Proceedings of the U-Go Healthy International Conference
29 March 2020, Pacitan, East Java, Indonesia

U-Go Healthy 2020

General Chairs
Dr. Sisca Mayang Phuspa, S.KM., M.Sc., Universitas Darussalam Gontor, Indonesia
Amilia Yuni Damayanti, S.Gz, M.Gizi, Universitas Darussalam Gontor, Indonesia

Technical Programme Chairs
Mila Tejamaya, M.OH., Ph.D, Universitas Indonesia
Dr. Yogi Wibisono Budhi, MT, Institut Teknologi Bandung, Indonesia
Muhamad Rifki Taufik, S.Si., M.Sc, Universitas Darussalam Gontor, Indonesia
Preface

We are delighted to introduce the proceedings of the first of the U-Go Healthy 2020. This conference has brought researchers, developers and practitioners around the world who are leveraging and developing smart grid technology for a smarter and more resilient grid. The theme of U-Go Healthy 2020 was “The Role Of Professional In Solving Contemporary Issues In The Development Of Health And Halal Industry”.

The growth rate of the global halal industry has increased in recent years, from 7.5% in 2015 to more than 8% in 2016 and is expected to continue to increase in 2017 and beyond. Indonesia in particular has great potential in the development of the halal industry sector because of the percentage of Indonesia’s population which constitutes 12.7% of the world’s Muslim population. The large potential of Indonesia in the halal industry sector can support national economic growth. The market for halal industry in Indonesia, especially the food, travel, fashion, medicines and cosmetics sectors has reached around 11% of the global market in 2016.

Behind the development of the halal industry globally, there are challenges especially in the health sector. The fact about guaranteeing halal products on drugs is still very alarming because the data from LPPOM MUI shows that out of 30 thousand types of drugs registered with BPPOM and circulating in the community, only 34 drugs are halal certified. In the food sector, data shows that Indonesia is the highest spending country for halal food compared to other countries in the world with a total expenditure of 170 billion US dollars. In the field of Occupational Health and Safety (OHS) is inseparable in the development of human resources in the halal industry. The security and quality of the halal industry are also closely related to the quality of human resources and the nation’s competitiveness.

The current development of the halal industry is fairly rapid in non-Muslim majority countries such as Thailand, South Korea, Russia, Mexico, Japan, and Spain. On the contrary, Indonesia has become a contested market target for halal products for foreign countries. This condition will backfire for Indonesia if there are no quick steps to follow up on this problem. Because Indonesian people will only be targeted by consumers in the halal industry market.

Strengthening regulatory development programs based on science and scientific and evidence according to standard development programs as well as strengthening the system of guidance and supervision of industrial security and its implementation in anticipation of the digital era needs to be done. To answer this problem U-GO Healthy Forum will hold International seminars and Call for Paper with the theme “The Role of Health Expert in Solving Contemporary Issues in Halal Industry” as the initial step to strengthen the security system of the halal industry.

We strongly believe that U-Go Healthy 2020 conference provides a good forum for all researcher, developers and practitioners to discuss all science and technology aspects that are relevant to smart grids. We also expect that the future U-Go Healthy 2020 conference will be as successful and stimulating, as indicated by the contributions presented in this volume.

General Chair

Dr. Sisca Mayang Phuspa, S.KM., M.Se
Conference Organization

Steering Committee
Prof. Dr. Amal Fathullah Zarkasyi, M.A Universitas Darussalam Gontor, Indonesia
Oktomi Wijaya, M.Sc Universitas Ahmad Dahlan, Indonesia
Putri Ayuni Alayyannur, M.KKK Universitas Airlangga, Indonesia
Dr. Lutfi Chabib, S.Farm, M.Sc. Apt Universitas Darussalam Gontor, Indonesia
Ani Asriani Basri, S.KM., M.KKK Universitas Darussalam Gontor, Indonesia
Nurul Marfu’ah, S.Si.,M.Si Universitas Darussalam Gontor, Indonesia
Indah Tri Lestari, S.Si, M.Si Universitas Darussalam Gontor, Indonesia

Organizing Committee
General Chair
Dr. Sisca Mayang Phuspa, S.KM., M.Sc. Universitas Darussalam Gontor, Indonesia

General Co-Chairs
Ratih Andhika AR, S.ST., M.Si Universitas Darussalam Gontor, Indonesia
Dian Afif Arifah, S.St, M.Kes Universitas Darussalam Gontor, Indonesia

TPC Chair and Co-Chair
Mila Tejamaya, M.OH., Ph.D. Universitas Indonesia, Indonesia
Dr. Yogi Wibisono Budhi, MT, Institut Teknologi Bandung, Indonesia
Muhamad Rifki Taufik, S.Si., M.Sc, Universitas Darussalam Gontor, Indonesia

Sponsorship and Exhibit Chair
Dianti Desita Sari, S.Pt, M.Si Universitas Darussalam Gontor, Indonesia

Local Chair
Hafidhotun Nabawiah, S.Gz, M.PH Universitas Darussalam Gontor, Indonesia

Workshops Chair
Solikah Ana Estikomah, S.Si.,M.Si Universitas Darussalam Gontor, Indonesia

Publicity & Social Media Chair
Dianti Desita Sari, S.Pt., M.Si Universitas Darussalam Gontor, Indonesia
**Technical Program Committee**

<table>
<thead>
<tr>
<th>Name</th>
<th>Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mila Tejamaya, M.O.H., Ph.D</td>
<td>Universitas Indonesia, Indonesia</td>
</tr>
<tr>
<td>Dr. Yogi Wibisono Budhi, MT</td>
<td>Institut Teknologi Bandung, Indonesia</td>
</tr>
<tr>
<td>Muhamad Rifki Taufik, S.Si., M.Sc</td>
<td>Universitas Darussalam Gontor, Indonesia</td>
</tr>
</tbody>
</table>
# Contents

Proposed Waqf Based Food Barn For Food Security Through Cash Waqf: Case Study In Global Waqf-Act, Jipang, Blora, Indonesia  
Ahmad Fanani, Mien Amrina Rosyada, Roifatus Syauqoti, Norhazlin Muhammad, Novia Nur Rosyida  

Daily Plain Water and Beverages Consumption Among Undergraduate Students in Universitas Indonesia  
Anggun Nurvika Putri, Saptawati Bardosono, Dewi Friska, Diana Sunardi  

Short course regarding antenatal care and prevention of low birth weight babies: Improving knowledge and behavior of husband in urban area  
Sri Achadi Nugraheni, Naintina Lisnawati, Etik Sulistyowati, Niken Wening  

Medication Compliance In Type 2 Diabetes Mellitus Patients  
Sulistyo Andarmoyo, Harmy bin Mohamed Yusoff, Berhanundin bin Abdullah, Yuzana bint Mohd Yusop  

The Use of Focus Group Discussion Method in Nursing Research  
Sulistyo Andarmoyo  

A NEW PARAMETER OF FAMILY HEALTH IN TREATING SCHIZOPHRENIA PATIENTS  
Sugeng Mashudi, Lusia CYK Wardhany  

The Impact Of Premarital Sexual Behavior On Student At Risk Of Unwanted Pregnancy  
Sri Susanti, Asmadi Alsa, Akif Khilmiyah  

Self Regulation And Emotional Aspect Among Diabetes Mellitus Survivor  
Sholihatul Maghfirah  

Knowledge of the Prophet Healthy Lifestyle on Students in Pesantren: a Comparison between Hand Fan and Leaflet Health Educational Media  
Fathimah Fathimah, Kartika Pibriyanti, Hafidhotun Nabawiyah, Fitri Komala Sari, Raida Annisa, Dianti Desita Sari, Fadhila Sukur Indra, Yana Elita Ardiani  

The Voluntary Counceling and Testing (VCT) in the Roles of National HIV Reporting  
Dian Afif Arifah, Ratih Andhika Akbar Rahma, Iklilul Faiz, Ragil Retnaningsih  

Formulation of Solid Soap Combination of Green Tea Leaf (Camellia sinnensis L.) and Corn Kernel (Zea mays) Extracts  
Solikah Ana Estikomah, Hamidah Tussifah, Nadia Kusumaningtyas, Binti Sholihatin, Lavia Dinta  

Risk Factors Of Central Obesity Among Female Students  
Kartika Pibriyanti, Fathimah Fathimah, Susi Nurohmi, Safira Kholifatul Ummah  

Effect of Date Fruit ‘Ajwah’ in Seven Number and Six Number to Blood Glucose in Female Adolescent  
Hafidhotun Nabawiyah, Kartika Pibriyanti, Nida Khoyrunnisa, Ladyamayu Pinasti

1 11 18 25 34 40 47 55 63 70 78 84 92
Effect of Different Storage Time of Petai (Parkia speciosa) on Amino Acid Score and Protein Digestibility (In Vitro)

Fitri Komala Sari, Hafidhotun Nabawiyah, Agustaviani Nursalma, Ardhiani Ayu

Nutrient Comparation between Date Fruit (Phoenix dactylifera L.) and Lemon Fruit (Citrus lemon L.) Infused Water

Mira Dian Naufalina, Yusrina Husnul Abida, Fathimah Fathimah, Indahtul Mufidah

IDENTIFICATION OF HERBAL PRODUCTS USED BY FAMILY IN THE CAMPUS ENVIRONMENT OF DARUSSALAM UNIVERSITY

Amal Fadholah, Kurniawan Kurniawan, Cania Sofyan Islamanda, Evi Rohana Ma’rufi Jannah

Description of Noise Measurement and Hearing Complaints at Workers in Hospital X Ponorogo

Rindang Diannita, Muhamad Rifki Taufik, Muslim Purwo Cahyo

Hahslm Heart Electrocardiogram

Roikhan Mochamad Aziz

The Influence of Traffic Noise And Work Stress on The Blood Pressure of Tirtonadi Bus Station Workers

Iwan Suryadi, Istar Yuliadi, Siti Rachmawati, Dhisa Claudia

Developing Occupational Health and Safety Website Using WordPress: Study Case Katigaku.top

Agung Supriyadi

Microcontroller based Hospital bed control

Iswanto Iswanto, Muhammad Akhdan, Prisma Megantoro, Afif Zuhri Arifianto

Analyze of Fatigue Related Vibration and Noise Exposure in Weaving Departement at PT. IDtex

Seviana Rinawati

Early Childhood Education: Study on Occupational Safety and Health Knowledge among Elementary School Students

Eka Rosanti, Ani Asriani Basri, M. Yazid Labib

Correlation of Fasting Habits to Testosterone Hormone Levels in UNIDA Gontor Students

Nurul Marfu’ah, Nadia Mira Kusumaningtyas, Amilia Damayanti

Relationship between Vitamin A and Vitamin C intake on Dental Caries

Amilia Yunia Damayanti, Nurul Marfu’ah, Siti Salamah, Fiki Husna

Fractional Factorial Analysis Of Immunoglobulin G Anti-Diphtheria Serum Fragmentation By Pepsin

Fuad Pribadi, Catur Riani, Hidayat Setiadjii

Affect Employee Engagement in Company Performance: Organizational Citizenship Behavior as Moderating

Oktaria Ardiaka Putri

Music And Local Information As Influential Broadcast Radio Content

Nur Aini Shofiya Asy’ari
Analyzing Factors Associated with Blood Glucose Levels on Female Islamic Student (Santriwati) at Syaichona Cholil 2 Islamic Boarding School in Bangkalan Regency

Lidia Aditama Putri, Dini Setiarsih, Nurun Nikmah, Ervi Suminar, A'im Matun Nadhiroh

Urgency Analysis of the Working Environment in the Coating Unit of Metal Industry

Putri Ayuni Alayyannur, Dani Nasirul Haqi, Meirina Ernawati

Improvement of Marketing Strategy Through Industrial Chicken Halal Food on Herbal SMEs, Ponorogo

Annas Syams Rizal Fahmi, Ahmad Muqorobin, M. Qoshid Al Hadi
Proposed Waqf Based Food Barn For Food Security Through Cash Waqf: Case Study In Global Waqf-Act, Jipang, Blora, Indonesia

Ahmad Fanani 1, Mien Amrina Rosyada 2, Roifatus Syauqoti3, Norhazlin Muhammad1, Novia Nur Rosyida4

1 Sultan Omar ‘Ali Saifuddien Centre for Islamic Studies, Universiti Brunei Darussalam, Brunei Darussalam
2 Islamic Economic, Maulana Malik Ibrahim Islamic State University Malang, Indonesia
3 Islamic Economic Laws, University of Darussalam Gontor, Indonesia
4 Agro-Industrial Technology, University of Darussalam Gontor, Indonesia

fannan677@gmail.com

Abstract. The research aims to create a proposed waqf based food barn for food security through cash waqf organized with Global Wakaf (GW)-Aksi Cepat Tanggap (ACT) Indonesia food security is the need of every human being on this earth. the unity of nations formulates that each nation will be able to develop and be sustainable if food is guaranteed. Indonesian agrarian countries have the opportunity to create food security through agriculture in collaboration with many philanthropic agencies. global waqf-ACT established Food Waqf Barns to help farmers and residents affected by the disaster in Jipang, Blora, Indonesia. This paper aims to determine the mechanism of Waqf Food Barn production using qualitative methods consisting of interviews, observations and documents. and the conclusion of this study is that the first support of LPW comes from cash waqf collected from waqifs, LPW has two programs, namely the provision of superior seeds, fertilizer and purchase of farmers' crops.

Keywords: Waqf, Agriculture waqf, Food Security, Global Wakaf-ACT

1 Introduction

Food security is globally a pressing issue at present whereas food production has been unable to sustain pace with the world population’s rate of growth. recently the World Bank projected that by 2050 the demand for food is proposed to be increased by 70 percent with an estimated $80 billion of annual investments needed to meet growth demand following the global human population which has estimated to reach almost 10 billion people by that time.

In World Food Summit-1996 defined the food security exists when all people, at all times, have physical and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life. Refer to the definition, especially food security talk about four main dimensions as 1) Physical availability of food addresses the "supply side" of food security and is determined by the level of food production, stock levels and net trade, 2) Economic and physical access to food: An adequate supply of food at the national or international level does not in itself guarantee household level food security. Concerns about insufficient food access have resulted in a greater policy focus on incomes, expenditure, markets and prices in achieving food security objectives, 3) Food utilization:
Utilization is commonly understood as the way the body makes the most of various nutrients in the food. Sufficient energy and nutrient intake by individuals is the result of good care and feeding practices, food preparation, diversity of the diet and intra-household distribution of food. Combined with good biological utilization of food consumed, this determines the nutritional status of individuals, and 4) Stability of the other three dimensions over time: Even if your food intake is adequate today, you are still considered to be food insecure if you have inadequate access to food on a periodic basis, risking a deterioration of your nutritional status. Adverse weather conditions, political instability, or economic factors (unemployment, rising food prices) may have an impact on your food security status (FAO-UN, 2008).

At present, most of Muslim majority countries (MMC) are categorized as less developed countries and developing countries, hence exposed to poverty and hunger (CIA, 2019). Poverty causes people to be unable in fulfilling their basic need especially getting what to eat, and this lead to suffering and hence destroy innocent lives particularly those of children. Currently hunger in the whole world remain in top and when it comes to health risk, it kills people every year more than AIDS, Malaria and tuberculosis combined hence it makes food security becoming a major worldwide problem which has to be solved. Indonesia which is the fourth most populous country in the world with the population of 269.9m and happened to be one of the Muslim majority countries with 13% of Muslims worldwide living there, equivalent to 87% of their population, has sad to be facing a similar food security problem (Muhammad dandy 2018).

The issue of food security is very important therefore need to be addressed. Waqf as the third sector of economics system could to tackle that issue, because waqf is an instrument could make wealth and beneficiaries sustain in the same time particularly productive waqf.

2 Literature Review

2.1. Country Background: Indonesia

Indonesia is often referred to as the world's largest archipelago, a name which aptly represents its 17,000 or so islands which span more than 5000 km (around 3,200 miles) eastward from Sabang in northern Sumatra to Merauke in Irian Jaya. There are eight major islands or island groups in this enormous chain. The largest landmasses consist of Sumatra, Java, Kalimantan (Borneo), Sulawesi (Celebes) and Irian Jaya (the western half of Papua New Guinea) (Indo, Undated). While in the past Indonesia was acknowledged as agrarian state, during January to November 2018, it is reported that Indonesian government imported around 2,2 million tons rice (databoks.katadata.co.id, 2019)

2.2. Introduction of Global Wakaf-Aksi Cepat Tanggap Indonesia

On April 21, 2005, Aksi Cepat Tanggap (ACT) was officially formed as a non-governmental organization that focuses on social works and humanitarian relief. From emergency response, ACT began to broaden its focus to post-disaster recovery, community empowerment and development, as well as spiritual-based programs, such as Qurbani, Zakat, and Waqf. ACT has been supported by public donors who have high concern about humanitarian issues. Supports also came from companies through partnership and Corporate Social Responsibility (CSR). ACT’s programs have also reached 22 countries in South and Southeast Asia, Middle East, Africa, and East Europe. 2014 was ACT’s beginning to start a global partnership in humanitarian actions with a new vision: to become a professional global
humanitarian organization based on the value of Global Philanthropy and Volunteerism to and create a better, civilized, and noble world for humanity (ACT, 2019).

Global Wakaf (GW) is an institution management of waqf from the society to be handled professionally, amanah and benefited globally, generating the welfare of people who needs it the most, distributed through a variety of programs, mainly those that are empowering and productive. Global Wakaf as a Moslem philanthropy organization is determined to appoint all Moslems as subjects for a better evolution of a global civilization. Global Wakaf has become a focal point for the development for a strong civil society, determined to make waqf a movement for Moslems of the world (GW, 2016).

GW accepts mandate of waqf in the form of money and through money with various forms of waqf like Waqf of Food, Educational Waqf (Waqf of a School), Waqf of Health and Economical Waqf. Since 2016, GW has a great role in waqf activities, that known from 7.635 transactions, 22.222 donors, Rp. 4.59 billion fund collected, and Rp. 1.13 billion fund managed (GW, https://www.globalwakaf.com, 2019).

2.3. Waqf

Definition of Waqf

Waqf is no explicit mentioned in the Qur'an, but in general it is ordered to spend property for good in the way of Allah Almighty (infāq fi sabi’llīlah). Waqf includes infāq fi sabi’llīlah, so that the legal basis of this waqf refers to the generality of the verses of the Qur'an as in the 'Ali Imran (QS 3:92):

((إِنَّمَا تَنَالُوا الْبِرَّ حَتَّىٰ تُنْفِقُوا مِمَّا تُحِبُّونََۚ وَمَا تُنْفِقُوا مِنْ شَيْءٍ فَإِنَّ اللَّهَ يَعْلَمُ مِنْهُ))

Meaning: “Never will you attain the good [reward] until you spend [in the way of Allah] from what you love. And whatever you spend - indeed, Allah is Knowing of it”.

Even in waqf doesn’t mentioned specific, Rasulullah (ﷺ) explained about waqf like below:

عَنْ أَبِي هُرَيْرَةَ رضي الله عنه - عن النبي ﷺ - أنَّ رَسُولَ اللَّهِ ﷺ صَلَّى اللَّهُ عَلَيْهِ وَسَلَّمَ قَالَ: إِذَا ماتَ الْإِنْسَانُ إِنْقَطَعَ عَنْهُ عَمَلُهُ إِلَّّا مَنْ ثَلَاثٍ: صَدَقَةٌ جَارِيَةٌ، أَوْ عِلْمٍ يُنْتَفَعُ بِهِ، أَوْ وَلَدٌ صَالِحٌ يَدْعُو لَهُ ثَلَاثٍ: صَدَقَةٌ جَارِيَةٌ، أَوْ عِلْمٍ يُنْتَفَعُ بِهِ، أَوْ وَلَدٌ صَالِحٌ يَدْعُو لَهُ (رواة مسلم).

Abu Hurairah (May Allah be pleased with him) narrated that The Messenger of Allah (ﷺ) said: “When a person dies, (the reward of) his deeds stops except for three: “A perpetual ṣadaqah (Ṣadaqah Jariyah), knowledge from which benefit is (continuously) gained, of a pious child who is invoking Allāh for him.” Related by Muslim (Al-'Asqalāny, 2003).

Ash-Shan'ānī said: "The scholars interpreted sadaqah jariyah with waqf. It should be noted that the first waqf in Islam is the waqf of 'Umar bin Al-Khattab as hadith is issued by Ibn Abi Syaibah. The Muhajirun said, "The first Waqf in Islam is the endowment of Umar” (As-Shan’ānī, 1960).

From that general meaning of waqf, several Islamic scholars wrote a definition of waqf, like Monzer Kahf said: “Waqf, in Arabic language, means hold, confinement or prohibition. The word Waqf is used in Islam in the meaning of holding certain property and preserving it for the confined benefit of certain philanthropy and prohibiting any use or disposition of it outside that specific objective. Waqf is called Hab (pl. Ahbas) in North and West Africa. This definition accords perpetuity to Waqf, i.e., it applies to non-perishable property whose benefit can be extracted without consuming their property itself. Therefore Waqf widely rates to land
and buildings. However, there are Waqf of books, agricultural machinery, cattles, shares and stocks and cash money” (Kahf, Undated).

The Agricultural Sector Through Cash Waqf Model

There are many models of agricultural sector through cash waqf, like a research explain below about muzara'ah and mudarabah model. The Islamic system will be used to cultivate the waqf of land called as muzara'ah. Muzara'ah is agreement between two parties, first is the local government as the parties who manage the waqf of land and the second is the farmers who will cultivate the land from the beginning until the harvest time and the total yield will be divided (shared) into two parties based on the agreement has made (Puspitasari, 2017).

The model shows that cash waqf can be used to establish Poultry Company through funds provided by the Baitul-Mal for example. Under this model, employment will be provided based on a Mudarabah contract in various sections including feed-mill, grinding, crate making, transportation, management and security. The proper utilization of this model will not only provide employment opportunities to the needy, it will also improve the general well-being of all the public (Babatunde, Nulambeh, Ibrahim, Harun, & Sanoh, 2015).

Figure: 1.1: Illustration of the Model

Current Development of Land Waqf in Indonesia

There are around 4360km² waqf land that reported not yet be productive in term of economic context as it is not producing any income even to cover the operational expense (BWI, 2017).

Side by side with a data from Islamic Economic Forum for Indonesia Development that Badan Wakaf Indonesia (BWI) decided that waqf land in Indonesia disseminated in 435.768 locations and reached 435.944 hectars with 287.160 are certified and 148.447 are uncertified (ISEFID, 2018).

In other data, currently Indonesia Minister of Religion decide that land waqf in Indonesia is around 51.088,42 hectars or 379.453 locations are divided in many functions like masjid 44.40%, prayer room 28.38%, schools 10.68%, cemetery 4.47%, boarding school 3.45%, and social activities 8.61% (SIWAK, 2018).

Even data from every institution is different, waqf practitioners still can conclude that Indonesia has huge potency of waqf land that separated in several places and still can be developed to enhance Muslim activities and especially to empower society towards food security in Indonesia.

Food Security: Indonesian Perspective

The Data of Hunger Index in Indonesia
In the context of Indonesia, as the fourth largest Muslim population country in the world, there are at least three main issues that can be identified with regard to food security. First, food security is a major issue as 1 out of 5 people is in hunger and 1 out of 3 children under 5% is exposed to stunting (Bappenas, 2019; knoema.com, 2019).

In accordance to Global Hunger Index, data based on these four compositions: 1) undernourishment; the share of the population that is undernourished (that is, whose caloric intake is insufficient), 2) child wasting; the share of children under the age of five who are wasted (that is, who have low weight for their height, reflecting acute undernutrition), 3) child stunting; the share of children under the age of five who are stunted (that is, who have low height for their age, reflecting chronic undernutrition), and 4) child mortality; the mortality rate of children under the age of five (in part, a reflection of the fatal mix of inadequate nutrition and unhealthy environments) (GHI, 2019).

Figures: 1.2: GHI Compositions

In the 2019, Global Hunger Index defines that Indonesia ranks 70th out of 117 qualifying countries. With a score of 20.1, Indonesia suffers from a level of hunger that is serious (GHI, 2019).

Figures: 1.3: GHI of Indonesia
Food Security Issue

Indonesia’s Law No. 18/2012 defines food security as the condition in which all people, in all households, at all times have sufficient food in both quantity and quality to enable them to live healthy, active, productive and sustainable lives, and that the food is safe, diverse, nutritious, equitably distributed and affordable, and does not conflict with religion, beliefs or culture. The 2015 Food Security and Vulnerability Atlas identifies which districts are most vulnerable to food and nutrition insecurity, and what makes them vulnerable defines that there has been a steady decline in highly vulnerable districts, classified as Priority 1 and 2. Indeed, for most Indonesians, food security improved between 2009 and 2015, largely as a result of improvements in a number of food and nutrition security-related factors. While these results are encouraging, progress may be at risk of stagnating if major challenges are not addressed. Three areas require particular attention: improving economic access to food including through continued investments in infrastructure; accelerating the prevention and reduction of malnutrition; and addressing the increasing vulnerability to climate-related hazards (Dewan Ketahanan Pangan, 2015).

Method

The methodology of this research is qualitative research which used an analysis descriptive like writing of data from several sources from interview and observation of manner or attitude of practitioners till known the background of research holistically (Utsman, 2014). This qualitative methodology often mentioned with naturalistic methodology because it explained a natural setting of research with a deep sentences, value and explanation (Sugiyono, 2014).

The research is taken in Blora, Center of Java, Indonesia which experienced flooding in 2007 and 2012. In 2007, the flood till 2 meters and drown many houses of residents in especially in district Balun (Detik, 2007). And in the 2012, Cepu-Blora has a flood disaster and sinks 6000 houses, many of 17.662 residents evacuated, in district Kedungtuban the flood sink 5000 houses and makes many people in lack of food (Liputan6, 2017).

The technique for collecting data is by observation, interview, and documentation. Especially interview to get results directly. And interview was conducted to several practitioners who involved in this agriculture land waqf program (Masri Sangarimbun and Sofian Efendi, 1982).

3 Findings

Proposed Waqf Based Food Barn for Food Security through Cash Waqf: Case Study in Global Waqf-ACT, Jipang, Blora, Indonesia
Global Waqf in its efforts to improve the welfare of people, especially in the sector of food availability, manages the Waqf Rice Barn (Lumbung Beras Wakaf). LBW is a waqf-based agribusiness system that empowers local farmers through the management of agricultural land. Starting from the concept of providing agricultural land to the purchase of farmers' harvests (wet rice) above the market price. This program educates and gives assistance to farmers to be more productive and independent in processing their land and reaping quality harvests. In several locations, Global Waqf built and managed rice processing plant (Huller) & (Dryer) till a factory became a centre for supplying food, instruments to prosper the agricultural sector, and supporting humanitarian programs such as the Humanitarian Ship (Papua, Somalia, Bangladesh (Rohingya), Syria, Palestine), Rice for Indonesian Santri, and Humanity Rice Truck (Global Wakaf, Undated).

The program is implemented in Jipang Village, located in Blora, Central Java, Indonesia. In this village, various waqf investment products are developed such as the Waqf Food Barn, Waqf Livestock Reservoir, Well Waqf, Boat Waqf and Warung Shadaqoh (Ngadi, 2019). In its implementation, waqf programs are not only focused on Jipang Village, but the program has implemented in several villages in the sub-districts of Cepu, Sambong, Blora and surrounding areas. Thus, the city of Blora-Indonesia is famous with a label “Desa Wakaf” cause a district based on the great potential of the city of Blora in providing community food security. Therefore, Global Waqf - ACT makes Blora as the Waqf Village which has a portfolio of waqf program assets, as well as a reference in implementing productive waqf innovation programs in other regions throughout Indonesia (Harun, 2019).

And in carrying out this goal, the committee has no special organization or structure formed, but only teamwork initiated by the four community leaders namely Harun Santoso, Hariyanto, Atifin and Yudi who oversee Wakaf Village programs (Harun, 2019).

The Concept of Waqf Food Barn

a. Provisioning of Superior Seeds and Fertilizer

Waqf of Food provides assistance in the form of seeds and fertilizer of the rice plants. According to Harun, the initial venture capital provided by Global Wakaf around 1.5 billion rupiah. This capital is only intended for operational costs as well as for the purchase of farmers' crops. However, for each harvest, the rice produced by Jipang Village farmers is around 540 tons, if the Waqf Food Barns buy at a price of 4,000 - 5,500 rupiah for each kilogram, the total money spent to buy rice reaches 2.5 - 3 billion. This figure is not commensurate with the capital owned, so that the LPW cannot cover all the farmers' needs from seeds and fertilizer (Harun, Waqf Food Barns, 2019).

b. Harvest Purchasing

The main purpose of purchasing these crops is to maintain the stability of rice prices from middlemen, who often manipulate prices by offering very low purchase prices for farmers detriment. LPW helps farmers by buying agricultural products higher than the standard price on the market. The difference in price offered by LPW is 1,500 rupiah per kilogram (Harun, Peran Lumbung Pangan Wakaf, 2019).

In its activities, LPW empowers 15 residents by giving jobs as employees who are responsible for managing productivity of rice. The employees consist of five people as permanent employees and ten people as daily employees with details of permanent employee tasks such as operating machinery, loading grain from the oven room into a grinding
machine, responsible for administration and as a supervisor. While daily employees are responsible for packaging rice that is ready to sell (Lamiran, 2019).

c. **Mechanism of Waqf Food Barn**

**Capital Fund**

Global Waqf - ACT acts as a waqf nazhir who receives cash waqf from waqifs, in which the Global Waqf-ACT works in collaboration with the Mutiara Insan Foundation and the volunteers of Aksi Cepat Tanggap in all regions of Indonesia including in the Blora area. The link between Blora leaders and ACT began after the flood disaster in Central Java and its surroundings in 2007 (Ngadi, Kerjasama Global Wakaf dan Yayasan Mutiara Insan, 2019).

Global Waqf-ACT emphasizes the use of cash waqf types. This is because cash waqf can provide an opportunity for everyone to represent. Waqf funds are invested by Nazhir in various halal and productive business sectors where the profits from these businesses can be utilized for the development of the people.

Global Wakaf-ACT offers waqf packages to prospective waqif for one unit of rice mill warehouse along with land and all types of machinery, equipment and operational costs. At the beginning of the establishment of this program, the Global Wakaf-ACT issued total waqf assets reached 3.5 billion rupiahs consisting of 2 billion rupiahs for the cost of procuring mills and their land, and 1.5 billion rupiahs as business capital (Harun, Modal Lumbung Pangan Wakaf, 2019).

**Production**

To make it easier to see Waqf Food Barn production, researchers formulate in the following chart:

Figures: 1.3: Mechanism of Food Barn

**Explanation:**

1. Blora's Global Waqf regional teamed up with Mutiara Insan foundation to cover a number of funding in advance.
2. Waqf food barns provide superior seed and fertilizer assistance to prevent them from interacting with middlemen which is detrimental to farmers.
3. At harvest time, the Waqf Food Barn will buy it at a price above the market price with the main objective to prevent farmers from middlemen.
4. Rice harvest is managed to become a superior rice product that is ready for consumption. during this period, the Waqf Food Barn empowered around 15 Jipang Village residents as permanent and daily employees.
5. Some of the results of the rice management are distributed to the national humanitarian agenda, foreign countries and or to the people of Jipang Village. While others will be commercialized in several local or inter-city market segments like Hydro Perdana Ritel Indo, Warung Ritel, and etc.

6. Finally, the husk waste from this productivity is sold to local residents at a price of three thousand rupiah for each sack, while the straw waste will be used as a mixture of animal feed in the Waqf Livestock

4 Conclusion

The capital fund of this waqf based food barn is cash waqf. And the program of Waqf Based Food Barn in Jipang Blora is divided in to two program, both are provisioning a superior seeds and fertilizer, and purchasing rice with a high price with mechanism of waqf based food barn is beginning from capital fund from cash waqf and formulated from a farmer after rice harvest to grinding machine of waqf and last is distribution for humanity and business.

5 Recommendation

Waqf based food barn production must be done carefully till productive waqf comes with many beneficiaries and without any loss. This is because waqf is an eternal treasure which is expected to exist for an unlimited time.

References


Daily Plain Water and Beverages Consumption among Undergraduate Students in Universitas Indonesia

Anggun Nurvika Putri1, Saptawati Bardosono1, and Dewi Friska2, Diana Sunardi1

{anggunnurvika24@gmail.com}

1 Community Nutrition, University of Indonesia, Salemba, Jakarta, Indonesia
2 Community Medicine Department, Faculty of Medicine, Universitas Indonesia

Abstract. Insufficient and inappropriate daily fluid intake in long period may have adverse effect to human health. Fluid intake sources from plain water and sugar sweetened beverages. Among college students assumed that health science students have a greater practice fluid intake related sugar and sweetened beverages and non-sugar and sweetened beverages. Objective: Identify the practices of fluid intake (plain water and sugar sweetened beverages) and compare health science and non-health science students in University of Indonesia. Methods: A cross-sectional study was conducted on 177 students; consist of 56 health science students and 121 non-health science students using a fluid intake 7-days record. Results: There were no significant differences in plain water intake and sugar sweetened beverages consumption between health and non-health science students (p>0.05). Conclusions: An average sugar sweetened beverage among health science students was lower than non-health science students. This was might be health science students have proper nutrition knowledge because their majority, that can useful for improving dietary habit to make healthful lifestyle choices. The result of this study provides data to help making intervention programs to college students.

Keywords: daily fluid intake, plain water, sugar sweetened beverages, young adults, health science students, non-health science students

1. Introduction

Water is one of the essential macronutrients that have an important function in the body, such as a regulator of temperature, a medium of transportation and elimination of metabolic waste in the body (Constant and Jequier, 2010). However, these nutrients are often forgotten. The sources of water intake are 80% from fluid and 20% from food (Fink, Milkesky and Lisa A. Burgoon, MS, D, CSSD, 2012). Insufficient and inappropriate daily fluid intake in long period may have adverse effect to human health. Dehydration is one of the impacts of imbalance fluid intake, which is when water output exceed than water input. Loss of water of 2% or more leads to a decrease in cognitive performance, decreased the ability short-term memory (Adan, 2012).
Young adult was group aged ≥18 that already has their own decision on the food and drink chosen and this age group are vulnerable to develop unhealthy behaviors. High intake of sugar sweetened beverages is a poor diet and unhealthy lifestyle that may be associated with increased of overweight and obesity. However, among college students assumed that health science students have a greater practice fluid intake related sugar and sweetened beverages and non-sugar and sweetened beverages.

There were several methods to assessed total fluid intake (TFI), such as 24-h dietary recall and 7 days fluid record. Assessed using 24-h dietary recall the respondents can focus on their food and fluid intake at meal time because both of foods and fluid intake were recorded. However 24-h dietary recall has limitation, which might have over- or under-reported their total fluid intake (TFI). Furthermore, 7-day fluids record more properly for assessed fluid intake. The study found with 24-h dietary recall the respondents recall two drinking act less than with a 7-day fluid record, but they estimated their volume consumed per drinking act to be larger. 7-day fluid record also designed to be complete at home (Bardosono et al., 2015). The aim of this study is to asses the differences of plain water and SSB consumption between health science and non-health science students in Universitas Indonesia.

2. Methods

2.1. Study Participants

In this study conducted in dormitory of Indonesia University. The students who came to the canteen will be asked to participate in this study. Inclusion criteria were bachelor degree students, aged 18–21 years, Indonesian citizen, and stay in dormitory of University of Indonesia. Finally, 177 students participated joined and fulfill the questionnaire, consist of 56 health science students and 121 non-health science students.

2.2. Assessment of Fluid Intake

Fluid intake assessment used 7 days fluid diary record. Each respondent was trained by enumerator about how to fill 7 days fluid record. During seven consecutive days respondent was recorded the entire fluid intake. To ensure the completeness of the record, in each day the same enumerators visited the participant to collect the fluid record of the previous day and to provide a new record for next day, and continued until the fluid recording is collected for seven consecutive days. This aim to reduce the bias because of participant might be copying the previous data into the next day record.

To get the daily fluid intake of the respondents was calculated from the sum of seven days fluid record, and then divided by seven. Mean of daily fluid intake used mL/day.

A drinking act was defined as any ac of consumption of any fluid type at any time of the day. Total fluid intake divided into two categories, plain water and sugar sweetened beverages. Plain water included bottled water and boiled water, milk without added sugar, coffee and tea without added sugar. Sugar sweetened beverages (SSB) consist of milk and derivatives with added sugar, soft drinks (carbonated and non-carbonated sugar sweetened beverages, ice based, chocolate-based, and fruit and vegetables-based drinks), and other beverages (traditional drinks, cereal drinks, herbal drink, others).
2.3. Statistical Analysis

The data was analyzed using SPSS version 20.0 using univariate and bivariate. Univariate analysis was used to analyze descriptively, such as socio demographic of the respondent. Normality test will be used Kolmogorov-Smirnov test and will be expressed as Mean±SD for normally distributed and median (min-max) for not normal data. Bivariate analysis will be analyzed using T-test or Mann-Whitney was used to assess continuous variables. If p value is <0.05 it will be considered as statistically significant.

3. Result

3.1. Characteristic Respondent

Table 3.1 showed the characteristics of the respondent. Total respondents in this study was 177 students, consist of 56 were health science students and 121 were non-health science students. A half of respondents were female, especially in health science students 75% was female. Most fathers were working in non-government, while most mothers were not working.

<table>
<thead>
<tr>
<th></th>
<th>Health science students</th>
<th>Non-health science students</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (%)</td>
<td>n (%)</td>
</tr>
<tr>
<td>Respondents</td>
<td>56</td>
<td>121</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>14 (25)</td>
<td>59 (48.8)</td>
</tr>
<tr>
<td>Female</td>
<td>42 (75)</td>
<td>62 (51.2)</td>
</tr>
<tr>
<td>Father occupation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Government</td>
<td>10</td>
<td>24</td>
</tr>
<tr>
<td>Non-government</td>
<td>44</td>
<td>85</td>
</tr>
<tr>
<td>Mother occupation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Working</td>
<td>18</td>
<td>44</td>
</tr>
<tr>
<td>Not working</td>
<td>36</td>
<td>70</td>
</tr>
<tr>
<td>Father education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>13</td>
<td>37</td>
</tr>
<tr>
<td>Middle</td>
<td>29</td>
<td>48</td>
</tr>
<tr>
<td>High</td>
<td>14</td>
<td>34</td>
</tr>
<tr>
<td>Mother education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>17</td>
<td>31</td>
</tr>
<tr>
<td>Middle</td>
<td>21</td>
<td>21</td>
</tr>
<tr>
<td>High</td>
<td>32</td>
<td>17</td>
</tr>
</tbody>
</table>

Education level: low (never attended the school, had attended or graduated in elementary school and junior high school), middle (senior high school graduated), and high (graduated from college).

3.2. Daily Fluid Intake
Table 3.2 shows the mean of daily fluid intake of health science and non-health science students. There were no significant difference in plain water, SSB, and total daily intake between health science and non-health science students. The mean of plain water intake were 1494±526 mL/day and 1604±683 in health science and non-health science students, respectively. There was no significant difference between health science and non-health science students.

The mean of sugar sweetened beverages intake in health science students is 213 mL/day and non-health science student 288 mL/day.

<table>
<thead>
<tr>
<th>Fluid intake (mL/day)</th>
<th>Health science students</th>
<th>Non-health science students</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total fluid intake</td>
<td>1783±538</td>
<td>1962±676</td>
<td>0.083a</td>
</tr>
<tr>
<td>Plain water intake</td>
<td>1494±526</td>
<td>1604±683</td>
<td>0.266a</td>
</tr>
<tr>
<td>SSB intake</td>
<td>213 (0-1170)</td>
<td>288 (0-1580)</td>
<td>0.081b</td>
</tr>
</tbody>
</table>

4. Discussion

Based on the gender 75% of respondents was female. Several studies found women are more active seeker of health issues than men. In addition, female also more aware and high motivation of health related information (Rothman and Salovey, 1997; Ek, 2013). Table 3.1 showed the almost of parents education was middle level and working in non-government for fathers and not working for mothers. Family is the first role model and family environment can affect the health practices their children. The study about parents education level and income with fruit and vegetables intake behavior found, adolescent of parents with higher education also had greater knowledge about food intake recommendation and preferences for fruit and vegetables intake(Bere et al., 2008). In addition, people with higher education also tend to earn more money to buy healthier food and beverages. Therefore, parent’s education level and family income is important to children behavior, especially for fluid and beverages consumption.

Water is an essential nutrient for life but the most of people overlooked the importance of water. Hydration status defines as the balance of water outputs and water inputs. The impact of excess loss of water or insufficient intake of the water is dehydration (Baron et al., 2015). Dehydration among college students can associated with several adverse health outcomes,
such as poor cognitive performance and will be affecting to their poor academic performance. Therefore Ministry of Health Republic Indonesia has published the message in *Pedoman Gizi Seimbang* to drink water sufficiently which is at least eight glasses of water in a single day. Moreover in 2014 there was a new recommendation of daily fluid intake for Indonesian based on age which is aged 19-29 years old were 1600-1800 mL/day (Kementerian Kesehatan Republik Indonesia, 2013, 2014).

Table 3.2 showed there was no significant difference of fluid intake between health science and non-health science students. Although there was no significant, but the mean daily fluid intake of the respondents has met the recommendations of Ministry of Health of Indonesia, which were 1783±538 mL/day in health science students and 1962±676 mL/day non-health science students. Similar with the previous study conducted in Universitas Jambi, the mean fluid diary intake of the respondents was 2100 mL/day (Rita and Mardiyah, 2018). Another study regarding fluid intake among college students in Universitas Gadjah Mada found the mean daily fluid intake among adults was 1584±590 mL/day (Gustam, 2012).

Water intake sources includes from fluid, food, and a very small from metabolic water. The water sources from fluid and beverages intakes contributed 80% and 20% from food intake (including fruits and vegetables). Nowadays the sources from fluid also are concern because the diversity of fluid types has the different nutritional composition. Table 3.2 showed the mean daily fluid intake based on the two types, which were plain water intake and SSB intake and found there were no significant differences between health science and non-health science students. Similar with previous study also assess the types of fluid and beverages intake, showed plain water is the most consumed of fluid intake among college students (Rita and Mardiyah, 2018). A study conducted by (Guelinckx, C and Moreno, 2015) about the types of water intake in 13 countries among adults found the highest type of fluid intake were water intake (tap and bottled water), hot beverages, and sweetened beverages.

Although in this study did not assessed factors that could affect to fluid intake among college students, but according to Sharma et al (2008) reported that the good dietary habit is significantly related with nutritional knowledge. The respondent was college students in the university, which means the respondents has more chance to explore more about health issues, especially about fluid intake. Healthy dietary habits among health major students are more important since they will become a physician. If these students ignore to adopt, they will be considered as a lack person in establishing health promotion for their patients or community. As we know, young adult has a power to choose what are they want to eat and drink. In this aged they have more risk to develop unhealthy behavior, which will predispose them to chronic disease in older life. However, these result not as researcher expected that health science students had better practice of fluid intake whether plain water or SSB intake. The study conducted by (Yahia et al., 2016) the result showed daily mean intake of total fat, saturated fat and cholesterol were significantly different based on major of study. Health science students would have high knowledge of nutrition because of they were covered more coursework related to nutrition than non-science student, therefor health science students expected has better knowledge related health issued.

However, this study has limitations. The main limitation was the study conducted in the dormitory of Universitas Indonesia. The environment might be could affect the pattern of
their fluid intake, such as the availability of water sources. Second, the proportion of respondent was higher in non-health science students.

5. Conclusion

There was no significant difference of type of fluid intake between health science and non-health science students. Although an average sugar sweetened beverage among health science students was lower than non-health science students. This was might be health science students have proper nutrition knowledge because their majority, that can useful for improving dietary habit to make healthful lifestyle choices. The result of this study provides data to help making intervention programs to college students.
References

Short course regarding antenatal care and prevention of low birth weight babies: Improving knowledge and behavior of husband in urban area

Sri Achadi Nugraheni, Naintina Lisnawati*, Etik Sulistyowati, Niken Wening

{naintina.lisnawati@live.undip.ac.id}

Department of Public Health Nutrition, Faculty of Public Health, Diponegoro University

Abstract. Pregnancy is an important period in life, so it requires husband's role in supporting health care as well. One of the efforts which is made in improving husband's knowledge is through education. The aim of this study was to analyze the effectiveness of short course regarding antenatal care (ANC) and low birth weight (LBW) babies prevention on knowledge, attitude and behavior of husband in urban area. This study was quasi-experimental with one group pre and post-test design. Subject was 99 husbands of pregnant women in Lebdosari Community Health Center working area who’s given a short course about ANC dan LBW babies prevention used “Bumil-Kit” media by Health Cadres. Knowledge, attitude, and behavior were measured before and after given intervention used a structured questionnaire and data were analyzed used Wilcoxon Signed Rank Test. The result showed that all of subjects (100%) were in productive ages. Both of knowledge and behavior of subjects were increased (p=0.001), but not on attitude (p=0.065) after intervention. The increased scores of knowledge and behavior of subjects were 8.16% and 5.85%, respectively. In conclusion, providing education through short course using “Bumil-Kit” media can increase knowledge and behavior regarding antenatal care and low birth weight babies prevention of husband in urban area.

Keywords: knowledge, behavior, antenatal care, low birth weight, husband

1. Introduction

Low birth weight (LBW) is a health problem related to nutrition and parenting. Newborns are categorized as LBW if the birth weight are less than 2500 g (WHO, 2010). According to the result of the Basic Health Research in 2018, total number of cases of LBW babies increased, i.e from 5.7% in 2013 to 6.2% in 2018. Although the increasing of cases of LBW babies wasn’t too high, the same survey in 2007 to 2018 showed consistantly increased, so we’ve to more considered concern about it because of the impact which will be very detrimental for the babies. LBW babies will be more at risk in growth failure compared to normal birth weight (NBW) babies. In addition, when they are adult, LBW babies will be more at risk for degenerative diseases and behavioral changes at school age (Gupta et al, 2013). A study in
Bangladesh showed that at the age of 10 months, LBW babies caused the decreasing of mental and psychomotor development than NBW babies (Tofail et al, 2012).

Prevention of babies born with LBW can be prevented through pregnancy care programs, one of which is the antenatal care (ANC) services. The frequency of utilization of ANC services of pregnant women is based on the decision of their husband as the head of the family (Carter, 2002). However, husband usually doesn’t pay much attention about this because of their knowledge of the ANC services is still poor. In line with a research in Laos which was showed that the knowledge related to the frequency of ANC visits of pregnant women (Ye et al, 2010). So, based on this phenomenon, increasing knowledge about the utilization of ANC services is very important to do, one of which is through education. Therefore, the purpose of this study is to analyze the effectiveness of giving short courses through "Bumil-Kit" media to husband on knowledge, attitudes, and behavior of pregnancy care, especially regarding the utilization of ANC services and prevention of babies born with LBW.

2. Method

This study was Quasi Experimental research with One Group Pre and Post Test study design. Research subjects were 99 husbands of pregnant women registered in Lebdosari Community Health Center working area. The intervention given to subjects was a short course with the "Bumil-Kit" media consisting of a weight scale, microtoise, mid upper arm circumference (MUAC) ribbon, maternal and child health books, health card for pregnant women, and booklets about the role of husband in assisting pregnancy care and prevention of babies born with LBW. Short courses were given through counseling or socializing and training on how to use the "Bumil-Kit" media. Short courses for husbands of pregnant women are given for 1 (one) day and given by health cadres in the region.

The variables were examined in this study were knowledge, attitude, and behavior of subjects regarding utilization of ANC services and prevention of LBW babies. These three variables were measured before and after the giving of intervention, and the instruments used were structured questionnaires. Data were analyzed using the Wilcoxon Signed-Rank Test with the interpretation there is a significant influence when the probability value used was less than 5% (p < 0.05). There was no compulsion from any party towards the subjects to participate in this study. This can be proved by the willingness of the subjects to sign the informed consent form to be the subject of research. This study has also passed an ethical study with Ethical Clearance Number No: 224/EAA/KEPK-FKM/2018 from the Commission of Health Research Ethics, Faculty of Public Health, Diponegoro University.

3. Result and Discussion

3.1. Subject Characteristics

Demographic data of the subjects reflects the background identity of the subject outside the research variables studied. In general, the subjects in this study has a moderate level of education and was included in the productive age. In addition, most of the subject families are also included in the main family type with sufficient per capita income.
Table 1. Distribution of Age Frequency, Level of Education, Per capita Income, and Family Type

<table>
<thead>
<tr>
<th>Variabel</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Not Productive</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>b. Productive</td>
<td>99</td>
<td>100</td>
</tr>
<tr>
<td><strong>Education Level</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Low</td>
<td>4</td>
<td>4.0</td>
</tr>
<tr>
<td>b. Moderate</td>
<td>77</td>
<td>77.9</td>
</tr>
<tr>
<td>c. High</td>
<td>18</td>
<td>18.1</td>
</tr>
<tr>
<td><strong>Per Capita Income</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Low</td>
<td>12</td>
<td>12.1</td>
</tr>
<tr>
<td>b. Moderate</td>
<td>87</td>
<td>87.9</td>
</tr>
<tr>
<td><strong>Family Type</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Extended</td>
<td>7</td>
<td>7.1</td>
</tr>
<tr>
<td>b. Main</td>
<td>92</td>
<td>92.9</td>
</tr>
</tbody>
</table>

All subjects in this study belong to the productive age (100%), meaning they have a tendency to spend longer duration in the workplace than at home. In addition, the productive age also illustrates the ability of the subject to meet the financial needs of the family, including in terms of pregnancy examinations. A study in Mexico showed that the risk of fetal growth stunted or often known as intra uterine growth retardation (IUGR) and babies born with LBW are reduced by 11% and 9% when conducting routine antenatal care (ANC) visit. The results of the study also showed that the husband could play a role as a friend for his pregnant wife, this was done to take care of the mother's psychological condition in preparing for childbirth specifically related to ANC (Coria-soto et al, 1996).

The subject's level of education was included in moderate level (77.9%) higher than the subject with higher (18.1%) and low (4%) education level. The education level classification is based on the latest education levels completed by the research subject. For example a subject included in the level of moderate education means the subject has successfully completed his last education at the high school level. Husband's education level is certainly very influential on the effectiveness of nutrition education which is provided. A study in Nigeria showed that the husband's education level had a significant effect on his wife's ANC visit. A husband with a high level of education will have more awareness to support his wife to have her pregnancy examination. In addition, they will also had better understanding on the benefits of the utilization of ANC services which one of the aims is to prevent low birth weight (LBW) of the babies (Awusi et al, 2009).

Per capita income of the subjects in the study were mostly quite sufficient (87.9%) for main family type (92.9%). In this study, the calculation of income per capita is more generated from the income of the husband as head of the family. As explained earlier that a husband's ability to meet the financial needs of the family is also related to the success or failure of the husband's role in assisting the preparation of the wife's delivery, especially in prenatal care. Pregnant women mostly get information about nutrition and health through ANC visits. In ANC visit activities, pregnant women are not only examined related to the condition of the fetus and their health, but in these activities health workers will also provide education in
order to prepare for a healthy and safe delivery. If the husband's income is low, then it is most likely that pregnant women will not conduct ANC visit routinely so this has an impact on decreasing access to information about childbirth preparation and also affecting their knowledge regarding prevention of having a LBW babies.

A study in Vietnam showed that family income or per capita income significantly influenced the frequency of ANC visits of pregnant women. Families with high per capita income tend to have ANC visit 4 times or more, compared to families classified as low income per capita (Ha et al, 2015). Apart from financial matters, the type of family is also very influential on the frequency of ANC visit of pregnant women. A study in India showed that family type was one of the demographic factors that influenced the ANC visit practice. Extended family type that usually consist of more than 1 head of household in 1 house will affect the knowledge of pregnant mothers regarding ANC and the prevention of LBW babies, and will also influence the decisions regarding childbirth preparation (Gupta et al, 2015).

3.2. Effect of Short Course

Short courses given to husbands include procedures for using the "Bumil-Kit" media and providing an education about pregnancy care. Through the theme of pregnancy care, subjects obtained information regarding ANC services and prevention of LBW babies. Based on the intervention given to the subject, then the subject will be measured regarding knowledge, attitudes, and behaviors related to the two things. The knowledge questionnaire consisted of several questions regarding medicine and food consumption during pregnancy, breast care, ANC definitions, sexual intercourse during pregnancy, weight gain on pregnant women, Tetanus Toxoid injections, exposure of pregnant women about cigarette smoke, frequency of antenatal visit, and iron supplement consumption for pregnant women. In addition to the those questions, in the knowledge questionnaire there are also questions about the definition and criteria for LBW, lifestyles of pregnant women which can trigger the birth of LBW babies, LBW risk factors, and the relationship between LBW and ANC.

In the attitude questionnaire, the subject will be interviewed with questions about the husband's attitude regarding the consumption of pregnant women, physical activity patterns, giving massage treatment to the wife, dietary restrictions for pregnant women, breast care, sexual intercourse, and factors causing miscarriages. In addition, in the attitude questionnaire there are also questions about pregnancy check up, weight gain of pregnant women, birth spacing, consumption of Fe tablets, psychological condition of pregnant women, exposure to cigarette smoke, food intake, and history of illness. Finally, the questionnaire related to the subject's behavior in pregnancy care for pregnant women contains the frequency of consulting pregnancy issues to health facilities, participation in pregnant mothers class activities, consumption of recommended and restricted foods by pregnant women, physical activity patterns, stimulation to the fetus, and personal hygiene. There is also a component of questions regarding anthropometric measurements, participation of the subjects in pregnancy-related counseling activities, and maintaining the psychological condition of pregnant women.

Table 2. Effects of Short Courses on ANC Care and Prevention of LBW Babies towards Knowledge, Attitude, and Behavior of the Husband of Pregnant Mothers
<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean ± SD</th>
<th>p&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-test</td>
<td>Post-test</td>
</tr>
<tr>
<td>Knowledge</td>
<td>36,38±4,83</td>
<td>39,35±3,36</td>
</tr>
<tr>
<td>Attitude</td>
<td>40,07±5,47</td>
<td>41,03±3,48</td>
</tr>
<tr>
<td>Behavior</td>
<td>39,64±8,00</td>
<td>41,96±2,57</td>
</tr>
</tbody>
</table>

<sup>a</sup> Wilcoxon Signed Rank Test
* Significant interventions affect all three variables (p<0.05)

The analysis showed that the provision of a short course on utilization of ANC services and prevention of LBW babies affected the knowledge and behavior of the husband in his role as a companion to a pregnant wife and in the process of childbirth preparation (p<0.05). The increase in the subject's knowledge and behavior scores were 8.16% and 5.85%, respectively. The increase in the score of both variables indicates that the short course given by the health cadres to the husband of pregnant women is very useful to support the health of pregnant women. This is in line with a study in Nepal, where researchers divided the subject into 3 groups, i.e. 1) providing ANC counseling to pregnant women and husbands, 2) providing ANC counseling only to pregnant women, and 3) giving flyers about ANC to pregnant women. ANC counseling is given approximately 35 minutes per session and is given in 2 sessions. The results showed that ANC counseling given to pregnant women and husbands (as a couple) proved to increase the frequency of ANC visit and post partum check-up visits compared with 2 other interventions. These results indicate that brief counseling is effective in increasing husband's knowledge regarding his role in assisting ANC care for pregnant women (Mullany et al, 2006).

A married couple who are given socialization related to ANC care will also get the same understanding related to childbirth preparation, one of which is in making decisions regarding professional labor and place of delivery. If both have the same understanding, then the husband and wife will have the same autonomy with each other in making these decisions with the main aim is to improve maternal health (Thapa et al, 2013). Another study conducted by Carter et al showed that in Guatemala the involvement of a husband in terms of his wife's health is very large in 2 (two) aspects, i.e. 1) regarding health care during pregnancy, and 2) accompany during childbirth. The husband will get a large portion in giving advice and input as well as making decisions regarding care during pregnancy. However, the phenomenon in Guatemala showed that the involvement of a husband in accompanying his wife's childbirth also depended on the availability of time and access to health facilities so that it is still a conceptually complex (Carter, 2002).

Another result in this study is that providing a short course to the husband has succeeded in increasing the husband's behavior score related to the ANC and prevention of LBW babies. This is in line with a study in Turkey that education about ANC in pregnant women proved to significantly influence their behavior related to the method of delivery, fetal care, and the baby to be born (Turan et al, 2003). During pregnancy, the role of the husband is needed by pregnant women. Not only in the process of pregnancy care, but the goal is more to prevent babies born with LBW. A study in Ethiopia showed that the less optimal role of the husband during the accompaniment of the pregnancy process was very influential on the risk of LBW babies (Wachamo et al, 2019). A husband who has a good level of education and knowledge regarding ANC will always support his wife to ANC visits. As previously known, during
ANC visits, pregnant women will be examined and monitored their fetal health, so the risk of giving birth to LBW babies will decrease (Ahmed et al, 2012).

In contrast to the research, a study in India showed that socio-demographic aspects including husband's knowledge did not significantly influence the incidence of LBW babies. The study states that the birth of a baby with LBW can be more effectively addressed through a direct intervention approach in pregnant women (Gogoi N, 2018). Although the focus of the intervention is more emphasized on pregnant women, but the results of a study in Ethiopia states that the thing that is more emphasized is more on ANC care, including the regulation regarding the pattern and type of food that is adequate and nutrient dense as one of the efforts to prevent the risk of LBW babies (Demelash et al, 2015).

4. Conclusion

Baby born with LBW is a sign of poor care during the pregnancy period, including ANC examination. Therefore, a husband whose status is a companion for a pregnant woman must have an optimal role during his wife's pregnancy period. Increasing knowledge about utilization of ANC services and prevention of LBW babies through the "Bumil-Kit" media proved to be significantly influential in improving knowledge and behavior of the husband of pregnant mothers in the of Lebdosari Community Health Center, Semarang City.

5. Conflict of Interest

There was no conflict of interest in this study.
References


Medication Compliance in Type 2 Diabetes Mellitus Patients

Sulistyo Andarmoyo¹ Harmy bin Mohamed Yusoff² Berhanundin bin Abdullah³ & Yuzana bint Mohd Yusop⁴

{sulistyoadarmoyo@gmail.com}

¹Universitas Muhammadiyah Ponorogo
²Faculty of Medicine, Sultan Zainal Abidin University, Terengganu, Malaysia
³Faculty of Islamic Contemporary Studies, Sultan Zainal Abidin University, Terengganu, Malaysia

Abstract. Type 2 diabetes mellitus is an incurable but manageable disease. The ability to control blood sugar levels in these patients requires collaboration between health care providers, especially doctors who prescribe drugs, and patients as someone whose health outcome will be affected. The results of cooperation between the two parties are shown by the patient's compliance in taking daily medication. The purpose of this paper is to gain a theoretical understanding of the concept of adherence in medication (taking daily medication in type 2 Diabetes Mellitus patients). Compliance in taking daily medication is the behavior to follow the suggestions or procedures from doctors about the use of drugs, which was preceded by the consultation process between patients and doctors as health service providers. Some aspects used to measure compliance in taking daily medications are frequency, number of pills/other drugs, continuity, metabolism in the body, biological aspects in the blood, and physiological changes in the body. While the determinants of the emergence of adherence in taking daily drugs include: patient perceptions and behavior, interactions between patients and doctors and medical communication between the two parties, policies and practices of treatment in the public made by the authorities and various interventions carried out so that compliance in consuming drugs occurs. The results of this paper are expected to be an understanding for those who are dealing with type 2 Diabetes Mellitus, especially doctors and nurses as well as the patient's family so that patient compliance in taking daily medication can increase, so as to be able to control blood sugar.

Keywords: Medication, Compliance, Type 2 Diabetes Mellitus

1. Introduction

Diabetes Mellitus is a long-term health problem and can have a serious impact on the lives and well-being of individuals, families, and communities throughout the world. This disease is one of the 10 leading causes of death in adults, and is estimated to cause four million deaths
globally in 2017. In 2017, health costs due to diabetes are estimated to be around USD 727 billion (IDF, 2017).

Since 2000, the International Diabetes Federation (IDF) has reported a national, regional and global incidence of diabetes. In 2009 an estimated 285 million people who had diabetes (combined T1D and T2D) (IDF, 2009), increased to 366 million in 2011 (IDF, 2011), 382 million in 2013 (IDF, 2013), 415 million in 2015 (IDF, 2015) and 425 million in 2017 (IDF, 2017). In Indonesia the DM case ranks 7th after Mexico with 8.5 million sufferers in 2013 (IDF, 2013) and increased to 6th with 10.3 million sufferers in 2017, and is estimated that in 2045 there will be around 16.7 million sufferers (IDF, 2017).

The three main types of diabetes are type 1 diabetes (T1D), type 2 diabetes mellitus (T2D), and pregnancy diabetes mellitus (GDM) (IDF, 2013). Type 2 diabetes is the most common type of diabetes, accounting for around 90% of all diabetes cases. In type 2 diabetes, hyperglycemia occurs due to inadequate insulin production and the body's inability to respond fully to insulin, which is defined as insulin resistance (IDF, 2017). The number of people with type 2 diabetes is growing rapidly worldwide. This increase is associated with economic development, elderly population, increased urbanization, changes in diet, reduced physical activity, and other lifestyle changes (IDF, 2013).

To control patients with type 2 diabetes mellitus includes activities such as pharmacological interventions, nutritional therapy, and physical activity (Hestiana, 2017). A bad management of patients with type 2 diabetes mellitus will lead to complications of other diseases such as dysfunction and failure of several major organs such as the eyes, kidneys, nerves, and heart (Hasbi, 2012). Patient compliance with taking drugs plays a very important role in the success of treatment to maintain blood glucose levels and blood pressure in the normal range. In general, the level of adherence in each patient is described by the percentage of the amount of drug taken and the time of taking the drug in a certain period of time (Osterberg & Blaschke, 2005).

The biggest problem that causes the high incidence of DM is non-compliance with medication (taking medication). Based on some of the results of previous studies, for example the study of Schaffer & Tian, (2004), Malbasa et al., (2007), Hayes et al., (2009) in a variety of chronic diseases including DM patients classified as not compliant in taking drugs is more than 50%, even the study of Frain et al., (2009) showed that patients who are not adherent will eventually end up stopping taking the drugs. Non-compliance with taking medication can be seen related to dosage, how to take medication, time to take medication and period of taking medication that is not according to the prescription.

The types of non-compliance include intentional non-compliance and unintentional non-compliance. Intentional non-compliance is caused due to limited treatment costs, patient apathy, and patient distrust of the effectiveness of the drug. Unintentional non-compliance is due to the patient forgetting to take medication, ignorance of treatment instructions, errors in reading convention. Some of the effects of patient’s noncompliance in taking drugs are the occurrence of side effects of drugs that can harm the health of patients, the swelling of medical and hospital costs as stated by Hayes et al., (2009). Apart from this, patients can also experience resistance to certain drugs. Based on this, several studies show that for the efficacy of drugs to significantly improve patients' cure rates, the level of compliance in taking drugs by patients must be at least 80% (Schaffer & Tian, 2004).
Compliance in taking drugs is a major aspect in managing chronic diseases like type 2 Diabetes Mellitus. Noting the conditions mentioned above, adherence to medication (taking daily medication) becomes the focus in achieving the patient's healthy status, in this case the behavior can be seen from the extent to which the patient follows or adheres to the agreed treatment plan by the patient and medical professionals to produce goals therapeutic (Frain et al., 2009).

2. Discussion

Definition of Compliance in Medication (Taking Medicines Daily)

There are several terminologies regarding compliance with taking drugs, as stated by Horne, (2006), namely: compliance, adherence and concordance. The National Council on Patient Informations & Educations adds one more term, namely persistence. According to the National Council on Patient Informations & Educations, the difference in terminology is related to differences in perspective in terms of the relationship between patients and health care providers (doctors), including confusion in terms of language to describe the behavior of consuming drugs decided by the patient.

Lutfey & Wishner, (1999) put forward the concept of compliance in a medical context as the level that shows the patient's behavior in obeying or following the procedures or advice of medical experts. Horne, (2006) suggested compliance as patient compliance in taking drugs in accordance with the prescription (doctor) advice. Horne et al., (2005) previously suggested that the term compliance indicates the position of patients who tend to be weak due to the lack of patient involvement in making decisions about the drugs consumed. In terms of persistence, patients exhibit behavior that is continuously / routinely taking drugs, which starts from the first prescription to the next prescription, and so on.

Lutfey & Wishner (1999) explains that the terms of adherence has higher complexity in medical care which is characterized by freedom, use of intelligence, patients’ independence to act more actively as well as having voluntary roles in explaining and determining the goals of treatments. Further, it is explained that in terms of adherence the patient becomes more continuous in the treatment process. Horne (2006) defines adherence as drug consuming behavior which is an agreement between the patient and the prescribers. In this sense, the advantage is freedom for the patient in deciding whether to agree with the doctor's recommendation or not, and if there is a failure in this process, there should not be a reason to blame the patient. Understanding adherence develops from the notion of compliance, it's just that the adherence emphasizes more on the need for agreement. The National Council on Patient Informations & Educations (2007) further asserts that in adherence the behavior of consuming drugs by patients tends to follow treatment plans that are jointly developed and agreed between patients and professionals.

Furthermore Horne et al. (2005) and Horne, (2006) explain the notion of concordance, that is behavior in complying with a doctor's prescription that previously had a dialogic relationship between patient and doctor, and representing decisions made together, in which process the beliefs and thoughts of the patient are taken into consideration. In concordance the
consultation process occurs, in which there is communication from the doctor with the patient to support decisions in treatment.

Horne et al. (2005), prefer to recommend the understanding of adherence in consuming drugs with the term **adherence**. This is widely supported by other researchers since patients are involved in decision making about things and what they want or expect as well as doctor’s reasonable decisions about treatment given. Osterberg & Blaschke (2005) also recommend the use of the term **adherence**, because in the sense of **adherence** there is also an understanding of **compliance**, with the added understanding that in **adherence** the patient's role tends to be active and there is a therapeutic contract that occurs after going through a communication process and finally an agreement between the two parties occurs.

From some of the notions that have been stated above, the notion of adherence in consuming drugs in this study also refers to the term **adherence**, which can be concluded as a behavior to obey doctor's suggestions or procedures regarding drug use, which was previously preceded by a consultation process between patients (and or the patient's family as a key person in the patient's life) with the doctor as a medical service provider.

**Aspects and Methods for Measuring Compliance in Medication (Taking Medication Daily)**

Patient compliance behavior aspects in taking drugs can be known from the method used to measure it. Horne (2006) summarizes several methods for measuring compliance in taking drugs, as contained in Table 1.

### Table 1.

<table>
<thead>
<tr>
<th>Method</th>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>a. Direct Method</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observation</td>
<td>The most accurate</td>
<td>Patients can hide pills in the mouth, then dispose them, less practical for routine use</td>
</tr>
<tr>
<td>Measuring the level of</td>
<td>Objective</td>
<td>Variations in metabolism can make the wrong impression, expensive</td>
</tr>
<tr>
<td>metabolism in the body</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measuring biological aspects</td>
<td>Objective, in clinical research, can also be</td>
<td>Requires expensive quantitative calculations</td>
</tr>
<tr>
<td>in the blood</td>
<td>used to measure placebo</td>
<td></td>
</tr>
<tr>
<td><strong>b. Indirect Method</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Questionnaire to patients /</td>
<td>Simple, inexpensive, most widely used in clinical settings</td>
<td>Very likely to be an error, in the time between visits can occur distortion</td>
</tr>
<tr>
<td>patient self-reporting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of pills / drugs consumed</td>
<td>Objective, quantitative and easy to do</td>
<td>Data can be easily distorted by patients</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>--------------------------------------</td>
<td>----------------------------------------</td>
</tr>
<tr>
<td>Rate of repurchase prescription (continuity)</td>
<td>Objective, easy to collect data</td>
<td>Less equivalent to the behavior of taking medication, requires a more closed pharmaceutical system</td>
</tr>
<tr>
<td>Assessment of the clinical response of patients</td>
<td>Simple, generally easy to use</td>
<td>Other factors besides treatment cannot be controlled</td>
</tr>
<tr>
<td>Monitoring of treatment electronically</td>
<td>Very accurate, easily quantified results, patterns of taking drugs can be known</td>
<td>Expensive</td>
</tr>
<tr>
<td>Measuring physiological features (e.g., heartbeat)</td>
<td>Able to measure physiological features (e.g., heartbeat)</td>
<td>Physiological features may not be apparent for certain reasons</td>
</tr>
<tr>
<td>Patient's diaries</td>
<td>Helps to correct low memories</td>
<td>Very easily influenced by the patient's condition</td>
</tr>
<tr>
<td>Questionnaire to the people closest to the patient</td>
<td>Simple, objective</td>
<td>Distortion occurs</td>
</tr>
</tbody>
</table>

Based on Table 1. above, it appears that to measure compliance as a behavior, the aspects measured are very dependent on the method used such as frequency, the number of other pills / drugs taken, continuity, metabolism in the body, biological aspects in the blood, and physiological changes in the body.

Morisky specifically made a scale to measure compliance in taking a drug called MMAS (Morisky Medication Adherence Scale), with eight items containing statements that indicate the frequency of forgetfulness in taking medication, intentionally stopping taking medication without the knowledge of the doctor, and the ability to control himself to keep taking medicine (Krousel-Wood et al., 2009).

Another method is proposed by Krousel-Wood et al. (2009), who made a formula to calculate compliance in consuming drugs called CSA (Continuous Single-Interval Medication Availability), MPR (Medication Possession Ratio) and CMG (Continuous Multiple-Interval Medication Gaps). CSA is calculated by dividing the number of days the drug was given by the doctor by the number of days before consuming the new drug at the time of the next treatment. MPR is calculated by dividing the amount given by the doctor between the first day given the drug until the last day the drug is consumed by the total number of days actually used for taking medication by the patient. CMG is calculated by dividing the total number of days without taking medication between the first and last day of taking medication by the number of days in the period given by the doctor.
Choudhry et al. (2009) developed the PDC (Proportion of Days Covered) which is obtained by dividing the number of days given by the doctor between the first and last day by the number of actual days used by patients between the first to the last day plus the number of days given by the physician between the first day to the end of the prescription then divided by the number of actual days used by the patient to take the drug in the prescription period, this period is multiplied by 100 percent.

It appears that CSA, MPR, CMG and PDC have in common aspects of compliance behavior in taking drugs which is about the number of days, with some variations. Based on several considerations (including ease, methods often used by previous researchers and technical factors as well as costs), this study uses the scale method which adapts MMAS from Morisky to measure compliance in consuming drugs.

Theories of the Emergence of Compliance in Medication (Taking Medication Daily)

There are three main theories that can explain the emergence of compliant behavior in consuming drugs, namely the Health Belief Model, Theory of Planned Behavior and Model of Adherence (Horne et al., 2005).

a. Health Belief Model (HBM)

HBM explains that the model of healthy behavior (for example, self-examination) as a function of personal beliefs in the magnitude of the threat of disease and its transmission as well as the benefits of recommendations given by health workers. The perceived threat comes from the person’s beliefs in how serious and vulnerable the disease they suffer are. The individual then assesses the benefits of the action taken (for example: treatment will ease symptoms) despite overshadowed risks of the action taken, such as: side effects or even the cost of treatment. Based on these dynamics, it can be understood that adherence in consuming drugs is a process that begins with a person's belief in the seriousness of the disease which results in treatment seeking, including compliance with taking drugs, regardless of overshadowed risks or side effects of such actions.

b. Theory of Planned Behavior (TPB)

This theory tries to examine the relationship between attitudes and behavior whose main focus is on intentions that leads to the relationship between attitudes and behaviors, subjective norms of behavior, and control of perceived behavior. Attitudes toward behavior are the product of beliefs about the end result (eg, the frequency of recurrence of epilepsy decreases) and the perceived value of the end result (a condition of relapse rarely is very important for the person). Subjective norms come from the views of people around about medical behavior (eg wife or husband wants the person to follow the doctor's recommendations), and motivation to support the views of people around them (for example: the person wants to please their partner with following doctor's recommendation). Perceived behavioral control describes how far the person feels that behaving obediently can be controlled. This depends on the person's belief that he is able to control his actions, for example: the perception that there are internal sources such as the adequacy of skills or information, as well as external sources such as support and obstacles that come from the surrounding environment.

c. The Model of Adherence
Horne et al. (2005) propose the Unintentional Non-adherence & Intentional Non-adherence model. Unintentional Non-adherence refers to the patient's obstacles in the treatment process. Obstacles can arise from the capacity and limitations of patient resources, including memory deficiencies (e.g., forgetting instructions or forgetting to seek treatment), skills (for example: difficulties in opening packages or closures of drugs or using medical equipment such as needles and syringes and oral medications), knowledge (e.g., not aware of the need to take medication regularly) or difficulties with normal daily routines.

Intentional Non-adherence describes the way patients are involved in decision making in treatment. In this process, rational action comes from beliefs, conditions, priorities, choices, and practices, apart from the perceptions and actions which are different from expectations in treatment to rationality. Barber (2002) further explained that through Theory of Human Error in organizations, the unintentional and intentional actions of patients, local / internal and external / organizational factors are the causes of adherence and nonadherence.

In addition to the three models mentioned above, some researchers propose several factors that cause a person to be obedient or not compliant in taking drugs. For example, Horne (2006) said that there are four things that affect compliance in taking drugs in general, namely:

a) Perceptions and behavior of patients (e.g., perception of severity of disease, sociodemographic variables, personality traits including beliefs, attitudes and expectations that are ultimately affect the patient's motivation to start and maintain drug-taking behavior during the treatment process).

b) The interaction between the patient and the doctor as well as medical communication between the two parties (e.g., skills in giving consultations can improve compliance, and different messages from different sources can affect patient compliance in taking medication).

c) Policies and medical practices in the public made by the authorities (for example: the tax system in prescriptions, deregulation of prescriptions and consumer rights in the process of making recipes),

d) Various interventions carried out for compliance in taking drugs occurs (e.g., interventions using the ASE Theory or Attitude-Social Influence-Self-efficacy model, it is applied in hospitals when nurses visit wards, nurses ask patients to remember the rules of taking drugs, to check memories and also patient understanding of the information provided by giving stimulant questions).

Several ways can be used to improve compliance in medication (taking daily medication), they are:

a) Provide information to patients about the benefits and importance of adherence to achieving treatment success.

b) Remind patients to do everything that must be done for the success of treatment by phone or other communication devices.

c) Show the patient the actual drug packaging or by showing the original medicine.

d) Give patients confidence in the effectiveness of the drug in healing.
e) Provide non-compliance risk information.

f) Provide pharmaceutical services by direct observation, visiting patients’ homes and providing health consultations.

g) Use compliance aids such as multi compartments or the like.

h) Get support from family, friends and people around to always remind patients to take medication regularly for the success of treatment.

i) Avoid the indiscipline of or irregular taking drugs, it often happens that a drug to be taken twice a day is only taken one time due to forgetfulness.

3. **Conclusions**

Compliance behavior in taking daily medications is an important psychological factor in determining the recovery rate of patients suffering from chronic diseases such as type 2 Diabetes Mellitus. In order for the emergence of patient’s compliance with medication based on commitments previously agreed upon by doctors and patients, health service providers, especially doctors and nurses as well as patients' families must strive to support patients. Suggestions that can be made are various interventions, both through cognitive approaches and treatments so that patient awareness to comply with daily medication can be realized.
References

The Use of Focus Group Discussion Method in Nursing Research

Sulistyo Andarmoyo¹
{sulistyoandarmoyo@gmail.com}

¹Universitas Muhammadiyah Ponorogo, Indonesia

Abstract. Focus Group Discussion (FGD) method is a common approach used to collect data or information in qualitative research such as research in nursing. The main characteristic of this method is to use interaction data generated from discussions among participants. The main strengths of the FGD method are proven to be able to provide more accurate, in-depth, more informative, and more valuable data than other methods. However, the optimal implementation of this method is still debated as reported in much of the literature and the consensus of the FGD method as an ideal method for data collection has not been agreed upon by many research experts.

Keywords: FGD, Nursing, Research

1. Introduction

Focus Group Discussion (FGD) is a method of data collection that is commonly used in social qualitative research, is no exception in nursing research. This method relies on the acquisition of data or information from an interaction of informants or respondents based on the results of discussions in a group that focuses on conducting discussions in solving certain problems. Data or information obtained through this technique, besides being group information, also works as a group's opinion and decision. The advantages of using FGD methods are providing richer data and adding value to data that is not obtained when using other data collection methods, especially in quantitative research (Lehoux et al., 2006).

FGD as a method of data collection has various advantages and limitations. Nowadays, FGD is becoming popular as an alternative in collecting qualitative data in various researches, one of them is in the field of nursing. This is evidenced by the large number of nursing publications that use data collection methods through FGD methods.

This paper discusses the definition and purpose of FGD as a method of collecting data, identifying the characteristics of the FGD method, analyzing the various strengths and limitations of data/information obtained through the FGD method, and the use of the FGD method in nursing research.
2. Discussion

Definition and Purpose of the FGD Method

The definition of FGD method according to Kitzinger (1994) is to explore an issue/phenomenon specifically from the discussion of an individual group that focuses on joint activities among the individuals involved in it to produce a collective agreement. The activities of the individuals/participants involved in the group discussion include talking to each other as well as interacting in giving questions, and giving comments to one another about their experiences or opinions on a social problem/issue to be defined or resolved in the group discussion.

In line with the definition above, Hollander, (2004); and Lehoux et al. (2006) define FGD method as a method for obtaining data/information through the social interactions of a group of individuals who in that interaction, fellow individuals influence one another. More specifically, Hollander, (2004) explains that the social interactions of a group of individuals can influence each other and produce data/information if they have similarities such as having common individual characteristics, similarity in social status, equality of issues/problems, and similarity of relations/social relations.

The FGD method is widely used by researchers to explore a range of life experience phenomena throughout the life cycle of a human through his social interactions within his group (Brajtman, 2005); (Oluwatosin, 2005); (Van Teijlingen & Pitchforth, 2006). The main purpose of the FGD method is to obtain data interaction resulting from a discussion of a group of participants/respondents in terms of increasing the depth of information to reveal various aspects of a life phenomenon so that the phenomenon can be defined and explained. Data from the results of interactions in group discussions can focus on or emphasize the similarities and differences in experience and provide solid information/data about a perspective resulting from the results of the group discussions.

The Characteristics of FGD

FGD method is a method of collecting research data with the final result providing results derived from the interaction results of a number of participants in a study, as is generally the case with other data collection methods. Unlike the other data collection methods, the FGD method has a number of unique characteristics, among others, a data collection method for the type of qualitative research and the generated data comes from the exploration of social interactions that occur during the discussion process carried out by the informants involved (Lehoux et al., 2006).

The characteristics of the implementation of FGD activities are carried out objectively and are external. FGDs need trained and reliable facilitators/moderators to facilitate discussions so that the interaction between participants is focused on problem solving. FGD method has characteristics of a sufficient number of individuals for one discussion group. One discussion group can consist of 4 to 8 individuals (Kitzinger, 1995); (Twinn, 1998) or 6 to 10 individuals (Howard et al., 1989).

The characteristics of problems/issues that can be obtained through FGD methods are issues/problems which promote an understanding of the various ways that shape the behavior
and attitudes of a group of individuals or to find out perceptions, insights, and explanations about social issues that are not personal, general, and non-threatening personal life (Lehoux et al., 2006). Thus, not all problems/issues can be collected through the FGD method.

Data collected through FGD method generally relates to various social events or issues in the community which can cause bad stigma for certain individuals or groups. The information needed from these individuals or groups is not possible to be obtained by other data collection methods. However, the FGD method is not appropriate for obtaining highly personal topics/data such as sensitive issues of personal life, health status, sexual life, financial problems, and personal religion (Kitzinger, 1995); (Lehoux et al., 2006).

Strengths and Weaknesses of FGD Methods

Many qualitative studies use FGD method as a data collection tool. As one of the data collection methods, FGD method has various strengths and limitations in providing data/information. As an example, FGD method provides more data than using other methods (Lehoux et al., 2006). The main strength of FGD method is the ability to use interaction between participants to gain a greater depth and wealth of denser data that is not obtained from in-depth interviews.

MacIntosh (1993) explains that the information or data obtained through FGD is richer or more informative than the data obtained by other data collection methods. This is possible because the participation of individuals in providing data can be increased if they are in a group discussion. However, this method is inseparable from the challenges and difficulties in its implementation. The optimal implementation of FGD method is still often the subject of debate among research experts and the consensus to agree on FGD method as an ideal methodology in qualitative research has not yet been achieved (McLafferty, 2004).

FGD method based on practicality and cost is a data collection method that is cost-effective/inexpensive, flexible, practical, elaborative and can collect more data from respondents in a short time (Streubert, J & Carpenter, 2007). In addition, the FGD method facilitates the freedom of expression of the individuals involved and allows researchers to increase the number of their research samples. In terms of validity, the FGD method is a method that has a high level of face validity and is generally oriented towards research procedures (Lehoux et al., 2006).

FGD method also has some limitations as a data collection tool. In terms of analysis, data obtained through FGDs have a high level of difficulty to analyze and require a lot of time. In addition, varied discussion groups can add to the difficulty when analyzing the data that has been collected. The influence of a moderate person or interviewer also largely determines the final outcome of data collection (Leung et al., 2005). Furthermore, in terms of implementation, FGD method requires a conducive environment for the continuation of optimal interaction from the discussion participants (Lambert & Loiselle, 2008). Another limitation of the use of FGD methods can occur in general because researchers are often less able to control the course of the discussion appropriately.

The activities of individuals in asking questions and expressing opinions are quite varied, especially if there are individuals who dominate the group discussions so that they can influence the opinions of other individuals in the group. Here is the important role of researchers as trained and reliable facilitators in groups to prevent the above (Streubert, J &
Carpenter, 2007). In addition, Lambert & Loiselle, (2008) state that the use of FGD methods requires a combination with other data collection tools to increase the wealth of data and make the resulting data more valuable and more informative to answer the research problem.

The Use of FGD Methods in Nursing Research

FGD method is widely used in a variety of more complex social studies, none the least in the area of nursing that studies many clients from diverse social backgrounds. The use of FGD methods is widely reported in various topics, in the areas of nursing management practice and nursing education. At present, FGD method is widely used by nurse managers in evaluating various educational programs for patients (Leung et al., 2005). In the area of nursing education, (Howard et al., (1989) studied the evaluation of nursing students after graduating from education. MacIntosh, (1993) studied various distance learning strategies through teleconferencing activities for nursing students who explored in depth how the nursing students maintained their distant class participation. Furthermore, McKinley et al., (1997) also developed a measurement tool to evaluate the level of satisfaction of patients receiving excellent nursing services.

The use of FGD methods has also been reported in the area of nursing research to study life phenomena and social issues experienced by humans throughout their life spans. For example, the use of FGD methods in the area of community nursing has been used by Oluwatosin (2005) in developing assessment tools to study the health of a community. Powell et al., (1996) also used FGD methods to increase the validity of a mental health measurement tool. Other researchers namely Millar et al. (1996) had collected data on the level of satisfaction of nurses and clients with health services through FGD methods.

3. Conclusions

FGD method is one of the strategies to collect data that involves social interaction between individuals in a series of discussions. This method is proven to be widely used for data collection in various qualitative research projects as well as nursing research. Although FGD techniques may be very effective, fast, and economical in providing data/information, it is not always the most appropriate technique/way to collect data/information. FGD method requires a trained and reliable moderator to be able to facilitate discussion appropriately, its implementation requires a conducive environment, and varied discussion groups, and the results of data collection have a high level of difficulty to analyze. In special situations in nursing research, it is suggested using other data collection techniques/methods so that the provision of data becomes richer and more informative.
References


A NEW PARAMETER OF FAMILY HEALTH IN TREATING SCHIZOPHRENIA PATIENTS

1Sugeng Mashudi, 2Lusia CYK Wardhany

{ sugengmashudi@umpo.ac.id }

1Faculty of Health Science, Universitas Muhammadiyah Ponorogo East Java Indonesia
2Public Health Services Ponorogo East Java Indonesia

Abstract. Studies concerning positive outcomes of Schizophrenia treatment are still rare. One of the positive outcomes of Schizophrenia treatment to patients is family health. The definition of family health according to the theory of family health is limited only to satisfaction. This study aimed to prove efficiency and happiness as new parameters of family health as positive outcomes of Schizophrenia treatment to patients. The study used a cross-sectional design by choosing 160 respondents randomly. Independent variable of the study is coping mechanisms which consist of two sub-variables (problem-focused coping mechanism and emotion-focused coping mechanism). Whereas dependent variable is family health which consists of three sub-variables (efficient, satisfaction, and happiness). The SMART PLS (2.0 Version) was used to prove the impact of the variables. The results of the study indicated that coping mechanisms possess significant impacts on family health. The hypothesis was taken from the value of the T-test on the structural model analysis, which shows T-statistics (13.966) > T-critical (1.96). The impact of coping mechanisms on family health is equal to 0.682. It means that if coping mechanisms are given one-unit value, it will increase the family health by 0.682 times. The findings of the study also strengthened the existing theory which previously focuses on family health indicator on family satisfaction. In this case, it added two new indicators, efficiency and happiness. Coping mechanisms chosen by families in facing stress will impact family health.

Keywords: Family health, new parameter, efficiency, satisfaction, family with Schizophrenia patients.

1. Introduction

The Family Health Theory (FHT) developed by Doornboss (2002) is a middle-range theory based on the Goal Attainment Theory made by E. King (1983). The FHT specifically predicts family health in a family with mental-disorder patients. However, family health in the FHT only measures the level of family satisfaction in treating patients with mental disorders (Doornbos MM, 2002). The theoretical definition of family health is the adaptive potential and functional ability of a family in social roles (King, 1983). King (1981) consistently defines...
health as two goals of nursing practice. According to King (1981), the first goal of nursing practice is “A functional state in the life cycle”. For this goal, King generally focuses on its function as the indicator of health. The second goal of nursing practice according to King (1981) is efforts to reach “A useful, satisfying, productive, and happy life”. Based on that, it can be inferred that the definition of health for family health should focuses on “A useful, satisfying, productive, and happy life”.

The data taken from WHO show that 21 million people suffered from mental disorders (WHO, 2018). 1% of the population in the United Kingdom are people who experienced mental disorders (Smith, 2015). The 2018 RISKESDAS (Basic Health Research) data in Indonesia show an escalation of proportion in the number of households with mental disorders by 7 per mil from 1.7 per mil. Specifically, the East Java Province shows that only 2.2 per mil households experienced mental disorders in 2013 and went up to 5 per mil in 2018 (RISKESDAS, 2013; 2018). Generally, similar incident rate also occurred in Ponorogo, with as many as 1.321 out of 600,336 residents in productive ages who experienced mental disorders (Nasriati, 2017). However, a higher prevalence rate was found in Paringan Village and Dukuh Mirah, where the prevalence rate of mental disorders in Paringan Village was at 11.2 per mil (Sugeng Mashudi, Bambang Widiyahseno, 2016).

Family health is affected by coping mechanisms (Doornbos, 2002). The study conducted by Çuhadar, Savaş, Ünal, and Gökpinar in 2015 strengthens the previous studies which found coping mechanism affects family health. Studies regarding stress and coping mechanisms in family with Schizophrenia members show that there is an effect of stress on coping mechanisms (Geriani, Savithry, Shivakumar, & Kanchan, 2015). Family coping consists of problem-focused coping and emotion-focused coping. Family coping is a cognitive assessment and behavior to manage internal and external needs that exceed ability (S.Lazarus & Folkman, 1984). The study done by Crowe and Lyness in 2014 shows that family coping affects family health. A better family coping will increase the level of family health.

2. Method

2.1. Sample

This study was conducted in Ponorogo Regency, East Java, Indonesia with a sample of 160 respondents and a cross-sectional design. The data were collected through questionnaires that have been tested for validity and reliability. Respondents were taken by using a random sampling technique from five primary healthcare centers in the North and West Ponorogo.

Participants were 81 men (50.6%) and 79 women (49.4%). Their average age was 49 (SD = 14.2). Furthermore, there were 139 married respondents (86.6%) and 10 single respondents (6.3%). Regarding education level, 102 respondents have completed basic education (24.4%), 39 respondents have achieved secondary education (48.68%), and 3 respondents have completed tertiary education (1.9%).

2.2. Variables and Instruments

Family coping variables were compiled based on the FACE questionnaire. A higher score reflects a better family coping. The Cronbach’s alpha coefficient for the scale was 0.534.
Family health variables were made based on the indicators of Useful, APGAR family, and HAPPY questionnaire. A higher score reflects a better family health. The Cronbach’s alpha coefficient for the scale was 0.883.

### 2.3. Statistical Analysis

Before the statistical analysis, the data were selected based on three standard deviations above or below the average score. Missing values are excluded from the analysis. Descriptive statistics and correlation analysis were performed with the SPSS program (Version 22.0, IBM Corp, Armonk, NY, USA). Structural equation models were tested with Mplus (Version 7.4, Muthen & Muthen, Los Angeles, CA, USA). The study of the structural model with a corrected level of confidence (CI) of 95% used 5000 bootstrap samples.

### 3. Result


The data used in this study were taken from 160 caregivers of Schizophrenia patients who seek treatments in primary healthcare centers located in the North and West Ponorogo. Selected respondents were those who meet the criteria of random sampling.

The observation of the study was done in the selected primary healthcare centers. The complete characteristics of caregivers who handle Schizophrenia patients can be seen in Table 1.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>81</td>
<td>50.6%</td>
</tr>
<tr>
<td>Women</td>
<td>79</td>
<td>49.4%</td>
</tr>
<tr>
<td>Age:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Productive (18-54)</td>
<td>102</td>
<td>63.8%</td>
</tr>
<tr>
<td>Not productive (55-80)</td>
<td>58</td>
<td>36.2%</td>
</tr>
<tr>
<td>Status:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>139</td>
<td>86.8%</td>
</tr>
<tr>
<td>Single</td>
<td>10</td>
<td>6.3%</td>
</tr>
<tr>
<td>Widower/widow</td>
<td>11</td>
<td>6.9%</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>76</td>
<td>74.5%</td>
</tr>
<tr>
<td>Low</td>
<td>84</td>
<td>52.5%</td>
</tr>
<tr>
<td>Job</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private</td>
<td>47</td>
<td>29.4%</td>
</tr>
<tr>
<td>Farmer</td>
<td>90</td>
<td>56.2%</td>
</tr>
<tr>
<td>Others</td>
<td>23</td>
<td>14.4%</td>
</tr>
<tr>
<td>Family members (amount) ≤ 3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 1 shows that the majority of caregivers are men (50.6%), at the age of 18-54 (63.8%). Most of them were married (86.8%) and graduated from high education (74.5%). They worked as farmers (56.2%) with >3 family members (54.4%) and salary < IDR 1,500,000 (82.5%). Caregiver burden was positive correlation with age of caregiver, employment of caregiver and level of education (Sugeng Mashudi, Ah. yusuf, Rika Subarniati T, Kusnanto, 2019).

<table>
<thead>
<tr>
<th>Salary</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; IDR 1,500,000,-</td>
<td>132</td>
<td>82.5%</td>
</tr>
<tr>
<td>≥ IDR 1,500,000</td>
<td>28</td>
<td>17.5%</td>
</tr>
</tbody>
</table>

Table 2. Characteristics of Schizophrenia Patients

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>95</td>
<td>59.6%</td>
</tr>
<tr>
<td>Women</td>
<td>65</td>
<td>40.4%</td>
</tr>
<tr>
<td>Productive (17-45)</td>
<td>131</td>
<td>81.9%</td>
</tr>
<tr>
<td>Not productive (46-71)</td>
<td>29</td>
<td>18.1%</td>
</tr>
<tr>
<td>Relationship with caregiver:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Son/Daughter</td>
<td>63</td>
<td>39.4%</td>
</tr>
<tr>
<td>Parent</td>
<td>14</td>
<td>8.8%</td>
</tr>
<tr>
<td>Others (Siblings)</td>
<td>83</td>
<td>51.8%</td>
</tr>
</tbody>
</table>

Table 2 explains that the majority of Schizophrenia patients are men (59.6%) in the age of 17-45 (81.9%), and siblings of the caregivers (51.8%). The majority of Schizophrenics in productive age tend to behave in smoking, even though the effects of nicotine contained in cigarettes affect oocyte maturity (Dwirahayu & Mashudi, 2016).

Table 3: Loading factors and T-statistical value.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Sub-variables</th>
<th>Loading (λ)</th>
<th>T-Statistics</th>
<th>T-table</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coping Mechanisms</td>
<td>Problem-focused Coping</td>
<td>0.915</td>
<td>14.393</td>
<td>1.96</td>
</tr>
<tr>
<td></td>
<td>Emotion-focused Coping</td>
<td>0.710</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family Health</td>
<td>Efficiency</td>
<td>0.912</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Satisfaction</td>
<td>0.914</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Happiness</td>
<td>0.873</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 3 illustrates that coping mechanisms done by the family are dominantly problem-focused coping (λ =0.915), whereas family health is determined by the satisfaction level in treating Schizophrenia patients (λ =0.914). Coping mechanisms have an effect on family health (α=0.05; t-statistics = 14.393).

4. Discussion

Coping mechanisms significantly impact family health. This is based on the T-test in the structural model analysis, where T-statistics (13.966) is greater than T-critical (1.96). The effect value of coping mechanisms on family health is 0.682. This means that if coping mechanisms are given one-unit value, it will increase family health by 0.682 times.

Family health is measured from the aspects of efficiency, satisfaction, and happiness. Some roles of the family may include knowing health problems experienced by patients, choosing the best action to treat patients, maintaining a conducive environment, and utilizing health facilities for patients. The family stated that family satisfaction with Schizophrenia patient care may be obtained by adapting with patients, discussing about the best solution to overcome problems that befall patients, showing affections and responses, such as anger, suffering, and love, and spending time together with patients. In terms of happiness, the family could enjoy the moment of treating patients with Schizophrenia compared to other caregivers with Schizophrenia patients. Also, they could enjoy everything and obtain optimal treatment for Schizophrenia patients.

Efficiency indicator (0.912) has the second-highest value in determining family health. Efficiency throughout the treatment process can be seen when a family could identify patients’ health problems, decide the best decision for them, take care of them well, keep a conducive environment, and take advantages of health facilities for them.

Satisfaction indicator (0.914) possesses the highest value in determining family health. Satisfaction throughout the treatment process can be found when a family can adapt, choose the best solution for problems, show affection, respond positively to patients, and spend some time together with patients. Family satisfaction in treating Schizophrenia patients can not be separated from the impact of coping mechanisms (problem-focused coping and emotion-focused coping) done by the family.

Happiness indicator (0.873) shows the smallest value in determining family health. The decline of happiness in treating Schizophrenia patients can be seen when family feel less happy compared to other families with Schizophrenia patients and cannot enjoy everything and obtain optimal caregiving. It is related to stress factors, such as economy, abusive behavior, and stigma that befalls the family.

Being healthy is defined as an ability to adapt physically, mentally, and socially as a single unit free from illness and disability (WHO, 1948). The characteristics of being healthy according to WHO involve the ability to reflect an individual as a person in internal and external contexts and to involve creativity and productivity. King (1981) stated that being healthy is a form of efficiency, satisfaction, productivity, and happiness (Alligood, 2017). In this study, family health refers to healthy family (King, 1981). However, the productivity indicator in this study is invalid and unreliable because the submitted questions only focus on...
attendance, while the respondents of the study are farmers who were unable to attend regularly.

The essential finding of this study is that coping mechanisms affect family health. Family Health Theory written by Doornbos in 2002 shows that coping mechanisms affect family health, whereas this study, in addition to the existing theory, finds family health indicator was measured not only based on family satisfaction, but also family efficiency and happiness. Coping mechanisms chosen by families in facing stress will impact family health (Martinez-montilla, Amador-marín, & Guerra-martin, 2017).

Stress may come from chronical diseases, such as mental disorders (Schizophrenia), addictions, accidents, disabilities, and economic problems. On the other hand, coping mechanisms used by families in treating Schizophrenia patients are problem-focused coping and emotion-focused coping. Stress in a family with Schizophrenia patients can transform the family’s life balance. That is why every family need to have great coping strategies. Caregivers with patients who have mental disorders also need to identify the main stress factor in their family. The best coping strategy is also needed so that family health can improve. Based on the theoretical and empirical studies, it can be inferred that coping mechanisms affect family health.

5. Conclusion

This research reinforces the family health theory. Coping mechanisms done by families (problem-focused coping and emotion-focused coping) affect family health. Apart from family satisfaction, family health can also be measured from the aspects of Efficiency and Happiness. This research further studies are necessary to be conducted to find out whether or not patients and treatment factors contribute to family health.
References


The Impact of Premarital Sexual Behavior on Student at risk of Unwanted Pregnancy

Sri Susanti1,2, Asmadi Alsa3, Akif Khilmiyah4
{santialmanar@gmail.com}
1 Faculty of Health Sciences, Universitas Muhammadiyah Ponorogo
2,3,4Islamic Education Doctoral Psychology
Posgraduate program of the Universitas Muhammadiyah Yogyakarta

Abstract. The phenomenon of premarital sexual behavior among students is increasing like an iceberg at sea level, which seems to be just a little but basically filled with clots. This required special attention from all parties, including universities. This study was conducted on 10 subjects premarital sexual behavior, aims to analyze the impact caused by premarital sexual behavior, and effort to overcome. This research is a qualitative phenomenological approach. Data collected by the snowball technique and purposive through observation, interviews, and documentation. The validity of the data using triangulation confirmation. Analysis of the data used is Miles and Huberman interactive model, using the software NVivo 12 Plus. The findings show that: (1) psychological sexual behavior will have an impact on the emergence of the sense of sin, the subject is always haunted by feelings of guilt and regret; (2) the physiological impact: the concern of the subject in case of an unwanted pregnancy; (3) physical effects: for subjects who are sexually active they are concerned about contracting a sexually transmitted disease; and (4) social impact: their social role confusion that suddenly changes due to pregnancy (not ready to be a mother), and the most feared is when suspended or penalized DO (dropout). Prevention efforts can be done by minimizing idle time during the lectures, so it is not used to go to places of entertainment and interact with her peer group. As for the efforts to overcome the following ways: understanding the main task as a student, filling time according to their talents, interests and abilities, choose a friend who can be a good influence, and establish attachment and effective communication with parents.

Keywords: Premarital sexual behavior, student, phenomenology.

1. Introduction

Adolescence is a period of transition from children to adulthood, a time for self-discovery. Teenagers who are in puberty is affected by libido or sexual maturation, which is peaking. Characteristics of adolescents who were proceeding to seek self-identity is also often a problem in itself. For some teens, Premarital sexual behavior is regarded as a natural thing
with the change of times today, so it was perceived as a lifestyle that can be consumed by anyone.¹

Social phenomenon which is currently rife is premarital sexual behavior that leads to abortion, where most of the perpetrators and the victims are teenagers. Women as actors is the most suffer the consequences of the current behavior, ranging from physical and psychological suffering. Seeing this fact, not a few teenagers who fall into the valley of adultery (free sex). This is due to too away their freedom in the mix, opportunities courtship activity that leads to premarital sexual behavior. The main factor is the lack of understanding of the problem of today's society of the limits of relationships between men and women, while there was a shift in society's moral values are getting much so that the issue seems to have become commonplace, whereas deviation sexual behavior is something to be avoided by everyone.² In addition to the support of the modernization increasingly globalized and weak faith on culture without a rigorous screening.

Premarital sexual behavior in adolescents is a serious issue and still dominates the debate from the moral, psychological, and physical. Especially in modern society will cause tremendous mental illness, especially for women.³ For some adolescents, premarital sexual behavior that initially only dabble intercourse or sexual contact, tend to be hooked and will do again, because they get enjoyment from this illicit relationship. The most prominent and visible of these cases is the increasing number of unwanted pregnancies by teenage couples who had sexual intercourse.⁴

An initial survey conducted by the author with the observation and interviewing student revealed that most of them have a serious relationship with the opposite sex (boyfriend). In fact, their behavior there is shown directly incompatible with the norms of ethical, moral, and religious, have a picture as seen from the display screen laptop or her WhatsApp’s profile. Also the lack of information from other observers say that when there is no college or deliberately skipped the average college student is in places of entertainment, in the clubs, or in the coffee shop with a partner.

Premarital sexual behavior at the student is constantly increasing and alarming of all parties. This happens for several reasons, among others, the lack of information they have about reproductive health or correct sexual behavior, the weak quality of faith and devotion, building personality fragile, relationship and communication with parents are less smooth and harmonious because most parents work abroad, lifestyle hedonist, individualist and materialist. Even the state's role as the policy makers and implementers in the public system was actually supports things that encourage free sex such as: the proliferation of pornography, the increasingly widespread localization or places nasty legal. Another was caused also by the frequency of their interactions more to do with peers than with family. They also tend to be more compliant and follow peers from the counsel of parents and religious norms, so that the control itself to be weak; what is said by her friends immediately followed and imitated, though not necessarily true. A study conducted Purnamasari, it was found that when teens in the group of peers who have permissive attitudes toward premarital sexual behavior, then the teen will also develop the same attitude. Conversely, if the teens in the group of peers who have the attitude to delay sexual activity, then he will do the same.⁵

Social and cultural conditions also contributed to the rise of premarital sexual behavior among teenagers in the town of Ponorogo. It is very interesting to study, considering Ponorogo as the
city of students on the one hand, it becomes ironic when the youth trapped in premarital promiscuity. On the other hand, Ponorogo well as Reog city and the city's second-largest supplier of labor in East Java. This resulted in a lack of moral education from an early age from family, and lack of supervision as well as exemplary of the parents, left them mired in premarital sexual behavior are at risk of unwanted pregnancy.

1.1. Literature Review.

Notoatmojo say that premarital sexual behavior is an act committed by juveniles associated with sexual urges that come both from within and from outside. Soetjiningsih specifies that premarital sexual behavior is any sexual behavior that is driven by sexual desire in the opposite sex performed before marriage. Meanwhile, according to Ajzen, premarital sexual behavior is closely related to a permissive attitude toward premarital sexual behavior. Attitudes and behaviors can be consistent when attitudes and behavior in question is specific and of no relevance to each other. Because the permissive attitude toward premarital sexual relations is relevant with each other, then that attitude can be a predictor for his behavior.

Based on some sense it can be concluded that premarital sexual behavior is the behavior that leads to intimacy heterosexual, which is a manifestation of their sexual drive in the stages of sexual behavior ranging from dating, holding hands, kissing to intercourse involving a pair of teenagers without going through the process of marriage legitimate according to religious and legal according to the law. According Sarwono, stages and forms of sexual activity can be categorized into four activities, namely kissing, necking, petting and intercourse.

Premarital sexual behavior is influenced by internal and external factors. Internal factors include increased sexual libido due to hormonal changes (biological perspective), the sexual experience as well as knowledge about reproductive health. External factors include the delay of marriage age in adolescents, prohibitions that are taboo about sexual behavior in adolescents, increasing sexual stimulation of the mass media, the attitude of parents who are open about sexual issues in children, the association that the freer among teenagers, lack of supervision of the old, and encouragement from peers to engage in sexual behavior.

According Sarwono, premarital sexual behavior in adolescents can cause a variety of negative effects, among others: the impact of physical, psychological, physiological and social effect.

2. Method

This research is a phenomenological study with a qualitative approach, the source of the data obtained through interviews with sources that the student who is undergoing courtship and lead to premarital sexual behavior, which is obtained through the snowball technique and purposive. The technique of collecting data using interviews, observation and documentation. The validity of the data using triangulation confirmation. Data analysis techniques using interactive analysis of Milles and Hubberman, using the software NVivo 12 Plus.

3. Result

The result showed that most of the subjects had sexual intercourse before marriage originated from trial and error when they are going through high school, and some other subjects in
premarital sexual intercourse because of sexual urges and desires wanted to achieve pleasure and satisfaction in dating. This is supported by data interviews with the subject as follows: "..... I do it before the marriage bond it’s because of the insistence of desire I want to try, and I think having sexual intercourse that should be performed by young people, the interaction-free and we are still studying not possible should marriage used to be married so not ready wrote, we still want having fun like other children later if it is time we also will get married and have children", According to Freud's theory of "psychoanalysis" of instinctual (id), suggests that a person with libidinal instincts have destructive impulse that ensures the survival of reproductive (sex). In this case the subject get satisfaction related to the sexual organs, namely erogen areas on the body that are sensitive to excitation. The subject will feel satisfaction and can relieve strain on her after having sexual intercourse.

Courtship, which is part of premarital sexual behavior has become commonplace among today's teenagers. If it does not have a boyfriend to say "no slang", so the courtship among teenagers is a matter that is already commonplace. Because of courtship has become a trend in itself for them, so they will not feel comfortable in the group if it differs from the others in this respect is the dating status. This is evidenced by the results as disclosed subject matter that: "......perfectly natural hell, whose in the dating intercourse do not matter as long as both the responsibilities, which is important not to get pregnant". Meanwhile, another subject says: "...... in my opinion, I think having sexual intercourse that should be performed by young people, while we are still studying not possible if we have to get married so not ready to be a wife, we still want having fun like other children later when it's time we also will get married and have children".

Furthermore, the results showed that subjects who peergrop risky sexual behavior before marriage, have a greater tendency to do the same in comparison to subjects with her peergrop perform premarital sexual behavior is not at risk of unwanted pregnancy. For the subject more permissive attitude toward sexuality have a risk and a greater tendency to perform premarital sexual behavior at risk of unwanted pregnancy compared with subjects less permissive. This is evidenced in the subject statement that: "..... to do premarital sexual intercourse during dating has become a trend for teenagers now, if we don't have a boyfriend and don't do as they do we will definitely be bullied with friends, arguably not slang is stupid so we want it inevitably join the trend". According to Santrock, peergrop conformity can mean conditions in which a person adopts the attitudes or behaviors of others in his peer group due to pressure from the reality or impression given by the group. Sarwono also explained because of the strong emotional ties and group conformity in adolescents, then this is often considered a factor that leads to the emergence of bad adolescent behavior. If the peer environment of adolescents is supportive of risky premarital sexual behavior, and also the conformity of adolescents is also high in their peers, then the teenager is very likely to engage in sexual activity premarital risks for unwanted pregnancy.

Picture 1: the attitude of respondents in peergrop towards premarital sexual behaviour
Teenagers who are dating have high enough opportunities to the activity / premarital sexual behavior. It is proven that students who in fact do not get comfortable with family / parents, then they will find a feeling of security with their partner. Feelings of security can lead to a sexual intimacy in them. As defined by Maslow’s Hierarchy of Needs theory, that every individual needs a sense of security, a requirement that encourage individuals to acquire tranquility of the environment, in the context of this study student will feel safe with their partner. In addition to the need for self security, the individual also seeks to meet the need for love and belonging, which is a requirement that encourage individuals to engage effectively with other individuals. For Maslow the need for love must be colouring the lives of individuals, without love someone will be dominated by feelings of hatred, worthlessness and emptiness.13

Premarital sexual intercourse for teens now seemed to have become a necessity that must be met. Since it was first doing until now with variable frequency, which is partly the subject admitted that as many as three times a month, some once a week or once a month for LDR (Long Distance Relation), and there is erratic or uncertain depending on the desires sexual. Results of research on the feelings after sexual intercourse shows that, most subjects thought it was a humane, mediocre, and on average they say satisfied, even though no one showed remorse, as disclosed subject as follows: "...... after doing it at home sometimes feel guilty, afraid that if you later get pregnant, but what can we do it already and are already accustomed us to do and has become a habit to channel the desire". According to Freud in his theory of instincts, guilty feeling / sin after sexual intercourse may occur if the ego against the superego moral norms, because guilty feeling is a function of conscience for inappropriate behavior. Eventually, remorse arises which leads to the emergence of "a self-administered punishment".  

Premarital sexual behavior is of course an impact on the lives of subjects, ranging from the impact of such psikoligis feelings of guilt, loss of self-esteem, feelings of anger, sadness, regret, fear, anxiety, depression, low self-esteem, and sin. In addition to the physiological effects, physical and social, such as unwanted pregnancy, abortion, can even lead to depression because of shame due to being ostracized by society.

**Picture 2: The impact of premarital sexual behaviour**
Seeing such a serious impact occurs on the subject, it is necessary to encourage and strategies in the prevention and control of premarital sexual behavior at risk. In this research, prevention and mitigation strategies can be done through internal and external efforts. Internally, to make a change, there must be intention of the heart and steady conviction of the subject when it will change the behavior, must be of personal awareness and not due to environmental influences or under compulsion. Another effort is done by minimizing idle time during the lectures, so that students do not perform activities in places of entertainment or in other places that can trigger sexual desire that leads to premarital sexual behavior at risk, prompting them to seek busyness so that the mind is not focused on sexual activity. In addition, there should be support for parents / families to apply discipline religious and moral cultivation early so that it can be a filter in her life.

In Murdiono research on strategies of religious values in the learning process at the university, that the provision of modelling is done through internal modelling and eksternal modelling. Internally done by giving a role models of attitude and behavior of the parents in a family environment and the attitude and behavior of the lecturers in the process of learning and education. Lecturers should be a reference figure (good role models) for female students in all things, because indirectly lecturer's behavior will be a reflection and will be followed by a student. While external exemplary done by setting a good role models of the environment and conformity peers.

Other efforts that can be done is by way of imposition of legal sanctions to the subject published in the form of suspension or certificate of DO (dropout) from the campus, which is one way of coaching to the subject, and a lesson to others so that no recurrent cases. These sanctions as exemplified in Islam, that for adultery are entitled sentenced to stoning, as it is written in Holy Qur’an, Allah says: "woman taken in adultery and men who commit adultery, then whip each one of them a hundred stripes, and do not have mercy on both preventing you to (run) the religion of Allah, if ye believe in Allah and the Last day, and let (implementation) their punishment be witnessed by a group of people who believe" (QS. 2nd, An-nuur).

4. Conclusion

Premarital sexual behavior that occurred in this almost entirely student begins courtship in which they live since Junior High School or Senior High School, and partly since the
beginning of college. Courtship is one of the reasons they commit acts of premarital sexual behavior, in addition to the factor of family / parents. Many of those who came from a family full of conflict and division (broken). This is due to the lack of intensity of communication between members of the family, because parents become migrant workers abroad so rarely communicate intensively with her teenage. Conditions parent who is a migrant worker makes the subject to lose the need for love and comfort of the family, which then makes the student look for meeting those needs to others who can serve as the outpouring of all the problems of life faced. As a result, they fall into the premarital sexual behavior at risk of unwanted pregnancy, and the impact on other social issues.

To minimize the premarital sexual behavior, the government should review the statute of limitations of the marriage age, establish appropriate penalties (civil and criminal), and for local governments in order to publish laws / regulations and limit the boarding house without a host, as well as the parents should provide control and establish effective communication with teenage, be a good modelling and providing moral education from an early age. For further research can make observations and ideas and development models and strategies handling of premarital sexual behavior through stages that are arranged in a systematic and applicable.
References


Self Regulation And Emotional Aspect Among Diabetes Mellitus Survivor

Sholihatul Maghfirah

{s.m.fira87@gmail.com}

Faculty of Health Sciences, Universitas Muhammadiyah Ponorogo, Indonesia

Abstract. Diabetes mellitus survivor have to propose a long-life Diabetes Mellitus treatments regulation which may produce many emotional problems. Self regulation-related to the emotional problem is one of the problem. This study purpose was to explain the correlation between self regulation and emotional aspect among Diabetes Mellitus survivor. The design of this study was a correlational with cross-sectional approach. Population of this study were all Diabetes Mellitus survivors in Public Health Services (Puskesmas) of North Ponorogo within 31 survivors as the total sample. Quota sampling used as sampling technique. Results showed majority of the study participant with the high ability of self regulation did not experience a distress/slightly distress (15 people, 48.4%). About two survivor (6.4%) with low ability of self regulation also did not experience a distress/slightly distress. Kolmogorov-Smirnov analysis test result showed \( p = 0.020 \leq \alpha (0.05) \), and thus may conclude that there was significant correlation between self regulation and emotional aspect among Diabetes Mellitus survivor. It is suggested to the health service provider establish an counselling session to the Diabetes Mellitus treatment regulation in order to assists and increases the self regulation and minimize the emotional problem among survivor.

Keywords: Self regulation, emotional aspect, Diabetes Mellitus

1. Introduction

Highly incidence rate of Diabetes Mellitus (DM) become one of serious problem in Indonesia (Sutandi, 2012). The acute and chronic complication of this silent disease also increase fatality. DM regulation in order to prevent the disease complication are including 5 standards: dietary planning, physical activity, medication, education and self monitoring of blood glucose level (Perkeni, 2015). All of this standards have to be complete through the survivors life-span, sure the long way process may produce another problem on highly number of non-compliance incidence and hopelessness (Aini et al., 2011). Stress, depression, possibility of long-term complication, fearness of living with diabetes, loss of motivation on Diabetes treatment, apprehensive on the blood-glucose result and feel of bored become usual emotional problems experienced by DM survivors (Kusniawati, 2011). Having low self regulation become one of
the causing factor among all of this emotional problem. Self regulation here defined as self controlling ability (Schunk & Zimmerman, 1998)

The 2016 WHO Global Report on Khairani (2019) mention that 1.5 millions of global death in 2012 was caused by Diabetes Mellitus. The slightly increase of blood-glucose level above the upper limit also produce another 2.2 millions of this death number, with induce another risk of complication on cardiovascular system and other. Interestingly, the 43% of 3.7 millions of this global death happen before the patient achieve 70 years old. Moreover, this highly death percentage related with Diabetes were showed on the countries within low and middle economic income rather than highly economic income country. Indonesia become the 5th world rank country with Diabetes survivor based on the 2012 WHO reports on Khairani (2019). Additionally, supported by the Indonesia Baseline Health Research (Riskesdas) (2018) that DM prevalence was 10.9 among Indonesian population age greater than or equal by 15 years old.

Zimmerman & Pons (1988) state about some predispose factors in self regulation, including individual factor, behavioral and environmental factor. Individual factors here known as personal knowledge. The better personal knowledge will help survivor to produce the better self regulation. Non-compliance of DM survivor to their treatment mostly caused by less knowledge about the disease prognosis, resulting a less self regulation or less control. Continously state, the behavioral factor are including three steps: self-observation, self-assessment and self-reaction. The impact on negative self-observation and self-assessment will produce negative self-reaction. Environmental factor are including social influence and self experience. DM survivor who receive less social support and less experience on the treatment of DM will have low self regulation and control among themselves. Based on Bandura & Cervone (1986) self regulation component is ability to manage the emotion. Ormrod (2009) also stated the characteristic of person who had a good self regulation are they will be able to control the emotion, always doing self assessment or intentionally change their emotion if the emotion will resulting a contraproductive behavior. The person who had a good self regulation will be able to control their emotion, thus they will able to avoid the distress emotional during treatment.

Bandura (2005) mention that self regulation could be the best medication to the individual who want to be healthy. Individual may actively adapts to the environment as long as they are able to control their psychology process, including emotional aspect and behavior related to Diabetic self treatment. Having low self regulation should be improves in purpose the survivor are able to independently control themselves during the DM treatment. Hence, the correlation between self regulation and emotional aspect itself still be questioned.

2. Methods

The study design was correlational study with a cross-sectional approach. Study population were all Diabetes Mellitus survivor in Public Health Service (Puskesmas) of North Ponorogo within 31 person as the total sample. Quota sampling technique were used as sampling technique. Self regulation in this study was assessed using a modified instrument of Treatment Self-Regulation (TSRQ) for Diabetes by Williams et al. (1998). The emotional aspect was assessed using questionnaire of Diabetes Distress Scale (DDS) by Polonsky et al. (2005) and
using interpretation by Fisher et al. (2012). Data was analyzed using Kolmogorov-Smirnov test.

3. Results and Discussions

Table 1 Distribution frequency of demography in Puskesmas of North Ponorogo per June 6th to 22nd, 2017 (n=31)

<table>
<thead>
<tr>
<th>Demography</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>16</td>
<td>51,6</td>
</tr>
<tr>
<td>Female</td>
<td>15</td>
<td>48,4</td>
</tr>
<tr>
<td><strong>Age (Years)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35-40</td>
<td>2</td>
<td>6,5</td>
</tr>
<tr>
<td>41-46</td>
<td>2</td>
<td>6,5</td>
</tr>
<tr>
<td>47-52</td>
<td>9</td>
<td>29,0</td>
</tr>
<tr>
<td>53-58</td>
<td>7</td>
<td>22,6</td>
</tr>
<tr>
<td>59-64</td>
<td>7</td>
<td>22,6</td>
</tr>
<tr>
<td>65-70</td>
<td>4</td>
<td>12,9</td>
</tr>
<tr>
<td><strong>Educational background</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No educational background</td>
<td>1</td>
<td>3,2</td>
</tr>
<tr>
<td>Elementary</td>
<td>9</td>
<td>29,0</td>
</tr>
<tr>
<td>Junior High School</td>
<td>8</td>
<td>25,8</td>
</tr>
<tr>
<td>Senior High School</td>
<td>7</td>
<td>22,6</td>
</tr>
<tr>
<td>College</td>
<td>6</td>
<td>19,4</td>
</tr>
<tr>
<td><strong>Job</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jobless</td>
<td>5</td>
<td>16,1</td>
</tr>
<tr>
<td>Government employees</td>
<td>7</td>
<td>22,6</td>
</tr>
<tr>
<td>Private employees</td>
<td>13</td>
<td>41,9</td>
</tr>
<tr>
<td>Other</td>
<td>6</td>
<td>19,4</td>
</tr>
<tr>
<td><strong>Income</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; Rp. 1.388.900</td>
<td>25</td>
<td>80,6</td>
</tr>
<tr>
<td>≥ Rp. 1.388.900</td>
<td>6</td>
<td>19,4</td>
</tr>
</tbody>
</table>

Source: 2017 primary data

Table 1 shows the majority of the respondent (51.6%) are male. Almost half of the participant’s age (29%) are ranges between 47 to 52 years old, within elementary as the study participant’s educational background. Majority are working as private employees (41.9%) and mostly (80.6%) producing monthly income less than Rp. 1.388.900.
Table 2 Distribution frequency of DM medical history at Puskesmas of North Ponorogo per June 6th-22nd, 2017 (n=31)

<table>
<thead>
<tr>
<th>DM Medical History</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Period time experiencing the disease</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-5 years</td>
<td>23</td>
<td>74.2</td>
</tr>
<tr>
<td>6-10 years</td>
<td>7</td>
<td>22.6</td>
</tr>
<tr>
<td>&gt;10 years</td>
<td>1</td>
<td>3.2</td>
</tr>
<tr>
<td><strong>Complication</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>16</td>
<td>51.6</td>
</tr>
<tr>
<td>No complication</td>
<td>15</td>
<td>48.4</td>
</tr>
<tr>
<td><strong>Last checked blood glucose level</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 200 mg/dL</td>
<td>12</td>
<td>38.7</td>
</tr>
<tr>
<td>≥ 200 mg/dL</td>
<td>17</td>
<td>54.8</td>
</tr>
<tr>
<td>Unknown</td>
<td>2</td>
<td>6.5</td>
</tr>
</tbody>
</table>

Source: 2017 primary source

Table 2 shows the majority of study participants (74.2%) are experience Diabetes Mellitus for 1–5 years. About half of the participant (51.6%) have another disease complication and majority (54.8%) had blood glucose level greater than or equal by 200 mg/dL on last time checked.

Table 3 Cross tabulation on self regulation and emotional aspect using Kolmogorov-Smirnov

<table>
<thead>
<tr>
<th>Emotional aspect</th>
<th>Non/sgilghtly distress</th>
<th>Moderate distress</th>
<th>Highly distress</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self regulation</td>
<td>High</td>
<td>15 (48.4%)</td>
<td>2 (6.4%)</td>
<td>3 (9.7%)</td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td>2 (6.4%)</td>
<td>6 (19.4%)</td>
<td>3 (9.7%)</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>17 (54.8%)</td>
<td>8 (25.8%)</td>
<td>6 (19.4%)</td>
</tr>
</tbody>
</table>

Kolmogorov-Smirnov analysis results $p = 0.020$

Table 3 shows almost half of the participant (15 person, 48.4%) within the high ability of self regulation experience non/sgilghtly distress. Only two person (6.4%) within the low ability of self regulation experience non/sgilghtly distress. Kolmogorov-Smirnov analysis result shows $p = 0.020 \leq \alpha (0.05)$, it may be conclude that there was significant correlation between self regulation and emotional aspect among Diabetes mellitus survivor.

Kolmogorov-Smirnov analysis test results shows there was correlation between self regulation and emotional aspect among DM survivor. The emotional problems previously known as usual problem happen among DM survivor. Stress, depression, possibility of long-term complication, fearness of living with diabetes, loss of motivation on the Diabetes treatment,
apprehensive on the blood-glucose result and feel of bored were the usual emotional problems experienced by DM survivors (Kusniawati, 2011).

Based on Shontz in Kusumadewi (2012), chronic-illness patients will be adapt to their disease through the four states of adaptation. 1) Shock, this state will raise up when the patients on the early knowing of the unwanted disease is positively acquire among themselves; 2) Encounter reaction, during this state the patients will shows a reaction to the emotional distress and shows the feeling of lose; 3) Retreat, the denial state of reality, usually patient will deny the reality and the stage of their disease; 4) Reoriented, in this state patient will take a look back the reality and impact of their disease to their life. Patient will start to modify their life target and re-thinking about the new way of life. Based on this theory, psychological adaptation of chronic-illness disease is dynamic, rarely happen on one state only. For some other patients the process also may repeatedly back, happen every of new life challenge, become the response of the lost and grieving. Moreover, to another patients these process may be missed.

Adaptation to the fluctuation of emotional were needed in order to set the succesfully treatment program among Diabetes Mellitus survivors. The survivor will adapt to the disease condition and also acceptance on the treatment consequence (Kusniawati, 2011). Ormrod (2009) continously stated, a person who had the good character or ability of self regulation will able to control the emotion trough self assessment or they will intentionally change the feeling which may resulting a contraproductive behavior. Bandura & Cervone (1986) also state that self regulation component are including ability to control the emotion and motivation trough monitoring and modification of motivation and emotional reaction. High ability on self regulation will lowering the Diabetes Mellitus survivor distress level. It showed in the cross-tabulation results (Table 3) that almost half of the participant (48.4%) who had a high ability on self regulation experience non/slightly distress. This finding similar to the study by Santoso (2015), the positive significant relationship between self regulation and problem- related coping stress means that there are individual effort to encounter the stress. Personal control is one of the significant factor that influence person to deal with stress (Potter & Perry, 2010) in this case is the self regulation. Conclusion of this study, the higher ability of self regulation implement by the survivor, the more positive a person to cope with the stress and they will experience non/slightly distress.

A study was done by Al-Jufri & Ervina (2015) in Jember proven that there are significant effect between self regulation to the emotional maturity. Moreover, the emotional maturity also influence by personal self regulation. Self regulation here define as a process, dynamic motivational system from a person to manage and modify the thinking process, feeling, the needs, and action or behavior in stipulate, develop, measure, revise and adjust the specific life goals, to the highest target, including managing the response of emotional to some trigger (Apranadyanti, 2010). Which means, the higher self regulation will increase the emotional maturity. Amiril (2013) through his study specifically mention that self control was correlated with work-related stress. Emotional maturity also correlate with work-related stress. Together, the high ability of self controlling and emotional maturity will influence the personal level of stress.
4. Conclusions

Almost half of the study participant have a high ability of self regulation, and minority experience a moderate level of distress. There was a significant correlation between self regulation and emotional aspect among Diabetes Mellitus survivor.

5. Acknowledgement

This research was supported by Research and Community Service Institute (Lembaga Penelitian dan Pengabdian Kepada Masyarakat) of the Universitas Muhammadiyah Ponorogo.
References

Knowledge of the Prophet Healthy Lifestyle on Students in Pesantren: a Comparison between Hand Fan and Leaflet Health Educational Media

Fathimah1*, Kartika Pibriyanti1, Hafidhotun Nabawiyah1, Fitri Komala Sari1, Raida Annisa1, Dianti Desita Sari1, Fadhila Sukur Indra2, Yana Elita Ardiani 2

{ fathimah@unida.gontor.ac.id }

1Nutrition Department, Faculty of Health Science, University of Darussalam Gontor, Indonesia. 2Faculty of Syari’ah, University of Darussalam Gontor, Indonesia.

Abstract. Background: Hand fan and leaflet health education media has been extensively used in health promotion. The application of Prophet healthy lifestyle not only spiritual benefit, but also physical health too. In the pesantren environment, an effective health education media to teach the Prophet's healthy lifestyle is absolutely needed to achieve the health level goals. The purpose of this study was to compare the effectiveness of hand fan and leaflets education media in increasing knowledge levels about the Prophet healthy lifestyle. Methods: This study used quasi experimental design, with pre-posttest two group design. Hand fan media group and leaflet media group, each group sample were 55 students. Data analysis used the Wilcoxon Signed Ranks test to compare scores before and after intervention in each group by questionnaire, then the Mann-Whitney test to compare between hand fan and leaflets groups. Results: There were significant differences (p <0.05) pre-post intervention in both groups. There was a significant difference (p 0.01) on mean score of knowledge between hand fan media group and leaflet media group. Conclusion: Both hand fan and leaflet media had improving the respondent's knowledge.

Keywords: hand fan, health educational media, leaflet, Prophet healthy lifestyle.

1. Introduction

The five pillars of Prophet’s healthy lifestyle consist of eating patterns, sleeping patterns, activity patterns, hygiene patterns and stress management patterns. These five patterns, if people applied properly and correctly, they had not only get the spirit benefit, but physical health is also well approved. The Prophet's healthy lifestyle refers to the healthy lifestyle promoted by the Indonesian Minister of Health that concerning the education on healthy living. (Kemenkes, 2011)
According to the Ministry of Health (2011), the healthy lifestyle habits was one of many factors that can affect health conditions. The application of clean and healthy behavior was one of health protection to a person or group who aware for improving their health.

In research on healthy lifestyles in Iran, it turns out healthy lifestyles were significantly associated with the incidence of breast cancer. (Ghosn et al, 2020)

Minister of Health the Republic of Indonesia Regulation No. 1/2013 regarding guidelines for organizing and developing Pos Kesehatan Pesantren (POSKESTREN), supports the realization of the independence of Pesantren’s people and the their community to behave in a clean and healthy life. One of them is through preventive health programs, such as a health education. In the pesantren, a health education is integrated with the education of the Prophet healthy lifestyle with various methods and media.

In Indonesia, various kinds of health education media have begun to facilitate the public about healthy lifestyles, support in the form of hand fan, disk, leaflets, posters, books, comics, videos, etc. The media has been used in exploration, training, and seminar activities to increase the knowledge of PAUD and kindergarten teachers and healthy breakfast education for students, elementary teachers and collage students (PERGIZI, 2016) and family (Sari Husada and PERGIZI, 2016).

All health education media are the embodiment of the healthy lifestyle that was launched by the Indonesian Ministry of Health. However, although the hand fan media has been generally used as a health promotion education media, but there is no study that proves that the hand fan education media is effective in increasing certain knowledge. In the pesantren environment, an effective health education media to teach the Prophet's healthy lifestyle is absolutely needed to achieve the learning goals.

The purpose of this study was to compare the effectiveness of hand fan and leaflets education media in increasing knowledge levels about the Prophet healthy lifestyle.

### 2. Instruments and Methods

#### 2.1 Design, Place and Time

The This research used quasi experimental design, with pre-post test two groups design. One group had intervention with hand fan media and the other group had intervention with leaflets media. All media about the Prophet healthy lifestyle education. Pre – post test used questionnaire.

- **Group 1. O1 - x1 - O2**
- **Group 2. O1 – x2 – O2**

O1 : pretest  
O2 : post test  

x1 : hand fan media  
x2 : leaflet media
This research was conducted in University of Darussalam Gontor (Pesantren College), in December 2019.

2.2 Instruments

The instrument used in this study were hand fan and leaflet media about the Prophet healthy lifestyle, questionnaire about hand fan and leaflet content provided.

2.3 Population and Research Subjects

The sample population was all female students of University of Darussalam Gontor. The number of each group used the formula of two independent groups (Rachmat, 2012)

\[
\sigma^2 = \frac{(n_1 - 1)S_1^2 + (n_2 - 1)S_2^2}{(n_1 - 1) + (n_2 - 1)}
\]

\[
n = \frac{(Z\alpha + Z\beta)^2 + 2\sigma^2}{\Delta^2}
\]

\[\sigma = \text{standard deviation sought}\]

\[S_1 = \text{standard deviation of the first group}\]

\[S_2 = \text{standard deviation of the second group}\]

\[n_1 = \text{group 1 sample size}\]

\[n_2 = \text{group 2 sample size}\]

\[Z\alpha = \text{confidence interval (5%; 1.96)}\]

\[Z\beta = \text{power of test (95%; 1.64)}\]

\[\Delta = \text{average difference with significant p value}\]

This study used the Kapti (2011) research method, with the same research design and a sample size was 30 respondents.

\[
\sigma^2 = \frac{(30 - 1)8.53^2 + (30 - 1)10.38^2}{(30 - 1) + (30 - 1)}
\]

\[
\sigma^2 = \frac{72,7609 + 107,75}{2}
\]

\[
\sigma^2 = 90.25
\]

\[
n = \frac{(1.96 + 1.64)^2 + (2 \times 90.25)}{6.52^2}
\]

\[n = 55\]

The number of samples each group were 55 students.
2.4 Data Analysis

Three steps of data analysis:

1. Normality distribution data test with Shapiro Wilk test. If p value >0.05, the data was normal distribution.

2. Analysis the differences each group of pre – post intervention with Wilcoxon Signed Ranks Test (all data had not normality distribution).

3. Analysis the difference between leaflet media group and hand fan media group with Mann Whitney Test (all data had not normality distribution).

3. Results and Discussion

The result of all data normality distribution test with Shapiro Wilk test can be seen in table.1 below.

Table 1: Data’s Normality Distribution

<table>
<thead>
<tr>
<th>Data</th>
<th>n</th>
<th>p - value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest hand fan</td>
<td>55</td>
<td>0.000</td>
</tr>
<tr>
<td>Posttest hand fan</td>
<td>55</td>
<td>0.000</td>
</tr>
<tr>
<td>Pretest leaflet</td>
<td>55</td>
<td>0.000</td>
</tr>
<tr>
<td>Posttest leaflet</td>
<td>55</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Table 1 shows that there was no data that had normal distribution. So, the statistical comparative analysis used the Wilcoxon Signed Ranks test to analysis pre – post knowledge score about Prophet healthy lifestyle in both intervention (hand fan media and leaflet) and Mann Whitney test to analysis mean knowledge score between hand fan and leaflet media.

Table 2. The knowledge scores pre – post intervention hand fan and leaflet media group

<table>
<thead>
<tr>
<th>intervention</th>
<th>n</th>
<th>Pretest*</th>
<th>Posttest*</th>
<th>P value**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hand fan</td>
<td>55</td>
<td>12 (8-14)</td>
<td>13(11–15)</td>
<td>0,00</td>
</tr>
<tr>
<td>Leaflet</td>
<td>55</td>
<td>12 (9-3)</td>
<td>13(10–14)</td>
<td>0,00</td>
</tr>
</tbody>
</table>

*Median (minimum – maximum)

** Wilcoxon Signed Rank Test

Table 2 shows that, there were significant differences knowledge scores of the prophet healthy lifestyle between pre and post test in both hand fan and leaflet media group (p < 0.000). It shows the post-test scores were higher than the pretest in both interventions (hand fan and leaflet).
The increasing of respondent's knowledge (post test score were higher than pretest scores) in both groups (hand fan and leaflet media) reflected an increasing the knowledge that influenced by media assistance which made it easier for respondents to remember the material provided.

It was in accordance with other educational media research such as research conducted by Beaujean et al. (2016) which states that both the movie and the leaflet are valued and effective intervention tools for improving knowledge about their study.

Other research that used educational media as a means to increase knowledge about healthy lifestyle is Karimlou’s study (2019), he said that the counseling such as educational media can improve health promoting lifestyles in middle-aged women.

In a study of the effectiveness of health education media in UK hospital waiting rooms, found that the variation of amount, topicality and material’s quality in waiting room are needed. As most patients notice health education materials and find them very useful. (K. Maskell et al., 2018)

Table 3. The knowledge mean scores between hand fan and leaflet media

<table>
<thead>
<tr>
<th>intervention</th>
<th>n</th>
<th>Median (minimum-maximum)</th>
<th>Mean ± SD</th>
<th>P value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leaflet</td>
<td>55</td>
<td>13(10–14)</td>
<td>12.58 ± 0.7</td>
<td>0.010</td>
</tr>
<tr>
<td>Hand fan</td>
<td>55</td>
<td>13(11–15)</td>
<td>13 ± 1.0</td>
<td></td>
</tr>
</tbody>
</table>

*Mann Whitney Test

Table 3 describes that there was significant difference knowledge scores of the prophet healthy lifestyle between hand fan and leaflet media group. (p 0.010). It also shows the hand fan post test value was higher than the leaflet.

Three functions of visual media were: 1) the attention function: to attract and direct students' attention to concentrate on content related to the meaning of the image displayed or the text that accompanied the subject. 2) the affective function: the level of student amusement when seeing the display of text, images or visual symbols that can arouse students' emotions and attitudes; 3) the cognitive function: makes it easier for respondents to understand and remember information or messages contained in images or symbols. (Levie, W.H. & Lentz, R. 1982)

The finding in this study can be related to the fact that hand fan media, is more attracting than leaflet ones. This interest could be due to the hand fan media having more functions compared to leaflets such as fanning, blowing air with tools. Also, hand fan media is easy to carry around especially on hot days, to cool the body. Respondents who were also students, can use this media while studying in hot weather. When the media is used functionally to cool the body, respondents repeatedly see the information in it. Unlike the leaflets whose use is only as information media (Bardaweel & dashash, 2018).

However, although statistically there were significant between the use of leaflet and hand fan media, the real difference was insignificant. This is shown by table 3, it explains that the difference in average score of post-test in the two media was only 0.5 which could be interpreted that between the two media there was different in one question. The difference in
one of these question obviously cannot prove that the use of hand fan media is more effective than the use of leaflets. It still needs further research with a certain period of time to see deeper changes in knowledge (Trihono, 2002).

4. Conclusion

Both hand fan and leaflet media had improving the respondent’s knowledge. Hand fan media more effective increased knowledge about the Prophet’s healthy lifestyle compared to leaflet media. We recommend for future research to consider.

Acknowledgements

Thank to University of Darussalam Gontor that has given us the opportunity to research and publish our research.
References

The Voluntary Counseling and Testing (VCT) in the Roles of National HIV Reporting

Dian Afif Arifah¹, Ratih Andhika Akbar Rahma¹, Iklilul Faiz¹, Ragil Retnaningsih¹

¹Occupational Safety and Health Departement of Health faculty, Universitas Darussalam Gontor

Abstract. The primary problem in HIV risk assessment is underreporting. The World Health Organization (WHO) and UNAIDS believe that the number of reported cases does not describe the actual number of HIV and AIDS cases in Indonesia. In 2016, based on the number of drug and prostitution users, the Ministry of Health estimated the number of PLWHA (people living with HIV / AIDS) in Indonesia is about 640,443 while the revealed case in the end of 2017 was only 280,623 (SIHA, 2017). The high gap between the estimated number of PLWHA and those who have reached HIV services caused many people with HIV/AIDS didn’t get the ARV treatment early. This study tried to systematically explore how VCT facilities play a role in the reporting new HIV cases in Indonesia. This study using secondary data involves 497 districts/cities obtained from the 2017 HIV and AIDS Situation October – December 2017. The HIV as dependent or response variable is the number of HIV new cases reported in October – December 2017. The VCT variable is the total number of VCT facilities in the districts/cities. Data were analyzed using simple linear regression modelled using the R program version 3.2.3. This finding proves the role of VCT facilities in increasing the discovery of new HIV cases in Indonesia where an increase in the number of VCT services can increase the number of diagnoses of HIV cases by as much as 7.4 times. The influence of VCT variable on HIV variable was 67.6% (R Square 0.676).

Keywords: Voluntary Counseling and Test (VCT), HIV, Self-report

1. Introduction

Indonesia becomes the 5th most HIV-AIDS risk country in Asia. the number of HIV cases reported from 2005 to 2017 has increased every year. The cumulative number of HIV infections reported up to December 2017 was 280,623 cases. Since it was first discovered in 1987 until December 2017, HIV-AIDS has been 81.9% reported by 514 districts /cities in all provinces in Indonesia.

The primary problem in HIV risk assessment is underreporting ((Locke et al., 1990). The amount of revealed case is like an iceberg phenomenon, where only a small portion (10%) of the actual number is visible. The World Health Organization (WHO) and UNAIDS believe
that the number of reported cases does not describe the actual number of HIV and AIDS cases in Indonesia. For example, in 1999, the number of HIV positive reported by the Indonesian Ministry of Health was only about 1000 cases, but WHO and UNAIDS estimate the actual cases is more than 26,000. In 2016, based on the number of drug and prostitution users, the Ministry of Health estimated the number of PLWHA (people living with HIV / AIDS) in Indonesia is about 640,443 while the revealed case in the end of 2017 was only 280,623 (SIHA, 2017).

AIDS is often associated with a variety of negative stigma. Forms of social punishment or stigma against AIDS include isolation, rejection, and discrimination to the HIV suspects. Violence or fear of discrimination, has prevented many people from taking an HIV test, checking how the test results are, or trying to seek a treatment. Early diagnosis allows persons to receive care and treatment to reduce viral load, increase immune function, and thereby reduce risk for transmission, morbidity, and mortality (Bradly et.al, 2014).

Recent findings show the significantly better health benefits for persons who start antiretroviral therapy (ART) earlier (Part, 2012). All persons diagnosed with HIV should receive medical care and be offered ART as soon as possible after diagnosis with HIV infection, regardless of CD4+ count or HIV viral load to prevent deterioration of immune function, prolong life, and decrease transmission risk (US Department, 2014). The use of antiretroviral will also increase the quality of life of PLWHA and decrease HIV transmission. Effective treatment will reduce up to 96% of HIV transmission (CDC, 2014).

The high gap between the estimated number of PLWHA and those who have reached HIV services caused many people with HIV/AIDS are undetected and only diagnosed when symptoms get worse. That’s why it is difficult to estimate the actual number of HIV case Djauzi (2009).

Indonesian Ministry of Health in recent years has made strategy that focus on finding new cases of HIV by increasing the number of health care facilities providing HIV testing. There are some type of HIV testing service in Indonesia. Voluntary HIV counselling and testing (VCT) is a passive HIV testing service facilities that providing Health education, counselling and HIV Testing. At these facility, clients come to ask for an HIV test for various reasons based on their HIV-transmitted risk. This service emphasizes the assessment of the risk of HIV infection from a client. The counsellor and client discussing about the client's desire to undergo HIV testing and strategies to reduce the risk of contracting HIV. VCT is implemented in a variety of settings such as health service facilities, independent VCT services outside health facilities, community, etc.

VCT continues to play a critical role in HIV prevention, care and diagnose (Matovu, 2006). It is become an integral component of HIV prevention and care strategies worldwide (Denison, 2007). This study tried to systematically explore how VCT service patterns play a role in increasing reporting of HIV cases in 497 districts / cities in Indonesia.
2. Method

There are 497 districts/cities in 33 provinces that periodically report new cases of HIV in Indonesia up to December 2017. This study involves all districts recorded in the HIV and AIDS Information System (SIHA).

HIV/AIDS reported periodically in every 3 months by the Disease Control and Environmental Health (P2PL) department, Indonesian Ministry of Health. This study using secondary data obtained from the 2017 HIV and AIDS Situation October - December 2017.

The HIV as dependent or response variable is the number of HIV new cases reported in October – December 2017. The VCT variable is the total number of VCT facilities in the district.

Data were analyzed using simple linear regression modelled using the R program version 3.2.3.

2 Result

These results represent HIV cases of 497 districts in the 33 provinces in Indonesia. As described in the following figure, the number of VCT facilities and HIV cases in each province are described in the graphic from the smallest case to the highest.

Figure 1. HIV/AIDS reported and VCT facilities at the end of 2017
Figure 1 shows that East Java was the province with the highest HIV case with total case 8,204. The highest number of VCT facilities was also found in East Java (1039 facilities).

The discovery of new cases of HIV is an important step in diagnose PLWA status so that they get the right treatment or improving their quality of life.

In the following figure, we will see that the highest HIV new cases, PLWA and VCT facilities are in the same area.

Figure 2. The number of HIV, PLWA and VCT facilities by district
From the figure 2 known that the discovery of the highest number of VCT found in the district with the highest case of HIV of PLWA.

In addition, to describe the role of the VCT facilities in the reporting HIV cases, we do the cross-tabulation to compare the number of HIV / AIDS cases based on existance of VCT facilities in the district.

Table 1. Cross-tabulation of case based on existance of VCT facilities in the district

<table>
<thead>
<tr>
<th>Case</th>
<th>the existence of VCT facilities in the district</th>
<th>Total case</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>VCT +</td>
<td>No-VCT</td>
</tr>
<tr>
<td>HIV</td>
<td>47.728</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>100%</td>
<td>0%</td>
</tr>
<tr>
<td>AIDS</td>
<td>90.621</td>
<td>11.379</td>
</tr>
<tr>
<td></td>
<td>89%</td>
<td>11%</td>
</tr>
</tbody>
</table>

Table 1 shows that there is huge difference in the number of HIV / AIDS between district with VCT facilities (VCT +) and district with no VCT at all (no-VCT). we can even see that there is no HIV cases reported in the district where there are no VCT facilities.

Linearity test results using simple linear regression showed that there was a significant linear model (Sig. <0.05) involving VCT variables and HIV as response variable with the following summary:

Table 1. Coefficient (s) and summary of HIV-VCT Model

<table>
<thead>
<tr>
<th>Model</th>
<th>R square</th>
<th>95 % CI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Variable</td>
</tr>
<tr>
<td>1</td>
<td>0.676</td>
<td>(Constant)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>VCT</td>
</tr>
</tbody>
</table>

a. Dependent Variable: HIV

Based on model summary in the table 1., we can predict the number of HIV case reported based on the number of VCT Facilities with the following equation:

\[ HIV = 303.3 + 7.4 \text{ VCT} \]  

Equation 1 indicates that the increasing of VCT number would increase the number of HIV cases by 7.4 times.

The linear relationship between the number of VCT facilities and the number of HIV cases reported illustrated in the following figure.
Figure 3: Linear relationship between HIV and VCT variables

Figure 3 shows the linear line formed by 2 variables showing a positive direction, that indicates an increase in the number of VCT facilities will increase the number of reported HIV cases.

R Square value 0.676 as shown in table 1 shows that the effect of the VCT variable on the HIV variable was 67.6% categorized to strong. It is mean the other factor excluded in this study contributed 32.4% in the HIV case reported.

3. Discussion

In developing countries, the essential point in HIV case situation is finding new case so it represented the actual data. In Indonesia, there are still high gap between the number of reported HIV cases and the estimated number of case.

Though the increase of reported HIV cases is an indicator of high incidence, but on the other hand, detecting new case is essential entry point to prevent transmission and improve an ARV treatment.

At this study we prove that the increasing number in reporting of HIV cases is an indicator that the better system report in Indonesia. It proved by a significant linear relationship between number of VCT facilities and the number of reported HIV cases. Based on the result of this study, it can also kown that the district with no VCT service facilities report no HIV case.

In Indonesia, VCT is not the only model of HIV service facilities. There are some type of HIV service provided by health care facilities, including provider-initiated HIV testing and counselling (PITC). This study only involved VCT variables because many studies that prove the model Self-report is typically the only acceptable method of assessment (Napper 2010, Usitalo 2014, Tassiopoulos, 2010). Uzochukwu (2013) in his study revealed that 76.6% of respondents believe VCT can provide useful information on HIV/AIDS and VCT is obtainable mainly in teaching hospitals.
One of the weaknesses of this study is that we did not consider other HIV service facility type to be compared with VCT.

VCT model is more efficient because it relies on participant initiatives. But this method raises the passivity of health workers and facilities because they only have to wait. In culture-oriented country, like Indonesia, VCT may less effective because fear of stigma and discrimination might prevent to seek service and consultation. An active role of health workers is needed. so that high-risk participants want to have a check-up because the community's motivation to seek services may be low given the continued fear of stigma and discrimination.

Sustainable strategy or methods to increase participation and initiation of participants are needed to take advantage of this VCT facility. Another approaches may needed in order to achieve universal access to HIV prevention, care, support and treatment.

4. Conclusion

This finding proves that there is significant role of VCT facilities to increase number reported new cases of HIV in Indonesia. The increase in the number of VCT services could impact on the increase number of HIV cases reported by 7.4 times.

The influence of VCT variable on HIV variable was 67.6% (R Square 0.676), while 33 % is effected by other variables.

Sustainable strategy or methods to increase participation and initiation of participants are needed to take advantage of this VCT facility. Another approaches may needed in order to achieve universal access to HIV prevention, care, support and treatment.
References


Formulation of Solid Soap Combination of Green Tea Leaf (*Camellia sinensis* L.) and Corn Kernel (*Zea mays*) Extracts

Solikah Ana Estikomah¹, Hamidah Tussifah², Nadia Mira Kusumaningtyas¹, Binti Sholihatin¹ and Lavia Dinta¹

{ ana@unida.gontor.ac.id }

¹Pharmacy Department, Darussalam Gontor University, Ponorogo, Indonesia
²Management Department, Darussalam Gontor University, Ponorogo, Indonesia

**Abstract.** Soap is one of the daily needs used as a body cleansing agent. The variety of commercially available soaps is seen in the type, fragrance, color, and benefits offered. Corn kernels are rich in vitamin A and vitamin E, these vitamins act as natural antioxidants that can enhance the body's immunity and inhibit degenerative damage, the antioxidant content can prevent the aging process and counteract free radical. Green tea (*Camellia sinensis* L.) is one type of herbal plant, green tea contains polyphenols. The famous polyphenol is catechin. Catechins have antibacterial properties. This research used experimental research. The tests were carried out toward a foam-forming test, pH test, water content test, and preference test on 20 respondents. Statistical data analysis using ANOVA significance level of 5% for preference acceptance data using a DMRT significance level of 5%. Solid soap preparations from green tea extracts and corn kernels showed good quality in formulation F4: 25% corn and 75% green tea which have alkaline properties with levels pH 8.99, moisture content of 15.43.

**Keywords:** Solid soap, green tea, corn kernel

1. Introduction

Along with the times and technology, many innovations have emerged, especially in making soap. Soap is one of the daily necessities that can be used as a body cleansing agent. Solid soap is a product of oil derived from mixing sodium or potassium with fatty acids. In general, soap is in the form of solid or liquid, has foam and aroma that varies (SNI, 2016).

The principle of making solid soap in the form of dissolving the mass of soap in alcohol, then adding other additional ingredients that have certain functions. One of the uses of natural materials is green tea leaves because it is considered to be safer, more practical and economical and has fewer side effects than using chemicals.
Free radicals are a form of reactive oxygen compound that has unpaired electrons so it tends to be unstable. These unpaired electrons will try to bind other electrons to become stable. Antioxidants are phytochemical compounds that act as electron donors to oxidant free radicals. Antioxidants are used as a deterrent to the oxidation process. The effects of free radicals on the body can cause damage to the function of body cells that cause degenerative diseases. The human body naturally produces antioxidants in the form of immune cells in limited quantities. To meet the needs of these antioxidants, external antioxidants are needed that can be obtained from vegetables and fruits. Examples of antioxidants that greatly affect the body's immune system are vitamin C, vitamin E, Se, Zn, and glutathione (Bewer, 2011)

Natural ingredients that can be used as antioxidants are green tea leaves (Camellia sinensis L) and corn (Zea Mays). Green tea leaves are known as plants that contain catechin compounds. Catechin compounds are known to be antioxidants that provide absorption at the wavelength of the UV B region (290-320) (Sari MP, 2014). Corn has Vitamin A or carotenoids and vitamin E, especially in yellow corn. In addition to its function as a micronutrient, the vitamin acts as a natural antioxidant that can increase body immunity and inhibit degenerative cell damage (Suarni, 2005)

2. Method

2.1 Material and equipment

The materials used in this study were green tea obtained from a yellow tea plantation, corn kernel from Karanganyar, 96% ethanol (Brataco), virgin coconut oil (VCO), iwe oil, sodium hydroxide (NaOH) 30% solution, glycerin (Brataco), ethylendiamamin tetraamide (EDTA), stearic acid, and deionized water.

The tools used in this study are glassware (Pyrex), blenders (Miyako), magnetic stirrer bars, vacuum pumps V-700, rotary vacuum evaporators (Buchi Rotavapor R11), stirrer hotplates (Thermo Fisher Scientific), analytical balance (Thermo Fisher Scientific, Ohaus), test tubes (Pyrex), pH meters (Risantec), waterbath, aluminum foil.

The basic compositions of our solid soap were shown in below (Table 1).

<table>
<thead>
<tr>
<th>Materials</th>
<th>Composition</th>
</tr>
</thead>
<tbody>
<tr>
<td>NaOH 30%</td>
<td>27 g</td>
</tr>
<tr>
<td>Aquadest</td>
<td>70 mL</td>
</tr>
<tr>
<td>EDTA</td>
<td>0.23 g</td>
</tr>
<tr>
<td>Olive oil</td>
<td>10 mL</td>
</tr>
<tr>
<td>Palm oil</td>
<td>130 g</td>
</tr>
<tr>
<td>Stearic acid</td>
<td>10 g</td>
</tr>
</tbody>
</table>

The basic composition of solid soap was called as basis. It was varied into 5 formulations (see Table 2).

Table 2. Vary formulations of solid soap combination of green tea leaf and corn kernel extract

<table>
<thead>
<tr>
<th>Materials</th>
<th>Ratio concentration of extract</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formula</td>
<td>Formula</td>
</tr>
</tbody>
</table>


All material used was weighed, the process of making soap utilized saponification reaction with the reaction of stearic acid, fatty acids with NaOH. Stearic acid was melted by heating 70°C. Furthermore, palm oil and olive oil were mixed until homogeneous, then added 30% NaOH solution at a temperature of 60-70°C, dissolved glycerin, added EDTA and extracts of green tea leaf and corn kernel.

### 2.2 Extraction of green tea leaf and corn kernel

The extraction method is carried out by infusion. Green weighed as much as 1 gram and 200 ml of distilled water is added, then the infusion process was carried out.

### 2.3 Organoleptic test

Organoleptic test was conducted toward physical tests of solid soap including colour, odour, and shape. Test was conducted on 20 respondents who were asked to try solid soap that was made in vary formulations, then after those respondents were asked to provide responses and assessments of transparent solid soap that had been tried.

### 2.4 Foam forming test

Foam forming was tested by weighting 1 g of solid soap. It was put into a test tube containing 10 mL of water. Furthermore, the test tube was shacked manually for 5 minutes then measuring the height of the foam.

### 2.5 pH test

pH test was conducted by 0.2 g solid soap soaked in 20 mL deionized water then the solution was measured using pH meter.

### 2.6 Moisture content test

The determination of moisture content was done by the gravimetric method. The procedures were weighing 5 grams of sample in a petri dish that was known the weight, heating in a drying cabinet at 105°C for 2 hours until the weight remains (SNI 01-3532-1994).

\[
\text{Moisture content} = \frac{W_1 - W_2}{W} \times 100\%
\]

Information :

\[
W = \text{sample weight (grams)}
\]
3. Results

3.1 Organoleptic test
Organoleptic testing aims to determine the physical appearance of solid soap preparations, by looking at the shape, odor, and color of the preparation. The resulting liquid soap is solid, brown and smelly.

3.2 Foam forming test
Foam is one of the most important parameters in determining the quality of cosmetic products, especially soaps. The purpose of foam testing is to see the foam strength from the soap. A stable foam for a long time is more desirable because foam can help cleanse the body (Pradipto, 2009). In this study, the high yield of foam was between 50.94-64.78%. The characteristics of soap foam are influenced by several factors, namely the presence of surfactants, foam stabilizers and other liquid soap compilers (Amin, 2006). Soap products on the market generally contain surfactants, namely Sodium Lauryl Sulfate (SLS) which functions as a foam enhancer. SLS is often used in soap making, but in large doses, it can irritate the skin. The making of soap in this study did not utilize Sodium Lauryl Sulfate (SLS) since it was expected to minimize the occurrence of skin irritation.

<table>
<thead>
<tr>
<th>Formula</th>
<th>Foam content (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>50.94*</td>
</tr>
<tr>
<td>F2</td>
<td>54.44*</td>
</tr>
<tr>
<td>F3</td>
<td>64.78*</td>
</tr>
<tr>
<td>F4</td>
<td>57.77*</td>
</tr>
<tr>
<td>F5</td>
<td>58.56*</td>
</tr>
</tbody>
</table>

Information :
F1: 100% corn kernel; F2: 75% corn kernel and 25% green tea; F3: 50% corn kernel and 25% green tea; F4: 25% green tea and 50% corn kernel; 100%: green tea.

3.3 pH test
The measurement of pH in this study aimed for checking pH of the preparations that was affected by the irritating properties of the skin. The amount of alkali present in the soap affects the magnitude of the pH value. Making soap involves using large amounts of NaOH. Tests using a digital pH (meter) tool based on the analysis results, the solid soap obtained in this study has a pH range between 8.86-9.00. Whereas according to SNI, the pH range of solid soap ranges between 9-11. The solid soap obtained in this study has met the SNI standard. The soap in this researcher is alkaline because of the addition of corn kernels extract and green tea leaves containing alkaline compounds in solid soap preparations that affect the value of the
acidity (pH) produced. In this study, the best pH level was 9 in the F3 treatment with 50% corn and 25% green tea.

<table>
<thead>
<tr>
<th>Formula</th>
<th>pH</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>8.86&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>F2</td>
<td>8.91&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>F3</td>
<td>9.00&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>F4</td>
<td>8.99&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>F5</td>
<td>8.91&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

Information:
F1: 100% corn kernel; F2: 75% corn kernel and 25% green tea; F3: 50% corn kernel and 25% green tea; F4: 25% green tea and 50% corn kernel; 100%: green tea

3.4 Moisture content test

The water content test aims to determine the levels present in a solid soap preparation. Bath soap according to SNI 06-3532-1994 stipulates that the water content of bath soap has a limit of a maximum of 15%. In this study the water content of treatments F1, F2, F4, F5 meet the standard range of 15%, while the treatment F4 exceeds the standard of 16.74%. The amount of water added to the soap will affect the solubility of the soap. Moisture content in solid soap affects the quality of the preparation. Water added to soap products can affect the solubility of soap in water. According to Hambali (2005), the more water contained in soap, the soap will shrink easily and run out quickly when used. Based on the results of the test of water content obtained data.

<table>
<thead>
<tr>
<th>Formula</th>
<th>pH</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>15.34&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>F2</td>
<td>15.44&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>F3</td>
<td>16.74&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>F4</td>
<td>14.74&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>F5</td>
<td>15.43&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

Information:
F1: 100% corn kernel; F2: 75% corn kernel and 25% green tea; F3: 50% corn kernel and 25% green tea; F4: 25% green tea and 50% corn kernel; 100%: green tea

4. Conclusion

Solid soap preparations from green tea extracts and corn seeds have good quality in formulation F4: 25% corn and 75% green tea which have alkaline properties with pH levels of 8.99, moisture content of 15.43
Acknowledgement
Researchers would like to thanks to Darussalam Gontor University for funding of this research thus it can be carried out well and all parties related to the writer cannot be mentioned one by one.

References

Risk Factors of Central Obesity among Female Students

Kartika Pibriyanti1 *, Fathimah2, Susi Nurohmi3, Safira Kholifatul Ummah4

{ dkartika.02@gmail.com }

1,2,3,4 Nutrition Department, Faculty of Health Science, University of Darussalam Gontor

Abstract. Central obesity is an excessive fat in abdominal cavity, wrapping around abdominal organs and considered as risk factor for several chronic diseases such as atherosclerosis, cardiovascular disease, type 2 diabetes mellitus, gallstones, pulmonary disorder, hypertension and dyslipidemia. Several factors, like low physical activity, mental emotional, less consumption of fruits and can cause obesity. This study aimed to identify the risk factors for obesity in female college students. This research used case control design and purposive sampling technique. Subjects participated in this research were 94 female students classified as normal and central obesity. Statistical analysis used Chi Square test to analyze correlation between variables. The results showed that risk factors for obesity were vegetable consumption patterns (p = 0.000; OR = 7.71) and fruit consumption patterns (p = 0.002; OR = 3.71). Nutritional knowledge (p = 0.835; OR = 1.09), physical activity (p = 0.748; OR = 0.81), and mental emotional state (p = 0.391; OR = 0.69) were neither related nor a risk factor for central obesity. Low consumption of vegetables and fruits was risk factor for obesity among female students, while nutrition knowledge, physical activity and mental emotional state were not risk factors for obesity among female students.

Keywords: Central obesity, female students, fruit and vegetable consumption pattern, mental emotional state, nutritional status, physical activity

1. Introduction

The prevalence of central obesity in Indonesia has increased in the last 5 years. The increase reached 31% in 2018 from 3.4% in 2013 (Ministry of Health, 2018). Munyogwa and Mtumwa (2018), explained that in Tanzania, prevalence of central obesity among women (35.14%) was higher than men (6.89%). In Indonesia, the incidence of obesity or central obesity is a "double burden disease" which can affect Indonesian population. Infection is a major cause of morbidity and mortality, on the other hand non communicable diseases such as central obesity can also cause death (Harbuwono et al, 2018).

Obesitas sentral merupakan faktor risiko dari beberapa penyakit sindrom metabolik diantaranya hipertensi, dislipidemia dan diabetes tipe 2 (Sofa, 2018). According to Ministry of
Health, 2018, central obesity can be measured using indicators of waist circumference or abdominal circumference (>80 cm in women and > 90 cm in men). The incidence of central obesity is caused by poor eating patterns and consuming unhealthy foods frequently such as fast food, junk food, and softdrinks (Septiana, et al. 2017). Furthermore, low activity level causing an imbalance between energy intake and expenditure can also be a cause of central obesity (Khairani, et al, 2018). And central obesity will be risk factor for several metabolic syndrome diseases including hypertension, dyslipidemia and type 2 diabetes mellitus (Sofa, 2018).

Prevention of central obesity earlier in adolescence is very important to minimize the occurrence of central obesity in adulthood and elderly. Central obesity in adolescents also affects adolescent psychological growth. Adolescents with obesity will have a negative body image that affects their mental and emotional state and it will result in a low quality of life (Kharistik, et al, 2018)

University of Darussalam Gontor has 2 categories of student namely regular students and teacher students. Besides being a teacher and mentor for guiding high school female students in boarding school, teacher students also study as college student at University of Darussalam Gontor. These all students join together in one forum namely Student Council. Teacher students have lots of activities from the start of waking up to going to sleeping their daily life. The activities must be balanced with a good diet so they can optimize their duties as female students of college and mentors for high school students (Wardun, 2019).

Islam gives special attention regarding overweight or obesity. The Prophet, Rasulullah SAW said, “The best people are those living in my generation, then those coming after them, and then those coming after (the second generation). There will be some people after you, who will be dishonest and will not be trustworthy and will give witness (evidences) without being asked to give witness, and will vow but will not fulfill their vows, and fatness will appear among them”. (HR. Bukhari dan Muslim)

This study aimed to identify the risk factors for obesity in female college students of University of Darussalam Gontor

2. Instruments and Methods

This study was descriptive analytic research with case control study design and conducted in December 2019-January 2020 at University of Darussalam Gontor. Among total population of 2047 female students, purposive sampling was used to determine subjects participated in this study. The number of sample was 94 female teacher students that was devided into two group consisted of case (47 subjects with central obesity) and the control group (47 subjects with normal waist circumference). Inclusion criteria of respondents were female teacher students of University of Darussalam Gontor aged 18-21 years and living in female campus dormitory.

Data collected were central obesity status, nutritional knowledge, vegetable and fruit eating pattern, physical activity level, and emotional mental health. Central obesity status was obtained by measuring waist circumference (WC). WC more than 80 cm was categorized as central obesity > 80 cm. Nutritional knowledge was assessed by using questionnaire containing 10 dichotom questions that had been submitted for validity and reliability. Food
Frequency Questionnaire was used to obtain vegetables and fruit eating patterns, IPAQ-SH questionnaire for physical activity and SRQ for emotional mental health.

Statistical analysis used Chi Square test with significant limit of $\alpha=0.05$ to analyse risk factors for central obesity and Odd Ratio (OR) to identify whether an exposure associate with lower or higher odds of outcome (central obesity).

This study has received research ethics from Health Research Ethics Commission of Faculty of Medicine, University of Muhammadiyah Surakarta Indonesia with licence number: 2539 / B.1 / KEPK-FKMS / XI / 2019.

3. Results and Discussion

The result showed that, good nutritional knowledge among female students was seen more frequently in control group (51.2%) as compared to central obesity group (48.8%). There was no significant association between nutritional knowledge and central obesity ($p=0.835$). In other words, nutritional knowledge was not risk factor for central obesity.

Nutrition is defined as food and its benefits for health so it’s important to keep healthy by choosing foods that are appropriate to the life cycle and physiological functions of the body (Hardinsyah, 2017). Nutritional knowledge is very important and one of the factors influencing preference in choosing food. If in adolescents have less nutritional knowledge, efforts to maintain the balance diet may be poor and cause malnutrition (Samranah, 2017).

The result of this study is comparable with the finding of Puspitasari (2018) which stated that there was no significant relationship between nutritional knowledge and central obesity in adulthood. Nutritional knowledge didn’t guarantee one’s eating pattern.

No significant association between nutritional knowledge and central obesity among female students was because food consumption was not only influenced by nutritional knowledge but also several factors.

### Table 1. Risk factors of central obesity among female students

<table>
<thead>
<tr>
<th>Variable</th>
<th>Normal waist circumference</th>
<th>Central obesity</th>
<th>$p$ value</th>
<th>Odd ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nutrition knowledge Good</td>
<td>21</td>
<td>20</td>
<td>0.835</td>
<td>1.000 (0.482-2.465)</td>
</tr>
<tr>
<td>Less</td>
<td>26</td>
<td>27</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical activity level</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>41</td>
<td>42</td>
<td>0.746</td>
<td>0.813 (0.230-2.875)</td>
</tr>
<tr>
<td>Moderate</td>
<td>6</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emotional mental health</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>28</td>
<td>32</td>
<td>0.391</td>
<td>0.691 (0.296-1.610)</td>
</tr>
<tr>
<td>Bad</td>
<td>19</td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vegetable consumption pattern</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adequate</td>
<td>40</td>
<td>53</td>
<td>0.000</td>
<td>7.714 (2.869-20.751)</td>
</tr>
<tr>
<td>Inadequate</td>
<td>7</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fruit consumption pattern</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adequate</td>
<td>22</td>
<td>29</td>
<td>0.002</td>
<td>3.716 (1.473-9.737)</td>
</tr>
<tr>
<td>Inadequate</td>
<td>25</td>
<td>28</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Most of female students had high physical activity level in not only control group (49.4%) but also central obesity group (50.6%). There was no significant association between physical
activity and central obesity (p=0.813) so that physical activity was not a risk factor for central obesity.

No significant association between physical activity and central obesity showed that students with high physical activity level could experience central obesity (p=0.748; OR=0.813). It is known that teacher students had lots of daily activities which were focus on teaching. Based on mobility and duration, it was included in strenuous activities, but in fact this activity was carried out with more sitting and occasionally standing. Azkia and Wahyono's research (2018) also stated that there was no significant association between physical activity and central obesity (p=0.872). It was due to the absence of physical activity measurement tools and only using questionnaire and observation in collecting data of physical activity level.

Physical activity is part of body weight management and has significant contribution to long-term weight loss. It can lower health risks associated with chronic diseases (Hasriana, 2014).

Total subjects with high level of physical activity was 83%. All activities in University of Darussalam Gontor and its dormitory or never stop 24 hours a day. It has slogan, "Alha’hadu Laa Yanaamu Abadan" which means" This boarding school will never sleep". It means that all the activities in Gontor never stop for 24 hours. Both day and night there will always be lots of activities carried out by students or teachers.

Masri and Sari (2019) explained that those who had high level of physical activity didn’t mean free from the risk of central obesity. It’s because the habit of high fat diet could be one of the factors affecting central obesity. According to the interview, respondents consumed high fat diet such as fried foods frequently. This habit should be aware of because based on previous research conducted by Hidayati and Pibriyanti (2018), women had risk 2.9 times greater of having high blood sugar levels that lead to hyperglycemia or even diabetes mellitus compared to men.

The proportion of normal emotional mental in central obesity and control group was 53.3% and 46.7% respectively. This study showed that there was no significant association between mental emotional with central obesity (p=0.391; OR=0.691). Mental emotional was not considered as risk factor for central obesity.

Research of Pibriyanti (2018) also showed that there was no significant association between mental emotional and central obesity. Normal and central obesity students tended to have the same emotional mentality status. It could be due to the capability to adapt and habitual factors of female students in regulating mental emotion so that they could adapt to the situations quickly. They got used to be trained since undergoing education at high school level of Kulliyatul Mu'allimin al-Islamiyah (KMI) at Boarding School of Darussalam Gontor. They had adapted for 6 years if entering KMI since junior high school, or 4 years if Teacher students who entered KMI at the junior high school level had adapted for 6 years, while those who entered KMI since the high school level had adapted for 4 years.

Adequate vegetable consumption among female students was seen more frequently in control group (66.7%) as compared to central obesity (33.3%). Vegetable consumption pattern had significant association with central obesity (p<0.05; OR=7.711). It meant that female students with inadequate vegetable consumption had risk 7,714 times greater to have central obesity compared to those consuming adequate daily vegetables. Previous research conducted by Triandhini, et al (2018), showed that there was significant difference of vegetable
Consumption between normal and obese children \( (p=0.001) \). Children with normal nutritional status consumed vegetables more frequently because their parents worked as vegetable farmers.

Vegetables and fruits are rich of micronutrients, source of vitamins, minerals and dietary fiber needed for development, growth and maintaining health. Green vegetables as well as colored fruits and vegetables are also sources of bioactive compounds as antioxidants. It can be obtained from colored vegetables such as red spinach purple, sweet potatoes, carrots, and tomatoes (Ministry of Health, 2017).

Consumption of fiber can reduce body weight by limiting energy consumption, so that someone with overweight or obese will be more motivated to have weight loss diet (Ledoux, et al, 2011). The different pattern of vegetable consumption between normal and central obesity group was due to eating preference of only a few kinds of vegetables such as spinach, long beans and carrots, while students sometimes didn’t like the existing vegetables provided in dormitory. It's sometimes considered to be overcooked so that students didn’t like it and preferred to buy vegetables in cafeteria.

The proportion of adequate fruit consumption among normal group was higher (71%) than central obesity group (29%). Fruit consumption pattern was associated with central obesity \( (p=0.002; \ OR=3.716) \). It meant that female students with inadequate fruit consumption had risk 3.716 times greater to have central obesity compared to those consuming adequate daily fruits.

Previous research by Bahreynian, et al (2018) showed that fiber consumption was significantly related to weight loss and central obesity \( (p=0.006; \ p=0.008) \). Most respondents with obesity or central obesity consumed small amounts of dietary fiber and didn’t meet RDA. It is strongly recommended to consume dietary fiber derived from fruits, vegetables or others to prevent degenerative diseases in adolescents such as metabolic syndrome, type 2 diabetes mellitus and coronary heart disease.

Prevalence of Indonesian people aged \( >10 \) years old that consume adequate and inadequate consumption of fruits and vegetables was 3.3 and 93.5% and 3.3% respectively. It could be seen that Indonesian people were lack of fruit and vegetable consumption in their daily eating habits. Ministry of Health (2019) recommended to consume 3-4 servings of vegetables and 2-3 servings of fruit every day or a half plate containing fruit and vegetables (more vegetables) at every meal.

Fruit and vegetable consumption patterns can be influenced by nutritional knowledge, food availability, and social media exposure (Rohman, et al. 2017). Nutrition knowledge obtained from social media is not guaranteed to be valid and verified. People with good nutritional knowledge, but obtained from invalid literature couldn’t yet be ensured to have good eating habit. In addition, there are several factors that can affect vegetables and fruit consumption pattern. One of these factors is availability depending on the season. In some seasons, fruit and vegetable availability or consumption can be higher or even lower (Layade, 2014).
4. Conclusions

Inadequate consumption of vegetables and fruits was a risk factor for central obesity among female students, while nutritional knowledge, physical activity and mental emotional state were not risk factors for central obesity among female students of University of Darussalam Gontor.
References

[1] Al-Hadist
[18] Layade., AI. 2014. Fruit and Vegetable Consumption Among Student of Tertiary Institution in Oyo State. Rjos. 6(3).


Effect of Date Fruit ‘Ajwah’ in Seven Number and Six Number to Blood Glucose in Female Adolescent

Hafidhotun Nabawiyah¹, Kartika Pibriyanti², Nida Khoyrunnisa³, Ladyamayu Pinasti⁴

{ nidakhoyr@gmail.com }

¹Nutrition Department, Faculty of Health Science, University of Darussalam Gontor

Abstract. Ajwah dates are commonly consumed by Prophet Muhammad. In hadith mentions the virtue of consuming Ajwah dates in an odd number of 7 dates. This research was conducted to determine the effect of date in introduction of odd number (7 dates) and even number (6 dates) to blood glucose. There 2 group was divided in this research group 1 was consuming Ajwah dates in odd number and group 2 was consuming Ajwah dates in even number. Sample was taken consecutive sampling, there were 20 respondents. Respondents fasted for 12 hours from 20.00 to 08.00. Respondents would be taken fasting blood glucose and then given Ajwah dates to be consumed. Subsequent intake of blood glucose in the 30 minutes, 60, 90, and postprandial blood glucose (120 minutes). The results showed that the average fasting blood glucose group 1 is 70.90 ± 8.77 and group 2 is 70.70 ± 10.45, while on blood glucose postprandial (minute 120) group 1 is 66.50 ± 13.73 and group 2 is 76 ± 13.25. Postprandial blood glucose in group 1 indicates it should not wait for 2 hours to consume other types of food because before 2 hours, blood glucose has dropped beyond fasting blood glucose.

Keywords: Ajwah dates, Fasting Blood Glucose, Postprandial blood glucose 2 hours after meal.

1. Introduction

Fruits are one type of food which is highly recommended by WHO for human consumption. One fruit that is recommended for consumption is the Ajwah date palm. Ajwah date is a fruit that is widely cultivated in the Al Madinah region of western Saudi Arabia which has nutraceutical properties for human health (Khalid et al., 2017). The nutritional content of dates includes carbohydrates, glucose, fructose, sucrose, magnesium, calcium, phosphorus, folate, protein, iron, vitamin A, thiamine (B1), riboflavin (B6), niacin (B3), pantothenic acid (B5), pyridoxine (B6) and folic acid (B9) (Al-alawi et al., 2017).

Based on previous studies showed that the largest component of carbohydrates in Ajwa dates is sugar amounting to 77% consisting of 0.5% sucrose, 34.5% glucose and 25.6% fructose. The total sugar content in 100 grams of Ajwah is 74.3 g which is included in the high category (Khalid et al., 2017), but based on the results of the study AlGeffari et al (2016) shows that
the levels of the Ajwah date palm glycemic index are relatively low (55, 9). The results of the study showed that the consumption of ajwah dates did not cause a significant increase in the glycemic response and concentration of blood glucose levels. Blood glucose level is the amount of glucose in blood plasma which is the main substrate for energy production during the perinatal, neonatal and postnatal periods (Dorland, 2010) (Güemes et al., 2015). The risk of high blood sugar levels in women is 2.95 compared to men (Pibriyanti & Hidayati, 2018).

Based on Ruslan's study (2015) showed that Ajwah has the same benefits and advantages as brown rice which can reduce blood glucose levels and inhibit glucose absorption so that it helps in controlling blood glucose levels in people with Diabetes Mellitus (DM). The results of the study (Indrayani et al., 2018) showed that the consumption of Ajwa dates based on the advice of the Prophet Muhammad was consumed in odd amounts. As narrated by Bukhari from Murajja bin Raja said; "Ubaidullah has told me that Anas said, the Prophet SAW eaten some dates with odd numbers" (Hadith narrated by Bukhari no. 990). Ajwah consumption is recommended in odd numbers such as 1, 3, 5 or 7 because Allah SWT likes odd numbers.

Febrianti’s study (2018) showed that there was no significant difference between the consumption of Ajwa dates with the number of dates 3, 5, and 7 pieces and delivery date on pregnant mice of 7 pieces is the most optimal dose to prevent the increase in blood sugar levels, as in the hadith of the Prophet Muhammad also suggested to consume 7 dates as narrated by Bukhari and Abu Daud from Amir bin Sa’d bin Abu Waqqash that the Prophet (SAW) said "anyone who consumes 7 Ajwah dates in the morning, then he will not be exposed poison or magic on that day” (Hadith narrated by Bukhari no. 5025 and Abu Daud no. 3378) (Indrayani et al., 2018). Based on this background, this study wants to prove whether there are significant differences in odd and even numbers, especially in the amount of 7 pieces and 6 pieces.

2. Methods

This research was held in the Nutrition Laboratory of University of Darussalam Gontor in November until December 2019. The population were student of University of Darussalam Gontor for Girls. The samples were taken by 10 people in each group. There were 20 female student collage gained. Sample was taken consecutive sampling method.

The research draft to be used by researchers was experimental. In research, the collected data was a variable related to fasting blood glucose and postprandial. The results of this study in the form of blood sugar charts ranging from fasting blood glucose and postprandial blood sugar 2 hours after meals. Measurement of blood glucose was started by 0, 30, 60, 90, 120 minutes (Istiqomah & Rustant, 2015).

In the respondents conducted anamnesis which includes self-identity, history of the disease, measurement of body weight and height. Respondents who have fulfilled all the criteria of inclusion and are willing to follow this research then fill in the Informed consent sheet.

The criteria inclusion are:

1. Under normal conditions seen from vital conditions.
2. BMI18.5-22.9 (based on Asia Pasific Standart).
3. Not being consumed or using certain medications such as insulin and oral hypoglycemic drugs.
4. Fasting blood glucose 70-110mg/dL (Sutedjo, 2009).

Exclusion criteria:
1. Suffer from chronic pain such as chronic kidney, diabetes mellitus, chronic heart and so on during interventions.
2. Has an allergic history to test food

Tools and material were used in this study is SF 400 10 kg digital kitchen scales was the scales used to weight Ajwah dates. Blood glucose intake using glucometer and blood glucose strips with the Easy Touch brand GCU. Respondents measured the weight of the electric body scale with the accuracy of 1 digit behind a comma. The respondent's height were measured using a microtoa with a General Care brand and a long accuracy up to 200 meters. Ajwah Date used to be bought from Riyadh, Saudi Arabia. Ajwah dates stored in the refrigerator with a temperature 10 degrees celsius. Before given to the respondent, the date of Ajwah removed in advance the seeds, then weighed and inserted into small plastic according to the number of dates, then distributed to each responden. This research has been through the level of ethical licensing of research in the dr. Moewardi’s hospital, Surakarta No: 1.262/ XII/HREC/2019

Data is presented in form of quantitative analysis. Data obtained in the form of ratio data and will be first tested using the normality test using Shapiro-Wilk. If the data is a normal distribution, it will be followed by a homogeneity test. After that, the data is homogeneous then done data processing using the One Way Anova to know the difference of each group.
3. Result and Discussion

2.1 Result

Table 1. Characteristic of Subject

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Max</th>
<th>Min</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>19,79 ± 1,68</td>
<td>23</td>
<td>18</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>Odd number</td>
<td>44,90 ± 1,85</td>
<td>48</td>
<td>43</td>
<td>10</td>
<td>50</td>
</tr>
<tr>
<td>Even number</td>
<td>38,40 ± 1,57</td>
<td>40</td>
<td>36</td>
<td>10</td>
<td>50</td>
</tr>
<tr>
<td>BMI</td>
<td>21,09 ± 1,10</td>
<td>22,9</td>
<td>19</td>
<td>20</td>
<td>50</td>
</tr>
</tbody>
</table>

According to Table 1 the average of respondents was 19 years, and was dominated by 18 years old respondents, there are 6 person. The difference in weight of dates on odd number and even number is 6,5 grams. The average of Body Mass Index (BMI) is 21,09, and it was categorized by normal nutritional status based on Asia Pacific.

Table 2. The Average of blood glucose checking and ANNOVA test results according to nutritional status

<table>
<thead>
<tr>
<th>FSG (mg/dl)</th>
<th>30’ (mg/dl)</th>
<th>60’ (mg/dl)</th>
<th>90’ (mg/dl)</th>
<th>PP (mg/dl)</th>
</tr>
</thead>
<tbody>
<tr>
<td>G1</td>
<td>70,90 ± 8,77</td>
<td>114,20 ± 25,24</td>
<td>73,40 ± 13,45</td>
<td>66,50 ± 13,73</td>
</tr>
<tr>
<td>G2</td>
<td>70,70 ± 10,45</td>
<td>96,90 ± 12,65</td>
<td>71,10 ± 18,75</td>
<td>76 ± 13,25</td>
</tr>
<tr>
<td>Sig.</td>
<td>0,964</td>
<td>0,148</td>
<td>0,797</td>
<td>0,756</td>
</tr>
</tbody>
</table>

According to Table 2, group 1 has a fasting blood glucose higher than postprandial blood glucose, while group 2 have a fasting blood glucose lower than postprandial blood glucose. Data showed that the high of blood glucose was in minute 30, which the blood glucose increased after consumed Ajwah dates. Difference between fasting blood glucose and postprandial blood glucose in group 1 is 44,4 mg/dl, in group 2 is 5,3 mg/dl.

Data from each group is tested normality using Shapiro-Wilk obtained the results that the data of the was normal and homogeneous because p > 0.05. The analysis continued using the One Way ANOVA test. The results of the ANOVA test showed that there was no significant difference in blood glucose examinations between the group because p > 0.05.
2.2 Discussion

The range of respondent age in this study was 18-23 years old which known as adolescent. At those age is known to occur in the mass of fat-free tissues and increase in fat tissue mass. Age alteration is related to increased distribution of fat tissue marked increasing the size of one's waist circumference (Tchernof & Després, 2013). The use of dates in odd number has been studied by Febrianti et al. (2018), which uses an extract of the date of fruit meat Ajwah 3 dates, 5 dates, 7 dates. Obtained the result that the lowest blood glucose and optimal in decreasing blood glucose after the administration of the date Ajwah extract contained in the group given in the number of 7 dates (dose 7.28 mg/kg weight).

The results of the analysis using the One Way ANOVA test showed that there is no significant difference between both of groups in blood glucose. This is due to the difference between dates is only 8-12 grams, so it does not pose a meaningful difference in blood glucose levels in both fasting blood glucose and postprandial blood glucose after meals. It relates to the glycemic index of food. That dates Ajwah with 50 g carbohydrates have a moderate glycemic index 55.9 (El-mergawi et al., 2018).

Another study conducted by AlGeffari et al (2016) that 17 varieties of dates grown in Saudi Arabia once of them is Ajwah dates has a glycemic index 55.9 and glycemic load 8.5 or equivalent with 50g of carbohydrat. And it will informed to diabetic or health people to controlled their diet. Ajwah dates categorised by medium range. According to food ingredients exchanger, 3 dates or equivalent to 15 g have a carbohydrate of 12 g (Damayanti et al., 2017). Thus, when the consumption of dates in odd and even quantities according to the study amounted to 30-40 grams of Ajwah dates or equivalent to 37.5-40 grams of carbohydrates.

On the curve described by Kholidha et al (2017) in his research that the increase in blood glucose did occur in the 30 minute and will return down in minutes to 120 or 2 hours after food consumption. The Association of Indonesian Endocrinology or in Indonesia called (PERKENI) and American Diabetes Association (ADA) use the benchmark < 70 mg/dl in diabetics mellitus and in non-diabetic individuals symptoms of hypoglycemia will arise when blood glucose levels < 55 mg/dl. Can be concluded that the respondent involved in the study is not hypoglycemi, because postprandial glucose > 55 mg/dl (Mansyur, 2018).

Researchers advise to immediately consume other types of food before 2 hours after consuming dates to avoid postprandial hypoglycemia 2 hours after eating. So, without having to wait 2 hours after the consumption of dates in lowering blood glucose, respondents could consume other types of food. This is the causes an odd number of dates ajwa in the number of 7 grains have the biggest increase when compared with an even number of 6 grains (see Table 7) but will decrease in minute 90 so, respondents can eat the other type of food without afraid in increasing blood glucose.

4. Conclusions

According on this study, there were no significant differences between respondents who consumed Ajwah dates in odd number and even number to blood glucose, because \( p > 0.05 \).
But if consumed in odd number, without waiting until 2 hours for eating the other type of food, in minute 90
References

Effect of Different Storage Time of Petai (*Parkia speciosa*) on Amino Acid Score and Protein Digestibility (*In Vitro*)

Fitri Komala Sari	extsuperscript{1*}, Hafidhotun Nabawiyah	extsuperscript{1}, Agustaviani Nursalma	extsuperscript{1}, Ardhiani Ayu	extsuperscript{1}

\{fitri.k.sari45@gmail.com\}

\textsuperscript{1}Nutrition Department, Faculty of Health Science, University of Darussalam Gontor

**Abstract.** Stink bean, locally known as petai, is widely consumed fresh as meals’ side dish. Petai often stored at room temperature for a relatively long time. This study aims to determine differences in amino acid scores and protein digestibility (*in vitro*) in petai with differences in storage time. Petai was kept at room temperature for 0, 4 and 8 days. Amino acid analysis uses HACCP and compared with PAAP (Provisional Amino Acid Pattern) to get the Amino Acid Score (AAS). Protein digestion is carried out in vitro with the addition of enzymes pepsin and pancreatin. The amino acid methionine was not detected at 0, 4, and 8 days storage. So, methionine as a limiting amino acid in the petai. Petai protein digestibility is between 66.37% - 70.83%. Consumption of petai as a side dish requires the substitution of other types of protein. Storage has no effect on the protein digestibility.

**Keywords:** decubitus; DC Motor; Microcontroller; Button; Bed Position.

1. Introduction

Petai (*Parkia speciosa*) is a legume which is commonly found in Indonesia. Some people like a petai as companion to eat rice, either raw as fresh vegetables or processed first. Protein inside petai is quite high, so it is often used as a side dish.

Protein is needed for growth and repair of body cells. The function of growth and improvements can be made if high-quality protein is shown from a high protein digestibility values in a material. Digestibility value can be calculated using the technique of *in vivo* and *in vitro*. One technique that is often used is the calculation of the digestibility of protein *in vitro* is done by adding multienzyme. Extra multienzyme in the analysis of protein digestibility will reduce the effects of endogenous inhibitors that are specific to a particular enzyme (Hahn, *et al.*, 1982).

Petai belonged to the legume is one source of protein commonly consumed by people of Indonesia. However, the digestibility of protein in legumes is lower than the digestibility of
the casein or sources other animal protein, due to factors intrinsic to the chemical structure of the protein legume as antinutrisi factor. Examples of protease inhibitors in legumes can inhibit serine protease pantreatik work and lower the value of protein digestibility (Lingsberger-Martin, et al., 2013).

Rule tasteless food is tasty, nutritious and safe for consumption. According Sutanti (2016), the protein content of the petai range at 22.85 to 36.03 g / 100 g. Good protein is ready to digest and contains essential amino acids in quantity in accordance with human needs (FAO, 1991 in Mokrane, et al., 2010).

Petai is usually used as secondary crops grown in villages. In the distribution of up to cities in Indonesia takes time and storage. However, during storage, changes the physical and chemical properties. Physical changes such as wilting, shriveled seeds, and loss of fluids (Sari, et al., 2016). Based on Sutanti, et al. (2016) an increase in levels of protein in the petai that has been stored in cold temperatures.

No studies have reported the digestibility of protein in the petai value. Therefore, the researchers looked at the need to examine the changes in amino acid score (AAS) and protein digestibility petai to long storage time.

2. Instruments and Methods

INSTRUMENT

The research material in the form of Petai obtained from Krasak Village, District Salaman, Magelang. The used chemicals were: aqua pro-injection, aqua bidestilata, HCl, NaOH, buffer phosphate, acid trichloro acetate, o-phthalaldehyde (OPA), methanol HPLC grade, standard mix of 17 amino acids (Sigma-Aldrich), pepsin enzyme digestion and pankreatin of pork (Sigma).

STORAGE

Petai stored at room temperature (28°C) by means of overlaid. Sampling was done on days 0, 4, and 8. The samples were stored in a freezer (-20°C) until analysis.

ANALYSIS OF AMINO ACID-FREE

Total amino acid analysis based research Jork, et al (1990) in Sulvi, et al. (2013). Petai powder (600 mg) was added to 4 ml of 6N HCl, refluxed for 24 hours at a temperature of 120°C, neutralized with 10 ml of 6N NaOH (pH7), and filtered through Wattman paper 0,2μm. A total of 50 mL sample was added a solution of 300 mL OPA.

Amino acid analysis wass done by HPLC SHIMIDZU LC 10 column LiChrospher 100 RP-C18 (125 x 4.0 mm). The mobile phase consisted of eluent A (50 mM sodium acetate: THF: methanol = 96: 2: 2) and eluent B (65% methanol with a flow rate of 1 ml / min. Elution gradient of 100% for solution A for 0.1 min, 100 % of solution B for 45 minutes and terminated at the 50th minute.

Amino Acid Score (AAS)
Amino acid score was calculated based on Almasyhuri et al. (1999). Essential amino acids in the material compared to respectively the same amino acids in PAAP (Provisional Amino Acid Pattern).

\[ AAS = \frac{mg \text{ amino acid in } 1 \text{ g protein tested}}{mg \text{ amino acid in } 1 \text{ g standard protein}} \]

**Protein Digestibility Analysis (In vitro)**

Analysis of *In vitro* Protein Digest based method Almeida, *et al* (2015) with modifications. 250 mg samples of Petai powder or 0.25 mL akuabides (as a blank) were suspended in 15 mL of 0.1N HCl containing 1.5 mg / mL pepsin, incubated for 2 hours in a water bath temperature of 37 °C. Pepsin hydrolysis was stopped by adding 7.5 mL of NaOH 0.5N. Hydrolysis followed by using 10 mg pankreatin that has been dissolved in 10 mL of 0.2 M phosphate buffer (pH 8) and incubated for 3 hours in a water bath temperature of 37 °C. Hydrolysis was stopped with 1 ml trichloro acetic acid 10 g / 100 ml and centrifuged (530 g for 20 minutes). The protein content in the supernatant was determined as total nitrogen use kjeldahl method. Value of *In vitro* Protein Digestibility (IVPD) is calculated by the following formula:

\[ \%\text{IVPD} = \frac{(N_s-N_b)}{N_s} \times 100\% \]

Ns and Nb represent the content of nitrogen in the sample and blank.

3. **Results and Discussion**

<table>
<thead>
<tr>
<th>Essential Amino Acids</th>
<th>The content of Essential Amino Acids (mg / g db)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>K</td>
</tr>
<tr>
<td>isoleucine</td>
<td>1:03</td>
</tr>
<tr>
<td>leucine</td>
<td>2.64</td>
</tr>
<tr>
<td>lysine</td>
<td>3.67</td>
</tr>
<tr>
<td>Methionine + cysteine</td>
<td>ND</td>
</tr>
<tr>
<td>Phenylalanine + tyrosine</td>
<td>2:04</td>
</tr>
<tr>
<td>threonine</td>
<td>1:20</td>
</tr>
<tr>
<td>Valin</td>
<td>1:56</td>
</tr>
</tbody>
</table>

Description: Nd = not detected

The content of essential amino acids in a petai can be seen in Table 1. The amino acid methionine, cysteine and tryptophan were not detected in this study. Legumes often contain high amino acids lysine and methionine amino acids are low, as in Pisum sativum varieties Xantos and Svir which has the highest content of the amino acid lysine (6.4 g / 16 g N) and methionine in the lowest levels (1.1 g / 16g N) (Amarakoon, 2009). So we can say that the
limiting amino acid in legumes, including petai, is methionine. When a group of nuts consumed in a single, then proteins that enter the body are of low quality.

The quality of protein in food one of which can be seen from the presence of amino acids essential by calculating the amino acids compared reversensinya, the pattern of amino acids that have been determined by FAO / WHO to evaluate the adequacy of protein to grow normally later called PAAP (Provisional Amino Acid Pattern). The proposed pattern is expressed as mg of amino acids per gram of protein. The value of the amino acids in the food must meet or higher than a predetermined pattern to become food with good protein quality (Harper, 1981). Scores of amino acids compared with PAAP petai can be seen in Table 2.

Table 2. Amino Acid Score compared PAAP
(Provisional Amino Acid Pattern)

<table>
<thead>
<tr>
<th>Essential Amino Acids</th>
<th>PAAP *</th>
<th>Amino Acid Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>isoleucine</td>
<td>40.00</td>
<td>2:58</td>
</tr>
<tr>
<td>leucine</td>
<td>70.00</td>
<td>3.77</td>
</tr>
<tr>
<td>lysine</td>
<td>55.00</td>
<td>6.68</td>
</tr>
<tr>
<td>Met + cysteine</td>
<td>35.00</td>
<td>ND</td>
</tr>
<tr>
<td>Phenylalanine + tyrosine</td>
<td>60.00</td>
<td>3:39</td>
</tr>
<tr>
<td>threonine</td>
<td>40.00</td>
<td>3.00</td>
</tr>
<tr>
<td>Valin</td>
<td>50.00</td>
<td>3.12</td>
</tr>
</tbody>
</table>

Description: ND = not detected

Amino acids methionine and cysteine when compared with the same amino acids at PAAP, showed the lowest score among the amino acids to another. The content of the amino acid methionine was not detected on the storage day 0 until the 8th. Therefore it can be said that the amino acids methionine and cysteine is a limiting amino acid in a petai.

Based on the results of the analysis (Table 3) the protein content petai protein digestibility value on a petai before administration of the enzyme, the increase during. Protein levels on day 4 was 24.16% and 29.91% on the 8th day. Values in vitro protein digestibility with room temperature storage of an increase of 66.37% on the 4th day of storage becomes 70.83% on the 8th day. According to Hejazi (2016), an increase amaranth seed protein digestibility value during seed maturation.

Table 3 Changes in protein digestibility in Petai Varying Storage

<table>
<thead>
<tr>
<th>samples</th>
<th>Protein levels</th>
<th>After administration of Enzyme Protein Levels (%)</th>
<th>In vitro Protein Digest (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Petai Initial (% db)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


Petai protein digestibility values similar to bean seed Glycine max 74.9%, Lupinus albus 66.0%, and 65.6% Faba vulgaris (Amarakoon, 2009). However, when compared with soybean, pigeon pea (Cajanus cajan) and cowpea (Vigna unguiculata) which is almost 100%, petai protein digestibility is low. According Akporhonor (2006), the protein digestibility of soybean by 94.49%, 94.12% pigeon pea and cowpea 94.55%. Antinutrisi, such as tannins, trypsin inhibitors and hemagglutinin is one of the factors that affect the digestibility of protein legumes (Mohammed, et al., 1987).

4. Conclusions

Petai as well as nuts in general, has a limiting amino acid in the amino acid methionine. Therefore, there needs to be a substitution in their consumption of other foods to complement the needs of amino acids. Storage did not affect protein digestibility petai.
References

Nutrient Comparation between Date Fruit (*Phoenix dactylifera L.*) and Lemon Fruit (*Citrus lemon L.*) Infused Water

Mira Dian Naufalina¹, Yusrina Husnul Abida¹, Fathimah¹, and Indahtul Mufidah ¹

{ miradianaufal@gmail.com, yusrinahusnulabidah@gmail.com, fathimah@unida.gontor.ac.id, indahtulmufidah@unida.gontor.ac.id }

Nutrition Study Program, Faculty of Health Science, University of Darussalam Gontor. Campus of Mantingan, University of Darussalam Gontor, Jalan Raya Ngawi-Solo, Mantingan District, Ngawi, East Java, Indonesia. Postal code 63261

Abstract. Infused water is commonly consumed as rehydration beverage. It is also assumed contains nutritious components that can help fulfill nutrients in the body. There was limited data to prove date fruit-based infused water, have higher nutrient properties than the usual lemon infused water. This study aimed to compare nutrient properties between date fruit and lemon infused water. We used pre-experimental designs with one-shot case study approach. The study determined fat, protein, carbohydrates, iron and potassium composition respectively by the soxhlet method, micro-Kjeldahl method, by different, Uv-Vis spectrophotometry method, and AAS method. The result showed that date fruit has significantly (p<0.05) higher value than the lemon infused water in protein (0.185% vs 0.067%), carbohydrate (5.719% vs 4.936%), Iron (0.00343% vs 0.00295%), potassium (0.01523% vs 0.00778%) composition, except fat (0% vs 0%). It can be concluded that mostly macronutrient and some micronutrient content of date fruit infused water are higher than the lemon one.

Keywords: date fruit, infused water, lemon, nutrient content.

1. Introduction

Researches proved that there is correlation fluid intake with physical morbidities and neural performance (Goodman, Moreland, & Marino, 2019; Popkin, D’Anci, & Rosenberg, 2011). the meta-analysis and review of 26 studies showed that high fluid intake in the Asia population has protective effect against bladder cancer (Liu et al., 2017). Good Hydration also gives a beneficial effect on exercise performance and routine activities (Ali et al., 2018; Ilyas et al., 2018). However, people in Spain, France, Turkey, Iran, Indonesia, and China intake water in range 0.76 to 1.78 L/day, lower than the recommendation (Guelinckx et al., 2015). Particularly, the Indonesian Regional Hydration Study (THIRST) research showed that 46.1% of the Indonesian population had mild dehydration (Hardinsyah et al., 2010).
Since of this issue, it is suggested to expend infused water so that hydration can be expanded. Basically infused water is single aqueous extract of fruit and herbs (Soraya, 2014). In addition to hydration purposes, infused water also was assumed contains nutrients that can help fulfill nutrients in the body. The nutritional content of fruits that are soaked in water will be released. Commonly used infusion water is infused lemon water.

Lemon and date fruits are Asia's typical fruits that have distinct characteristics for each other. Lemon fruit infused water was commonly consumed as a beverage. The nutrient composition and its bioactive compound are known as a natural remedy for many physical morbidities. Nevertheless, date fruit-based water infusion was unfamiliar to be drunk. Whereas, date fruit infused water is part of Tibb an-Nabawi, which has been able to rise globally in terms of research and practice, but there is little or no emphasis on the basic principles underlying this medical system. Several studies proved the clinical effect of the date fruit and its aqueous extract (Akunna et al., 2012; Al-Alawi, et al., 2017; Al-Farsi & Lee, 2008; Ali et al., 2014; Ali, et al., 2016; Gautam, 2016; Marzieh et al., 2008). There were also utilization of date fruit to some food product (Ismail, Darni, & Setyorini, 2018; Purwanto, Nurohmi, Rahadiyanti, & Naufalina, 2018). On the other hand, there was limited data to show the chemical composition of the infused water from date fruit. Therefore, we aim to analyze nutritional value of date fruit based infused water compared with lemon infused water.

2. Methods

2.1 Preparation of Lemon and Date Fruit Infused Water

Khalas date fruit in tamr stage and lemon sample were procured from local store in Yogyakarta and Sragen, Indonesia in a row. The fruits were sorted carefully, and weighted exactly 100 g each of them. Date fruit was chopped and lemon was sliced. Two bottles were prepared for adding water with a ratio of 10: 1 fruit (Naheeda, 2013) then put the fruits in to the water and let them immersed for 12 hours (Harifah, Mustofa, & Suhartatik, 2015) in refrigerator temperature (8-15°C) according to Handini (2018). After 12 hours, infused water were analyze for nutrient contents.

2.2 Analysis of Nutrient Content

The analysis was conducted in Chemix Pratama Laboratory for nutrition and other proximate composition. The aim of analyzing selected minerals (iron and potassium) was the biggest proportion in date fruits. While potassium was chosen because date fruit contain high potassium among other fruits. Therefore, this study wants to prove whether in the form of infusion water, the levels of these nutrients are also higher in infusion water date fruit than in lemon infused water.

Protein was determined by Micro-Kjeldahl method (Yenrina, 2015). Weigh the sample which has been pureed as much as 0.2 ml into the kjeldhal flask. Add 0.7 grams of N catalyst (250 grams of Na2SO4 + 5 Gram of CuSO4 + 0.7 grams of Selenium / TiO2), then add 4 ml of concentrated H2SO4. Destruction in acid cupboards until the color turns clear green, after the color becomes clear green then cool then add 10 ml of distilled water. Then distilled by adding 20 ml of NaOH - Tio (NaOH 40% + Na2SO3 5%) and distillate is accommodated using 4% H3BO3 which has been given the Mr-BCG indicator. Run distillation until the distillate
volume reaches 60 ml (The color changes from red to blue). After the volume reaches 60 ml, stop distillation then the distillate is titrated using the standard 0.02 N HCl solution to the end point of the titration (the color changes from blue to pink). Note the volume of titration obtained then calculate the protein content using the formula.

\[ \% \text{ Protein} = \% \text{ N} \times \text{ conversion factor} \]

NB:
\( \% \text{ N} \) = Nitrogen
Conversion factor = 6.25

Fat was analyzed by soxhlet method. We prepared 5 ml sample then put the sample into filter paper casings and tie with yarn. Dry it in an oven at 80°C for 15 minutes. Cool and put into soxhlet. Pour into enough petroleum ether. Heat with an 8-scale electric heater for 3 hours. Cool with the desiccator and weigh the fat (Maligan, 2014).

Carbohydrate was estimated by difference of mean values. This method requires data on fat and protein composition, as well as moisture and ash composition test results. Moisture composition was determined by Association of Analytical Communities, 1970. Calculated based on \( n = 100\% - (\text{moisture content} + \text{ash content} + \text{fat content} + \text{protein content}) \) (Nielsen, 2010; Yenrina, 2015).

Iron was determined by UV-Vis spectrophotometry with wavelength of 510 nm (Yenrina, 2015). Weigh sample as much as 5 ml. Put in a muffle furnace until it is formed into ash. Dissolve the ash using 50 ml HNO₃ 1: 3 while grinding in a porcelain mortar. Filter using filter paper tamping filtrate into the 100 ml Erlenmeyer. Take 1 ml of clear filtrate, add 2 ml of Amonium Tiosianat 1.5 M, if the sample contains iron (Fe), the color of the solution will turn red. Add Aquadest to a volume of 10 ml then read the absorptions using a spectrophotometer with a wavelength of 510 nm. Record the data obtained then calculated using the standard Iron curve.

Potassium content was analyzed by Atomic Absorption Spectrophotometry (AAS) in wavelength of 766.5 nm. The sample is weighed as much 5 ml. Put in a muffle furnace until it is formed into ash. Dissolve the ash into 25 ml of HNO₃ (1: 3). Read the absorptions using a AAS with a wavelength of 766.5 nm (Nielsen, 2010).

2.3 Data Analysis

All data obtained through tests of normality and homogeneity to determine the method. Analysis was carried out using independent samples t-test in one direction for normally distributed data, and used the Mann Whitney test for abnormally distributed data. The significant difference in independent samples t-test or man whittney test was indicated by the p-value <0.05.
3. Result

The difference in the use of fruit types affects the macro nutrient content in infused water. Based on Table 1, the date fruit infused water has a higher protein content (0.19 g / 100 g) than lemon infused water. Statistical test results using independent samples T-test showed that there were significant differences in the protein content between infused water with different types of fruit, such as dates and lemons (p-value = 0.027). The results showed that fat contents in date fruit and lemon infused water have zero content of fat. Similarly protein, date fruit infused water has higher carbohydrate content (5.72 g / 100 g) than lemon infused water. Statistical test results using independent samples T-test showed a significant difference in carbohydrate content between the two types of infusion water (p-value = 0.021), so it can be seen that there was effect of type fruit on carbohydrate content infused water.

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Date fruit infused water</th>
<th>Lemon infused water</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protein (g)</td>
<td>0.19</td>
<td>0.07</td>
<td>0.027*</td>
</tr>
<tr>
<td>Fat (g)</td>
<td>0</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>Carbohydrate (g)</td>
<td>5.72</td>
<td>4.94</td>
<td>0.021*</td>
</tr>
<tr>
<td>Iron (mg)</td>
<td>3.43</td>
<td>2.95</td>
<td>0.020*</td>
</tr>
<tr>
<td>Potassium (mg)</td>
<td>15.23</td>
<td>7.78</td>
<td>0.000*</td>
</tr>
</tbody>
</table>

Differences in the use of fruit also affect in the micro nutrient content of infused water. Based on Table 1, the date fruit infused water has a higher iron content (3.43 g / 100 g) than lemon infused water. The statistical test results using Mann Whitney test, there are significant differences in the iron content between infused water with different types of fruit such as dates and lemons (p-value = 0.020). Date infused water has a higher potassium content of (15.23 g / 100 g) than lemon infused water. Statistical test results using independent samples T-test showed that there were significant differences in the potassium content between two types of infused water (p-value = 0.000), so that it can be seen that there was effect of type fruit on potassium content infused water.

4. Discussion

4.1 Protein

Date fruit have the highest protein content (2.3-5.6%) of other fruits such as apples (0.3%), oranges (0.7%), bananas (1.0%), and grapes (1.0 %). There are twenty-three different amino acids contained in protein date fruit (Al-Shabib & Marshall, 2003). for example alanine, arginine, aspartic acid, cystine, glutamic acid, glycine, histidine, iso-leucine, leucine, lysine, methionine, phenylalanine, proline, serine, threonine, tyrosine, valine, and tryptophan (Al-Barnawi, 2018; Assirey, 2015; Birlangi, 2016). Amino acid content increases in dry varieties mainly due to water reduction (Al-Farsi & Lee, 2008).
The protein content in lemon is only about 0.9% (Indonesia Ministry of Health, 2018) and is not significantly different with other citrus family (Sayd, 2014; Paul & Shaha, 2004). But the investigation (Sayd, 2014) show numerous kind of free amino acid content in lemon juice that distinctive to date fruit's. They are α-amino-butiric acid, glutamine, and asparagine.

Although they have a plenty of amino acids, we can say fruit is not a source of protein (Dwiyani, 2014). Dissolved proteins in date fruit and lemons into the water because hydrogen bonds not only form intermolecular water but also with molecules that have polar groups. Protein has an amine group which is a polar group so that the protein in date fruit and lemons can be dissolved in water (Kusnandar, 2010).

### 4.2 Fat

Date fruit and lemons infused water do not contain fat. The explanation is that fat is a non-polar ester compound that is not soluble in water (Kusnandar, 2010). Since the mechanism of infused water involve diffusion process, that explained as the process of mass transfer of the soluble molecule (the nutrient) from the high concentration (date fruit and lemon) into the low concentration (water), so anything that is not soluble in water may not experience the diffusion (Demirel, 2014).

### 4.3 Carbohydrate

Table 1. showed a significant difference between the carbohydrate content of date fruit infused water and lemon (p=0.021). The carbohydrate content of date fruit infused water was higher than lemon infused water, that was as much 5.719g/100g while the carbohydrate content of lemon infused water was 4.9362g/100g. The analysis of total carbohydrate content of three dried date varieties date fruit (Khasah, Khalas, and Fardh) ranges between 68.53 to 75.37 g / 100 g of date flesh. The highest value of 75.37 g / 100 g was observed in the Khalas variety.

Types of carbohydrates in date fruit are glucose, fructose, sucrose, mannose, maltose, small amounts of cellulose and starch. Total simple carbohydrate increases with the level of fruit maturity (Al-Farsi & Lee, 2008).

Date fruit is classified into 5 categories step of maturity and there are 3 edible stages of khalal, rutab and tamr (Ghnimi et al., 2016). Glucose and fructose are the dominant component of date fruits in tamr stage. These reducing sugars was produced by hydrolysis of sucrose from previous level of rippening. They engander the sweetness and softness of the moisture. They also contribute to fruit colouring through maillard and caramelization reactions. Consequently, the date fruit infused water looks more brown than the lemon infused water (Ghnimi et al., 2018).

Date fruit khalas variety have 52.10-78% components are carbohydrates in certain sugars (Ali, Al-kind, & Al-said, 2009; Ghnimi et al., 2018; Habib & Ibrahim, 2011). High carbohydrate content in date fruit can make date fruit as an energy source. Lemon has carbohydrate content yet, although it not as much in date fruit. It is around 6.2% (Indonesia Ministry of Health, 2018). Carbohydrates in ripped lemons consist of fructose, glucose, and sucrose. Especially in tropic regions, the hot climate plays major role in citrus family development and maturation. The fruit potentially can reduce the time to reach mature stage fo 50% (Sadka et al., 2019). But that condition can not make lemon exceed date fruit in sugar content.
Dissolved carbohydrates in date fruit and lemons into the water because hydrogen bonds not only form intermolecular water but also with molecules that have polar groups. Carbohydrates have hydroxyl groups which are polar groups so that carbohydrates in date fruit and lemons can be dissolved in water (Kusnandar, 2010).

4.4 Iron

Dates and lemons are included in the category of iron Fe²⁺ type. According to Habib and Ibrahim (2011) who conducted research on nutrient content in 18 different date varieties, the micromineral levels studied were iron (Fe), zinc (Zn), copper (Cu), manganese (Mn), cobalt (Co), molybdenum (Mo) and selenium (Se) and it was found that the highest micromineral content that was combined in date fruit was iron. The results showed that iron levels ranged from 0.67 mg / 100 g to 1.75 mg / 100 g, and the khalas variety had the highest iron content. Date fruit can be used as a source of iron for people with anemia, because the iron content in date fruit can increases blood haemoglobin levels. This has been proven in Pravitasari’s (2014) study that giving date fruit for 60 days can increase blood hemoglobin levels in vitro in male white mice.

Date fruit provide benefits in maintaining health during pregnancy. Based on a study (Widowati, Kundaryanti and Lestari, 2019) giving date fruit-based beverage to pregnant women has an effect in increasing hemoglobin levels compared to before intervention. Date fruit is able to support erythropoietin synthesis increasing by the liver in order to stimulate the spinal cord to produce more red blood cells or hemotopoiesis mechanism (Onuh et al., 2012).

Balanced amount of iron fulfillment is preeminent for the body. Iron deficiency can cause anemia as well as bad affect for the immune system. (Anani et al., 2017) explained that children who symptomatic and asymptomatic lack iron substances may change CD4+ and CD8+ cells ratios. Increase the amount of substances that can affect the role of IFN-signaling receptors and then influence MHC class I molecules that lead to NK cell activation (Sottile et al., 2019).

4.5 Potassium

Date fruit are the fruits that contain the highest potassium among fruits. The content of potassium date fruit ranges from 100-800mg/100g dry weight but, depends on the type of variety and the origin of the fruit. While the potassium content in lemons is only 120-145mg/100g. Potassium is an important mineral that the body needs for muscle contraction, maintaining a healthy nervous system and helping the body’s metabolism (Rostita, 2009). High potassium levels in date fruit are proven to reduce blood pressure by playing a role in maintaining the arterial wall to remain elastic and optimize its function so that it is not easily damaged by high blood pressure (Satuhu, 2010). Altothought potassium in fruit has beneficial health effect in the body metabolism. its not considered necessary to establish a health-based guideline value for potassium in drinking water (infused water). Potassium intake from drinking water is well below the daily requirement (World Health Organization, 2009).

According to (Ningtyas, 2017) The presence of glucose and potassium content in date fruit water can replace sport drink as a rehydration drink because it can regulate fluid balance in the body.
5. Conclusion

There was a significant differences in carbohydrate contents, protein, iron and potassium between date fruit and lemon infused water, except in fat content. We recommend for future research to consider mineral content in water used for infused water production.
References


IDENTIFICATION OF HERBAL PRODUCTS USED BY FAMILY IN THE CAMPUS ENVIRONMENT OF DARUSSALAM UNIVERSITY

Amal Fadholah¹, Kurniawan², Cania Sofyan Islamanda³, Evi Rohana Ma’rufi Jannah⁴

¹,²,³,⁴ Pharmacy Study Program, Faculty of Health Sciences, Darussalam Gontor University

Abstract. In the health sector, the development of medicinal products circulating in the community is increasingly widespread. As stated in Law No. 3 of 2009 concerning health article 48 (1) which states that one health effort can be carried out with traditional health services. Today the use of traditional medicines is increasing from year to year. Herbal medicines circulating in Indonesia are safe to consume if the product is registered with BPOM and does not contain BKO (Medicinal Chemicals). On the other hand, the use of herbal medicines in the family environment of UNIDA Gontor is increasing. So the need for identification related to herbal products that are used to ensure safety. This research was conducted by identifying herbal products that are used based on features, functions, and benefits. This research method is RAP (Rapid Assessment Procedure) with a qualitative approach. The results showed that the products used by 72 respondents amounted to 100 products with categories based on features reviewed from 4 aspects (1) The level of product safety used is based on raw materials as much as 96% and based on claims of efficacy as much as 76%. (2) The type of product used is based on the category of herbal medicine as much as 94.7%, OHT as much as 5.3% and none fitofarmaka. (3) Completeness of information listed on the product packaging label is 83%. (4) The level of understanding of respondents based on features and benefits in the range of understanding to very understanding while in the function in the range of less understanding to understand. The use of herbal products based on function is as much as 71% supplement, as much as 19% preventive form and helps treat complaints as much as 10%. The use of herbal products based on benefits is classified as safe because it has a higher benefit ratio compared to the side effects.

Keywords: Herbal Products, Feature, Function, Benefits, The Family of UNIDA Gontor.

1. Introduction

Health development in Indonesia aims to increase awareness, willingness and ability to live a healthy life for everyone to realize the highest degree of public health. The health effort can be carried out in the form of activities with promotive, preventive, curative and rehabilitative approaches that are carried out continuously. As in Law No. 36 of 2009 concerning Health
article 48 paragraph (1) states that there are 17 health efforts, one of which is a traditional health service effort.

The development of traditional health services using herbs today is increasing rapidly, namely in 2009 as much as 15.04%, 2010 as much as 31.7%, 2012 as much as 41.7%, and the latest data in 2018 as much as 44.3% (Kemenkes RI, 2018). Herbal medicines circulating in Indonesia are safe to consume with a record already registered with BPOM. However, herbal medicines that have been used for generations (herbal medicine) do not need clinical trials because they have been used for 3 generations or 180 years (Parwata, 2016) such as Tolak Angin, Wood Herbs, and Diapet (Utami, 2018).

In herbal medicine alone it should not contain BKO (Medicinal Chemicals) because it can endanger the health and be fatal. Nowadays, many herbal medicines are clinically still not supported by strong and consistent evidence (Kamaluddin, 2016). Observation results show that the use of herbal medicines among the families of UNIDA Gontor lecturers has been increasing rapidly in recent years.

So the purpose of this study is to determine the level of safety of herbal products used by UNIDA Gontor's lecturer family by identifying herbal related products based on features, functions, and benefits. As well as presenting the use of herbal products in the categories of herbal medicine, OHT, and fitofarmaka.

2. Theoretical Review

2.1. Herbal Medicine

Herbal medicines are raw materials or preparations derived from plants that have therapeutic effects or other effects that are beneficial to human health. The composition can be in the form of raw materials or materials that have undergone further processing that comes from one or more types of plants (WHO, 2005).

Regulation of the Minister of Health number 88 of 2013 concerning the parent of the development of raw materials for traditional medicines refers to the National Traditional Medicines Policy (KOTRANAS) explaining that the intended traditional medicines are not limited to traditional preparations that are used for generations (herbs) but also include ingredients or gelenik preparations that have been through pre-clinical and clinical trials such as Standardized Herbs (OHT) and phytopharmaka.

Herbal medicine categories in circulation in Indonesia consist of 3 types, namely herbal medicine, OHT, and Fitofarmaka. Herbal medicine is a traditional Indonesian medicine that has proven its safety and efficacy based on empirical data and has been used for generations (Permenkes, 2016). OHT (Standardized Herbal Medicines) is a drug preparation made from natural raw materials that have been proven scientifically and safety efficacy (preclinical testing) such as Fitolac and Diabmeneer (Utami, 2018). While phytopharmaca is a drug preparation made from natural ingredients that have been standardized in safety and efficacy and scientifically proven both preclinical and clinical trials such as Stimuno Tensigard, and Nodiar (Permenkes, 2016).

2.2. Types of Herbal Product Identification
Herbal products are unique in that there are features, functions, and benefits (Kotler & Keller, 2009). The feature is a characteristic of a product that is designed to enhance the function and consumer interest in the product (Arifin & Saidani, 2012).

The function is a benefit obtained by consumers after using a product that is the suitability of the function listed in the product packaging (Juwandi, 2004). The benefit is the benefit obtained by consumers in using the product that has a high benefit ratio compared to the side effects caused (Rambat, 2001).

2.3. Government Regulations Regarding Product Labels

According to Government Regulation No. 69 of 1999 article 2 (1), that is, every person who manufactures or imports packaged food in the territory of Indonesia must include a label inside and or outside the food packaging. Also, based on Minister of Health Regulation No. 246 of 1990 article 1 (9) states that the herbal medicine label must include information in the form of product name, composition, net weight, name and address of the business actor, expiry date, rules of use, date of manufacture, side effects, symbol of herbal medicine, dosage of use, efficacy, and usefulness, contraindication (if any), registration number, production code number, specific ingredient information (if any), alcohol content (if any).

3. Method

3.1 Research Design

The design of this study uses the RAP (Rapid Assessment Procedure) method or a rapid assessment procedure with a qualitative descriptive approach. So in this study, researchers will identify the use of herbal products used by respondents based on features, functions, and benefits.

3.2 Research Place and Time

This research will be conducted in the campus environment of UNIDA Gontor, both for the families of lecturers who live in UNIDA Siman, as well as Gontor Putri 1 and 2. The time in this study starts from September 2019 to January 2020.

3.3 Research Samples

The population in this study is the lecturers of UNIDA Gontor with a total population of 250 people. The research sample that will be used as a respondent uses a purposive sampling technique which is a method for selecting respondents by determining criteria included in the research category (Saryono & Anggraeni, 2010). The sample of respondents to be taken using the Slovin formula with an error rate of 10% so that the degree of trust in this study is 90%.

Slovin formula:

$$n = \frac{N}{N(d^2) + 1}$$

With information:

n : Sample Size
N : Large population

d : The degree of accuracy of the alleged magnitude of the sample = 0.1 (10%)

So that the results obtained based on the Slovin formula are 72 respondents from a total population of 250 people.

3.4 Ways of Data Collection

In this study, researchers conducted interviews with respondents by contacting respondents who used herbal products and were willing to become respondents. Interviews were conducted face-to-face by visiting respondents in the office or at home. In this study, researchers brought tools such as pens, notebooks, and recorders to help facilitate data processing. At the end of the interview, the researcher asked respondents to provide samples of herbal products that were used as research documentation.

3.5 Data Analysis and Processing

The data obtained will be analyzed using a qualitative descriptive analysis that describes the results that have been obtained by researchers by accurately describing the facts related to the phenomena conducted in the interview. The data processing is done using Microsoft Office Word and Microsoft Office Excel.

Stages of data processing are: (1) Organizing data obtained during interviews, (2) Conducting data categorization of the same type, (3) Interpret data obtained to answer research problems and describe phenomena related to research, (4) Evaluate interpretations to avoid misinterpretations.

4. Result and Discussion

4.1 Overview of Research Subjects

In carrying out the identification related to the use of herbal products used by 72 respondents. The respondents with male gender amounted to 73.6% and female respondents amounted to 26.4%. In this case, lecturers who teach at UNIDA Gontor are dominated by male lecturers so that many of them use herbal products.

According to (Nur, 2004) respondents with male gender tend to use the internet to search for information compared to social media while women tend to use the internet for social media. If respondents based on education level were dominated by S-2 lecturers (94.4%) than S-3 (5.6%). This is because the university of UNIDA Gontor was only established in 2014 so that not many lecturers have doctoral degrees and no one has graduated students at the doctoral level.

4.2 Feature

In distributing herbal products in Indonesia must have a marketing authorization (Permenkes, 2012) and include clear information on the packaging (Government Regulation, 1999). The licensing agency related to the circulation of a product in Indonesia can be through BPOM, MUI, and PIRT.
BPOM licensing is the highest licensing that takes care of drug and food control (BPOM, 2017). MUI is a licensing institution based on the deliberations of Muslim scholars and scholars who determine the halal status of a product by Islamic law (Government Regulation, 2014). Whereas PIRT is a licensing scope for district or city service for MSMEs and home industries (Nurwidiana, 2019). So that from 100 products used there are licensing:

Table 1. Types of Licensing of Herbal Products

<table>
<thead>
<tr>
<th>BPOM</th>
<th>BPOM &amp; MUI</th>
<th>PIRT &amp; MUI</th>
<th>PIRT</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 Product</td>
<td>36 Product</td>
<td>16 Product</td>
<td>19 Product</td>
</tr>
</tbody>
</table>

Based on features on herbal products, it can be viewed from 4 aspects, namely: (1) The safety of herbal products can be seen on the packaging label based on the raw materials used and claims of efficacy as in tables 2 and 3, namely:

Table 2. Safety Levels of Herbal Products Based on Raw Materials

<table>
<thead>
<tr>
<th>KATEGORI</th>
<th>BPOM</th>
<th>BPOM &amp; MUI</th>
<th>PIRT &amp; MUI</th>
<th>PIRT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secure</td>
<td>25%</td>
<td>36%</td>
<td>16%</td>
<td>19%</td>
</tr>
<tr>
<td>Not secure</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>4%</td>
</tr>
</tbody>
</table>

Table 3. Safety Levels of Herbal Products Based on Claims Efficacy

<table>
<thead>
<tr>
<th>KATEGORI</th>
<th>BPOM</th>
<th>BPOM &amp; MUI</th>
<th>PIRT &amp; MUI</th>
<th>PIRT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secure</td>
<td>23%</td>
<td>33%</td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td>Not secure</td>
<td>2%</td>
<td>3%</td>
<td>6%</td>
<td>13%</td>
</tr>
</tbody>
</table>

Table 4. Completeness of Herbal Product Information

<table>
<thead>
<tr>
<th>KATEGORI</th>
<th>BPOM &amp; MUI</th>
<th>BPOM</th>
<th>PIRT &amp; MUI</th>
<th>PIRT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete</td>
<td>25%</td>
<td>36%</td>
<td>16%</td>
<td>6%</td>
</tr>
<tr>
<td>Not Complete</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>17%</td>
</tr>
</tbody>
</table>

In table 2, 96% of the products are classified as safe based on the raw materials listed on the packaging. This is very important considering the number of cases related to herbal products that contain BKO (medicinal chemicals) and are fatal to health.

In table 3, there are 76% of products classified as safe based on the claims of efficacy listed on the packaging. Herbal products with BPOM permission claim the product is only as a supplement and helps prevent or treat it not as a medicine. Whereas the PIRT permit product can only claim as food, not as a supplement or medicine.

(2) Types of herbal products based on herbal, OHT, and phytopharmaca categories, namely:
Based on the percentage of use of herbal products in a sequence, respondents use more herbs, OHT and no one uses phytopharmaca. Phytopharmaca herbal products are herbal products that can be equated with synthetic chemical drugs because they have been proven clinically (evidence-based medicine).

(3) Completeness of information listed on herbal products as in table 4. 83% of products have completed information standards based on the type of license. Completeness of information is important because it can guarantee the safety and authenticity of a product to consumers in using a product.

(4) The level of understanding of herbal medicine categories based on herbal medicine, OHT, and phytopharmaca. Based on the overall 2 respondents understand related herbal medicine categories, namely:

<table>
<thead>
<tr>
<th>Respondents</th>
<th>Understand</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (1 Respondents)</td>
<td>Jamu and OHT</td>
</tr>
<tr>
<td>B (1 Respondents)</td>
<td>Jamu, OHT, and fitofarmaka</td>
</tr>
<tr>
<td>70 Respondents</td>
<td>Do not understand</td>
</tr>
</tbody>
</table>

The level of understanding of respondents related to features and benefits in the range of understanding to very understanding. While the functions in the range do not understand until understand. This is based on the ability of respondents to understand the active compounds contained in the product composition and the ability to analyze products that are categorized as insecure or contain BKO.

4.3 Function

The use of herbal products must have to match the benefits felt by consumers with the product claims listed on the packaging. The percentage functions required by respondents based on the product used are:

<table>
<thead>
<tr>
<th>Supplement</th>
<th>Preventive Form</th>
<th>Help Treat</th>
</tr>
</thead>
<tbody>
<tr>
<td>71%</td>
<td>19%</td>
<td>10%</td>
</tr>
</tbody>
</table>

Herbal products used by many respondents were classified as overclime, but the use of these products was limited to the table above. The respondent's answer related to the perceived benefits of making the body healthier, stamina, not easily hurt and tired when on the move.

4.4 Benefits
In the aspect of benefits, the use of herbal products is following the information contained in the packaging label. Although there are some products that state claims to cure, respondents only use it as a cure or prevent.

The reasons respondents use herbal medicines are the lack of side effects and even almost not found, minimize the use of chemicals, do not cause dependence effects, and can be used continuously to maintain health.

So based on the perceived benefits, respondents will choose to use herbal medicines before using synthetic chemical drugs to help treat or prevent a complaint.

5. Conclusion

The use of herbal products used by respondents based on features can be reviewed from the aspect of product safety level based on raw materials (96%) and efficacy claims (76%), correctness of information on product packaging labels 83% and respondent knowledge levels based on herbal, OHT, and fitofarmaka as many as 2 respondents.

The use of herbal products based on function is a supplement (71%), preventive form (19%) and helps treat complaints (10%). The use of herbal products based on benefits is considered safe, which has a higher benefit ratio compared to the side effects.

The use of herbal products based on the category of herbal medicine was 94.7%, OHT was 5.3%, and fitofarmaka was 0%. So that herbal products that have not included the logo of herbal medicines are 62 products from the total products used by respondents.

6. Suggestions

For further research, it is necessary to test the levels of active substances in the products used by respondents to find out the level of truth by the packaging labels listed on the product and the need for making manuals or guidelines on how to choose herbal products that are safe, useful and guaranteed. As well as for the government to make a special policy regarding product truth standards with PIRT permit status that can be accessed by the general public.

7. Acknowledgements

We all researchers in this study would like to thank the Darussalam Gontor University for providing an internal research grant to conduct research related to the identification of herbal products used by UNIDA Gontor's lecturer family.
References


Description of Noise Measurement and Hearing Complaints at Workers in Hospital X Ponorogo

Rindang Diannita¹, Muhamad Rifki Taufik¹, Muslim Purwo Cahyo²

¹Lecturer Department of Occupational Safety and Health, Darussalam Gontor Ponorogo,
²Student Department of Occupational Safety and Health, Darussalam Gontor Ponorogo,
East Java University, Indonesia

Abstract. Noise is unwanted noise that comes from activities or activities within a certain period of time and can cause health problems for workers. The purpose of this study is to provide an overview of the impact of noise on labor at Hospital X Ponorogo. This research method is a descriptive study with cross sectional approach. Measurements were made on workers in the Technician Room, Patient Registration Room, Medical Record Room, Administration Room, Nutrition Room, Laundry Room. Data retrieval is done using a Sound Level Meter noise meter. The results showed there were complaints of noise in the workforce at X Ponorogo Hospital. Based on the Decree of the Minister of Health of the Republic of Indonesia Number 1204 of 2004 concerning Hospital Environmental Health, the noise intensity does not exceed the established Threshold Value (NAV) of 78 dBA. The conclusion in this study is that workers should and should provide information on the importance of the use of ear muffs and ear plugs, the need for regular hearing health checks at least once a year, and to carry out and pay attention to aspects of occupational safety and health at Hospital X Ponorogo.

Keywords: Noise Measurement, Hearing Complaints, Hospital

1. Background

Occupational safety and health is a form of effort to reduce the risk of hazards at work and workplace accidents. The effort covers the noise of workload, worker's behavior, with the aim that every worker can work safely and healthily. Work safety is very closely related to noise, personal protective equipment, work processes, and how to do work (Suwardi, 2018).

Hospital occupational safety and health is an effort to guarantee and protect the safety and health of workers in the hospital, so as to prevent potential occupational accidents in hospitals (Regulation of the Minister of Health of the Republic of Indonesia, 2016).
Occupational safety and health are conditions that provide workers with safety and health for their work, agencies, companies, as well as for the community and the surrounding environment. There needs to be an awareness of workers regarding occupational safety and health in order to minimize and even risk occupational accidents. Occupational safety and health are preventive measures for any unsafe actions and conditions that cause work accidents (Daryanto, 2018).

Work productivity can be disrupted due to noise at work. Noise results in disturbing concentration in activities or activities at work. There are several aspects that can cause interference with humans, namely sound duration, noise intensity, frequency (Kuswara, 2014).

According to Chandra (2012), noise is defined as unwanted sounds or sounds that can interfere with hearing, both frequencies below the threshold value or frequency above the threshold value that can result in health and other health problems.

In a study conducted by Dewanty (2015) obtained the results of measurements on laundry officers at the Government General Hospital Dr. Soetomo Surabaya as many as 8 officers experienced hearing impairment in the right ear, and 6 officers experienced hearing impairment in the left ear, so there is a relationship between hearing loss and noise intensity, which exceeds the value required by Decree of the Minister of Health of the Republic of Indonesia Number 1204 of 2004 concerning Hospital Environmental Health ie the noise intensity does not exceed the established Threshold Value (NAV) of 78 dBA with an exposure time of 8 hours.

Hospital X Ponorogo has implemented occupational safety and health efforts supported by prevention and control of workplace hazards and hazards in the workplace in the form of noise measuring devices, Light Fire Extinguisher, Management of Hazardous and Toxic Materials, has hospital infrastructure in terms of safety, and has sources human resources in the field of occupational safety and health with occupational safety and health education.

Data related to hearing loss of workers at Hospital X Ponorogo shows that there are still complaints of noise in the form of reduced hearing intensity of workers, effects on hearing in the form of buzzing ears From these data it is evident that interference with workers still occurs a lot.

2. Method

This research method is a descriptive study with cross sectional approach that aims to give an idea of the impact of noise on labor, then conducted observations and collected at the same time. So that each object of research is only measured once in the same time.

The population in this study were all employees who worked at X Ponorogo Hospital as many as 324 workers with a sample of 179 respondents. The room was investigated in the section in the Technician Room, Patient Registration Room, Medical Record Room, Administration Room, Nutrition Room, Laundry Room.

The sampling technique uses Proportional Cluster Random Sampling, which is a sampling technique in proportion to each professional group, namely 18 respondents Medical, 57
respondents Nurse, 11 respondents Midwife, 57 Non Clinical respondents, 18 respondents Health Workers, outsourcing 18 respondents.

3. Result

Noise is one of the dangers in the hospital which certainly has a negative risk for workers in the hospital. Danger of noise which is. Various effects of noise among them are the reduced sensitivity of hearing workers, communication disorders, the influence on psychological, and the sociological influence of labor (Moeljosoedarmo, 2008).

Workers who experience high noise intensity can cause hearing loss in the form of sensorineural deafness. Sensorineural deafness is a noise trauma that occurs due to organ damage in the sensorineural part of the inner ear which causes it due to the impact of the accumulation of noise in a long time (Kristianto, 2012).

The results of this study found that workers experienced noise complaints. Measurements were made at six noise measurement points, namely the Technician Room, Patient Registration Room, Medical Record Room, Administration Room, Nutrition Room, Laundry Room. The details are as follows:

<table>
<thead>
<tr>
<th>Complaint</th>
<th>Amount</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>There is a complaint</td>
<td>129</td>
<td>72.06%</td>
</tr>
<tr>
<td>There are no complaints</td>
<td>50</td>
<td>27.94%</td>
</tr>
<tr>
<td>Total</td>
<td>179</td>
<td>100.00%</td>
</tr>
</tbody>
</table>

Based on the tabulation of the results of complaints due to noise shows that of 179 respondents experiencing noise more than 78 dBA as many as 129 respondents with a percentage of 72.06% which means that in Hospital X Ponorogo 129 respondents experienced noise.

<table>
<thead>
<tr>
<th>Room Name</th>
<th>Noise Measurement Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineer Room</td>
<td>80 dBA</td>
</tr>
<tr>
<td>Patient Registration Room</td>
<td>85 dBA</td>
</tr>
<tr>
<td>Medical Record Room</td>
<td>85 dBA</td>
</tr>
<tr>
<td>Administration Room</td>
<td>80 dBA</td>
</tr>
<tr>
<td>Nutrition Room</td>
<td>82 dBA</td>
</tr>
<tr>
<td>Laundry Room</td>
<td>84 dBA</td>
</tr>
</tbody>
</table>

Based on the tabulation of the results of the measurement of the noise level showed that in six rooms experienced noise of more than 78 dBA namely the Technician Room with the results of the noise measurement that is 80 dBA, the Room for Patient Registration with the results of noise measurement that is 85 dBA, the Medical Record Room with the results of the noise measurement is 85 dBA, Administration Room with 80 dBA noise measurement results,
Nutrition Room with 82 dBA noise measurement results, Laundry Room with 84 dBA noise measurement results.

4. **Discussion**

In the Technician Room there are sound sources in the form of tools, tubes, and others, the Room for Patient Registration and Medical Record Room for noise originating from interacting patient activities, as well as the location for Patient Registration Room and Medical Record Room close to the highway, in the Noise Administration Room comes from the activities of officers in a large room that does not have a barrier, the Nutrition Room has noise from food cooking activities, while in the Laundry Room the noise comes from laundry equipment.

In this study shows the measurement of noise and hearing complaints among workers are interrelated, measurements at six measurement points show that the results are above the Threshold Value (NAV) of noise, which is 78 dBA, which has been stipulated in the Decree of the Minister of Health of the Republic of Indonesia Number 1204 of 2004 concerning Hospital Environmental Health.

The results of this study are in line with Transiska's research (2015) The Effect of Noise Place Conditions and Human Factors on Employee Accident Rate at PT. Putri Midai Bangkinang, Kampar Regency, namely the influence of Noise Places and human factors on work accidents as much as 62.3%, while the remaining 37.7% was influenced by other variables not examined in this study.

**Impact of Noise Factors on Labor**

Noise that occurs at six measurement points, namely the Technician Room, Patient Registration Room, Medical Record Room, Administration Room, Nutrition Room, Laundry Room is very high, the average is above the NAB determined by the Decree of the Minister of Health of the Republic of Indonesia Number 1204 of 2004, namely the value the 78 dBA threshold.

In these six rooms, a lot of workers work so that some workers experience things as follows:
1. Communication problems, which result in labor, which in general workers speak loudly.
2. Physiological disorders so that some workers who work at X Ponorogo Hospital claimed to have felt dizzy, pain in the stomach, high blood pressure.
3. Psychological disorders in some workers in the form of insomnia, irritability.
4. Impaired voice clarity which can indirectly cause danger to the safety and health of the workforce.

5. **Conclusion**

The conclusion in this study is the noise intensity at six noise measurement points shows that the results are above the Threshold Value (NAV) of noise, which is 78 dBA, which has been stipulated in the Decree of the Minister of Health of the Republic of Indonesia Number 1204 of 2004 concerning Environmental Health of Hospitals. performed in the Technician Room,
Patient Registration Room, Medical Record Room, Administration Room, Nutrition Room, Laundry Room, with measurement results of more than 78 dBA.

Suggestions from researchers is to provide protective equipment in the form of ear muffs and ear plugs, to prevent and reduce the negative impact of noise, provide a silencer in the guard room. The hospital is expected to hold an ear health examination, socialization related to occupational safety and health, mainly related to noise hazards.
References

[29] Sugiyono (2016). Quantitative qualitative research methods and R&D. Bandung. Alfabeta Publisher
[34] Law of the Republic of Indonesia, Number 44 (2009). About the hospital. Government of the Republic of Indonesia
Abstract. There are various aspects of human life in the medical field about the heart such as the circulatory system of heart and heart rate machine with religiosity factor. This research aims to analysis about relation among medical in human body, circular system of heart and religiosity of heart. Data gets from various sources books, journals, internet, primary data, and secondary data also from holy book. Primary data gets from electrocardiogram (ECG) with the rate of heart. Methodology used in this study is approach of hahslm with main variables from religiosity aspects and internal external factors of medical. The methods are similarity and reflexivity. Similarity between ECG and form of hahslm. Reflexivity in the main variables of heart rate. The results are human heart always praises to Allah and the graph of heart rate in ECG shows the symbols of sequence of prayers order. Heart praises to God with sentence of Glorious, Merciful, Sustain, and Cycle.

Keywords: hahslm, heart, praise, Islam, ecg

1. Introduction

The advancement of medical science today seems to have forgotten the contribution of religious texts, which is the Qur'an and the Hadith. As we know, progress in the 20th century alone has resulted in a large literature and understanding in anatomy, drug health, and the correlation between the two.

In accordance with the times, each generation has a higher level of civilization compared to the previous generation. At each level of human civilization, there are only natural secrets that open the veil. This is because human nature itself is always curious and continue to think to seek answers to various things that exist in this world. But on the other hand, there is also an undeniable fact that there is a destiny there that belongs to the creator of nature, and becomes the secret of the power that determines the time, when it is time to unfold the secret of the creation of the universe for the benefit of man.

Humanity in accordance with the level of civilization in every decade has an increasingly good ability to unveil the secret of the existence of the entire universe in this universe. The more open the veil, the more the world is amazed at the Islamic message. Because so many
secrets are perfectly summarized by the message of Islam in the revelation of Allah SWT, Al-qur'an and in the words and actions of the Prophet Muhammad, and as Sunnah.

The essay must be a benchmark in human life. Because it is a guide for man, then the content of the treatise is the way of human life according to his nature. These guidelines can be reached by humans if humans are indeed berifikir and trying to find the truth. The Islamic treatise sourced from the Qur'an will be preserved by Allah SWT forever, along with his word:

"It is We who sent down the Qur'an and indeed, We really take care of it". (QS. Al-Hijr [15]: 9).

Islamic treatise is a treatise that stands on the objective reality of man with the nature possessed by man. Therefore humans are required to have the ability to reveal the wisdom of Islamic treatises contained in the Qur'an or as-Sunnah.

It is clear that the Qur'an and hadith are the guidance of man. In it, there are clues about various aspects of human life, including the medical field, especially about the heart, the circulatory system, the circulatory system and many other things, which will be a special discussion on this paper. In the Qur'an and hadith we can find accurate depictions of anatomical structure, physiology, medicine, prevention, and spiritual health . (Fadhil & Effendi : 2016).

There are some objections in this research to have the result of integration between Islam and science.

a. **Problem Formulation**

What is the relationship between heart and Islam in Electrocardiogram om Hahslm theory ?

b. **Purpose**

To analyze the relationship between heart and Islam in Electrocardiogram on Hahslm theory.

c. **Benefits**

Able to be a reference for Lecturers, Students, and academics who will conduct research about Heart and Religion to have integration between science and Islam based on muslim methodology.

2. **Theoretical Basis**

A. **Islam kaffah**

Islam rahmatan lil alamin is an integral part or a core part in the living system that exists in man, in the environment, and the universe which means that all life begins from the concept of Islam kaffah. In other words, the earliest creation process was Islam. (Fadhil & Effendi : 2016).
Islam Kaffah, which has been comprehensive in all its aspects, is Islam that has been accepted by the Companions directly from Rasulullah SAW and they amalkan under the supervision of SAW, even direct divine praise. If something is not right or wrong, then down verse reminds of an event, or down verses again detailing the problem. The direct supervision of the seventh heaven, ie the direct supervision of Allah SWT which decreases this shari'ah. Therefore, the Prophet sallallaahu 'alaihi wa sallam said: "The best of generations is the generation in which I am there." What does it mean best in what way? In all matters of religion, morality is the best of the Sahaba, his faith is also the best. Worship, both the quality level and the quantity level, the shahabat are the best. Because the Messenger of Allah (peace and blessings of Allah be upon him) firmly declares that the generation is the generation where I am. (Anonymous: 2010).

According to the theory developed by Aziz (2016) on the theory of Hahslm about development of epistemology in the research of a comprehensive system with approach method according to Arabic rule that is to see the word Islam in basic word format consisting of 3 consonant letter, that is: Sin, lam, mim. It is then formulated in the function of an Islamic formula called H theory, always based on its basic philosophy, consisting of ontology in Islam, epistemology in kaffah, and its axiomatic patterned stance in the form of warning and kindness, so it is stated that the emergence of Islam, forming the concept of kaffah, Which is done through warning and kindness. (Fadhil & Effendi.: 2016) This is in accordance with the contents of the Qur'an which reads "silmi kaffah" with the word "silmi" which is a derivation of the letters sin lam mim. (Roisah: 2013).

The formulation of the three basic philosophical elements of Islam is in sync with the approach that produces the H theory which is the elaboration of the basic word of Islam itself (Aziz, 2016). Islamic scholarship must have a foundation of thought, as a theory to be implemented in the field in accordance with the progress of science at this time. It takes synchronization between the theory derived from the Quran with the practices that occur in the simulation and modern technology, so it takes a corridor of a big concept of the basic science of Islam itself. Islamic science comes from monotheism and stops at monotheism as well. (Zainuddin: 2017)

B. Ontology

The Islamic ontology is monism, meaning that God is the origin of all things, the One and there are no allies to Him, while all of His creations are dualism and pluralism. (Zainuddin: 2017).

Each whole concept must have a consistent rationale. In general knowledge a concept that is always consistent in its true will become a universal form which is understood as the basic value which will be possessed by another form.

Ontologically all creation or creation or universe is a system and the basic system is called Islam. Based on this system, the sub systems present in the universe will be consistent with the basic system. Throughout the elements of the system

Surah Al-Imran [3]: 19 :
"Indeed Din Allah is Islam" (QS.Al Imran [3]: 19)

C. Epistemology

Epistemology is a study of science that is very popular and become the most interesting thing. Simply Epistemology is a subject that examines the knowledge and its relation to the essential truth. Epistemology becomes an interesting discussion when it is associated with divinity because the ultimate truth will only be possessed by god, therefore the essence of the ultimate truth that is subject to Epistemology becomes impossible to obtain by the thought and taste of man as a creature of God. (Dahlan: 2014).

Islamic epistemology is eclectic, not only rational, empirical, but also intuitive and based on revelation as the first and main source. (Zainuddin: 2017) Islam is interpreted as a holistic system, comprehensive or wholly. Then it is the whole Islam that becomes epistemology and is called as the kaffah concept of Islam. (Fadhil & Effendi.: 2016)

Surah Al-Baqarah [2] 208:

"O ye who believe! Enter into Islam you kaffah (complete)." (QS. Al-Baqarah [2]: 208).

D. Axiology

The axiom aspect of philosophy discusses the values or morals prevailing in human life. (Kayung: 2011) Previously there was a discussion of ontology which means Islam and then epistemology as the kaffah of an existing system and the axiology of the simple implementation of the two previous elements ie Ontology and epistemology.

In this axiology, there are always two relationships between horizontal and vertical structures. The emergence of Islam, forming the concept of Kaffah, which has two sides side by side in nature (Fadhil & Effendi.: 2016) These two things are analogized as different things like men and women, light and dark. As per QS. Yasin [36]: 36 which states 2 things:

3. RESEARCH METHODOLOGY

A. Hahslm Method

The Hahslm method is a genuine method of Islam because Derived from Quran Surah Al-Hijr (15): 87
"And we have given you seven verses over and over and the great Qur'an." (QS. Al-Hijr [15]: 87)

Formula:

\[ H = a.h \ (s.l.m) \]

Where: 
- H = Huda (Hint)
- A = Alif (Road)
- H = Hanif (Straight)
- S = Sin (Human)
- L = lilah (God)
- M = Mosque (Worship)

4. DISCUSSION

A. Heart And Islam

There is a diagram with heart variable to explain that it turns out the heart has the same concept with the concept of Hahslm theory. If on the theory Hahslm depicted that Man (sin) was created by Allah SWT (lam) to worship him (mim)

Diagram Heart Thinking

Source: Analysis 2018

Other diagram explains the function of the heart. The heart as the core organ of the human is denoted as (lam) instructions. Because the function of the heart itself is very important that is to pump blood. Then in the heart there is a section called Aorta. This aorta serves to carry
blood containing oxygen. This aorta is represented as (sin) because it functions as a blood-carrying carrier containing oxygen to some other parts of the heart such as the lungs, left ventricle and the right chamber before passing through the body. For the atrium itself is usually referred to as a porch, where there are two parts of the left porch and the right porch. The function of the left foyer brings blood to the left ventricle or also called the left ventricle and the right porch serves to carry oxygen-rich blood to the right ventricle or also called the right chamber. Then the last one on the heart is the superior vena cava & ventricles. These two parts are in the same place, which is located on the left side of the heart that serves to receive blood flow from the aorta earlier. This part of the ventricle is also called the cubicle. This chamber was divided into two parts namely the left chamber and the right chamber. The function of each room is different. The right chamber serves blood blood from the right atrium (the right side) and then spreads to the lungs, then the left ventricle receives blood from the left atrium (left portico) and carries it throughout the body. Then after the left ventricle to flow throughout the body, this is where the superior vena cava function is to bring blood that contains carbon dioxide back into the heart, so that the heart can receive blood intake and continue in the pump again as in the picture above. Thus the superior vena cava and Ventricle are represented as (mim).

Diagram Heart Anatomy

In the picture above, the authors explain that the flow of the human circulatory system at the core of the heart line Hahsln concept. Here the author is able to describe the heart as the central core of the human organs, where the blood is in the heart (lam) in the pump / channeled to the right called aorta (sin), where this aorta actually has a primary function to direct blood flow to the whole Body, but before that, flowed first goto the left atrium (left porch). The main function of the left porch is to receive the blood that is rich in oxygen and then redirected back to the left ventrical (left chamber). After the left chamber receives blood
from the left foyer is the main function of the left chamber to drain the blood throughout the body or commonly called "big blood circulation". However, there are several blood streams flowing into the Vava Superior (VKS) section, where the function of this VKF redirects blood to the heart.

Then for the right atrium (right porch) serves to receive blood rich in carbon dioxide and then circulated to the right ventricle (right ventricle). Then this is where the function of the right ventricle (right ventricle) is to drain the blood to the lungs or commonly called the "small blood circulation". Such is the description of the analysis of the picture above, that the blood circulation in the human heart has been in a very neat and structured arrangement. It all happened because of the power of Allah SWT. In accordance with the concept of Hahslm, our heart is able to function optimally with the aim that we are able to perform daily life activities, and most importantly we are created by Allah Swt to worship Him.

Diagram Heart Praise

Source: Aziz, 2019

According to the chart that is observed in the ECG monitor, each heartbeat can be divided into three (3) phases. The first phase, is a range of preparation of the heart for pulsing. In this initial phase, blood flow is headed towards the heart and almost flow in the heart. In this first phase, it has been seen the signs of a heart a right under pressure the presence of the initial pressure although light but fast sequential. The analogy of this blood flow to the heart is like a basketball that is dribbled with resulting in a graph of up and down thick and fast. As a result of the ball being reflected to the floor by hand.

The shape of the graph up and down, thick and many of these as well as signs of arrival a massive tsunami or signs of a large earthquake. In accordance with the methodology of similarity, graphic patterns of up and down or thick and many resembles the letter S or the letter Sin in Hijiyah or approaching number 3 (three) that means plural or many in Arabic structure. This interpretation of thick and many is compassionate and fostered, because groups of small but and many are more closely served with words of compassion and foster care. In religious terminology, referred to as the Glorious and Merciful whereas according to the Asmau Husna that is known as Ar-Rahman Ar-Rahim.

The second phase, it means occurred of heartbeat. The highest pressure occurs in comparison with another phase. The ECG graph showing the vertical line, up to the extreme high and low indicating blood flow that was flow the heart. The shape of high and low in this graph can be analogous to basketball that is connected to the top to be able to pass the opponent then enter the ring. In accordance with the methodology of similarity, this high graphic pattern resembles the letter L or Lam in Hijaiyah in the Arabic structure. Interpretation of the heart praise in this
second phase is the heart does prayer movement know as rukuk that is long with a recitation of the Al-Azhim is defined as long, tall or summarized into words sustain or become phrases Supreme Sustain.

Phase-3, is a continuation of the main heart rate, so that it can be categorized as residual pressure results or result of cardiac stress. The graph on the ECG shows a line which is curved in a medium, not too big convex, nor too small concave. This semicircular shape showing the flow of blood which is leaving the heart. This curved shape can be analogous to basketball that is reflected back after the occurrence of high ball before. In accordance with the methodology of similarity, the semicircular lines resemble the letter M or Mm in Hijayah on the structure of Arabic. The interpretation of the heart in the 3rd phase is that the heart is performing the prayer movement which is prostration that is curved with the reading of Al-A’la. As bound as the circular or the Supreme Cycle.

5. CLOSING

A. Conclusion

The heart is the most vital human organ, because with heart, human is able to live in daily activities. In harmony with the Islamic religion, the heart is the organ that first formed, which serves to pump blood and drain it throughout the body, as well as the existence of Islamic religion. Islam is the religion that was first established since the first time of human being created and sent down to earth.

From the 1,2,3 phase when the heart is beating from the ECG device a graph of heart pressure is displayed with the interpretation that the heart glorifies by performing prayer movements in the form of horizontal lines (S), vertical (L), and diagonal (M ) which is interpreted by reading Ar- Rahman Ar-Rahim, Al-Azhim, Al-A’la.

So the heart is the most important organ and must be maintained by every human being to stay in a healthy and stable condition, as well as with Islam. Islam is the spiritual heart for Muslims that we should keep and always be used as a guide for life, in order to get physical and mental happiness.
References

The Influence of Traffic Noise And Work Stress on The Blood Pressure of Tirtonadi Bus Station Workers

Iwan Suryadi¹, Istar Yuliadi², Siti Rachmawati³, Dhisa Claudia⁴

{ iwansuryadi@staff.uns.ac.id }

¹ Diploma 3 Industrial Hygiene and Occupational Health, Universitas Sebelas Maret, Ir Sutami No 36 A Street, Surakarta, Indonesia, ² Departement of Medicine Education, Universitas Sebelas Maret, Surakarta, Indonesia, ³ Departement of Environmental Science, Universitas Sebelas Maret, Surakarta, Indonesia, ⁴ Bachelor of Diploma 4 Occupational Health and Safety, Universitas Sebelas Maret, Surakarta, Indonesia

Abstract. Work noise and stress do not only appear in industrial areas but also in public places like the Bus Station. One of the risk factors at the bus station is noise and work stress. This study aims to determine the relationship between traffic noise and work stress with blood pressure. research methods with observational analytic and cross sectional approaches. The population is 95 Tirtonadi Bus Station field workers. Sampling by simple random sampling and get 50 respondents as samples. The instrument used a Sound Level Meter to measure noise, Job Stress Questionnaire based on from Minister of Manpower regulations No. 5 of 2018 to assess work stress and Spyghmomanometer Aneroids to measure blood pressure. Independent and dependent variables are calculated by the Spearman rank test. Test results show an intermediate p-value traffic noise with blood pressure of 0.813 and 0.715. work stress with systolic and diastolic blood pressure shows p-values of 0.037 and 0.047. Conclusions There is no significant relationship between noise and blood pressure. There is a relationship between work stress and blood pressure.

Keywords: Traffic Noise, Work Stress, Blood Pressure, Bus Station Workers

1. Introduction

Noise in the modern era does not only come from factory machines but also a vehicle. WHO data (2018) states at least 100 million respondent in the European Union the road traffic noise is exposed, and in Western Europe alone at least 1.6 million years of life lost due to road traffic noise. Pressure at work can result in cases of stress at work. In Europe, more than 1.2 million respondent every year there are cases of premature death due stress and depression (The Guardian, 2018).

Work noise and stress not only appear in industrial areas but also in public places such as terminals, stations and airports. Such that described in Law No. 1 of 1970 in article 2
Research by Van Kempen (2012) and Purwanto (2012) states that one of the effects of work noise and stress is high blood pressure or hypertension. Hypertension itself is a common cause of disorders cardiovascular both in developed and developing countries (Ministry of Health, 2018). Amount hypertension sufferers in the world continues to increase every year. Estimated at in 2025 there will be 1.5 billion respondent in the world affected by hypertension. Meanwhile, in Indonesia itself there has been an increase in the cost of hypertension services BPJS Employment starts from 2014 to 2016 (Ministry of Health, 2018).

Tirtonadi Terminal Surakarta is the largest terminal in Surakarta. Tirtonadi Terminal operates 24 hours because it serves the connecting bus lines both Inter-City-Within-Province and Inter-City-Inter-Province. From the results interviews with local officials, every day in 3 shifts there are ± 1,300 - 1,500 bus fleets entering the terminal. From the results of the initial survey using Sound Level Meter to measure noise, traffic noise levels at Eastern work point is 90.1 dB and in the western work point is 86 dB. This number including above the Threshold Limit Value at work that is 85 dB. Respondents work in the field from the security unit, the last service unit cross, and janitor. Measurement results using Aneroid sphygmomanometer to measure blood pressure in 12 respondents at the point of cooperation found 58.3% or 7 out of 12 respondents had pressure high blood pressure with an average service life of 21 years. Past service workers traffic and security at Tirtonadi Terminal are given target demands every day to do a ramp check 100 times. Based on the results of the interview, some workers also experience sleep disorders. Initial measurement results using the Job Stress Diagnosis questionnaire taken from Minister of Manpower regulations No. 5 of 2018 concerning Occupational Safety and Health at Work Environment 12 respondents found 8.3% or 1 out of 12 respondents experienced mild stress, as many as 66.6% or 8 out of 12 respondents experienced moderate stress, and 25% or 3 of 12 respondents experienced severe stress.

Based on the above problems, researchers want to conduct research with the title "the influence of Traffic Noise and Stress Work with Pressure Blood on Workers in Tirtonadi Terminal, Surakarta

2. Methods

This research was used analytic observational type that is research explain the differences between variables through testing previously formulated hypothesis. This research approach use a cross sectional approach wherein the cause / risk variable and causal is measured or collected at the same time and carried out at the same time situation (Notoatmodjo, 2012).

The population of workers in Tirtonadi Terminal, Surakarta is 95 respondent. The population after inclusion was 54 respondent. Criteria for Inclusion Workers work in the Tirtonadi Terminal field, Surakarta. Workers with an age range of 20 - 55 years, Workers with a normal Body Mass Index (BMI), Workers do not have a family history of hypertension. Workers do not consume alcohol 1x24 hours before measuring blood pressure.

The sampling method was carried out by probability sampling. the minimum sample size after calculation of 48 respondents, but to anticipate the existence of respondents who fall into
the exclusion criteria, the research sample used is 50 respondents. Data analysis used analysis to determine the frequency characteristics of variables and bivariate analysis to determine the correlation between independent and dependent variables.

Our research instruments have used a sound level meter to measure noise, work stress questionnaire based on the regulation of the Minister of Manpower regulations No. 5 of 2018 and Aneroid Sphygmomamometer to measure blood pressure. Univariate analysis includes age, mass index the body which is calculated based on height and weight, work stress, noise and blood pressure. Bivariate analysis uses the Spearman rank correlation test.

3. Results

3.1 Univariate Analysis

Respondents in this study numbered 50 respondent in which the whole is a field worker consisting of cleaning workers, workers security section and traffic control workers. Respondents in this research is male, body mass index (BMI) is normal, no consumed alcohol during the past 24 hours, and has no history hypertension.

3.1.1 Data Characteristics of Respondents

Characteristics of respondents consisted of age, work area and work stress

<table>
<thead>
<tr>
<th>Table 1. Characteristics of Respondent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>20-25</td>
</tr>
<tr>
<td>26-35</td>
</tr>
<tr>
<td>35-45</td>
</tr>
<tr>
<td>46-55</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Aera</td>
</tr>
<tr>
<td>East</td>
</tr>
<tr>
<td>West</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Information

Hyprt : Hypertension

Nrml : Normal

Table 1 explains the characteristics of the respondents. where for hypertensive patients dominant in the age range 46-55 and for the work area is almost balanced in both areas.

The results of the cross tabulation table show the number of workers in the category low work stress who have normal blood pressure of 3 respondents, workers with prehypertensive as
many as 6 respondents, workers who have level 1 hypertension as many as 5 respondent. Meanwhile, the number of workers in the moderate work stress category who have blood pressure normal amounted to 4 respondents, workers with prehypertensive totaling 12 respondents, workers with hypertension level 1 a total of 15 respondent as well as workers with level 2 hypertension totaling 4 respondents. Meanwhile, the number of workers in the job stress category is high there are only 1 respondents with prehypertensive.

3.2 Bivariate Analysis

The researcher uses the backup correlation test, the Spearman Rank test to find out the relationship between traffic noise and blood pressure workers in Tirtonadi Terminal, Surakarta. The results of the backup correlation test are tests Spearman Rank 'by looking at the p-value significance can be seen in

<table>
<thead>
<tr>
<th>Variable</th>
<th>P-Value</th>
<th>r</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noise*Sistolik</td>
<td>0.813</td>
<td>0.034</td>
</tr>
<tr>
<td>Noise*Diastolik</td>
<td>0.315</td>
<td>0.053</td>
</tr>
</tbody>
</table>

Spearman Rank correlation test results table shows the significance value or p-value between traffic noise and systolic blood pressure and diastolic 0.813 and 0.715, respectively. This value shows the data the absence of a significant correlation between traffic noise and variables blood pressure of workers at Tirtonadi Terminal, Surakarta.

Table 3 shows there is a relationship between work stress with systolic and diastolic blood pressure. r values indicate the direction of a positive correlation where the more stressed a person is, the more risk he will get from blood pressure with the weak correlation power.

Table 4. Spearman Rank correlation test results' between Work Stress with Blood pressure

<table>
<thead>
<tr>
<th>Variable</th>
<th>P-Value</th>
<th>r</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work Stress*Sistolik</td>
<td>0.037</td>
<td>0.296</td>
</tr>
<tr>
<td>Work Stress*Diastolik</td>
<td>0.047</td>
<td>0.198</td>
</tr>
</tbody>
</table>

Sources : Primary Data, 2019

4. DISCUSSION

Age of respondents included in this study were workers the Tirtonadi Terminal's cleaning, security and traffic control department, Surakarta with an age range of 20 to 55 years. This age selection has been

in line with the theory put forward by Gray, et al (2005) which explained that as many as 50% of men and women over the age of 55 years old suffering from isolated systolic hypertension, 160 systolic blood pressure mmHg and diastolic 90 mmHg. Purwanto (2012) also supports with his theory which explains that the higher a person's age is the higher the blood pressure.

This is due to the elasticity of the wall blood vessels decrease with age. In the results of cross tabulation between age and blood pressure known in the final adolescence category overall
respondents only suffer from prehypertension. Meanwhile, hypertension sufferers are often found in the age category of late adulthood and early adulthood is as much 24 respondent. This shows that the older the respondent's age, the higher also his blood pressure.

Andria (2013) also explained that the incidence of hypertension increases with age. This matter due to the increasing age of a person the body will has decreased in physiological terms such as the reduction in the body the flexibility of blood vessels and the appearance of crust on the edges of blood vessels which can cause the narrowing of blood vessels to the end increase blood pressure.

The noise source at Tirtonadi Terminal, Surabaya comes from the engines and horns of buses that are active inside the terminal, whistle traffic service and human activity unit officers in the terminal area. Noise measurements at two different points namely the eastern terminal and the western terminal. Measurement results in the east area obtained 77 dB (A). Meanwhile, the measurement results in the western area are also 77 dB (A). for the mean value between east and west noise respectively 80.5 dB and 78 dB. This shows the noise value in the east area is greater than in the west area.

This is in accordance with the situation in the field where the activity in the eastern terminal is denser than the western terminal at the time of measurement. However, the type of noise at the Tirtonadi Terminal is included intermittent noise or intermittent where the value of the intensity of noise is fluctuating or changing for a certain time. According to Ardiansyah (2013), if the type of noise in a workplace is fluctuating, the noise measurement results seen are equivalent noise values (Leq). Equivalent value is a certain value of noise from changing noise which is equivalent to a fixed noise level at the same time interval. On that basis, the noise value between the eastern terminal and the western terminal is the same, 77 dB (A). This value exceeds the Noise Level Quality Standards for the trade and service area of 70 dB (A) based on the Decree of the Minister of Environment No. 48 of 1996. Although not directly, according to Muhtadi (2011) environments with high noise can cause cardiovascular disorders such as vasoconstriction and hypertension.

The results of cross tabulation between noise variables in the east area showed that workers suffering from hypertension, both level 1 and 2 hypertension, were 11 people. Meanwhile, in the western area workers who experience hypertension, both level 1 and 2 hypertension, as many as 13 people. Workers in the western terminal suffer more hypertension than workers in the eastern terminal. In fact, in plain view the eastern terminal has a denser activity compared to the western terminal. This result occurs because workers with an early age category in the area more west than workers in the east.

According to interviews, the peak activity at the Tirtonadi Terminal took place on weekends. However, researchers in this study have limitations, one of which is that it is a requirement from the terminal that data retrieval is only allowed during Monday - Friday workdays. The researcher collected the noise data on Tuesday where the terminal activity was not busy enough. This could be the cause of the absence of variations in noise values in this study. It is better if the next researcher wants to do a noise measurement, it is better to choose days with heavy bus activity such as days before holidays such as religious holidays or before long holidays which do not have to be on weekends.
Hawari (2008) states that noise is considered as a stressor by the body captured sense of hearing. Noise exposure activates sympathetic nervous system and induces hormonal changes in the body played by the hypothalamic-pituitary-adrenal (HPA) axis. Mukhlish, (2018) states the sympathetic nervous system which activates the hypothalamus causes the production of epinephrine and norepinephrine hormones by the medulla the adrenals get taller. This high hormone level is able to increase blood pressure. This relationship is also supported by research conducted by Suryani (2018) in the residential area of Jalan Ambengan Surabaya shows that at high noise intensities > 55 dB (A) yang had high blood pressure of 24 people 72.7%. Whereas for areas with low noise intensity [<55 dB (A) which have pressure high blood pressure by 5 people (25.0%). Relationship test results using Chi square analysis results obtained p-value = 0.002 where p-value <0.005 then noise is related to blood pressure.

Stress affects high blood pressure through the sympathetic nerves. Stress resulting in sympathetic nerves stimulating juxtaglomerular cell apparatus increase renin production. Renin production will activate the RAA system (Renin-Angiotensin-Aldosterone) so that it will increase Angiotensin II.

Increasing the amount of Angiotensin II will result vasoconstriction in the vascular smooth muscle that results in increased blood pressure (Purwanto, 2012). The theory is also supported by research Ardian (2018) at Bangetayu Semarang Health Center who presented the results that of the 99 respondents found that 46 respondents experienced stress moderate level and 45 respondents experienced high stress levels. Test results Statistical relationship between stress levels and blood pressure in hypertensive patients at Puskesmas Bangetayu Semarang using Somer's test produced a p value of 0.001 or p-value <0.005 which means there is a relationship between levels.

stress with blood pressure in hypertensive patients. The results of statistical analysis with the Spearman rank correlation test 'on this research shows p-value = 0.037 and p-value = 0.047 which means there is a relationship between work stress and blood pressure in workers at Tirtonadi Terminal, Surakarta. In addition to the p-value, in a statistical test this research also known correlation coefficient value or r positive that is r = + 0.296 and r = + 0.198 which means the relationship between work stress variables with stress blood goes in the same direction. Correlation coefficient or r is positive in the test results Spearman Rank correlation shows that the higher the stress level experienced by workers, the blood pressure of workers will also increase. The amount Correlation coefficient values refer to Table 4 interpretation of the Pearson Spearman Rank test 'by Dahlan (2011) showing the strength of the relationship between Work stress variable with blood pressure variable is very weak.

A weak relationship between work stress and blood pressure can occur bearing in mind there are age factors that are associated with more blood pressure dominant considering that most respondents came from the adult age category late and early elderly. In addition, there are other factors that could be more dominant in influencing blood pressure that is not a researcher control such as smoking, exercise habits, and nutritional intake. The relationship between stress and blood pressure of workers in the Terminal Tirtonadi, Surakarta in accordance with research conducted by Andria (2013) to the elderly at a Posyandu in the city of Surabaya who explained that the less a person's immunity to stress the higher the possibility of a person suffering from hypertension.
5. Conclusions

Traffic is a risk factor for blood pressure. In research based on statistical tests there is no agreement between traffic with detecting cross tabulations it shows the opposite. For work pressure, suggestions for the terminal tirtonadi to make a routine exercise program as an effort to reduce work stress.
References

[6] Hawari, Dadang. 2008. Management of Stress, Anxiety, and Depression. Jakarta: Balai University of Indonesia Faculty of Medicine Publisher
Developing Occupational Health and Safety Website Using WordPress: Study Case Katigaku.top

Agung Supriyadi¹

¹OHS System Management System Lecturer, Institut Medika Drg. Suherman, Cikarang Utara, Kabupaten Bekasi

Abstract. Indonesia has more than hundred thousand of workplace accidents. Katigaku.top developed as occupational health and safety (OHS) website since 2014 for giving contribution to reduce workplace accident in Indonesia. This paper has objective to describe how katigaku.top as OHS website developed from WordPress and its effectivity. We use Manhas framework that describe on how a website developed. We use jetpack plugin wordpress data to show total post, authors, views, visitors from 2014-2018. Katigaku.top firstly designed using domain komunitask3.wordpress.com in 2014 then hosted in hosting provider and fully operational until now using domain katigaku.top with still using WordPress as content management system (CMS). The website can be viewed in personal computer (PC) and mobile phone because it uses responsive theme. Total 304 post already published from 5 authors and viewed more than 1.4 million times. Developing OHS website using WordPress in study case katigaku.top is easy and give great impact in term of viewer reach.

Keywords: occupational health and safety website, WordPress, katigaku.top

1. Introduction

Workplace safety accident is increasing year by year. In 2001, workplace accident recorded by Manpower Social Security Administrator (Badan Penyelenggara Jaminan Sosial Tenaga Kerja/ BPJSTK) is 104.714[1]. That number was decreased in 2004-2011. Workplace accident in Indonesia showed increasing number starting 2012. The number at its peak in 2018 with 173.015 workplace accidents recorded[1].

Workplace accident brings loss for workers, their families and global economy as well. For workers, workplace accident can lead to loss quality of life or even premature death. Workers’s family have risk to loss income source from the accident. Loss production by workplace accident to global GDP according to ILO is estimated 4% of the global GDP (roughly 2.8 trillion US dollars)[2].
Government, private sector and workers have been doing some efforts to decrease workplace accident. Government already has 1579 personnel as government manpower supervisor (pengawas ketenagakerjaan)[1]. They trained 16.791 professional personnel as general safety expert (ahli K3 umum), first aider (petugas peran P3K), occupational health and safety management system (sertifikat manajemen keselamatan dan kesehatan kerja/SMK3) auditor, and occupational doctor. Government also has validated 647 company as audit body and Occupational Health and Safety Company Service (Perusahaan Jasa Keselamatan dan Kesehatan Kerja)[1]. Private sector put contribution to OHS in Indonesia with 5119 companies certified with SMK3 and 9098 companies already awarded by zero accident award from government[1].

Big number of workplace accident in one side and many OHS professional, government supervisor, OHS company service in another side have created necessity to access valid OHS information easily. When it comes to question about getting information easily, the answer must be: internet.

Indonesia is in digital age. Indonesia has 88.1 million users of internet in 2015 and it has been predicted by McKinsey that the user will be nearly doubled in 2020 [3]. It is believed that 73% of internet user access via mobile [3]. Increasing user of internet open opportunity for OHS professional to access OHS information through internet.

To build specific website is important in the age of digital in Indonesia. Nowadays, most of the websites are powered by different content management systems (CMS) that allows website administrators to make changes to their websites without web programming tools knowledge. WordPress, Joomla and Drupal are popular open source CMS technologies, but WordPress has become far more popular among three in the past couple of years [4]. Wordpress is CMS that used by 23.3% of the top 10 million websites [5].

WordPress offers many benefits for website builder. WordPress is easy to use even for new user and it gives good result when it come to user and reader interface. It gives great Search Engine Optimization (SEO) positioning [6] because WordPress has many plugins to improve a quick inclusion in search engines, compared with other WCMS [7]. WordPress also provides quick integration with social medial such as facebook, instagram, linkedin, and twitter.

Create an OHS website that easy, good reader and user interface, and have great Search Engine Optimization can be useful for OHS professional in Indonesia. This study aimed to describe on how WordPress can be used to build OHS website and show its effectivity.

2. Methods

2.1 Website Development

Website development are different in a number of respects to existing types of IT systems [8]. Manhas [9] mentioned that there are 14 models that are traditionally being used for the process of website development.

Manhas (2017) proposed framework for website development that grouped to 4 stages namely objective identification, design, development and implementation.
2.1.1 Phase 1: Objective identification

First thing to do in website development is identifying objectives. We need to answer questions: What are the organizations expectations from a website? Who are desired visitors of the website?

In this stage, we need to set the objectives. Some considerations to take account are: technology to use, skill set analysis, content analysis, user analysis, cost analysis and risk analysis.

2.1.2 Phase 2: Design

Simplicity and the design are success keys for a website. The design of the website is worked out keeping in view the facts listed in objective document.

This phase contains following stage:

- Structure design: it refers to network of hyperlinks, which is responsible for making the navigation through the webpages of website possible. It will help on simplicity access from a user.
- Appearance design: it deals with the look and feel of the website. This stage will concern on different colors, images, pictures, animations, fonts and graphics used in the website.
- Design testing: This step helps the designer to evaluate its structure and appearance design at an early stage of development so that the desired objectives can be achieved effectively.

2.1.3 Phase 3: Development

This phase focuses more on development and is driven by objective and design document finalized in previous stages. It has following steps:

- Resource gathering: it includes various resources such as development environment, front end and back end software, database, hardware, trained staff and other technical specifications are gathered for future use.
- Coding: website needs to be coded in such a way that it can efficiently handle all the security threats. The performance of web based system on different search engines must be taken care of during this phase.
- Testing: testing of the code for desired performance needs to be evaluated before its implementation. If some problem occurred, it can be located and rectified by iterative looping between coding and testing stage.

2.1.4 Phase 4: Implementation

Implementation phase involves the launch of website on World Wide Web. This phase includes:

- Implementation: in this phase the presence of concerned website on network must be made aware to the entire user community. This can be achieved by carrying out
various promotional steps such as advertising, etc. The performance of the website on various search engines also needs to be improved so that it can be easily searched.

- Maintenance: this step involves continuous monitoring of the website to ensure that the contents and information displayed are up to date and future changes can be easily incorporated.

- Objective review: since World Wide Web is an ever changing domain and new technologies become available after a short span of time. The websites must be developed in such a way that they can easily meet the requirement of ever changing dynamic environment.

2.2 Jetpack Plugin

Plugin is a specific and customized function that can be installed in a WordPress website. A WordPress plugin is made up of standard PHP code that makes use of the WordPress plugin API. This API provides several extension mechanisms: hooks that allow custom functionality to be called when specific site events occur; user-provided tags (called shortcodes) that can be embedded into posts and are then expanded into HTML; and database APIs that allow new configuration options to be added for plugin customization or new metadata to be added to blog posts, users, and comments [5].

Jetpack is a WordPress plugin that originally made by Automattic, same company that made WordPress. Jetpack has function to collect detailed visitor statistics [10]. We use Jetpack to investigate website statistic during 2014-2018.

2.3 Empirical Data

Empirical data can be used because the researcher had direct experience in making katigaku.top. The researcher knows each detail progress that experience by katigaku.top. This empirical data will be described using words or table.

Empirical data also will be collected from WordPress dashboard data that including WordPress reader interface, website author, and other data. We use also data from hosting provider to complete our description.

![Fig 1. Manhas Framework for Website Development](image)
3. RESULTS

Using method offered by Manhas (2017), the development of website katigaku.top will be described.

3.1 Phase 1: Objectives

3.1.1 Objectives of Katigaku.top

Katigaku.top designed to give occupational health and safety references for Indonesia citizens generally and OHS professionals specially. It targeted visitors coming from search engines, direct visit, and social media.

3.1.2 Objectives evaluation

In term of website development, there are 2 type of WordPress: wordpress.com and wordpress.org. For many people, WordPress.com is their first and only experience with WordPress. At WordPress.com, you can sign up for a totally free WordPress site. WordPress.com runs the software for you, takes care of upgrades, and maintains the servers. All you have to do is sign up and start adding content. This is one of the services run by Automattic, the company closely allied with the development of WordPress. The free service doesn’t allow the complete flexibility you have when you run the software on your own server, but it’s a great place to start experimenting and get a feel for how WordPress works [11].

The WordPress.org website is home to the WordPress software itself. If you are going to install WordPress on your own webserver, download the latest version of WordPress from here. WordPress.org is also home to the documentation, WordPress add-ons (themes and plugins), and most important, the WordPress community, which provides support and a place to share ideas on the development of WordPress [11].

For development sake of website, we chose WordPress.org. With WordPress.org, katigaku.top will have great chance to do customization but still in easy way.

At initial, this WordPress site is mainly built by one person. He learnt WordPress by self-taught from internet source, Facebook group discussion, and book. No formal education received by him to develop the site.

Contents planned to be in site is contents related to health and safety. The contents can be article, pictures, quotes, or videos. Google keyword planner from Google Ads was used to do keyword research analytic [12]. Google keyword planner helps the website stays on top of keyword trends to refine search campaigns and ensure content remains relevant [12]. The result of this tool indicates that the keyword is effective enough to be used and elaborated in content writing [13].

User analysis that used is from Google Analytic and Google Pagespeed Insight. Google Analytic enable us to show effectiveness of different variable on various dependent variable which all are times series and especially show how to use time series regression on one of the most important and primary index [14]. While Google Pagespeed Insight, it profiles a page load and report its best estimate of the critical path from the client’s perspective [15].
Budget was one of main consideration in this phase. As the site was only managed by lone person, budget could not be too high. The person set limit for IDR 1 million as yearly budget to rent shared hosting from hosting provider and domain name.

Threat that gives risk to the site can be from virus, malware, or spam comments. It can make the site get problem in future such as loss of visitor, hacked admin page, or even loss all data. The founder of the site planned to cooperate with shared hosting provider and WordPress plugin to make the site less vulnerable.

3.2 Phase 2: Design

3.2.1 Structure design

To access an article of website, we usually click to hyperlink. Form of hyperlink can be set from permalink which is main form for all hyperlink in the sit. There are several permalink that can be used. Katigaku.top using permalink below with consideration easiness in traceability and search engine optimization.

https://katigaku.top/yyyy/mm/dd/sample-post/ (…)

Katigaku.top divided into several categories mainly about: technical, organization and personnel. Each of article in katigaku.top can be grouped to minimum 1 of category. Beside category, there are also site “page” that is used to put homepage and author list information.

3.2.2 Appearance design

Katigaku.top appearance was designed to meet simplicity, highly customized, and mobile ready. Simplicity means easy to use and light in term of speed accessed. Highly customized represents modification easiness of an appearance and freedom given to design the site according our willingness. Mobile ready means ability of an appearance to have full feature and easy to access via mobile phone.

To design the appearance, WordPress provide us may themes that can be installed to a site easily. We tested some of magazine themes in WordPress to meet our requirements. In the end, we choose Jannah theme from TieLabs that meets to our requirement.

Fig.2 web view of katigaku.top
3.2.3 Design testing

Because WordPress is easy to be used, any change that we made in term of design can be evaluated directly during testing.

3.3 Phase 3: Development

3.3.1 Resource gathering

WordPress enable the user to develop backend and backend of website easily. In backend, WordPress give access to do major change with some click effectively in admin page. In hosting side, we use cpanel with full support from hosting provider. With easy and effective resource in backend, it enables katigaku.top to give good user interface in frontend.

In early development, there was only 1 person fully develop the website. His job was designing website, managing hosting, managing ads and providing content. Today, katigaku.top has recruited 9 writers to provide content in the site.

3.3.2 Coding

Coding activity was reduced in katigaku.top because minimum knowledge of coding existed in katigaku.top team and WordPress provides many advantages that enable us to do less in coding. Specific function in front-end website such as displaying calendar, displaying statistic,
linking to social media, can be performed using WordPress plugin without any coding knowledge needed.

3.3.3 Testing
Some features of WordPress provide preview page before we do the change permanently so we can directly know the result. If we wish to cancel the update, we can undo our action in the site. Katigaku.top always do testing after modification performed to ensure the readers feel best performance.

3.4 Phase 4: Implementation

3.4.1 Implementation
Katigaku.top known by public through 3 ways: search engine, social media and direct visit. Each visitor origins have their own characteristics.

Visitor from search engine coming from search engine optimization. search engine optimization (SEO) is enabling a web site to appear in top result lists of a search engine for some certain keywords [16]. SEO can be divided to on-page SEO and off-page SEO. On-page SEO includes optimization inside our website such as site hierarchy, website domain name, site title, site description, site keywords, etc. Off-page SEO includes optimization outside our website such as link building, reciprocal linking, etc.

On-page SEO in katigaku.top performed using Yoast plugin help. Yoast enable us to complete and check on-page SEO features such as snippet, tittle, keyword reciprocal, inbound link, outbound link, etc. After we complete SEO requirements, our post will have green signal from Yoast.

Katigaku.top article is shared in social media such as Facebook, Instagram, Twitter, Whatsapp, etc using publicize plugin. Katigaku.top social media has follower as follow:

- Facebook page : 1372 followers
- Instagram : 866 followers
- Twitter : 65 followers

Sharing using whatsapp cannot be counted because the whatsapp sharing counter feature is not available in whatsapp and WordPress as well.

![Fig.4 social media counter](image)

3.4.2 Maintenance
Maintenance of katigaku.top performed by following actions:

- Hosting data server maintained by hosting provider. Some improvement related to hosting also can be supported from hosting provider action.
- Self-website maintenance performed by katigaku.top’s administrator. The actions include: update plugin, daily monitoring of website, display change, etc.

3.4.3 Objective Review
Katigaku.top designed to give occupational health and safety references for Indonesia citizens generally and OHS professionals specially. It can be seen from achievements from 2014-2018 as follows:

- Total author in Katigaku.top: 5 authors
- Total article in katigaku.top: 304 articles
- Viewers katigaku.top: 1,439,724 viewers

4. Conclusions
This study showed that katigaku.top as WordPress based website can be easily developed even started by only 1 person. Not only it is easy to use WordPress, but also it still gives great impact in term of display, sharing in social media and total viewers of website.

Manhas method (2017) to describe development of website enable us to deliver the description easily. It also can be used for evaluation of a website.

5. Discussion
This study did not include on “google dance” discussion. Google dance is series of google algorithm update that will affect google rank of a website. Update in google rank will affect also statistic viewers of a website. This study not include google dance because it mainly lay on google decision and difficult to relate with developer task in a website.

Revenue on a website is important to make a website live. The revenue can be acquired from google adsense, direct ads or another ads provider. This study not include revenue aspect because it is seen as confidential.

Future study can enlarge the scoop of the study to include this google dance issue and website revenue. The study can be specific discuss about one topic.

6. Conflict of interest
Authors declare that they have no competing interest.
7. **Funding**

Author thanks to Institut Medika Drg Suherman for their funding in this research.
References


Microcontroller based Hospital bed control

Iswanto¹, Muhammad Akhdan¹, Prisma Megantoro³, and Afif Zuhri Arfianto⁴

{iswanto_te@umy.ac.id}

¹, ² Department of Electrical Engineering, Universitas Muhammadiyah Yogyakarta, Yogyakarta, Indonesia; ³ Department of Engineer Profession Program, Universitas Muhammadiyah Yogyakarta, Yogyakarta, Indonesia; ⁴ Department of Electrical Engineering, Universitas Gadjah Mada Politeknik Perkapalan Negeri Surabaya, Surabaya, Indonesia Indonesia

Abstract. One of the causes of paralyses is stroke that occurs because of brain blood vessel disorder. Because of it, the patients suffered from stroke must lay most of their time on a bed. Laying too long can pressure a specific area in contact with the surface of the bed leading to decubitus. To prevent this, the nurse changes the patient's sleep position periodically. Most hospital beds have been designed to adjust the position of the patients. However, changing the bed position manually needs extra energy. The study aims to design a tool for hospital bed control using a DC motor controlled by a microcontroller. Nurses, patients and families of the patients can change the position of the bed by using a button connected to the microcontroller. The bed controller circuit uses the button to control the bed position using a dc motor. By using this device, the patients, nurses or caregivers and the patients’ family can simply press the button to control the bed position according to the comfort of the patient's sleeping position so as to minimize the occurrence of decubitus

Keywords: decubitus; DC Motor; Microcontroller; Button; Bed Position.

1. Introduction

Stroke is a clinical syndrome due to brain vessel disorders. Stroke is a neurologic deficit arising from cerebral vascular disease. Stroke makes the patients lay down on the bed in a considerable time. The impact of it is decubitus, a disease caused by a pressure on the area in contact with the surface of the bed. Decubitus wounds are the effects of prolonged pressure on the prominent surface area of the bone and result in reduced blood circulation in the stressed area and over time the local tissue experiences ischemia, hypoxia, and develops into necrosis. Some studies on nursing interventions to prevent decubitus injury consist of lying position regulation which can reduce tissue pressure and can be an effective action to prevent decubitus injury. Changing the position can be done periodically every hour, starting at 08.00-10.00 (Western Indonesian time) the patient is tilted to the right, at 10.00-12.00 the patient is stretched, at 12.00-14.00 the patient is tilted to the left.
Based on the problem, this paper presents an innovation to change the position of the patient's tilt angle on hospital bed by adding a DC motor. The motor is used to change the position of the patient's tilt angle driven by using the microcontroller. Microcontrollers have been used by previous researchers to control dc motors. Research on microcontrollers to control dc motor speed for wheeled robots was investigated by Ages (Abad et al. 2018). Microcontroller was investigated by Croock to control dc motor speed to drive a wheelchair (Croock, Al-Qaraawi, and Ali 2018). Microcontrollers were examined by Ages to control the position of the robotic arm to sort based on Fuzzy Logic-Controlled Feedback (Aliff et al. 2019). The angle position controller with a dc motor controlled by a microcontroller was examined by Hamid (Hamid et al. 2018). DC motor has been used to control the position of the angle with the control of the microcontroller.

The motorbike has been researched by researchers before, such as the study of permanent magnet DC motors studied by Wu for movement control and attitude adjustment for climbing robots on flexible surfaces. The sliding mode control (SMC) control algorithm is used to control the angle position of the dc motor (X. Wu et al. 2018). Position control was examined by Xuan Ba to control the angular position of a BLDC type DC motor with the Gain-Adaptive Robust Backstepping Position Control control algorithm (Xuan Ba et al. 2018). Control of angular position was examined by Shi for the control of mouse robots modified to study mouse movements. The dc motor is controlled by using an STM type microcontroller (Shi et al. 2018). Research on the angular control of electromagnetic fluid actuators for robotics rehabilitation was investigated by Davidson. DC motors are controlled using impedance control used for stroke rehabilitation robots (Davidson and Krebs 2018).

The control of the dual-axis tracking system using a DC motor was examined by Belkasmi. To drive a DC motor, a PIC type 18F4550 microcontroller was needed. An LDR sensor was needed to detect the position of the sun. Fuzzy logic controller algorithm was needed to drive the angular position of the DC motor (Belkasmi et al. 2015). A Low level control embedded in a DC motor to move robot's feet was examined by Bonci. The system used a Renesas type microcontroller with 32-bit processor YRDKRX63N board. This microcontroller controlled the angular position of the DC motor using PID control (Bonci et al. 2015). Wheelchair control for handicapped people was studied by Kim. The wheelchair was designed to be driven by a dc brushless. To be stable, the wheelchair required a controller consisting of a microprocessor (MPU), an accelerometer sensor, and a DC brushless motor driver (Kim et al. 2015).

A design and development of a continuous intelligent passive movement device for knee rehabilitation was examined by Umchid. The system consisted of ARM9 microcontroller, LCD touch screen, Arduino nano, current sensor, rotary encoder, limit switch, and DC motor. The DC motor was controlled by Arduino nano whose angular position was set by using an LCD touch screens connected to ARM9 (Umchid and Taraphongphan 2016). A design and development of Solar Tracking system using Single Axis and Azimuth-Altitude Dual Axis was investigated by Ray. The system consisted of light sensors using LDR sensor, microcontrollers, dc motor drivers and dc motors. An Atmega8 microcontroller was used to control the direction of solar panel position using a DC motor (Ray and Tripathi 2016). A design and construction of an automatic test bench for MCB testing was examined by Wickramarachchi. The system consisted of dc gear motors, a DC servo driver, microcontrollers, a halleffect current sensor, and an MCD. An Arduino type microcontroller
was used to run dc motors and measure the current generated from the MCB (Wickramarachchi et al. 2016).

A Single Track Autonomous vehicle was investigated by Alshahadat. This vehicle system consisted of a gyroscope sensor, microcontroller, and Bluetooth. A DC motor was connected to a microcontroller using a driver interface. (Alshahadat et al. 2018). A flexible platform with a wireless interface for remote control of a DC motor was examined by Litta. The system consisted of a microcontroller, Bluetooth, rotor position sensor, and dc motor. A 32-bit ARM cortex-M3 type controller was used to control DC motors (Litta et al. 2018). The 2DOF control system with a single chip computer was examined by Sladka. The system consisted of a single chip microcontroller, industrial personal computer, and dc motor. The dc motor was controlled by a PID control algorithm programmed on an industrial personal computer. The data were then transmitted to the microcontroller using serial communication (Sladka, Czebe, and Wagnerova 2018).

A four quadrant DC motor with regenerative braking was examined by Kumar. This system consisted of a microcontroller, high voltage insulation, four quadrant chopper, a DC motor, load, and Tacho-generator. An Arduino Mega2560 type microcontroller was used to control PWM on the four quadrant chopper to regulate the speed of high voltage DC motor (Kumar, Saraf, and Kumar 2018). The design of a two-way DC-DC converter based on a single chip microcomputer was investigated by Wu. The system consisted of a microcontroller, LCD, half-bridge rectifier circuit, and a series of DC-DC converter circuit. An STC12C5A60S2 microcontroller was used to control dc motors (Y. Wu, Wang, and Ning 2018). A machine for helping the elderly up and down lavatory were examined by Jangwanitlert. This system consisted of a microcontroller, dc motor, and a H-bridge circuit. There were two DC motors used in this system. An Arduino Uno microcontroller was used in this system to provide inputs in the form of PWM pulses to the H-bridge circuit (Jangwanitlert, Meesrisuk, and Sanajit 2018).

A DC motor angle control using a microcontroller has been investigated by many previous researchers such as researches on tracking dual-axis solar panels, robot legs, disaster rescue robots, insect robots, traction therapy, and knee rehabilitation. The DC motors used were BLDC motors, servo motors, and stepper motors. The PIC controller of PIC 18F4550, DSPIC30F4011, ATMEGA 2560, STC12C5A60S2, ARM cortex-M3, LPC1549, and PIC16F887 types were used by previous researchers to control DC motors. The purpose of this paper is to design the position control of hospital bed using a microcontroller. The DC motor was controlled using a microcontroller. The microcontroller was used to control the angle of the bed by using a DC motor mounted in the patient's bed. The control position of the angle was connected to the microcontroller to control the angular position. By using this device, the patient or nurse can simply press the button to control the position of the bed according to the patient's comfort.

2. Research Method

A control system for hospital bed with microcontrollers (Wijaya, Oktavihandani, et al. 2020; Megantoro et al. 2020; Tarigan, Sinurat, and Sinambela 2015; Ruifeng, Zhe, and Liying 2015; Kuantama, Setyawan, and Darma 2012) designed using block diagrams and flowcharts is
The design of the block diagram of the bed control system is shown in Figure 1. The figure shows that there are three systems: input system, control system, and output system.

### Input System

Figure 2 shows an input system for the bed control in the hospital. This system consists of two input sensors that function to control the bed: the button sensor (Dzulfikri et al. 2020) and accelerometer sensor. The up/down button sensor is used to control the position of the bed. The sensor button is connected to the digital port of the microcontroller (Tunggal et al. 2020; Latif et al. 2020; Yudi Limpraptono, Putri Ratna, and Sudibyo 2012; Limpraptono et al. 2011; Fanbiao et al. 2015) named port 2. The accelerometer sensor is used to detect the tilt angle of the controlled bed. This sensor is connected to the digital generator with i2c communication.

### Control System

Figure 3 shows the process of input system from sensor data which is then released to the output system to control the DC motor. This system uses ATMEG AT89S51 type microcontroller which has low power input and low price. This microcontroller is used to control the DC motor using the inputs from the button up/down sensor.
Output system

The output system for hospital bed control using a DC motor is shown in Figure 4. The figure shows that the DC motor is connected to the motor driver interface so that it can be controlled by the microcontroller. The microcontroller emits the PWM on the digital port of the microcontroller to control the motor (Kunal et al. 2020; Wijaya, Alvian, et al. 2020; Han 2015; Sharma and Sonwane 2017; Bais et al. 2016).

Figure 5 shows the flowchart of the hospital bed control algorithm. It can be seen in the figure that when the program runs, the up/down button provides the data derived from the microcontroller delivered to the motor driver. When the bed is moved by the DC motor, the angular position is read by the angle sensor and then displayed on the display viewer.

Figure 3: Block diagram of the bed control output system.

Figure 4: Block diagram of the bed control output system.

Figure 5: Flow chart of hospital bed position.
3. Copyright Form

The hospital control system test was performed in stages from the subsystem test to the entire system test as shown in Figure 6. The figure shows that there are three subsystems tested namely the input subsystem, control subsystem and output subsystem.

![Figure 6: Bed control circuit](image)

Input subsystem test

There are two testing methods for input subsystem as shown in table 1. The table shows that there are up and down buttons test and accelerometer sensor test. When the button is pressed, the LCD displays ‘pressed button’ and when the button is not pressed the LCD displays the ‘not pressed’ button. In the accelerometer test, when the accelerometer is rotated right to the direction of the x axis, the LCD displays 90 degrees and when it is rotated left in the direction of the x axis, the LCD displays -90 degrees.

<table>
<thead>
<tr>
<th>No</th>
<th>Test</th>
<th>LCD display</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Button up</td>
<td>Pressed button</td>
<td>Pressed</td>
</tr>
<tr>
<td>2</td>
<td>Button up</td>
<td>Not pressed button</td>
<td>Not pressed</td>
</tr>
<tr>
<td>3</td>
<td>Button down</td>
<td>Pressed button</td>
<td>Pressed</td>
</tr>
<tr>
<td>4</td>
<td>Button down</td>
<td>Not pressed button</td>
<td>Not pressed</td>
</tr>
<tr>
<td>5</td>
<td>Accelerometer rotates to x-axis</td>
<td>90 degrees</td>
<td>Rotated right to x-axis</td>
</tr>
<tr>
<td>6</td>
<td>Accelerometer rotates to x-axis</td>
<td>-90 degrees</td>
<td>Rotated left to x-axis</td>
</tr>
<tr>
<td>7</td>
<td>Accelerometer rotates to y-axis</td>
<td>90 degrees</td>
<td>Rotated right to y-axis</td>
</tr>
<tr>
<td>8</td>
<td>Accelerometer rotates to y-axis</td>
<td>-90 degrees</td>
<td>Rotated left to y-axis</td>
</tr>
<tr>
<td>9</td>
<td>Accelerometer rotates to z-axis</td>
<td>90 degrees</td>
<td>Rotated right to z-axis</td>
</tr>
<tr>
<td>10</td>
<td>Accelerometer rotates to z-axis</td>
<td>-90 degrees</td>
<td>Rotated left to z-axis</td>
</tr>
</tbody>
</table>

Please note that the word “Table” is spelled out.

Subsystem Control test

When the Up/Down button is pressed, the microcontroller will direct the motor driver to move the motor and adjust the angle of the patient bed. The bed movement stops every time it reaches 10 degree and is set for maximum 60 degree. The change of the angles is received by the sensor and then displayed on the LCD.
Output subsystem test

The motor drive circuit shown in figure 7 actively moves the motor when the Up/Down button is pressed. It can be seen in the figure that when P1.0 logic is 0 and P1.1 logic is 1, the NPN1 and NPN2 transistors form the darlington transistor configuration and activate relay 1. Because the coil of relay 1 gets +12 voltage and 0 voltage (ground), the contact on relay 1 is connected to NO which gets 30V while the contact on relay 2 is connected to NC that gets 0 voltage (ground) so that the motor rotates clockwise and stops when the bed reaches 10 degree. When P1.0 logic is 1 and P1.1 logic is 0, the NPN3 and NPN4 transistors form the darlington transistor configuration and activate relay 2. Because the coil of relay 2 gets +12 voltage and 0 voltage (ground), the contact on relay 2 is connected to NO which gets 30V while the contact on relay 1 is connected to NC that gets 0 voltage (ground) so that the motor rotates counterclockwise and stops the bed reaches 10 degree.

![Figure 7: Motor drives circuit.](image)

4. Conclusions

The hospital bed system proposed in this paper equipped with features that adjust the tilt position by simply pressing a button placed near the patient so that the patient can easily reach it. The bed is moved by using a DC motor controlled by a microcontroller. Every time the up/down button is pressed, the microcontroller directs the DC motor to move the bed to reach 10 degree and is set for maximum 60 degree. This system consists input system, control system and output system. The input system contains button sensor and accelerometer sensor. The button up/down sensor is used to control the position of the bed and the accelerometer sensor is used to detect the tilt angle of the controlled bed. The control system is used to control the DC motor using the inputs from the button up/down sensor. The output system emits the PWM on the digital port of the microcontroller to control the motor. By simply pressing the button, nurses, patients and families of the patients can change the position of the bed according to the comfort of the patient's sleeping position so as to minimize the disease caused by long staying on the same position such as decubitus.
References


Analyze of Fatigue Related Vibration and Noise Exposure in Weaving Departement at PT. IDtex

Seviana Rinawati

{ sev1ana_er@staff.uns.ac.id }

1Occupational Health and Safety Program, Sebelas Maret University, Ir. Sutami 36A, Kentingan, Surakarta Indonesia

Abstract. Machinery and mechanical work equipment cause vibrations which channel some power to the worker's body, objects in the workplace and the environment. Vibration and noise from weaving machines at PT. IDtex causes a resonance of organs and body tissues, leading to fatigue on workers. The purpose of this research was to determine the analysis of fatigue related vibration and noise exposure in weaving machine at the company. The research was conducted at PT. IDtex of weaving machine departments. The sample involved 31 respondents with Win Episcope 2.0. The respondents were divided into 3 groups vibration exposure < 1 m/sec², 1-4 m/sec² and > 4 m/sec² and noise intensity below 80 dBA, 80-85 dBA and above 85 dBA. Simple Linear Regression analysis test was used to analyze data, and the correlation test had a significant p-value of 0.000 (R = 0.749). This means that there was a significant relationship between vibration and noise exposure with fatigue. The coefficient of determination R² = 0.560, it's mean intensity of vibrations and noise accounts for 56.0% of changes in fatigue variables.

Keywords: Vibration, Noise, Weaving Machine, Fatigue

1. Introduction

Machinery and mechanical equipment cause vibrations, which involve regular movements from objects or media with the alternating direction from the balanced position. Some of the mechanical power is channeled to the worker's body or objects in the form of mechanical vibrations (Suma’mur, 2013).

Arief (2005) studied the production machinery in the plywood industry and factors affecting the level of vibration intensity in the production process room. The results showed that the vibrations had exceeded the standards with an average acceleration of 8.97 ms²/8 hours. In case this happens continuously without control or repair, the health and safety of workers, and the durability of the production machine will be negatively affected. Noise exposure that
exceeds the Threshold Limit Value interferes with the workforce activities. It is estimated that almost 14% of the total workforce of industrialized countries is exposed to noise, which exceeds 90 dB in the workplace. Hearing impairments and physiological disorders in the form of fatigue due to noise are common occupational diseases. These problems need to be identified earlier for prevention or control to be carried out. (Soeripto, 2002).

PT. IDtex is a textile industry that processes raw materials into fabrics. Due to the increasing demand, the company recently increased its production capacity with the weaving machine totalling 614 units. Apart from the noisy impact, the weaving machine also produces high vibrations. The weaving room has a large with 1 worker operating 6 machines for 8 hours per day. Based on data from the initial survey, 70% of workers suffer from fatigue (base on fatigue criteria by Lintje 2010). This is indicated by an average reaction time of 425 m/s along with some complaints made by workers at the interview. The measurement data of mechanical vibrations in the weaving machine was 5.7 m/s², and the noise intensity was 91 dBA. According to the Minister of Manpower Regulation No. 5 of 2018 on Occupational Safety and Health in the Workplace, the Threshold Limit Value (TLV) of work equipment vibration directly or indirectly exposed to the arms of the worker is set at 4 m/s² for 8 hours of work, while the noise intensity is 85 dBA for 8 hours per day. Therefore, the intensity of vibration and noise in the weaving machine department is inappropriate. This study is entitled "Analysis of fatigue related vibration and noise exposure in weaving at PT. IDtex”

2. Methods

This research an observational analytic study that used Cross Sectional approach. The population was obtained through simple random sampling (Win Episcope 2.0 program : Gobeirno, 1998) was divided into 3 groups, each with 31 respondents). Group 1 consisted of respondents exposed to vibration and noise less than TLV in the Ricing Room. Group 2 respondents were exposed to vibration and noise in the range of TLV in Office Space, while Group 3 was exposed to vibrations and noise more than TLV in the Weaving Room. Research data on vibration and noise (interval) with fatigue (ratio) were tested using a simple linear regression analysis test (Soekidjo, 2010).
3. Results

The location for the study was at PT. IDtex in the weaving room receiving vibration from 614 weaving machines with shuttle loom. The ricing and office room were used for comparison purposes. Based on statistical tests, the following research results were obtained:

Table 1. Respondent statistics results at PT. IDtex

<table>
<thead>
<tr>
<th></th>
<th>Group 1</th>
<th>Group 2</th>
<th>Group 3</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>37.12±4.98a</td>
<td>37.25±3.85a</td>
<td>39.74±1.75a</td>
<td>0.072</td>
</tr>
<tr>
<td>BMI</td>
<td>21.76±1.65a</td>
<td>21.40±1.53a</td>
<td>21.62±1.39a</td>
<td>0.636</td>
</tr>
<tr>
<td>Work Period</td>
<td>18.12±4.95a</td>
<td>18.03±4.31a</td>
<td>19.48±3.16a</td>
<td>0.321</td>
</tr>
<tr>
<td>Workload (beats/minutes)</td>
<td>77.41±1.65a</td>
<td>76.61±2.61b</td>
<td>78.38±1.83b</td>
<td>0.036</td>
</tr>
<tr>
<td>Lighting (Lux)</td>
<td>196.14±9.80a</td>
<td>222.85±48.23a</td>
<td>204.71±45.01a</td>
<td>0.433</td>
</tr>
<tr>
<td>Work climate (°C)</td>
<td>30.52±0.41a</td>
<td>26.48±0.38b</td>
<td>30.54±0.64a</td>
<td>0.000</td>
</tr>
<tr>
<td>Noise (dBA)</td>
<td>77.2</td>
<td>70.2</td>
<td>97.8</td>
<td></td>
</tr>
<tr>
<td>Vibration (m/s^2)</td>
<td>0.22±0.07a</td>
<td>2.148±0.56b</td>
<td>5.458±0.76c</td>
<td>0.000</td>
</tr>
<tr>
<td>Fatigue</td>
<td>262.01±75.84a</td>
<td>339.72±86.74b</td>
<td>484.89±83.35c</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Description: Different letters on one line indicate a real difference in the Anova test followed by the Post Hoc Test with α = 0.05

Based on the table 1 explain that the age, Boddy Mass Index, work period and workload of the respondents did not have a significant influence in this research. Similarly, gender and work attitude was insignificant since they were controlled in this research.

There is no relationship between age and fatigue. This is probably due to the average age of respondents being below 40 years. According to Hidayat (2003), workers aged 40-50 years suffer from fatigue more quickly than relatively young individuals.

Based on the results of the statistical regression tests, the following results were obtained:

Table 2. Simple Linear Regression Analysis Test Results

<table>
<thead>
<tr>
<th>Ry (1,2)</th>
<th>R^2_y (1,2)</th>
<th>Df</th>
<th>F value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.749</td>
<td>0.560</td>
<td>2.92</td>
<td>57,364</td>
<td>3.09</td>
</tr>
</tbody>
</table>

Respondents have normal nutritional status based on BMI criteria, according to Tarwaka (2014), since their BMI mean value is 18.5-25. In general, a worker with proper nutrition has a
better work capacity and endurance, and vice versa (Budiono et al., 2003). Statistical test results showed that there is no relationship between nutritional status and fatigue.

The work period of respondents more than one year. According to Burke and Peper (2002), if the work period is long, workers are likely to be exposed to work equipment every day. Due to the vibration intensity, they are likely to suffer health problems, including discomfort during work. The results of the analysis showed that there is no relationship between the work period and fatigue.

Based on the workload criteria in Tarwaka (2014), the respondent has a light workload because, in each group, they have between 75-100 work pulses/minute. Although the workload in the three groups is light in this study, there are different results from the level of fatigue. This is in line with Setyaningsih (2009), which established that workload has a significant influence on fatigue in porters at the Klewer Market.

The lighting intensity at PT. IDtex did not have a significant effect in this research since the average was still within work activities standards. According to Grandjean (2003), bad lighting cause visual disturbances or fatigue during work. It also results in general fatigue, which leads to reduced power and work efficiency.

The analysis result showed that there is a relationship between work climate and fatigue. This is because the source of heat comes from the operation of the weaving machine. Individuals work efficiently and productively in case the work environment is comfortable (McCurney, 1999).

Descriptively, the value of noise intensity between groups shows different and increasing results, and this is significant in this research. Weaving machine with high vibrations and noise intensity cause fatigue. This is in line with Agustian and Samiadi (1993), who stated that there was a hearing disturbance in the frequency of conversation due to the length of noise exposure in textile factory workers. Huang and Griffin (2012) reported that vibration masked the discomfort of noise but only when the magnitude of vibration was greater than the highest magnitude used in the present study.

Based on table 1, the intensity of vibrations between groups is different. This is indicated by the exposure in the weaving room exceeding the TLV. In general, mechanical vibrations in the body interferes with comfort at work, accelerate the occurrence of fatigue and health problems (Suma’mur, 2013). Similarity with Luke and Tresna (2016) with analysis calculation with Spearman and Pearson correlation is p<0.05 is that mean there is real relationship exists between the machine vibration and vibration exposure received by workers with systolic blood pressure and reaction time as an indicator of physiological fatigue.

Test results obtained between groups have a significant difference. This is evident in the measurement results, which show that fatigue increase due to exposure to vibration intensity in all the three groups. Although the respondents are exposed to vibrations under the TLV, other factors lead to fatigue.

The equation of the regression line on the effect of vibration and noise on fatigue is stated by:

\[Y = 296,377 + 35,678 X_1 - 0,384 X_2\]

The equation showed that the coefficient value of X1 is 35,678, meaning that if the intensity of vibration (X1) increases by 1 point, fatigue (Y) increases by 35,678 points, assumed X2 remains constant. The close relationship between
vibration and noise with fatigue $= 0.749$ showing the relationship is significant. The influence of vibration and noise on fatigue is 56%, and therefore other factors account for 44%. This is in line with Supriyadi and Yohanes (2007) which stated that there is a very significant relationship between exposure to vibration, noise, and Occupational Safety and Health (OHS) knowledge on fatigue, precisely reaction time and fatigue feelings ($p <0.010$).

Application of high strength steel sheets to automotive bodies requires evaluation technologies of fatigue and noise-and-vibration properties with high accuracy. In designing a vehicle body structure, it is common practice to first meet the requirements for crashworthiness and then provide the vehicle body structure panels with damping sheets and sound insulators to reduce vibration and noise. However, the addition to features such as dampers tends to increase vehicle body structure weight significantly (Atsusi, et.all, 2013).

Other researchers performed Akira, et.all (1991) that noise at 100 dB(A) showed only an initial effect on skin sympathetic nerve activity (SSA), whereas when combined with local vibration at 60 Hz, a pronounced increase in neural activity was noticed, indicating effect of vibration and noise.

The same research by Pyoung (2013) shows that total annoyance caused by combined noise and vibration was considerably greater than the annoyance caused by noise alone. The contribution of noise annoyance to total annoyance is dependent on the magnitude of noise stimuli.

4. Conclusions

This study established that there is a relationship between vibration and noise exposure with fatigue in weaving workers at PT. Idtex. Therefore, there is need for work rotation, using personal protective equipment, and routine monitoring, especially on the intensity of vibration and noise as an evaluation material.
References

[24] The Minister of Manpower Regulation RI No. 5 of 2018 on *Occupational Safety and Health in the Workplace*
Early Childhood Education: Study on Occupational Safety and Health Knowledge among Elementary School Students

Eka Rosanti¹, Ani Asriani Basri¹, M. Yazid Labib²

¹Lecturer Department of Occupational Safety and Health, Darussalam Gontor Ponorogo, ²Student Department of Occupational Safety and Health, Darussalam Gontor Ponorogo, East Java University, Indonesia

Abstract. The high number of work accidents in Indonesia requires handling efforts from various indirect aspects; one of the efforts is safety and health education in the student curriculum. A preliminary study of this research aims at identifying the hazard and risk factors in the schools, analyzing the level of student knowledge about safety and health, and observing information from the school about safety and health implementation at school. This research was a descriptive quantitative approach at Siman Elementary School, Ponorogo. The subjects of this research were students in grades IV, V and VI using purposive sampling. Based on the results of the hazard identification, it could be summed up that the highest danger came form the use of chalk, liquid petroleum gas, and bacterial contamination in school canteens and slippery floors. The average of student knowledge about safety and health is at a moderate level (81%). The lowest student knowledge (medium level) in the safety aspect is about safety riding (73%) and the health aspect is about bullying (79%). Siman Elementary School Ponorogo has not been committed to the implementation of safety and health education as there is no command from the provincial level leaders as well as the ministries. The curriculum should include safety and health aspect to familiarize its behavior in early childhood.

Keywords: Safety and Health Education, Knowledge, Elementary School, Students.

1. Background

The source of hazard can occur anywhere. In addition to industry, the hazard source also exists at school where early childhood always activities every day. For young children, school is a second home with teachers as their parents. Students do learning are playing at school. Playing activities both inside and outside the class are natural and an important part of the physical, cognitive, social and emotional development of students (Clements, Lester and Russel, Little H, and Eager D, 2010). Beside getting benefits, playing activities also has potential hazards that can threaten student safety. According to Gill, Lester and Russell, Madge and Barker in
Little H and Eager D (2010) the limitation of the child's understanding make it difficult for them to recognize the source of hazards around them.

The issue of child safety is an important thing for parents to do because the results of a journal study in Poland obtained accident data at schools for about 3,274 incidents per 293,000 students each year (Sosnowska and Kostka, 2003). Based on data from the UKS Bernardus 02 Semarang school, in the period of 2015 to January 2016, there were 9 students injured as a result of falling during activities such as walking, running after bathing, exercising and also running in the school areas Widowati and Hutasoit (2017). Besides, the danger of fire in schools can save the lives of children and all people in the school environment, such as the recent fires caused by poor understanding and awareness of the sources of fire hazards. One reason is unsafe connections such as improper use of electricity that involves short-circuiting.

According to the European Commission in Garcia A.B. (2010), the strategy for implementing occupational safety and health is to strengthen a culture of prevention through integration in education, training, and risk management activities. According to Social Security Administration Body, Indonesia had 106,383 cases of work accidents that occurred in 2014. Likewise, there were 110,285 cases, in 2016 101,367 cases in 2016, 123,041 work accident cases were also reported in 2017 (Hasanuddin, 2018).

Therefore, schools must pay attention to the elements of the safety and health of their students to implement school safety management. School is one of the effective media to instill culture from generation to the next generation (Einstein in Walker S.R., 2014). According to Butcher & Manning in Meksamoot, et al (2013) a general definition of a safe school provided a positive environment for students, teachers, staff, and others who are in school without the risks and dangers in order to achieve the educational mission of the school.

In addition, there are professional teachers in the school who have the qualifications to be able to provide lifelong skills to the students. In this study, the authors concern elementary school students. Elementary school students are a period where they experience growth and development very rapidly so that the age of primary school is said to be a golden period throughout human life. Therefore it is hoped that through the instilling of safety education early on, it will be able to instill safe and healthy behaviors from an early age that will continue to be carried out as long as they live.

Based on observations at the Siman Elementary School Ponorogo, there were various sources of hazards and a fairly high level of safety risk, including schools located right on the side of the road, one of the playgrounds student outside the school fence, school stairs causing students to fall, perforated floor and also slippery floor found in the toilet area. Another source of the hazard was liquid petroleum gas in the school canteen. The results of interviews with students showed that they did not recognize the safety signs that have been posted on the school wall. With the early safety education implemented, it will increase knowledge related to safety and health in the school environment. Therefore, it is hoped that all students can implement safety behavior and recognize the existing signs.

Thus, the authors are interested in exploring the level of student knowledge about occupational safety and health aspects in elementary schools. This is a basic of the author's research roadmap to the implementation of occupational safety and health aspects in an
integrated curriculum. This is expected to be an effort to familiarize awareness of risks, so they can anticipate the number of work accidents in the future.

According to Garcia A.B (2010), instilling a culture of occupational safety and health in the workforce in the future, it is necessary to integrate the occupational safety and health aspects in the school curriculum. When the occupational safety and health culture is applied early, they can begin to be aware of the risks around them and learn to make their environment safe, secure and healthy.

2. Method

This research was a descriptive quantitative approach. It was conducted at Siman Elementary School, Ponorogo. The subjects of this research were students in grades IV, V, and VI using purposive sampling. According to Santi and Sugiyanto (2015), the children began to learn important information, anticipate, conclude and integrate two things at the age of 7-11 years.

The instruments used were a questionnaire together with interview sheets for the headmaster and all staff. The questionnaire was a closed question and it consisted of 31 items for safety and 24 items for health. The data were analyzed using Microsoft Excel. The categories of occupational safety and health knowledge were (1) Good: 85-100%, (2) Moderate: 70-84%, and (3) Low: <70%.

3. Result

The following figure is the result of the hazard and risk identification at Siman Elementary School, Ponorogo which are divided into room and sanitarians.

Figure 1: Hazard and risk identification in the rooms at Siman Elementary School, Ponorogo
Based on the picture above, it showed that the highest hazard and risk were in chalk and noise.

Figure 2: Hazard and Risk Identification in Sanitarian at Siman Elementary School, Ponorogo.

Based on the picture above, it appears that the highest hazard and risk were the use of liquid petroleum gas, bacterial contamination at the school canteen and slippery floors.

The following is the result of the level of safety and health knowledge in the school for each class:

Table 1: Answers in Research Subject about the Safety and Health Aspects.

<table>
<thead>
<tr>
<th>Class</th>
<th>Aspects</th>
<th>Average</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Safety</td>
<td>Health</td>
<td></td>
</tr>
<tr>
<td>Grade IV</td>
<td>81%</td>
<td>75%</td>
<td>78%</td>
</tr>
<tr>
<td>Grade V</td>
<td>79%</td>
<td>81%</td>
<td>80%</td>
</tr>
<tr>
<td>Grade VI</td>
<td>71%</td>
<td>85%</td>
<td>85%</td>
</tr>
<tr>
<td>Average</td>
<td>77%</td>
<td>80,33%</td>
<td>81%</td>
</tr>
</tbody>
</table>

Based on table 1, it can be concluded that safety and health knowledge in grade IV was a moderate category (78%), grade V was in a moderate category (76%) and grade VI was in a moderate category (78%). The distribution of each component was as follows.

Table 2: Distribution of Student's Knowledge Level on Safety and Health in Each Component.

<table>
<thead>
<tr>
<th>Component</th>
<th>Class (Grade)</th>
<th>Average</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IV  V  VI</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safety</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Safety</td>
<td>90% 87% 86%</td>
<td>88%</td>
<td>Good</td>
</tr>
</tbody>
</table>
4. Discussion

Based on the results of the identified hazards and risks, the highest danger was the use of chalk, noise, liquid petroleum gas, bacterial contamination in school canteens, and slippery floors. Schools needed to make efforts to control the hazards and risks identified as preventive measures against unwanted incidents. According to Ugwulashi (2017), educational facilities should become a strategy for school safety management.

The student knowledge average about safety and health at Siman Elementary School, Ponorogo was at a moderate level (81%). If it was seen from each component of the safety questions, student's knowledge of safety riding (73%) was the lowest one. In line with the recapitulation of answer from the questionnaire, it was known that the lowest score was on number 30 about the safety sign in driving as in the graph below:

According to the Royal Society for the Prevention of Accidents (2012), young people had the highest risk of accidents is in school-age at 10-24 years. This risk substantially reduced after the age of 14 years. The most significant type of injury up to the age of 14 years was fall. The

<table>
<thead>
<tr>
<th></th>
<th>%</th>
<th>%</th>
<th>%</th>
<th>%</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety School</td>
<td>85%</td>
<td>75%</td>
<td>92%</td>
<td>84%</td>
<td>Moderate</td>
</tr>
<tr>
<td>Safety Riding</td>
<td>69%</td>
<td>72%</td>
<td>79%</td>
<td>73%</td>
<td>Moderate</td>
</tr>
<tr>
<td>The Strangers</td>
<td>90%</td>
<td>89%</td>
<td>100%</td>
<td>93%</td>
<td>Good</td>
</tr>
<tr>
<td>Health</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Health</td>
<td>74%</td>
<td>81%</td>
<td>88%</td>
<td>81%</td>
<td>Moderate</td>
</tr>
<tr>
<td>Bullying</td>
<td>77%</td>
<td>76%</td>
<td>83%</td>
<td>79%</td>
<td>Moderate</td>
</tr>
<tr>
<td>Health School</td>
<td>84%</td>
<td>96%</td>
<td>96%</td>
<td>92%</td>
<td>Good</td>
</tr>
</tbody>
</table>

Figure 3: Distribution of Student Answers to the Safety Aspect

According to the Royal Society for the Prevention of Accidents (2012), young people had the highest risk of accidents is in school-age at 10-24 years. This risk substantially reduced after the age of 14 years. The most significant type of injury up to the age of 14 years was fall. The
most significant number of falls for those aged under 14 years occurred at school. The injury rates of particular sport and leisure activities many of which were run in schools and colleges. According to Widjajanti in Santi and Sugiyanto (2015) the causes of traffic accidents, especially those that occurred in children were (1) child’s instincts were still impulsive and inconclusive, (2) they had poor experience, (3) they were physically smaller than adults, (4) they were supervised by their parents, (5) Some studies stated that children's behavior was lacking in perception, concentration, attention, memory, physical and emotional control, lack of knowledge and understanding of traffic procedures, and lack of in behavior patterns in the traffic environment. Therefore, driving safety education needed to be instilled in children from an early age or as early as possible to form a mindset and character accustomed to discipline in traffic (Santi and Sugiyanto, 2015).

In the health aspect, the student knowledge about bullying was still at a moderate level which reached 79%. This was in line with the recapitulation of the answer from the questionnaire. It was known that the student got the lowest score on question number 3 about relationships with classmates in the bullying aspect as in the graph below:

![Figure 4: Distribution of Student Answers on Health Aspects](image)

According to Jan A (2015), those who were directly or indirectly involved in bullying were at increased risk of misbehavior, abuse, and absenteeism from school. Bullying among students caused academic performance, mental health problems, and physical injuries. Therefore knowledge about bullying had to be instilled in students from an early age.
The results of interviews with the headmaster, teachers, and students showed the results of achieving the implementation of safety and health in the school based on the European Agency for Safety and Health at Work in Meksamoot, et al (2013). The results are as follows:

Table 3: Current Position of Siman Elementary School on Safety and Healthy Implementation in Schools

<table>
<thead>
<tr>
<th>Components of Management Leading to a Safe and Healthy School</th>
<th>Siman Elementary School Ponorogo Current Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appropriate and dynamic legislation to facilitate the appropriate management of safety</td>
<td>There were no written regulations about school safety management. The safety activities have been carried out incidentally by external.</td>
</tr>
<tr>
<td>Effective management of communication among all safety stakeholders</td>
<td>There was no specific program. Nowadays, there are only appeals about the drop off children to avoid the main road.</td>
</tr>
<tr>
<td>A safe environment achieved through effective school policy, which was designed, understood and enforced by school leaders</td>
<td>Schools had made a safe and healthy environment even though there was no school safety policy. However, there are still sources of hazard and risk.</td>
</tr>
<tr>
<td>Curriculum management to include safety as part of lifelong learning</td>
<td>not available</td>
</tr>
</tbody>
</table>

Based on the analysis of the table above it can be seen that Siman Elementary School Ponorogo did not have a commit regarding the implementation of safety and health education in schools even though students' knowledge of general safety and health was moderate.

Based on the results of interviews with the students, they have understood that some aspects of safety and health were from personal observations and sometimes there was direction from parents and teachers. The top management of an organization had a strong commitment to implementing occupational safety and health as outlined in a policy to be detailed in a systematic work program (ISO 45001, 2018).

Therefore, according to Meksamoot, et al (2018) the Provincial Education Office must have a systematic program for elementary schools by considering the seven management barriers to effective safety in the school: (1) Finance, (2) Time, (3) Leadership, (4) Communication, (5) Stakeholder Understanding, (6) Culture and (7) Commitment. Besides, occupational safety and health aspects also needed to be integrated into the curriculum. According to Widowati and Hutasoit (2017), instructional media is part of the supporting factors of learning in safety education. Based on the results of research conducted by Kusuma, et al (2018) providing socialization about fires and their handling as well as incorporating the material into the subjects became a means of succeeding in increasing student understanding. The Royal Society for the Prevention of Accidents (2012) also stated that the key to implementing a culture of safety and health in students was integrating safety education and risk within the curriculum.
According to Walda and Ballesteros in Kusumaningtias, et al (2016), children in the elementary school were a golden age throughout human life. The knowledge obtained would be embedded and attached in children's memories, so it could be implemented in their habit of life. According to Walda R, Laurie et al in Kusumaningtias, et al, (2016), and Widowati, Hutasoit (2017) schools became the main target of prevention programs and controlled the safety and health hazards together with teachers as the role models.

According to Bassok et al in Wong, Bassok, and Doromal (2018), the majority of parents strongly agreed with early childhood education in the family to instill the risks and hazards faced by their children outside the home. Thus, parents were the most important instilling safety education early. Likewise, parents, the stakeholder, and the school committee could encourage the effective implementation of safety education in schools (Widowati and Hutasoit, 2017).

Through the application of safety education from an early age, it can reduce the number of accidents and make it easier to achieve independence of the occupational safety and health culture as planned by the Ministry of Manpower and Transmigration of the Republic of Indonesia. Hofstede in Bieder (2018) revealed that the cultural inputs received early in life reside deeper in one’s cultural core than the inputs received later on.

### 5. Conclusion

The highest hazard and risks that need to be controlled are the use of chalk, noise, liquid petroleum gas, bacterial contamination in the school canteen and slippery floors. The student's knowledge of safety and health is at a moderate level (81%). The lowest level of student safety knowledge is safety riding (73%) at a moderate level and bullying (79%) for healthy knowledge. Schools have not implemented integrated safety and health education in learning. Students gain knowledge based on their observations and some directions from parents and teachers.

Schools together with stakeholders should issue policies and systematic programs related to safety and health education. It is recommended that the provincial education office, the ministry of education as well as the ministry of manpower and transmigration of the Republic of Indonesia integrate safety and health in the learning subjects of elementary school from an early age to shape the safety and health behaviors.
References

Correlation of Fasting Habits to Testosterone Hormone Levels in UNIDA Gontor Students

Nurul Marfu’ah¹, Nadia Mira Kusumaningtyas¹ and Amilia Yuni Damayanti²

{nurulmarfuah@unida.gontor.ac.id}

¹Pharmacy Department, Darussalam Gontor University, Ponorogo, Indonesia
²Nutrition Department, Darussalam Gontor University, Ponorogo, Indonesia

Abstract. UNIDA Gontor is a university that has a pesantren system. Students are accustomed to carrying out activities to improve their faith, for example fasting. Fasting is mandatory and sunnah. In Hadith of Bukhari Muslim, it is mentioned that fasting can be used to control libido in men who are not ready to get married, whereas one's libido is controlled by the testosterone hormone. This research purposed to determine the correlation between fasting habits and testosterone hormone levels in UNIDA Gontor students. This study utilized 5 treatments (n=2), which were not fasting (control); yaumul bidh fasting (fasting on 13, 14, and 15 Hijri); Monday-Thursday fasting; Dawood fasting; and fasting every day for 37 days. The subjects of this study were male students. Testosterone levels were measured using the ELISA method. Data were analyzed with a one-way ANOVA. The results showed that the average level of testosterone in the fasting group was statistically significantly different (P = 0.037). Whereas the Post hoc test used presented that the levels of the testosterone hormone in the Monday-Thursday fasting group were significantly different from other treatments. The fasting habit influences the control of testosterone levels so that it can be applied to control libido as Hadith.

Keywords: Fasting habits, Testosterone hormone, UNIDA Gontor students

1. Introduction

Darussalam Gontor University (UNIDA Gontor) is a university with a pesantren system where the implementation of the Tridarma is based on the teachings of Islam. Therefore, all academicians in it, including students, are accustomed to carrying out activities to increase faith, for example fasting.

Fasting is mandatory and sunnah. Ramadan fasting is fasting during the month of Ramadan and is one example of fasting that is mandatory (QS Al-Baqoroh 183-185). Whereas fasting that is sunnah, viz. Monday-Thursday fasting (HR. An-Nasai no. 2362), yaumul bidh fasting (HR. Abu Daud no. 2449), and Dawood fasting (HR. Bukhari no. 1131).

In addition to being rewarded, fasting is one of the religious rituals that has health benefits for the body. One of them, as in H.R Bukhari Muslim, stated that fasting could be used to control
libido in men who are not ready to get married while libido is controlled by the presence of the hormone testosterone (Muryanti et al., 2006).

According to Batrinos (2012), men who have aggressiveness and high crime rates. He also has high levels of the hormone testosterone. Furthermore, it can be concluded that there is a close relationship between the levels of the hormone testosterone with the level of crime committed by someone. Therefore, if testosterone levels can be controlled, juvenile delinquency levels and crime at the adult level, especially those related to sexual crimes can be reduced.

Several studies on fasting have been carried out. The previous research was done by Marfu'ah (2018a) which showed that yaumul bidh fasting, Monday-Thursday fasting, Dawood fasting and fasting every day were able to increase the total number of spermatozoa and the morphology of normal spermatozoa in Balb / C strain mice. Marfu'ah's research (2018b) explained that Monday-Thursday fasting could reduce cholesterol levels in Balb / C strain mice. Rosyidin's research (2011) and Chusna (2017) stated that Monday-Thursday fasting affected mental health. According to Masitoh's research (2014), Monday-Thursday fasting could be used to increase spiritual intelligence.

Research on the effect of fasting on testosterone hormone levels has been conducted by Marfu'ah and co-worker (2019) using subjects Balb/C strain mice. Based on the results of their research, fasting can increase testosterone levels but not exceed the normal levels. In contrast, the most optimal type of fasting to control testosterone hormone levels is Monday-Thursday fasting. This research is a continuation of the research by taking subjects in humans.

2. Method

The method of research was begun with finding subjects to be used in research. After obtaining volunteer subjects, a letter of willingness was made to be the subject of research and a letter of ethical clearance. The subjects were then asked to fast from dawn (around 04:30 AM, GMT+7) to sunset (around 06:00 PM, GMT+7) for 37 days.

Blood of volunteers was drawn before and after treatment. This process began with the subject being asked to sit on a chair with a straight arm position. Subjects were asked to clench their fists and placed a ± 10 cm tourniquet above the elbow folds. The chosen vein was the median cubital vein. The skin on the part that would be drawn off was cleaned using a cotton swab with 70% alcohol then waited till dry.

The vein that has been cleaned with 70% alcohol was pricked with a syringe needle, with a tilt angle between the needle and the skin around 15 degrees. The syringe pump was pulled so that the blood entered the syringe tube. After ± 3 mL of blood had been taken, the needle was withdrawn and put on a puncture mark 70% alcohol cotton and pressed for ± 2 minutes then put on a plaster. The tourniquet was removed, and subjects were asked to release their fists.

The collected blood was placed into an Eppendorf bottle and centrifuged using a speed of 3,000 rpm for 20 minutes to obtain the plasma. The collected plasma was stored in a freezer at -20°C. Measurement of testosterone levels in blood plasma was done using the ELISA method. The data obtained were analyzed using the ANOVA with the significance level of
5%. If the results are significant, then the analysis continues with the Post Hoc test in the form of LSD. Analyzes were performed using the SPSS 16.0 statistical program.

3. Results

The results of the study in the form of average testosterone levels before and after treatment was presented in Table 1. Levels of testosterone in the control group, treatment groups of D and E, increased between before treatment and after treatment. While the levels of the hormone testosterone in the treatment groups B and C decreased between before and after treatment.

The results of the average analysis of testosterone levels in subjects after being treated with fasting with one-way ANOVA showed that the significance value was 0.037. This proved that the average testosterone levels in the control group compared with the treatment group were statistically significantly different (P <0.05). Hormone levels in all treatment groups were lower than in the control group. The lowest testosterone levels occurred in the treatment group C, followed by treatment groups B, D and E. While based on the Post hoc test using the LSD method showed that a significance value of P <0.05 was found in the treatment groups C with B, C with D and C with E showed that testosterone levels in the treatment group C were significantly different from the treatment groups B, D and E.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>n</th>
<th>Testosterone hormone levels before treatment (ng/ml)</th>
<th>Testosterone hormone levels after treatment (ng/ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2</td>
<td>7.58</td>
<td>8.75 ± 0.05&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>B</td>
<td>2</td>
<td>8.76</td>
<td>8.00 ± 0.06&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>C</td>
<td>2</td>
<td>7.36</td>
<td>6.30 ± 0.01&lt;sup&gt;bc&lt;/sup&gt;</td>
</tr>
<tr>
<td>D</td>
<td>2</td>
<td>6.88</td>
<td>8.55 ± 0.01&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>E</td>
<td>2</td>
<td>8.52</td>
<td>8.65 ± 0.11&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

Information: a, b,c = significant different at the level of 5%

n = number of experimental volunteer
SD = standar deviasi
A = not fasting (control)
B = yaumul bidh fasting
C = Monday-Thursday fasting
D = Dawood fasting
E = fasting every day for 37 days

4. Discussion

According to the previous study of Marfu'ah (2019), the result showed the effect of fasting on testosterone levels carried out on experimental animals such as Balb/C strain mice were insignificant results. Meanwhile, the research subjects were changed into humans, as in this
study, the results obtained were significant. Testosterone levels in mice Balb / C increased compared with the control group. This result presented that testosterone is strongly influenced by food intake. Based on observations of subjects in the treatment group, it has an increase in appetite, thereby increasing testosterone levels. Although, the rise in testosterone levels that occur do not exceed normal levels. Whereas in this study, the levels of testosterone in the treatment group decreased when compared to the control group even though all levels of the hormone testosterone in the treatment group were normal levels of 2.5 - 9.5 ng/ml (Pathology handbook, 2019).

The results of this study indicated that fasting are activities that can be carried out by animals and humans, but the effect of these activities on metabolism in the body is closely related to the intellect and intentions of the living things that carry it out. Humans as intelligent beings and can do fasting with the aim to show significant results than animals that are not intelligent and cannot do the intention before being fasted. As said, Prophet Rasulullah in H.R Bukhari Muslim, who said that "All charity/deed depends on his intentions." Therefore, if you want to do all activities, humans should start with good intentions then the results are also in the form of goodness.

Based on the fasting applied, the most optimal fasting to reduce testosterone levels was fasting Monday-Thursday. Monday-Thursday fasting is one of the fasts that is highly favored by Prophet Rasulullah (H.R Tirmidzi, Nasai and Ahmad). This fast is sunnah and is applied on Monday and Thursday. The time lag between Monday and Thursday fasting is between 2-3 days. The possibility of this time lag is the most optimal in controlling the process of cholesterol metabolism into the hormone testosterone.

The metabolism of cholesterol into testosterone occurs in the mitochondria of testicular cells. Cholesterol is transferred into the mitochondria using the help of the StAR protein. Cholesterol is converted into the hormone testosterone using the enzyme 3β-hydroxysteroid dehydrogenase, 17α-hydroxylase / C17-20-lyase, and 17β-hydroxysteroid dehydrogenase. The testosterone biosynthesis process was shown in Figure 1 (McEwan and Brinkmann, 2016).

![Figure 1: Biosynthesis of testosterone hormone.](image-url)
5. Conclusion

The results showed that the fasting habits practiced by UNIDA Gontor students affected controlling the level of the hormone testosterone. Furthermore, it could be used to control libido in the words of Prophet Rasulullah in H.R Bukhari Muslim. In contrast, the most optimal type of fasting to monitor testosterone levels is Monday and Thursday fasting.

6. Suggestion

Further research needs to add some parameters, such as the number of research subjects, increasing the length of time of treatment, the change in male subjects who experience testosterone deficiency or excess hormones.

7. Acknowledgement

Our gratitude goes to the Ministry of Research, Technology, and Higher Education who has given the Beginner Lecturer Research Grant and the Pharmacy department of UNIDA Gontor, who has given permission and support in conducting research.
References

Relationship between Vitamin A and Vitamin C intake on Dental Caries

Amilia Yuni Damayanti¹ *, Nurul Marfu’ah², Siti Salamah³, Fiki Husna⁴

{ amilia@unida.gontor.ac.id }

¹,³,⁴Nutrition Department, Faculty of Health Science, University of Darussalam Gontor, Ngawi.
²Pharmacy Department, Faculty of Health Science, University of Darussalam Gontor, Ngawi.

Abstract. Background Dental caries is a multifactorial disease with a number of risk factors. Dental caries in children become important because it can cause chewing disorders which in the long run can lead to malnutrition because children have difficulty chewing their food. This study aims to analyze whether the level of intake of vitamin A and vitamin C is associated with the incidence of dental caries in schoolchildren.

Methods The design of this study was an observational study with a cross-sectional design. This research was conducted at Madrasah Ibtidaiyah, Ngawi. The study period starts from April - May 2019. The assessment of dental caries is evaluated from the DMF-T index. The instrument used to determine food intake, vitamin A and vitamin C was a Semi-Quantitative Food Frequency Questionnaire (SQ-FFQ) form and the Nutrition Adequacy Rate Form. Primary data in this study were collected by interviewing respondents directly with questions that have been provided.

Results Statistical test results indicate a significant relationship between the intake of vitamin A and vitamin C on dental caries status in MI children (p = <0.05).

Conclusions Vitamins and minerals play a role in dental caries and are needed in the process of tooth formation. Deficiency of vitamins can increase the risk of dental caries.

Keywords: caries, intake, vitamin A, vitamin C

1. Introduction

Dental caries is important because it can cause chewing dysfunction, this disorder can make children lazy to chew which if continued in the long term can be at risk of malnutrition that affects the activity and health of children (Hanum et.al 2019). Based on the results of RISKESDAS 2018 57.6% of Indonesian people have dental and mouth problems but only 10.2% have received medical services (Riskesdas, 2018). Caries in children is currently receiving less attention from parents on the assumption that the tooth will be replaced by permanent teeth, but the experience of caries is related to the development of dental caries in the future (Hanum et.al, 2019).
Dental caries is a multifactorial disease and has many risk factors, several risk factors that cause dental caries include plaque with acidic pH, behavior and knowledge, food consumption and cariogenic beverage (Hanum et al., 2019; Talibo et al., 2016; Fitriati et al., 2017). Nutrition, diet and dental health of children are particularly related for children in the growth and development phase. Good and proper nutrition is important to support the health and growth of teeth on the other hand dental health is important to support adequate nutrition intake (Agung & Nurlitasari 2017).

Dental caries itself is a dental and oral health disorder that is formed due to the presence of food scraps attached to the teeth and ultimately causes calcification so that the impact on porous and cavities (Widayati et al., 2014). In these foods, the activity of microorganisms in shared carbohydrates causes damage to the teeth starting with enamel, dentin and cementum (Mariati, 2015).

Nutrients affect human growth and development as well as the development and growth of teeth. Healthy tooth growth can occur if all the nutrients needed for its formation are available in sufficient quantities. The formation of teeth is supported by the intake of Vitamin A and Vitamin D. Vitamin A is needed in the formation of tooth enamel while vitamin D is needed for the growth of the dentin layer of teeth. Vitamin C deficiency can damage teeth, swelling of the oral cavity, gingival bleeding and eventually tooth loss due to the result of collagen hydroxylation (Agung & Nurlitasari, 2017).

Vitamins and minerals affect the formation of dental caries. In the tooth formation phase, vitamin A deficiency can interfere with the function of ameloblast cells and vitamin C deficiency can cause reduced odontoblast response to induction that comes from ameloblast so that the formation of odontoblast is imperfect (Zakiyah et al., 2017). In addition, some vitamins and minerals that affect dental caries include are vitamins A, B, C and D, and minerals are calcium, phosphorus, fluorine, and zinc. Vitamin A deficiency can damage the formation of enamel and dentin, vitamin C deficiency can cause odontoblast degeneration (Ramayanti & Purnakarya, 2013).

2. Instruments and Methods

2.1 Design, Place and Time
The design of this study was an observational study with a cross-sectional design. This research was conducted at Madrasah Ibtidaiyah Nurussalam, Ngawi. The study began from April to May 2019. The independent variable in the study was the intake of vitamin A and vitamin C, while the dependent variable was dental caries.

2.2 Instruments
The assessment of dental caries in this study was evaluated from the DMF-T index. The instrument used were dental diagnostic tools such as mouth glass, tweezers, masks and gloves, 70% alcohol, cotton, and DMF-T examination sheets. The instrument used to determine food intake, vitamin A and vitamin C was a Semi-Quantitative Food Frequency Questionnaire (SQ-FFQ) and 24-hour food recall form and the Nutrition Adequacy Rate Form. Primary data in
this study were collected by interviewing respondents directly with questions that have been provided.

2.3 Population and Research Subjects

The targeted population in this study was school-age children with 96 primary school students MI Nurussalam in Ngawi as the subjects. The inclusion criteria in this study were elementary school children aged 7 - 12 years and the exclusion criteria were elementary school children who were not willing to fill out the questionnaire.

2.4 Data Collection and Analysis

The dental caries value is determined by the DMF-T index, the data is obtained by dental examination by a dentist and written in the examination form. Data on vitamin A and vitamin C intake were obtained by conducting direct interviews with respondents using the SQ-FFQ form and the 24-hour food recall form. Vitamin A and vitamin C data are processed using Nutrisurvey software and the Indonesian Food Composition Table (TKPI). Then the data is analyzed with a computer program.

Statistical tests began with the Shapir-Wilk test to determine the distribution of data (normal = p> 0.05). Chi-square test was used to analyze the relationship between vitamin A and vitamin C intake with dental caries. This study has received ethical permission from the RSUD Dr. Moewardi Fakultas Kedokteran Universitas Sebelas Maret with Number: 393 / III / HREC / 2019.

3. Results and Discussion

3.1 Results.

Food intake data in this study were assessed using the SQFFQ method which records food intake for one month. Questions given included the frequency of 7 categories of food classification during the past month, the categories and the amount of food consumed by respondents can be seen in table 1.

<table>
<thead>
<tr>
<th>Food Category</th>
<th>Amount of Food (Type)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbohydrate Source</td>
<td>13</td>
</tr>
<tr>
<td>Sources of Animal Protein</td>
<td>21</td>
</tr>
<tr>
<td>Vegetable Protein Source</td>
<td>6</td>
</tr>
<tr>
<td>Source of fat</td>
<td>3</td>
</tr>
<tr>
<td>Vegetables</td>
<td>19</td>
</tr>
<tr>
<td>Fruits</td>
<td>17</td>
</tr>
<tr>
<td>Assortment and snacks</td>
<td>19</td>
</tr>
</tbody>
</table>

3.2 Discussion.
These results indicate that there was a significant correlation between vitamin C intake and the incidence of dental caries statistically. Strengthened by research Hendarto (2015) which said that vitamin C can maintain healthy teeth in the formation of a collagen and vitamin C deficiency can have an impact on the disruption of dental and oral health. In another study, this study proves that the lack of vitamin C intake causes dental caries tends to be higher than the respondent's vitamin C intake which is sufficient, seen from the amount of children who consume vitamin C intake but experience “high” dental caries less than children who consume less vitamin C, as many as 63.5% are in caries level "high". Looked from the questionnaire, there are still many respondents rarely for consume fruits and vegetables, this makes antioxidants that function to destroy free radicals will be reduced.

Vitamins are complex substances that the body needs in small amounts and have functions that help regulate or process the body's metabolism. Vitamins are one of the substances that the body needs, the need for vitamins in small amounts does not make it a trivial thing because deficiency of vitamin intake can affect the onset of illness and disruption of the body's metabolism because its function cannot be replaced by other compounds (Permana et.al, 2018).

Dental caries, which is a disorder of the teeth and mouth, is caused by many factors, including vitamin and mineral deficiencies, some vitamins that are known to be associated with dental caries, including vitamins A, B, C, and D and minerals, namely calcium, phosphorus, flour, and zinc (Zakiyah et.al, 2017; Ramayanti & Purnakarya, 2013). Vitamins have physiological functions in the growth of bones and teeth. Vitamin A is needed in building strong bones and teeth (Agung & Nurlitasari, 2017). Vitamin C acts as a collagen maker which is a protein making up skin tissue, joints, bones and other supporting tissues (Permana et.al, 2018).

Teeth that are in the pre-eruptive phase are affected by the nutritional status of the body. Malnutrition affects oral structure and its development. Things that have been linked to abnormalities in the mouth structure are a deficiency of vitamin D, vitamin C, vitamin B, and vitamin A and lack of protein-energy. Vitamin A deficiency plays a role in decreasing epithelial tissue development, impaired tooth formation, hypoplastic enamel. The effect of vitamin C deficiency causes the irregular formation of dentin, changes in the pulp of bleeding gum teeth, delayed wound healing and formation of damaged collagen (Sheetal et al., 2013).
References


Fractional Factorial Analysis Of Immunoglobulin G Anti-Diphtheria Serum Fragmentation By Pepsin

Fuad Pribadi¹, Catur Riani², Hidayat Setiadjí¹

¹Research and Development Division, PT. Bio Farma, Bandung, West Java, Indonesia; ²Laboratory of Pharmaceutical Biotechnology, Department of Pharmacy, School of Pharmacy, Institute of Technology Bandung, Bandung, West Java, Indonesia
fuadpribadi@gmail.com

Abstract. The number of diphtheria outbreaks was observed to be quite high in the last 5 years. One way to treat diphtheria at the time of an outbreak is to use an anti-diphtheria serum. The availability of anti-diphtheria serum products worldwide has been reduced for years because manufacturers in several countries have stopped producing. The cessation of production is partly due to a decrease in demand, production failures and regulatory requirements in the manufacture of increasingly stringent biological products from the blood. In addition, the use of certain types of pepsin as a component of production becomes problematic with the issuance of Law No. 34 of 2014 concerning Guarantees of Halal Products. This study aims to analyze the use of pepsin A as a substitute for pepsin B, get parameters that have a significant effect on IgG fragmentation using fractional factorial design, get the optimum parameter value of IgG fragmentation (highest titer value, shortest Kf time and absence of IgG bands in SDS PAGE ) and increase anti-diphtheria serum product antibody titers. Risk analysis was carried out to find out several factors that influence the process of pepsin A fragmentation against IgG anti-diphtheria serum products using fishbone and FMEA methods. Factors belonging to the unacceptable and intolerable classification are purification methods (RPN 60 value), pH termination of the fragmentation process (RPN 100 value), fragmentation temperature (RPN 60 value), number of pepsin (RPN 125 value), and fragmentation time (RPN 125 value ) Changes in the method carried out by replacing the ammonium sulfate fractionation process to diafiltration using a 100kDa filter membrane on the initial plasma showed insignificant results. Fractional factorial analysis was carried out on 4 factors, namely: pH; temperature; amount of pepsin and time. Based on pareto analysis and main effect, the four factors showed a very significant effect on the IgG fragmentation process by pepsin A (p-value <0.05) by using antibody titers as the main response. Characterization of the results of fragmentation is done using the BCA test and SDS PAGE. The conclusion of this study is that pepsin A can replace pepsin B, a factor that has a significant effect is the amount of pepsin, time, temperature, and pH of the incubation termination; optimum value (highest titer, shortest Kf time and no IgG band) IgG fragmentation process by pepsin A is the amount of pepsin 1163mg / L, temperature 37ºC, time 135 minutes, and pH 5.95; and increasing antibody titer at IgG fragmentation stage to 2.67 times than the previous method using pepsin B.

Keywords: Anti-diphtheria serum, horse plasma, pepsin, IgG fragmentation, halal.
1. Introduction

Diphtheria is an infection caused by the Corynebacterium diphtheriae. Signs and symptoms begin 2-5 days after exposure. Corynebacterium diphtheriae produce a toxin that causes thick gray or white patches on the back of the throat (Unicef, 2017). In 2017, Indonesia experienced an Extraordinary Incidence (KLB) of diphtheria with a report up to November 2017 outbreaks totalling 593 cases and 32 deaths spread across 20 provinces. 66% of the total prevalence of non-immunization, 31% of immunization, but the immunization status is incomplete (Health Ministry, 2017). The appropriate handling of diphtheria outbreaks in addition to increasing the coverage of diphtheria immunization is by administering anti-diphteria serum, intravenously or intramuscular injection (Unicef, 2017)

Anti diphtheria serum is a preparation containing specific immunoglobulin fragments obtained from natural serum (plasma) through purification that is influenced by enzyme treatment, fractionation and other chemical or physical procedures (WHO, 1969). Anti diphtheria serum has been included in WHO's Essential Medicines List (EML), which consists of a list of important medicines that must be available in all health facilities. The availability of anti-diphtheria serum has decreased over the years because producers in several countries have stopped producing due to several factors including decreased demand, as well as increasingly stringent regulatory requirements in the manufacture of products that originate from blood (Unicef, 2017). In the 2016-2017 period there were only three pharmaceutical companies in the world capable of producing and supplying the world's needs for diphtheria anti-toxin, namely Haffkine Bio Pharmaceutical Corporation (India), Microgen (Russia) and Vins Bioproducts Limited (India).

One of the stages of anti-diphtheria serum production that is suspected to be problematic is the fragmentation of immunoglobulin G (IgG) to obtain divalent immunoglobulin fragments, F(ab')2. The divalent immunoglobulin fragment F(ab')2 produced so far has been considered not optimal so as to produce anti-diphtheria horse plasma antibody titer values that do not meet the requirements set by WHO which is > 350Lf / mL. The process that has been carried out using the protease enzyme pepsin B. The use of pepsin B also in the future will have problems with the Law of the Republic of Indonesia No. 33 of 2014 concerning Halal Product Guarantee.

This study aims to analyze the use of pepsin A as a substitute for pepsin B, obtain parameters that have a significant effect on fragmentation of IgG by using fractional factorial design, obtain optimum parameters for IgG fragmentation (highest titer value, shortest Kf time and absence of IgG bands in SDS PAGE ) and increase the antibody titer of anti diphtheria serum products. Optimized parameters in the digestion process are the amount of pepsin A, incubation temperature, pH of digestion process termination, and digestion time. The response used in assessing a significant factor (P-value <0.05) is a quantitative parameter of the IgG fragmentation process, which is the antibody titer value. Characterization of IgG fragmentation results used bichinconic acid (BCA) test to determine the total protein content produced and SDS-PAGE profile to see the character of IgG fragmentation into antibody fragment F (ab) 2.
2. Digestated enzymes on immunoglobulin

Immunoglobulin fragments are produced through proteolytic breakdown which has been proven to be able to elucidate structures / functions related to immunoglobulin. Several different enzymes produce different immunoglobulin fragments. The papain enzyme breaks down immunoglobulin molecules in the joint region before disulfide bonds between H chains. This process results in the formation of 2 identical fragments containing L chains and VH, CH1 regions in the H chain. These fragments are called Fab fragments which contain antigen-binding sides to antibodies that are able to bind to certain antigens because they have special combinations of VH and VL. The Fab fragment produced by the papain enzyme is monovalent. The use of the papain enzyme also produces fragments containing the remaining 2 H chains, each containing CH2 and CH3, which are named as fragments of Fc that are easily crystallized (Mayer, 2017).

The addition of the pepsin enzyme aims to obtain divalent immunoglobulin fragments namely F(ab')2. Pepsin cuts the structure of immunoglobulins in the H chain after disulfide bonds between the H-H chains to produce divalent fragments that contain both sides of the binding of antigens. The Fc region of the protein molecule is broken down into small peptides (Figure 1.1). The resulting fragment F(ab')2 is capable of binding to antigens, but is unable to mediate the effector function of antibodies (Mayer, 2017). This fragmentation method using pepsin also causes degradation of non-IgG proteins such as albumin (WHO TRS 1004, 2017).

There are different specifications of the use of pepsin from type B and A. These differences determine the fragmentation process that occurs in the production process of Anti Diphtheria Serum. Fab fragments are very sensitive to temperature changes, while Fc fragments are very sensitive to pH reduction. The difference in specifications between the 2 types of pepsin can be seen in table 1.1. The difference in molecular weight of each fragment and immunoglobulin causes significant differences in pharmacokinetic and pharmacodynamic parameters. Monovalent antibody fragment (Fab) which has a molecular weight of ± 50kDa has the largest
volume of distribution and can reach the extravascular part quickly, but Fab fragments are also very quickly eliminated mainly through renal excretion so that it has a short elimination half-life (4-24 hours). Divalent fragment Fab (F(\text{ab}')\text{2} with molecular weight ± 120kDa) and IgG molecules (molecular weight ± 180kDa) are not eliminated by the kidney route (elimination through phagocytosis through the reticuloendothelial system) so that it has a longer half-life (2-4 days) (WHO TRS 1004, 2017).

| Table 1.1 The difference in the specifications of pepsin B and pepsin A |
|----------------|------------------|
| Parameter     | Pepsin B         | Pepsin A        |
| pH            | pH 2             | pH 2-3          |
| Temperature   | 37°C – 42°C      | 52°C            |
| pH inaktif    | pH 6.5 – 8       | N/A             |
| Enzym Activity| 1:10.000         | 1:10.000        |

3. Critical factor screening for IgG fragmentation

The identification of critical factors is done by using a fishbone diagram and the Failure Mode and Effect Analysis (FMEA) method. The method is used as an initial selection of factors affecting the IgG fragmentation process quantitatively assessed from the titer value of anti-diphtheria serum products. Fishbone diagrams use several categories used in the manufacturing industry, namely machinery; method; material; human; measurement; and the environment. Each of these categories is determined by factors that have a possible influence on the response. FMEA is one method of determining the risk generated by several factors towards the response in the form of a Risk Priority Number (RPN) score. The FMEA method uses parameters of severity (S), level of likelihood of occurrence of a risk (P) and level of detectability in capturing a risk (D) (Rathore, 2013). These parameters are ranked in five levels as shown in Figure IV.1. The RPN score is the result of multiplication of the severity, the likelihood of a risk event and the ability to detect several factors towards the risk. Risk classification is determined based on the risk severity matrix (Figure IV.1) which is a description of the RPN value obtained. The risk classification specified includes; negligible (RPN score 1-12); acceptable (score 13-36); unacceptable (score 37-64); and intolerable (score 65-125). RPN scores that are in the unacceptable and intolerable matrices are analyzed using factorial fractional designs to determine the influence of these factors and the interactions between them.
4. Material and method

This research uses anti diphtheria horse plasma which is carried out by the diafiltration process using 100kDa membrane filter. Centrifugation was carried out on the early plasma of the diphtheria horse to separate the sediment and the supernatant. The diafiltration process uses a 100kDa membrane filter with 0.85% NaCl buffer exchange and 0.25% phenol. The results of the separation were characterized by SDS PAGE to analyze the results of purification of immunoglobulins from diphtheria horse plasma, a BCA test was performed to determine the total protein content and determine the initial plasma titer value of the anti-diphtheria horse using the flocculation test method.

5. Statistical analysis

Pepsin fragmentation analysis was carried out using a factorial fractional $\frac{1}{2}$ fraction design at the IgG fragmentation stage with the addition of pepsin. The response that will be observed from the factorial $\frac{1}{2}$ fraction design is the titer of the flocculation test results. The antibody titer value is expressed as a response from several predetermined factors, namely the amount of pepsin; time; pH; and fragmentation temperature. Factorial design uses 3 midpoints with the aim to see the most significant factors that influence the process of fragmentation of anti-diphtheria horse IgG plasma by pepsin A. The number of experiments as many as 11 was obtained using Minitab software 17. The assessment of significant factors was seen from the results of ANOVA, pareto diagrams, main effects and response optimizer results of antibody titers among several of these factors.

6. Result and discussion

The use of fishbone diagrams as initial screening of the risk of several factors on the results of antibacterial titer of anti diphtheria products can be seen in Figure V.1. Several factors that are described to influence the response in the form of antibacterial titer values of anti diphtheria
serum products are categorized into 6 categories, namely humans; machine; measurement; ingredients; method and environment.

The fishbone diagram provides an overview of the causative factors that influence the value of antibody titers resulting from IgG fragmentation by the use of pepsin A. Fragmentation and serum antibody titer values are influenced by several factors including: amount of pepsin; pH; temperature; time; production methods (fractionation and heat denaturation) (Pope et al, 1951 and Harms et al, 1948). Other factors that influence the production process also contribute to the antibody titer value such as the risk of contamination resulting from the operator's working procedures in classy rooms, operator qualifications in carrying out the production process, the life of the fermenter and press filter produced in 1961 greatly contributed to the results product titers due to decreased ability of the machine in the product purification process; qualification and validation of tools used in the production process; initial storage of plasma and reagents used in the production process influences the initial diphtheria horse plasma titer so it needs to be considered and maintained according to its specifications; and some environmental conditions that must be determined according to the room qualifications used in the production process such as room temperature; relative humidity; pressure difference between spaces; microbiology; and the number of particles. These factors are grouped into six categories according to type to calculate the RPN score using the FMEA method.

The next risk management analysis uses the FMEA method to determine the RPN score of several factors that influence the titer value. RPN score calculations can be seen in Table V.3. Factors that are in the unacceptable and intolerable matrix include pH stopping the incubation process (RPN value 60); fragmentation temperature (RPN value 60); fragmentation process time (RPN value 125); the number of pepsin used in the production process (RPN 125); and the ammonium sulfate fractionation purification method (RPN value 60) can be seen in Figure V.2. Some of these factors are included in the classification of unacceptable and intolerable because optimization has never been done to get the optimal value of each factor. These factors become critical parameters because at the time of starting the production process, initial adjustments are made to the time, temperature and pH, so that these three factors
become parameters that must be considered during the production process because it determines the value of titer and yield. The amount of pepsin is known to affect how many antibody fragments are produced (Pope, 1939). Pepsin works as a protease enzyme that breaks down IgG into fragments F (ab) 2 and F (c) in anti diphtheria horse plasma. The purification method is classified as unacceptable because the fractionation process using ammonium sulfate directly impacts the damage to some antibodies in the anti-diphtheria horse plasma, so it is necessary to modify the purification method of anti diphtheria serum products.

Figure 1.4 The RPN histogram of the factors that influence the antibody titer value

7. Analisa fragmentasi igg terhadap rancangan eksperimen faktorial fraksional ½ fraksi

The flocculation test results obtained through experiments and calculations using equation of each sample show different titer (LFT) and KF values. Titer and KF values can be seen in Table 1.2. This difference in results is influenced by the different parameter values for each experiment, namely the amount of pepsin, temperature, pH and incubation time. Fractional factorial design of the ½ fraction uses replication 3 times at the mean value, from the flocculation test it was found that the results of the three obtained variations that were not much different from one experiment to another. This relatively small variation proves that the error rate of the experiments carried out is relatively small.

In the factorial fractional design ANOVA results showed that all four factors and their interactions had a significant influence on the value of anti diphtheria serum titers. The Pareto graph and the main effect plot also show that the four factors and their interactions have a significant effect on the resulting titer value. ANOVA shows a p-value <0.05 for all four factors and interactions that occur among several of these factors (Table 1.3).

These values indicate that the four factors have a significant influence on the value of titer as a parameter of the success of IgG fragmentation by pepsin A on anti-diphtheria serum products. The interaction between the two factors and the four factors shows a significant value (p-value <0.05), this indicates that the four factors interact strongly with each other in influencing the anti diphtherin antibody titer. The influence of these factors can also be seen from the Pareto diagram (Figure 1.5) which shows how much influence these factors have on responses. The
main effect plot (Figure 1.6) of each factor shows that the effect of some of these factors is significant to the response of anti diphtheria serum antibody titer values (Montgomery, 2013).

<table>
<thead>
<tr>
<th>No</th>
<th>Sample</th>
<th>Pepsin (mg/L)</th>
<th>pH</th>
<th>Media (℃)</th>
<th>Weight (mmol)</th>
<th>Nihx titer (LO)</th>
</tr>
</thead>
<tbody>
<tr>
<td>E1</td>
<td>Experim 1</td>
<td>2000</td>
<td>8</td>
<td>22</td>
<td>30</td>
<td>120</td>
</tr>
<tr>
<td>E2</td>
<td>Experim 2</td>
<td>328</td>
<td>8</td>
<td>22</td>
<td>30</td>
<td>0</td>
</tr>
<tr>
<td>E3</td>
<td>Experim 3</td>
<td>2000</td>
<td>3.0</td>
<td>32</td>
<td>30</td>
<td>0</td>
</tr>
<tr>
<td>E4</td>
<td>Experim 4</td>
<td>1183</td>
<td>5.95</td>
<td>37</td>
<td>135</td>
<td>100</td>
</tr>
<tr>
<td>E5</td>
<td>Experim 5</td>
<td>328</td>
<td>3.0</td>
<td>22</td>
<td>30</td>
<td>0</td>
</tr>
<tr>
<td>E6</td>
<td>Experim 6</td>
<td>1183</td>
<td>5.95</td>
<td>37</td>
<td>135</td>
<td>400</td>
</tr>
<tr>
<td>E7</td>
<td>Experim 7</td>
<td>328</td>
<td>8</td>
<td>22</td>
<td>240</td>
<td>90</td>
</tr>
<tr>
<td>E8</td>
<td>Experim 8</td>
<td>2000</td>
<td>3.0</td>
<td>22</td>
<td>240</td>
<td>1200</td>
</tr>
<tr>
<td>E9</td>
<td>Experim 9</td>
<td>1183</td>
<td>5.95</td>
<td>37</td>
<td>135</td>
<td>400</td>
</tr>
<tr>
<td>E10</td>
<td>Experim 10</td>
<td>2000</td>
<td>8</td>
<td>38</td>
<td>240</td>
<td>0</td>
</tr>
<tr>
<td>E11</td>
<td>Experim 11</td>
<td>328</td>
<td>3.0</td>
<td>32</td>
<td>240</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 1.2 Titer value of each experiment

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>Adj SS</th>
<th>Adj MS</th>
<th>F-Value</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>0</td>
<td>1215095</td>
<td>1215095</td>
<td>1232906</td>
<td>0.001</td>
</tr>
<tr>
<td>Linear</td>
<td>4</td>
<td>751808</td>
<td>187952</td>
<td>187952</td>
<td>0.001</td>
</tr>
<tr>
<td>Pepsin</td>
<td>1</td>
<td>187727</td>
<td>187727</td>
<td>187727</td>
<td>0.001</td>
</tr>
<tr>
<td>pH</td>
<td>1</td>
<td>121802</td>
<td>121802</td>
<td>967.74</td>
<td>0.001</td>
</tr>
<tr>
<td>Media</td>
<td>1</td>
<td>359652</td>
<td>359652</td>
<td>359652</td>
<td>0.001</td>
</tr>
<tr>
<td>Weight</td>
<td>1</td>
<td>172872</td>
<td>172872</td>
<td>172872</td>
<td>0.001</td>
</tr>
<tr>
<td>2-Way interactions</td>
<td>3</td>
<td>481176</td>
<td>160392</td>
<td>160392</td>
<td>0.001</td>
</tr>
<tr>
<td>Pepsin*pH</td>
<td>1</td>
<td>172872</td>
<td>172872</td>
<td>172872</td>
<td>0.001</td>
</tr>
<tr>
<td>Pepsin*Media</td>
<td>1</td>
<td>187727</td>
<td>187727</td>
<td>187727</td>
<td>0.001</td>
</tr>
<tr>
<td>Pepsin*Weight</td>
<td>1</td>
<td>121802</td>
<td>121802</td>
<td>121802</td>
<td>0.001</td>
</tr>
<tr>
<td>4-Way interactions</td>
<td>1</td>
<td>102109</td>
<td>102109</td>
<td>102109</td>
<td>0.001</td>
</tr>
<tr>
<td>Pepsin<em>pH</em>Media*Weight</td>
<td>1</td>
<td>102109</td>
<td>102109</td>
<td>102109</td>
<td>0.001</td>
</tr>
<tr>
<td>Error</td>
<td>2</td>
<td>257</td>
<td>128</td>
<td>128</td>
<td>0.001</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1.3 Results Factorial fractional ANOVA antibody titer values

Figure 1.5 Pareto diagram of the influence of factors on the titer value (α = 0.05)
Fractional factorial is also used to predict the optimum response value of the factors that affect the response. By using regression analysis, obtained by the equation model for the response are as follows:

$$
\text{Titer} = 393.33 + 153.00 \text{Pepsin} - 123.00 \text{pH} - 177.00 \text{Suhu} + 147.00 \text{Waktu} - 147.00 \text{Pepsin} \times \text{pH} - 153.00 \text{Pepsin} \times \text{Suhu} + 123.00 \text{Pepsin} \times \text{Waktu} - 216.33 \text{Pepsin} \times \text{pH} \times \text{Suhu} \times \text{Waktu}
$$

The model equation can then be used to identify the optimal factor values, namely the number of pepsin 2000mg / L; pH 3.9; Temperature of 22° C; and 240 minutes (Figure 1.7). The value generated from the response model equation does not differ significantly from the factual titer value that has been done that is equal to 1160Lf. This value is still included in the value of confident interval (CI) which is 1150.3-1249.7 Lf / mL (Figure 1.7).

The optimal parameter values need further analysis. The success rate of pepsin A fragmentation process against IgG in addition to the resulting titer value> 350Lf / mL, also needs to be seen from the SDS-PAGE profile where there are no more IgG bands and $K_f$ values which indicate the speed of reaction between antigens and antibodies in forming flocculation in flocculation tests. The IgG fragmentation process is then seen from the characterization of the experimental sample. Characterization included BCA test to see the total protein content and SDS-PAGE test to see the fragmentation profile with protein amount of 10 µg / well.

IgG fragmentation experiments by pepsin A can be seen from the results of the SDS PAGE, pepsin A with different treatments namely the amount of pepsin, temperature, pH and time, giving different profiles between treatments. Center points (ex 4, 6 and 9), which are the middle values of the experimental range, show profiles that are close to each other that there are no more IgG bands in the lane. It can be said that the optimization process at the center point parameter values (pepsin 2000mg / L, temperature 37 ° C, 135 minutes and pH 5.95) provides an optimum fragmentation profile. The optimum value parameter from this center point can also be seen from the titer value in table V.1 which shows that the antibody titer between the three center points is in the adjacent range (380-400 Lf).
Table 1.4 Results of total protein levels from several experiments

<table>
<thead>
<tr>
<th>No</th>
<th>Sample</th>
<th>Pepsin (mg/L)</th>
<th>pH</th>
<th>Saltn (°C)</th>
<th>Weight (mmol)</th>
<th>Ultimate Protein (µg/mL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>E0</td>
<td>Plasma Kads Diben</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>13434.00</td>
</tr>
<tr>
<td>E1</td>
<td>Experiment 1</td>
<td>2000</td>
<td>8</td>
<td>22</td>
<td>40</td>
<td>10891.46</td>
</tr>
<tr>
<td>E2</td>
<td>Experiment 2</td>
<td>328</td>
<td>8</td>
<td>52</td>
<td>30</td>
<td>10954.10</td>
</tr>
<tr>
<td>E3</td>
<td>Experiment 3</td>
<td>2000</td>
<td>3.9</td>
<td>52</td>
<td>30</td>
<td>10544.04</td>
</tr>
<tr>
<td>E4</td>
<td>Experiment 4</td>
<td>1180</td>
<td>5.95</td>
<td>37</td>
<td>135</td>
<td>10412.04</td>
</tr>
<tr>
<td>E5</td>
<td>Experiment 5</td>
<td>326</td>
<td>3.9</td>
<td>22</td>
<td>30</td>
<td>11528.84</td>
</tr>
<tr>
<td>E6</td>
<td>Experiment 6</td>
<td>1180</td>
<td>5.95</td>
<td>37</td>
<td>132</td>
<td>9245.34</td>
</tr>
<tr>
<td>E7</td>
<td>Experiment 7</td>
<td>326</td>
<td>8</td>
<td>22</td>
<td>240</td>
<td>10488.5</td>
</tr>
<tr>
<td>E8</td>
<td>Experiment 8</td>
<td>2000</td>
<td>3.9</td>
<td>22</td>
<td>240</td>
<td>11980.08</td>
</tr>
<tr>
<td>E9</td>
<td>Experiment 9</td>
<td>1180</td>
<td>5.95</td>
<td>37</td>
<td>135</td>
<td>10088.1</td>
</tr>
<tr>
<td>E10</td>
<td>Experiment 10</td>
<td>2000</td>
<td>8</td>
<td>52</td>
<td>240</td>
<td>8357.95</td>
</tr>
<tr>
<td>E11</td>
<td>Experiment 11</td>
<td>326</td>
<td>3.9</td>
<td>52</td>
<td>240</td>
<td>11905</td>
</tr>
</tbody>
</table>

Every protein in the blood plasma has a certain charge, the protein becomes uncharged at a certain pH and tends to interact and form aggregates. The pH at which the protein becomes uncharged is called pI (isoelectric point), IgG and F (ab) 2 horse plasma has pI above pH 6.5; albumin A has a pI of 4.9; and PI Fc 5.0-5.5 (Cheung et al, 2003). The pI value can be utilized in the next step of purifying antibody fragments by using the ion exchange chromatography method. Flocculation test is also influenced by pH, in general flocculation is not formed if the pH is outside the range 5-9 (Dennison, 2002). This can be seen in experiments 3, 5 and 11, besides due to the influence of temperature, the pH of experiment 3.9 did not form flocculates which are visual parameters for the formation of interactions between antigens and antibodies. Experiment 8 showed an anomaly because the experiment used the largest amount of pepsin and time compared to Experiment 5, so the enzymes work were still active but the flocules formed were very small when compared to other experiments that showed titer values.
Electroporegram profiles were analyzed using densitometry with Totallab software. The molecular intensity of the proteins separated during electrophoresis is marked by the height of the peak and the area of the area produced during densitometry. Densitometry results on electrophoregrams produce peak heights that vary between experiments. This shows the differences in the profile of IgG fragmentation by pepsin enzyme due to different treatments between experiments. The results of densitometry analysis of the middle value can be seen in Figure 1.9. In experiments 4, 6 and 9 no peaks formed on the band above > 135kDa, this is because in all three experiments IgG was fragmented into smaller fragments, especially F(ab)2 by the protease enzyme, namely pepsin A. Experimental densitogram 5 (Figure 1.9) shows that there is still a peak in the IgG band which shows that the fragmentation process is not optimal, this is because in experiment 5 using the smallest parameters of the range of factor levels in Table 1.5. Lf, Kf and SDS-PAGE profile data for some of the experimental samples shows that the parameter values at the center point provide optimal values in the IgG fragmentation process by pepsin A (Table 1.5).
Figure 1.9 Comparison of densitogram results from SDS PAGE. (a): experiment 6 (middle value); (b): experiment 5; (c): experiment 8

Table 1.5 The results of the characterization of IgG fragmentation by pepsin A

<table>
<thead>
<tr>
<th>No</th>
<th>Sample</th>
<th>Pepsin (mg/mL)</th>
<th>pH</th>
<th>Time (min)</th>
<th>Temperature (°C)</th>
<th>Yaw (mm²)</th>
<th>Yaw’ (mm²)</th>
<th>Kf (min)</th>
<th>Molar (L/g)</th>
<th>Area (L/g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Positive</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>E1</td>
<td>Experiment 1</td>
<td>2000</td>
<td>0</td>
<td>22</td>
<td>30</td>
<td>10081,42</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>E2</td>
<td>Experiment 2</td>
<td>130</td>
<td>0</td>
<td>22</td>
<td>30</td>
<td>10084,18</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>E3</td>
<td>Experiment 3</td>
<td>2000</td>
<td>1,8</td>
<td>22</td>
<td>30</td>
<td>10084,24</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>E4</td>
<td>Experiment 4</td>
<td>140</td>
<td>1,8</td>
<td>22</td>
<td>30</td>
<td>10084,24</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>E5</td>
<td>Experiment 5</td>
<td>130</td>
<td>1,8</td>
<td>22</td>
<td>30</td>
<td>10084,24</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>E6</td>
<td>Experiment 6</td>
<td>110</td>
<td>1,8</td>
<td>22</td>
<td>30</td>
<td>10084,24</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>E7</td>
<td>Experiment 7</td>
<td>130</td>
<td>1,8</td>
<td>22</td>
<td>30</td>
<td>10084,24</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>E8</td>
<td>Experiment 8</td>
<td>2000</td>
<td>1,8</td>
<td>22</td>
<td>30</td>
<td>10084,24</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>E9</td>
<td>Experiment 9</td>
<td>130</td>
<td>1,8</td>
<td>22</td>
<td>30</td>
<td>10084,24</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>E10</td>
<td>Experiment 10</td>
<td>2000</td>
<td>1,8</td>
<td>22</td>
<td>30</td>
<td>10084,24</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>E11</td>
<td>Experiment 11</td>
<td>130</td>
<td>1,8</td>
<td>22</td>
<td>30</td>
<td>10084,24</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

8. Conclusion

Pepsin A can be used as a substitute for pepsin B in the anti-diphtheria serum production process as one of the commitments to deliver halal products. Factors that have a significant influence on the antibody titer value of anti-diphtheria serum products are the amount of pepsin, time, temperature, and pH of incubation termination. The optimum value (highest titer, shortest Kf time and no IgG band) IgG fragmentation process by pepsin A is the amount of pepsin 1163 mg / L, temperature 37°C, time 135 minutes, and pH 5.95. Using the optimum parameters of pepsin A can increase the antibody titer in the IgG fragmentation stage to 2.67 times from the previous method using pepsin B.
References

Affect Employee Engagement in Company Performance: Organizational Citizenship Behavior as Moderating

Oktaria Ardika Putri

{ oktariaardika@iainkediri.ac.id }

Institut Agama Islam Negeri (IAIN) Kediri

Abstract. In service companies, the ability of individuals to attract consumers is the spearhead of the company. The type of service company that is currently developing is Sharia insurance based on Islamic law. Prudential Syariah is a type of insurance based on Sharia principles and without usury. Marketing agents are an important factor in the implementation of Sharia Prudential's business. Employee engagement is one of the things that affect company performance. This study aims to assess and analyze the effect of employee engagement on company performance with organizational citizenship behavior (OCB) as a mediation conducted on Prudential Sharia marketing agents in Malang. This research is quantitative approach. The analysis used is descriptive analysis and inferential analysis (SEM-PLS). The samples used in this study were marketing agents with AD level, 7 Agency Directors, SUM (Senior Unit Manager) as many as 14 people, and UM (Unit Manager) 42 people so that the total number was 63 people. The results of this study indicate that employee engagement has no effect on company performance but on OCB. OCB affects company performance and becomes a mediating variable on employee engagement on company performance. The results of this study are expected to be a consideration of Sharia insurance companies and market agents in the process of improving company performance.

Keywords: Employee Engagement, Organizational Citizenship Behavior, Company Performance

1. Introduction

The development of insurance in Indonesia has experienced rapid progress. Various insurance companies are competing to offer insurance programs to the public or companies. In addition, insurance companies currently also offer Sharia insurance programs, one of the insurance companies is Prudential Syariah. In Prudential Sharia, it uses the type of agreement "Tijarah Agreement (Mudharabah)" and "Tabarru Agreement" (grant) ″. A tijarah / mudharabah agreement is a contract made between a customer acting as a policyholder (shohibulmaal) and a Shariah prudential acting as a manager (mudarib).
Funds are owned by Prudential Sharia customers, while Sharia prudential has obligations as a manager in accordance with Sharia principles with the supervision of the Sharia Supervisory Board. It aims to supervise so that the marketing agents in Sharia prudential do not take actions that are not in accordance with Islamic law. Prudential Syariah does not provide interest and also does not invest in financial instruments based on interest and Prudential Syariah makes investments in accordance with Sharia principles.

In an insurance company, especially Syariah prudential, the company's performance is the spearhead of employee success in getting customers. The company's performance is one of the key companies to remain in the insurance market. Assets in carrying out insurance company strategy are market agents, namely as a basis for holding an important role in efforts to reduce risks and problems faced by the company. So this situation proves if the role of the human resource management strategy is very necessary to adopt everything that happens to the company.

The performance of companies in insurance companies is very dependent on the success and optimization of workers in achieving targets in the form of increasing numbers of customers. Employee engagement is one of the results of marketing agents in achieving their work, so that it can provide the best performance to achieve company success (Watkin, 2002) without transferring Islamic principles. Slow activity, weak decision making, the number of working days, and lack of interest in work can cause a marketing agent to break away from the company and can produce production from a low company (Pech and Bret, 2006).

Employee engagement is one of the main problems that should get more attention from the company (Bernthal, 2010). Because employee engagement is a picture of a sense of connectedness and involvement of an individual with an organization, with the relationship of employees will have an impact on the ability to do work beyond the limits of ability and provide the best performance to achieve company goals (McBain, 2007).

The ability to do work beyond the limits in a company is usually called organizational citizenship behavior (OCB) which can effectively affect performance. OCB is a thing that has a positive impact on the company, because OCB contributes to increasing employee productivity, improving performance, and strengthening the ability of organizations to survive effectively (Podsakoff, 2000). Ariani (2012) suggested that employee engagement has an influence on OCB because employees who have high involvement in a company will tend to improve the conditions conducive to the company. In addition, employees will develop a higher commitment to the company. King and Gong (2009) state that OCB must improve company performance. Because OCB is more supportive towards achieving company goals (Aslefalahl and Ali, 2014)

2. Theoretical Framework

Employee Engagement and Company Performance

The success of a company can be seen from the extent to which employees are able to make a positive contribution in carrying out their duties and responsibilities as employees to achieve company goals. Employee engagement gives a positive influence on company performance, namely high employee engagement can increase high growth and profitability (Anbuoli and
Devibala, 2009; Desai et al., 2010). Clearly this can be concluded that employee engagement and company performance are very important because these two things have been involved, related to one another. For example, workers who are related to their companies have lower absenteeism and a desire to improve company performance. Employee engagement is a sense of connection between employees and the company, employees who feel bound will contribute according to their ability to achieve company performance (Mwangi and Jane, 2015). Boonner and Rebecca (2014) stated that employee engagement is negatively related to company performance, then Yu and Chris (2015) stated that employee engagement does not improve the performance of insurance companies if the marketing agent does not use online media in completing their work.

Employee engagement has been described as the key to success in company performance. Macey et al (2009) shows how much employees in realizing employee engagement by using persistence, proactiveness, role expansion, and adaptability. This measurement aims to see how much influence employee engagement has on OCB and company performance. In addition, company performance is measured using indicators namely financial perspective, customer perspective, operational process perspective and learning and growth perspective (Sintaasih, 2011). Based on the empirical evidence and explanation, the following research hypothesis is proposed.

H1. Employee engagement influences company performance

Employee Engagement and Organizational Citizenship Behavior (OCB)

OCB is the contribution of the above work to achieve goals and maintain the welfare and survival of the organization. Employees who have a good perception of organizational support will try their best to repay the kindness received from the organization. With this commitment to the organization will increase. In OCB the emphasis is on social contracts between individuals and other individuals (coworkers) and between individuals and organizations which are usually compared to in-role behavior based on the "limited performance" required by the organization.

Ariani (2012) stated that employee engagement has a positive influence on OCB, it is explained that workers who have a high engage, will tend to improve the conducive situation in the organization. Nadem (2012) is said to have a positive relationship between employee engagement and performance (financial and company performance), like OCB which also has a positive relationship on company performance. OCB is the behavior of individuals who have responsibilities and are ready to work outside working hours and do not show fatigue in completing tasks assigned to the interests of the company. Bukhari (2008) and Podsakoff et al. (2000) use altruism, conscientiousness, sportsmanship, civic virtue, and courtesy as effective gauges of OCB. Based on the empirical evidence and explanation, the following research hypothesis is proposed.

H2. Employee engagement influences organizational citizenship behavior (OCB)

Organizational Citizenship Behavior (OCB) and Company Performance

Organizational citizenship behavior is seen as a factor that contributes to the overall work of the organization. Podsakoff (2000) suggests several benefits of organizational citizenship behavior. These benefits include increasing co-worker productivity, manager productivity,
conserving resources owned by management and the organization as a whole, helping to save scarce energy resources to maintain group functions, being an effective means of coordinating work group activities, increasing the organization's ability to attract and retain employees, improve the stability of company performance, enhance the organization's ability to adapt to changing environments.

Seeing the importance of OCB in a company, such as behavior that includes assistance to colleagues to ease their burden, not get much rest, carry out the tasks requested, and help others to solve problems. Empirical evidence, Bhatla (2006) suggests a significant relationship between organizational citizenship behavior variables on company performance in India. This is in line with Bukhari et al. (2009) that a significant influence between nationalism, conscientiousness, and civic virtue on OCB, and corporate performance. Aslefalah and Ali (2014) also suggested a significant influence between OCB on the performance of insurance companies. Zhang et al. (2017) is the result that there is a relationship between employee engagement and OCB on company performance. The findings in his research indicate the role of OCB as a mediator on the relationship of employee engagement and company performance. Thus, it can be said that OCB bridges the influence of employee engagement on company performance. However, without OCB, basically the management of employee engagement can also improve business performance directly. Based on empirical evidence and explanation above, the hypothesis that can be submitted is

H3. Organizational citizenship behavior (OCB) influences company performance

H4. Organizational citizenship behavior (OCB) mediates the effect of employee engagement on company performance

The research hypothesis proposed raises an explanatory model about the effect of employee engagement on business performance with organizational citizenship behavior as mediation, as shown in Figure 1.

3. Research method and analysis

This study is related to the effect of employee engagement on company performance with organizational citizenship behavior as a mediator. This research is a quantitative approach, a research that aims to develop knowledge through survey results so as to produce statistical data that can be used to test hypotheses in research (Creswell, 2014). Respondents used in this study are marketing agents Prudential Syariah in Malang City at the level of AD (Agency Director) as many as 7 people, SUM (Senior Unit Manager) as many as 14 people, and UM (Unit Manager) 42 people so that the total number of 63 people. The sample used in this study is a saturated sample (census), which is that all members of the population are used as research samples (Sugiyono, 2010).
The analysis used in this research is descriptive analysis and inferential analysis. Descriptive analysis is used for the purpose of describing trends and responses with the help of SPSS software. Inferential analysis is used to test hypotheses and produce viable models. The analysis technique uses Structural Equation Modeling with Partial Least Square (SEM-PLS) approach and the help of SmartPLS 3.0 software. Partial Least Square has the advantage of being a powerful analysis tool, because it does not assume the data must be of a certain scale measurement, can be applied at all data scales, the sample size does not have to be large (Ghozali, 2008).

4. Results and discussion

Research Sample Collection Results

The respondents of this study are all active marketing agents Prudential Syariah in Malang City at the level of AD (Agency Director), SUM (Senior Unit Manager), and UM (Unit Manager). The survey was conducted privately with relevant marketing agents so that all questionnaires could be processed at a later stage. Table 1 is a descriptive result of a questionnaire that has been distributed with 1-5 years of service.

<table>
<thead>
<tr>
<th>Characteristics of Respondents</th>
<th>Percentage (%)</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Man</td>
<td>34.92</td>
<td>22</td>
</tr>
<tr>
<td>Woman</td>
<td>65.08</td>
<td>41</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 – 35 years old</td>
<td>63.49</td>
<td>40</td>
</tr>
<tr>
<td>36 – 50 years old</td>
<td>36.51</td>
<td>23</td>
</tr>
<tr>
<td><strong>Last Education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D3</td>
<td>23.81</td>
<td>15</td>
</tr>
<tr>
<td>S1</td>
<td>68.25</td>
<td>43</td>
</tr>
<tr>
<td>S2</td>
<td>7.94</td>
<td>5</td>
</tr>
<tr>
<td><strong>Marital Status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>49.21</td>
<td>31</td>
</tr>
<tr>
<td>Married</td>
<td>39.68</td>
<td>25</td>
</tr>
<tr>
<td>Widower/ Widow</td>
<td>11.11</td>
<td>7</td>
</tr>
</tbody>
</table>

Based on Table 1, shows that the marketing agent Prudential Syariah is dominated by women by 65.08% while men by 34.92%. This is because women are more suitable in the field of product marketing than Prudential Syariah. The age characteristics of the Prudential Shariah marketing agent are dominated at the age of 20-35 years with a percentage of 63.49%, while the age of 36-50 years with a percentage of 36.51%. This value indicates that the marketing agent enters the productive period, so that he is able to provide good service to customers in terms of negotiating and communicating. The marketing agent of Prudential Syariah is dominated by Bachelor with a percentage of 68.25% (Diploma 23.81% and Postgraduate...
7.94), the value indicates that acceptance of the marketing agent is preferred by bachelor graduates because it is considered capable of carrying out work well. On the characteristics of marital status, unmarried has the highest percentage that is equal to 49.21% (married 39.68% and widower / widow 11.11%), the value indicates that the marketing agent has a soul for a higher career even though the agent agent who is married also has the same passion.

**Measurement Model Evaluation Results**

Evaluation of measurement results is a condition that must be passed in testing with Partial Least Square. Evaluation of this measurement model is used to measure the validity and reliability of the measurement results. Validity can be confirmed by seeing the results of outer loading values above 0.7, but values 0.5 - 0.6 can still be accepted (Ghozali and Latan, 2012); the results of the √AVE value are greater than the correlation value between variables with the condition that the AVE value is above 0.5. Reliability can be confirmed by looking at Cronbach Alpha and Composite Reliability values above 0.7 (Abdillah and Hartono, 2015). The measurement results show that the validity and reliability can be confirmed properly. (Table 2)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Indicator</th>
<th>Outer Loading</th>
<th>Cronbach’s Alpha</th>
<th>Composite Reliability</th>
<th>AVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employee Engagement</td>
<td>Persistence</td>
<td>0.812</td>
<td>0.828</td>
<td>0.870</td>
<td>0.628</td>
</tr>
<tr>
<td></td>
<td>Proactive</td>
<td>0.704</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Role Expansion</td>
<td>0.774</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Adaptability</td>
<td>0.870</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organizational Citizenship Behavior (OCB)</td>
<td>Altruism</td>
<td>0.724</td>
<td>0.818</td>
<td>0.873</td>
<td>0.579</td>
</tr>
<tr>
<td></td>
<td>Conscientiousness</td>
<td>0.719</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sportmanship</td>
<td>0.751</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Civic Virtue</td>
<td>0.773</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Courtesy</td>
<td>0.833</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Company Performance</td>
<td>Finance</td>
<td>0.805</td>
<td>0.744</td>
<td>0.851</td>
<td>0.655</td>
</tr>
<tr>
<td></td>
<td>Customer</td>
<td>0.767</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Learning and Growth</td>
<td>0.855</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Structural Model Evaluation Results**

This study follows a three-stage approach proposed by Aldás (2016) to analyze structural models: 1) determinant coefficients (R2 values) for variables; 2) Predictive Relevance Q2; 3) the path coefficient results to see significance. This study estimates the causal relationship between latent variables in the model, through the sign and the magnitude of the path coefficient, the structural model estimation results are summarized in Figure 2. R2 on OCB shows a value of 0.302 which can be interpreted that OCB can be explained by employee engagement by 30.2% and the remaining 69.8 % is explained by other variables outside the model. R2 value on company performance shows a value of 0.311 which can be interpreted that OCB can be explained by employee engagement and OCB is 31.1% and the remaining 68.9% is explained by other variables outside the model. Q2 value of 0.519, meaning that the
diversity of data generated from the structural model examined in this study is 51.9% and the remaining 48.1% is explained by variables outside this research model, in addition this model also shows very good research because the value is close to one.

Based on testing the hypotheses in Figure and Table 3, it was shown that employee engagement had no significant effect on company performance, so hypothesis 1 was rejected. Employee engagement has a significant effect on OCB, so hypothesis 2 can be accepted. OCB has a significant effect on company performance, so hypothesis 3 can be accepted. On indirect effects, OCB is able to provide an influence on employee engagement on company performance (hypothesis 4 is accepted).

Table 3. Structural Model

<table>
<thead>
<tr>
<th>Relationship between Variables</th>
<th>Coefficient</th>
<th>T-statistic</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct Influence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employee Engagement → Company Performance</td>
<td>0.026</td>
<td>0.191</td>
<td>0.849 (n.s)</td>
</tr>
<tr>
<td>Employee Engagement → OCB</td>
<td>0.549</td>
<td>8.197</td>
<td>0.000</td>
</tr>
<tr>
<td>OCB → Company Performance</td>
<td>0.543</td>
<td>3.401</td>
<td>0.001</td>
</tr>
<tr>
<td>Indirect Influence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employee Engagement → OCB → Company Performance</td>
<td>0.298</td>
<td>2.891</td>
<td>0.004</td>
</tr>
</tbody>
</table>

5. Discussion

Employee engagement has no effect on company performance at Prudential Syariah in Malang. This can be interpreted that employee engagement owned by marketing agents with UM, SUM, and AD levels has not been able to improve company performance. Hypothesis testing results show that employee engagement does not significantly influence company
performance at Prudential Syariah in Malang. In addition to theoretical contrast, the results of this study also conflict with previous empirical studies conducted by Mwangi and Jane (2015), Anbuoli and Devibala (2009), Ahmed et al. (2012), Watkin (2002), and Andrew and Saudah (2012) which stated that employee engagement had a significant effect on company performance. However, the results of this study support the study conducted by Pech and Bret (2006), Boonner and Rebecca (2014), Yu and Chris (2015), and Bronson (2015) which state that employee engagement has no significant effect on company performance.

Empirical research that supports the results of research by Pech and Bret (2006) found different results that there was no influence between employee engagement on company performance. Described in it employee engagement can have a negative effect depending on leadership, as well as the level of education of a worker. Workers who have a high level of education and awareness of global conditions will tend to give up their jobs, if not supported by an appropriate salary. It also depends on the organization or company, which is basic, performance standards in the company. The existence of global developments, speed, ambiguity, and level are the reasons for a company to have to survive. In defense, it is good for companies to strengthen economic factors, trust, innovation, and strong leadership. Based on the explanation above, the role of each employee engagement characteristic described through persistence, proactiveness, role expansion, and adaptability needs to be optimized in relation to the correlation with Prudential Syariah company performance in Malang. Implementation related to external factors such as organization trust, motivation, work ethics, ability to do work, and work design can be another supporting alternative that can be used by companies to support or improve the performance of Prudential Syariah companies in Malang.

Employee engagement influences organizational citizenship behavior (OCB) on the Prudential Syariah marketing agent in Malang. This can be interpreted that employee engagement which is owned by marketing agents with UM, SUM, and AD levels is able to increase the OCB level of these employees. The results of hypothesis testing indicate that employee engagement has a significant effect on organizational citizenship behavior in Prudential Sharia in Malang. Findings from the results of this study are in line with previous empirical studies that support it, conducted by Ariani (2012); Sun (2012); Andrew and Saudah (2012); Watkin (2002); and Zang et al. (2017) which states that employee engagement has a significant effect on organizational citizenship behavior. The findings in this study, both based on the perception or thought of marketing agents and the actual conditions felt by marketing agents, have provided a different picture for the company. Basically these findings indicate that in Prudential Syariah in Malang City employee engagement marketing agents can have a good impact on organizational citizenship behavior. Vice versa, if employee engagement is bad then organizational citizenship behavior will be low.

Organizational citizenship behavior (OCB) influences company performance on Prudential Syariah marketing agents in Malang. This can be interpreted that the OCB level possessed by marketing agents with UM, SUM, and AD levels is able to improve company performance. In this study, an important parameter in creating organizational citizenship behavior is through the ability of marketing agents to maintain the good name of the company. This condition shows that the marketing agent of Prudential Syariah in Malang by maintaining the good name of the company, the company's image will improve. On the other hand, company performance is more indicated by indicators of learning and company growth. Thus, it can be said that
Prudential Syariah in Malang prioritizes the learning and growth of the marketer's agents owned, seeing that these agents are directly related to customers.

The findings in this study confirm some of the findings of previous studies such as Ahdiyana (2010); Bukhari et al. (2009); Bhatla (2016; and Nadem (2012), who found that organizational citizenship behavior has a significant effect on company performance, in addition, the findings of this study are also in accordance with existing theories and practices. Behavior: These benefits can increase co-worker productivity, manager productivity, save resources owned by management and the organization as a whole, help save energy scarce resources to maintain group functions, be an effective means to coordinate work group activities, improve organizational ability to attract and retain employees, improve the stability of company performance, improve the ability of organizations to adapt to changes in the environment. Based on the findings of this study note that organizational citizenship behavior marketers Prudential Syariah hilariously in the city of Malang pushed the company's performance improvement. Thus, the high level of organizational citizenship behavior will have an impact on improving company performance. Vice versa, if the level of organizational citizenship behavior of employees is low then it will have an impact on decreasing company performance.

The role of organizational citizenship behavior is able to mediate the effect of employee engagement on the performance of Prudential Syariah companies in Malang. This finding is able to contribute to the relationship of employee engagement and company performance. Marketer's perception of the ability to maintain the good name of the company through actions taken has a dominant influence. Apart from some aspects of organizational citizenship behavior, companies must be able to provide freedom for employees to deal with colleagues and as a form of agency responsibility so as to be able to have an impact on the harmonious company conditions between coworkers and between employees and companies, so that with increasing organizational citizenship behavior the company's performance also improved. Good employee engagement in the company will make employees feel responsible for work and freedom of contact, creating high organizational citizenship behavior. With this attitude, it will indirectly affect increasing company performance.

The test results show that not all hypotheses are accepted. Practical implications for companies and related employees in a number of ways including, in the development of human resources in companies, especially in Prudential Sharia in Malang, the company is able to pay attention to employee engagement of marketing agents in every internal or external activity in order to influence the improvement of company performance by not ignoring organizational citizenship behavior, because the involvement is able to provide the perception that the individual is important in the company. Prudential Syariah in Malang needs to consider the form of employee engagement owned by marketing agents that are used as a reference in improving company performance. In addition, companies can increase employee engagement through indicators such as persistence, proactivity, role expansion, and adaptability with expectations through these indicators or other indicators that the company's performance will improve. For Prudential Syariah employees in Malang, this study was able to realize that the importance of employee engagement and organizational citizenship behavior for employees and company growth and development.
References


Music And Local Information As Influential Broadcast Radio Content

Nur Aini Shofiya Asy’ari
{nuranishofia@unida.gontor.ac.id}

Communications Department, University of Darussalam Gontor, Ponorogo, Indonesia

Abstract. Management of radio broadcasts that are not based on audience behavior research causes convergence strategies cannot build listeners' awareness and engagement with the radio which ultimately results in very low listenership. This article aims to find out what broadcast content is appropriate to the character of the radio and the needs of the audience. This study uses a qualitative approach using survey methods in 270 Ponorogo people. From the survey that was carried out, the researchers obtained some data that showed that music (69%) and local information (27%) were content that should have a great influence on listenership because both content was the listener's first choice when accessing the radio. Entertaining music characters are very compatible with auditive and personal radio characters. But in presenting music must first be arranged according to the audience segmentation. While local information is also very closely related to the radio because the proximity value is high. Local information can be excellent content because the community's need for that information is very high while its media competitors are relatively small.

Keywords: Radio, Local Content, Music, Radio Convergence

1. Introduction

Nowadays, audiences are turning to accessing new media rather than radio, making the radio industry continue to decline. In the past, radio competitors were televisions with audio-visual power, so in this era, new media became a giant competitor that was very difficult to conquer. From the media habit data released by Nielsen it can be seen that the trend of listening to the radio continues to fall even in 2015 at 15.77%, inversely proportional to the internet trend that broke at 37.845%. The presence of the internet has also continued to erode radio ad spending. Social media that we are witnessing today is another development of new internet-based media. In 1978, a bulletin was found to upload or download information, including allowing users to use electronic mail, although still using a modem. Its development is increasingly rapid with the discovery of Geocities, Friendstrer, LinkedIn, including Facebook. Internet-based media platforms continue to evolve and the most phenomenal is the social media platform that even changes the current social order.
The development of information media is due to the continued development of information technology. This is a challenge for mainstream media both paper and electronic based. The ability of broad reach, through space and time as well as high speed owned by radio in fact is no longer a helper for the radio industry in the era of new media (new media) because radio also has weaknesses that are only auditory while the public is now more interested in complete information that is audio, visual as well and can be accessed anytime, anywhere. Another weakness of the radio is the character of the radio message that is fleeting, not detailed and detailed becomes an obstacle in the industry including the noise factor because signal interference becomes the complaint of the audience which ultimately decides to leave the radio. The presence of new internet-based media causes mainstream media business managers to think of new strategies for survival. Kompas newspaper transforms itself using a media convergence strategy called 3M, namely multimedia, multichannel, multiplatformz in accordance with the characteristics of convergence itself (Sugiya, 2012).

Therefore, facing the new media era, radio is demanded to be creative and innovative. So synergy and integration become the choice of the radio industry rather than moving away or hostile to new media. Radio currently chooses to do media convergence, that is, to integrate with new media in all forms of radio broadcasting. Media convergence has been carried out by many radios especially in big cities and has a significant impact on expanding the audience market and radio advertising spending. In several radios that have been studied, namely Swaragama FM, Geronimo FM and Prambors FM radio, it is known that the reach of these three radio audiences extends to foreign countries, namely Europe, America, Russia, Hong Kong and Thailand. (Trinoviana, 2017). Radio Suara Surabaya also converged media by combining three concepts at once in the broadcast, namely On air, Online and Non air (Asy’ari, 2016). In other studies, it is known that the Solo Pos convergence strategy is News Gathering Convergence (Prihartono, 2016).


2. Methodology

This research is a descriptive research design that analyzes the convergence of radio media using a questionnaire that takes place from May to June 2019 in Ponorogo. Data collection in this study used a questionnaire with 29 questions. The question illustrates the behavior of the respondents including the type of media used and views on radio in the digital age. To
simplify the process of distributing questionnaires, this study uses a Google form and printed questionnaire in order to cover respondents as a whole.

Researchers chose the Ponorogo community of various ages as respondents. In this study set for 95% confidence interval given the value, the expected proportion is, and the tolerable error limit of 6%. Then the number of samples needed by 267 respondents was selected by the convenient random sampling method where respondents were chosen randomly and voluntarily filled out the questionnaire.

3. Results and discussion

Low Awareness As A Reason For Low Listenership

Radio di Ponorogo telah banyak yang melakukan konvergensi media dengan menghadirkan platform radio streaming, video streaming dan media social (Asy’ari and Luthfi, 2018) To find out the response of the Ponorogo community, a survey of 270 radio listeners was conducted. From the survey results it is known that 226 people (84%) still access analog radio instead of internet-based radio as a medium of listening to the radio even though they have a device that is connected to the internet. Brand awareness is a condition where consumers can recognize a brand in different circumstances where it can happen when the brand is continuously introduced and reminded again in the minds of consumers (Saputri, 2017), then when radio listeners do not access internet-based radio it is known that Ponorogo community knowledge is relatively low. In other words the brand awareness of radio convergence products has not yet achieved the expected results. This will affect the brand image expected by the radio. Converged radio brand image is very important to be built because with this image the public knows that radio can be heard in various ways and that the characteristics of radio information are more balanced so that a higher degree of trust is the choice for people who want reliable information.

Diagram 1. The most widely used radio device Ponorogo community to access the radio

Furthermore, data findings related to the accessibility of convergence media platforms owned by radios in Ponorogo show figures that are also not very satisfying. 74% of respondents said...
they did not access streaming radio, 91% did not access video streaming 91% did not access Youtube radio and 85% did not access social media radio. If media convergence is assumed to be an attempt to increase storefronts to display radio products, then the intended storefront has not provided the expected contribution because these storefronts have not been able to attract the attention of consumers.

But for people who claim to access radio streaming, video streaming and social media, there is a good impression that is conveyed regarding the ease of access to the new media platform rather than analog radio. 85% of respondents said it was easier to get information via radio streaming whenever and wherever, 97% of respondents said the same thing when accessing video streaming. Including people who use YouTube, 91% find it easy and fun to access radio through YouTube.

There are three main characteristics in media convergence, namely multimedia, multichannel and multiplatform. Multimedia is the provision of information in various formats, including photos, text, graphics, audio and visual or video. By applying this multimedia concept it is expected to meet the needs of the audience so that the audience is interested in following and using the media. Multichannel is the use of various methods and tools in the delivery of information digitally. With the multichannel concept, information is expected to be obtained not only in the form of audio but also in digital form (internet). Because of the ease of access to information supported by the many channels, it is important to consider factors of accuracy, completeness and speed. Meanwhile, Multiplatform uses different tools to get information, for example via smartphone, PC or tablet.

The high rate of change in information technology causes the media industry must prepare to face it. The media industry is expected to be ready to face changes in people's culture by starting to implement a code of ethics for media business people.

The challenge paradigm should also be able to be turned into a business opportunity because the media industry is possible to expand its industrial capacity by increasing the efficiency and effectiveness of work as a result of the development of information technology.

Ideally, the presence of information technology will make it easier for the mainstream media to broaden their wings and make it easier to spread information so that it can ultimately strengthen the influence of the media. Then came the phenomenon of the many collaborations between the mainstream media and new media, commonly referred to as media convergence.

Media convergence is a new idea how to convey information to the mass media. Print and electronic media are combined and the content is a combination of text, audio and video that is united on one internet media technology using a satellite network.

Convergence is an absorption word from the English language that is "convergence" which means it is the act of meeting or uniting in a place, or it can also be interpreted as focusing on eye sight to a place that is very close. While the media is something that is used to connect information and delivery of entertainment from the sender of information to the recipient of information.

Media convergence is the integration or merging of existing media to be directed and used into a single point of destination, where media convergence is caused by the development of digital
communication technology which causes efficient telephone, video and data communication in a network (network convergence).

So it can be concluded that media convergence is a phenomenon of the joining of various media which were previously considered different and separate which includes print and electronic media (for example television, radio, newspapers, and computers) into one single media.

Convergence provides a new opportunity for the public to expand media access options according to their tastes. In terms of the media economy, convergence means new opportunities in the world of the communications industry. From this it can be interpreted that convergence should be able to strengthen the bond (engagement) between producers and consumers in economic terms, the needs of both parties are met by the presence of media convergence.

In the context of the radio industry, engagement can be seen from radio listenership or media habits of the radio listeners themselves. The higher listener listenership indicates that the radio has a strong influence on the listener so that it binds the listener to always listen or access the radio. People's behavior in accessing media (media habit) is a reflection of the success of the radio strategy in carrying out its broadcast program.

From questionnaires distributed to 270 people of Ponorogo, it is known that 98.5 percent of Ponorogo people know about radio. However, although the level of public knowledge about radio is still quite high, their closeness to radio is still quite lacking. The last Ponorogo community to access the radio was quite far in time. 47% claimed to listen to the radio more than a year ago, 30.5% listened to the radio more than two months ago and the rest only 22.6% claimed to listen to the radio less than a month ago. It is a concern considering that in one day the community could repeatedly access cellphones while accessing radio less than a month ago only 22.6%.

Diagram 4. The last time Ponorogo people listened to the radio

From these data an understanding can be drawn that the people of Ponorogo are less tied to their needs with radio. Society no longer makes radio as the main reference in accessing information and entertainment. If information and entertainment are assumed to be people's
daily needs while the time span of people accessing radio is very far away, it can be said that people choose to access other media rather than accessing radio. In other words, as the media of radios in Ponorogo, they are considered less influential on people's daily lives.

The ideals of radio convergence to return the community to return to listening to the radio were not as expected. According to Errol Jonathan, Managing Director of Suara Surabaya, convergence is essentially aimed at returning people to listen to the radio (Asy’ari, 2018) however, the results of a survey of 270 people showed that 62.2% of the people of Ponorogo did not want to listen to the radio despite the availability of various convergence media platforms.

Music And Local Content As Influential Broadcast Content

To find out what things that satisfy the listener (audience) first need to know beliefs in the audience. In Phillip Palmgreen's expectancy - value theory which is still a derivative of Uses & Gratification explained that satisfaction (gratification) sought from the media is determined by the behavior of the audience in the media. The audience's belief or expectations are very closely related to what the media can provide to the audience. For example, when the audience believes that the drama is a representation of real life and by seeing the drama the audience feels they have the benefit (entertainment or wisdom of life), the audience will look for satisfaction by watching the drama, otherwise if the audience believes the drama as something that will only drain emotions and time then he will stay away from it (Rosalia, 2009).

Radio as a medium of mass communication must be able to understand the wants and needs of its audience. This is important as a basis for determining broadcast program policies. In her writings, Rosalia states that the audience actively chooses media that they deem appropriate and goal-oriented, the audience is responsible for choosing the media to meet their needs, this condition is called the Uses and Gratification theory (Rosalia, 2009). So even though the media has a great power to influence the audience, the audience remains the determinant of what broadcast products they will choose and follow. From this explanation, it is known that it is very important for the radio to review the radio characters again as the radio's attraction in attracting audiences.

Some radio characteristics include; 1) Auditory. Radio is a voice to be heard because the content of the broadcast is cursory and cannot be repeated. 2) Transmission. The process of dissemination or delivered to the listener through transmission (transmission). 3) Theater of mind. The radio creates a picture in the listener's imagination with the power of words and sound. 4) Identical to music (Sari, 2014). Terkait dengan karakter keempat yaitu musik, Perebinossoff mengatakan bahwa "produk utama dari stasiun radio adalah music “ (Rosalia, 2009).

Music is an art that depicts human thoughts and feelings through the beauty of sound. Just as humans use words to transfer concepts, music uses sound compositions to express inner feelings. Like other arts, music is a reflection of individual or community feelings so that it can be said that music is the result of human creativity and sense of life (Feriyadi, 2012).

Music is the unity of a collection of sounds of melody, rhythm, and harmony that can arouse emotions. Music can change human feelings to be happy or vice versa suddenly become sad. Even humans do not realize that they have been influenced and directed to do things they don't want through music. Music therapy helps people who have emotional problems get their
feelings out, make positive changes with mood, help solve problems and fix problems (Larasati, 2017).

Because the nature of music that is believed to affect human feelings such as feelings of loneliness, shock and other feelings of heart, began many studies that take music as the object of research. Many studies recommend music to be used to stimulate nerve cells to achieve the goal of strengthening or weakening human feelings. In addition, music is recommended as a therapeutic tool and healing process because it has an influence on the sensory and motor nervous system.

The data that the writer obtained in this study shows that the highest motive of the people of Ponorogo to listen to the radio is because of music. Then the radio station should pay more attention to music management on the broadcast. The results showed that 69% of the reason that people in Ponorogo listened to the radio was music, 27% was information and the rest were interested in announcers. Then these three factors should be the basis of the radio station in Ponorogo for the management of broadcast content.

<table>
<thead>
<tr>
<th>Variabel</th>
<th>Frekuensi</th>
<th>Prosentase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Informasi</td>
<td>74</td>
<td>27.50</td>
</tr>
<tr>
<td>Musik</td>
<td>185</td>
<td>68.77</td>
</tr>
<tr>
<td>Penyiar</td>
<td>10</td>
<td>3.71</td>
</tr>
</tbody>
</table>

Source: Researcher Processed

In addition to music the manager of a radio station in Ponorogo needs to also consider strengthening its broadcast by raising local Ponorogo news. This is related to research data which shows that from 27% of the people who chose information as the reason for radio turned out to be looking for information that is local.

All broadcast activities are local in nature and both factual and non-factual programs, which include events, issues, background stories, and human resources, in the context of developing the culture and potential of the local area. this is in accordance with the Indonesian Broadcasting Commission (KPI) in the Broadcasting Behavior Guidelines (P3) and Broadcast Program Standards (SPS). More clearly chapter XII Article 52 in the Broadcast Program Standards on Local Programs in the Network Station System explains that: a) Local broadcast programs must be produced and broadcast with a minimum duration of 10% (ten percent) of the total duration of networked broadcasts per day. b) Local broadcast programs as referred to in paragraph (1) of at least 30% (thirty percent) of them must be aired at prime time local time. C) Local broadcast program as referred to in paragraph (1) must be gradually increased to 50% (fifty percent) of the total duration of networked broadcasts per day. (Mazdalifah, 2015)

The rules regarding local content when viewed from the perspective of audience behavior can actually be a powerful strategy in regional radio broadcasts. Because the success of the media is largely determined by how the media understands the needs and wants of the audience, the media are expected to understand the audience because in the eyes of marketing science it is believed that the audience is the consumer and the broadcast program is analogous to the product (Dewi Sri Ratna Sari and Ismail, 2016).
In the context of local media content, it is expected to be keen to understand the needs of the local community, both information and music choices offered in their broadcast programs. Evidenced by the results of research that shows information data which is sought by radio listeners when accessing information either through social media radio or listening directly to the radio is local information.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>International News</td>
<td>5</td>
<td>10.20</td>
</tr>
<tr>
<td>Local News</td>
<td>27</td>
<td>55.10</td>
</tr>
<tr>
<td>National News</td>
<td>1</td>
<td>2.04</td>
</tr>
<tr>
<td>Entertainment News</td>
<td>16</td>
<td>32.65</td>
</tr>
</tbody>
</table>

Source: Researcher Processed

4. Conclusions

Ponorogo's low public awareness of the convergence strategy carried out by linear radio managers with low radio listengership in Ponorogo. Several factors cause it is the low sensitivity of the radio manager to the wants and needs of the listener. Broadcast radio managers only rely on instincts without research related to audience behavior. Broadcast content that has no effect has an impact on broadcasts that have no effect which ultimately does not become a reference for the public in accessing information. The results show that the reason Ponorogo people access the radio is because of local music and information. Understanding the needs of listeners is the most important factor radio can be liked by the community, so it is important to follow up on research data that shows that music and local information are the strength factors of regional radio. Entertaining music characters are very compatible with auditive radio characters. But in presenting music must first be arranged according to the audience segmentation. While local information is also very closely related to the radio because the proximity value is high. Local information can be excellent content because the community's need for that information is very high while its media competitors are relatively small.
References


Analyzing Factors Associated with Blood Glucose Levels on Female Islamic Student (Santriwati) at Syaichona Cholil 2 Islamic Boarding School in Bangkalan Regency

Lidia Aditama Putri1, Dini Setiarsih2, Nurun Nikmah3, Ervi Suminar4, A’im Matun Nadhiroh5

{ liydyaputri@umg.ac.id, dinisetiarsih@gmail.com, nurunx@yahoo.co.id, ervi_suminar@yahoo.co.id, aimatunnadhiroh@fik.um-surabaya.ac.id }

1,4 Faculty of Health, Muhammadiyah Gresik University, 101 Sumatera Street, Gresik, Indonesia, 2 Doctoral Program in Faculty of Medicine, Public Health, and Nursing, Gadjah Mada University, 1 Bulaksumur Street, Yogyakarta, Indonesia
3 Midwife Profession Education, Institute of Health Science Ngudia Husada Madura, 45 RE. Martadinata Street, Bangkalan, Indonesia,
5 Faculty of Health Science, Muhammadiyah Surabaya University, 59 Sutorejo Street, Surabaya, Indonesia

Abstract. This is a cross sectional study that aims to analyze the factors associated with blood glucose levels on teenage women. The researcher selected 77 female Islamic students (Santriwati) at the Syaichona Cholil 2 Islamic Boarding School as the respondents by using simple random sampling. The Data were collected by interviews, observations, and measurements which conducted on October 2019. The research variables were the education level, blood pressure status, instant drink consumption, nutritional status, and physical activity which were analyzed by using Correlation Rank Spearman with significance $\alpha = 0.05$. The results showed that factors related to blood glucose levels are blood pressure status ($p = 0.035$) and physical activity ($p = 0.023$); while the level of education ($p = 0.571$), instant drink consumption ($p = 0.955$), and nutritional status ($p = 0.159$) are not associated with blood glucose level. The school suppose to conduct blood glucose screening test on teenagers for early detection of at-risk teenagers.

Keywords: Blood Glucose Levels, Education Level, Blood Pressure, Instant Drink Consumption, Nutritional Status, Physical Activity

1. Introduction

Nowadays, the world faces the challenges of epidemiological transition, where the main causes of morbidity and mortality that were significantly caused by infectious diseases.
However, this time the most significant cause is non-communicable diseases. Based on World Health Organization data (2018), they are 70% of non-communicable diseases which cause human death in the world.

One of Non-communicable diseases which cause human death in the world is diabetes mellitus. In 2015, it was noted that diabetes mellitus occupies the 7th position out of ten main causes of death in lower middle income countries and occupies the 6th position in upper middle income countries, and occupies the 8th position in high income countries (World Health Organization, 2018).

Diabetes mellitus is a serious health problem that occurs both in developing countries and in developed countries. 350 million people in the world suffer the type 2 of diabetes mellitus significantly. It is estimated that in 2045, the number of people who suffer diabetes mellitus increases to 700 million people. Unfortunately, it is estimated that one in two people who suffer from diabetes mellitus apparently does not realize that he has diabetes mellitus. This implies that 50% of people who suffer from diabetes mellitus are not diagnosed (International Diabetes Federation (IDF), 2018).

Diabetes mellitus (DM) or diabetes is a chronic metabolic disorder which is caused by the pancreas does not produce enough insulin or the body cannot use insulin effectively. Insulin is a hormone that regulates the blood sugar levels in a person's body. If the body does not produce enough insulin or the body can not use insulin effectively, the blood glucose levels will increase. This could bring up a high blood glucose level (hyperglycemia). Hence, this result initiates the occurrence of diabetes mellitus (Kemenkes RI, 2014).

There are two types of diabetes mellitus, namely type 1 diabetes which refers to a lack of insulin production by the pancreas and type 2 diabetes which is characterized by a lack of effective use of insulin produced by the body. The most common type of diabetes suffered in Indonesia is type 2 diabetes. 90% of all diabetes cases are type 2 diabetes (Kemenkes RI, 2014).

WHO states that Indonesia is the 7th country with the highest prevalence of diabetes mellitus after China, India, USA, Brazil, Russia, and Mexico. Indonesia has 10 million people who suffer diabetes mellitus (WHO Indonesia, 2015). In addition, WHO also predicts that the people who suffer diabetes mellitus in Indonesia will increase 2-3 times, from 8.4 million in 2000 to 21.3 million in 2030 (Soelistijo, 2015).

The results of the Basic Health Research (Riskesdas) in 2013 noted that 6.9% of Indonesia population or around 12 million people suffer type 2 diabetes mellitus (DM). 29.9% of Indonesia population or around 52 million people suffer impaired glucose tolerance (TGT) and 36.6% or around 64 million people suffer Fasting Blood Sugar (GDP). TGT and GDP are normal transition conditions and diabetes which means that people with TGT and GDP have a high risk of developing type 2 diabetes mellitus. Riskesdas in 2013 also noted that from 33 Provinces in Indonesia, East Java was ranked first which has the highest population who suffer type 2 diabetes mellitus. There were 605 thousand people (Kemenkes RI, 2013).

The risk factors of diabetes mellitus can be grouped into two types, namely unmodified risk factors and modified risk factors. Race, ethnicity, gender, age, family history of diabetes, history of childbirth> 4000 grams or <2500 grams are the unmodified risk factors of diabetes mellitus. Overweight, abdominal/central obesity, lack of physical activity, hypertension,
dyslipidemia, unhealthy/unbalanced diet, history of TGT or GDP Disorder are modified risk factors of diabetes mellitus because this refers to behavior patterns and lifestyle (life style) of individuals (Kemenkes RI, 2014).

Diabetic who has a unmodified risk factors and unhealthy lifestyle (lifestyle) can trigger the increasing of blood sugar. If the diabetic does not care of this condition, this will eventually stimulate the occurrence diabetes mellitus. Unhealthy lifestyle, such an unbalanced diet without enough physical activity, often causes diabetes mellitus.

Teenagers are the age groups that are prone to suffer diabetes, because they usually have unhealthy lifestyles, such as, consuming instant food and drink without having a regular exercise so that it can cause the gradual weight gain. Teenagers with unhealthy lifestyles will be at risk of experiencing TGT and GDP Disorder. If they let this risk without any screening and early treatment, the risk of suffering diabetes mellitus will increase when they grow up (Lukács et al., 2018).

The Riskesdas data in 2013 which was cited by the Ministry of Health of Republic of Indonesia (2014) related to the proportion/presentation of Indonesian population who have risk factors for type 2 diabetes mellitus are as follows: teenagers who were 13-18 years had the greatest risk of 14.0% having more weight, 4.1% were obese, and 26.6% were central obesity. 10 years old teens and over has a proportion of 26.1% lacking in physical activity. 10 years old teen and over have an unbalanced diet, such as consuming sweet food or drink more than 1 time in a day by 53.1%, consuming salty food or drink more than 1 time in a day by 26.2%, and consuming food or fatty drink more than 1 time in a day by 40.1%. Meanwhile, according to sex, the group of teenage woman have a greater proportion in suffering the diabetes that is equal to 12.9% compared to teenage man which is equal to 12.9% (Kemenkes RI, 2014).

Diabetics are generally more than 45 years old. However, teenagers and children lately experience the increasing of diabetics (Kemenkes RI, 2014). A research conducted by (Lukács et al., 2018) shows that teenagers have a risk of in suffering diabetes mellitus by 13%. According to Temneanu et al. (2016), teenage woman have a higher proportion of people in suffering type 2 diabetes mellitus compared to teenage man.

Bangkalan Regency is well known as Islamic students (santri) city, because it has a lot of Islamic boarding schools in which the students have full activities. In addition, the students pay less attention to the food supply they consume, so it affects the blood glucose level. If this blood glucose level is more or less, it will be able to attack the student's healthness.

The results of the Basic Health Research (Risksdas) in 2013 also showed that Indonesian population of 15-25 years had suffered diabetes mellitus by 1.1%, 17.6% of the age group had experienced TGT, and 26.2% of the population had experienced GDP disorder (Kemenkes RI, 2014). This shows that diabetes mellitus does not only affect adults or the elderly. the diabetes mellitus also attacks the teenagers. The proportion of diabetics will increase with age. Therefore, teenagers who have experienced TGT and GDP disorder without any treatment possibly suffer diabetes mellitus when they reach adulthood.

Diabetes mellitus is a silent killer, because this disease causes many complaints and can attack all body organs (Fatimah, 2016). The complications that occur include heart disease and stroke; kidney failure; neuropathy (nerve damage) in the legs which will increase the
occurrence of foot ulcers, infections, and leg amputation; and diabetic retinopathy or a damage of small blood vessels in the retina that can cause blindness. In general, people with diabetes mellitus are two times more likely to experience death than non-diabetics (Kemenkes RI, 2014).

The purpose of this study is analyzing factors related to blood glucose levels in female Islamic students at Syaichona Cholil 2 Islamic Boarding School in Bangkalan

2. Methodology

Study Recruitment

The ethic clearance of this study has been issued by Dian Eka Januriwasti, S.SiT., M. Kes as a chairman of The Health Research Ethics Committee of STIKES Ngudia Husada Madura with certificate number is 338/KEPK/STIKES-NHM/EC/IX/2019

Sampling Technique

This study is an observational analytic with cross sectional approach. The study was selected female students at the Syaichona Cholil Bangkalan Islamic Boarding School as the respondents which were taken randomly by using simple random sampling. 77 female students were selected as research subjects.

Data Collection

The data was taken by the researcher through interviews, observations, and measurements made at female students at Syaichona Cholil Bangkalan Islamic Boarding School. Data collection was conducted on October 2019.

Before data collected, the students were given an explanation of the objectives, benefits, and research procedures. If the student agrees to be the subject of the study, the student will sign an informed consent sheet before conducting interviews and research data collection.

The data taken through interviews with female students were in the form of characteristics of research subjects, while the data taken through observation and measurement were weight, height, blood pressure, and fasting blood sugar levels.

Data Analysis

The data analysis was conducted by using IBM SPSS Statistics 22 with a confidence interval (CI) of 95%. The data of respondent characteristics are explained using a frequency distribution. Data of education level, blood pressure status, instant drink consumption, nutritional status, and physical activity were analyzed by using the Correlation Rank Spearman.
3. Results

General characteristics of research subjects which include age, education level, body weight, height, BMI, nutritional status, blood pressure, instant drink consumption, physical activity, and GDP levels are listed in Table 1.

Table 1: Characteristics of Research Subjects.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>n = 77</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (tahun) *</td>
<td>16,10 ± 2,06</td>
<td></td>
</tr>
<tr>
<td>Education Level b</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SD Graduate</td>
<td>21</td>
<td>27,3</td>
</tr>
<tr>
<td>SMP Graduate</td>
<td>48</td>
<td>62,3</td>
</tr>
<tr>
<td>SMA Graduate</td>
<td>8</td>
<td>10,4</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>49,29 ± 9,02</td>
<td></td>
</tr>
<tr>
<td>Height (m)</td>
<td>1,49 ± 0,05</td>
<td></td>
</tr>
<tr>
<td>Body mass index (IMT) *</td>
<td>22,03 ± 3,59</td>
<td></td>
</tr>
<tr>
<td>Nutritional status b</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Underweight</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>11</td>
<td>14,3</td>
</tr>
<tr>
<td>Overweight</td>
<td>34</td>
<td>44,2</td>
</tr>
<tr>
<td>Obese 1</td>
<td>13</td>
<td>16,9</td>
</tr>
<tr>
<td>Obese 2</td>
<td>18</td>
<td>23,4</td>
</tr>
<tr>
<td>Systolic Blood Pressure (mmHg)*</td>
<td>102,34 ± 8,26</td>
<td></td>
</tr>
<tr>
<td>Diastolic Blood Pressure (mmHg)*</td>
<td>73,25 ± 6,97</td>
<td></td>
</tr>
<tr>
<td>Blood Pressure Status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypotension</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normotension</td>
<td>52</td>
<td>67,5</td>
</tr>
<tr>
<td>Hypertension</td>
<td>24</td>
<td>31,2</td>
</tr>
<tr>
<td>Instant Drink Consumption</td>
<td>1</td>
<td>1,3</td>
</tr>
<tr>
<td>Rarely</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Often</td>
<td>9</td>
<td>11,7</td>
</tr>
<tr>
<td>Every Day</td>
<td>22</td>
<td>28,6</td>
</tr>
<tr>
<td>Physical Activity</td>
<td>46</td>
<td>59,7</td>
</tr>
<tr>
<td>Light</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td>48</td>
<td>62,3</td>
</tr>
<tr>
<td>Heavy</td>
<td>24</td>
<td>31,2</td>
</tr>
<tr>
<td>Fasting Blood Glucose Levels (mg/dL)*</td>
<td>83,34 ± 17,09</td>
<td></td>
</tr>
<tr>
<td>Status GDP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td>12</td>
<td>15,6</td>
</tr>
<tr>
<td>Disorder</td>
<td>55</td>
<td>71,4</td>
</tr>
<tr>
<td>High</td>
<td>9</td>
<td>11,7</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>1,3</td>
</tr>
</tbody>
</table>
The average age value of the subjects in this study is 16.10 ± 2.06 years. Most of the subjects are junior high school students (62.3%). The average body weight is 49.29 ± 9.02 kg, the average height is 1.49 ± 0.005 m, and the average IMT is 22.03 ± 3.59. Most of the study subjects have normal nutritional status (44.2%). Meanwhile, most subjects have a hypotensive status for the blood pressure status (67.5%), the average systolic blood pressure is 102.34 ± 8.26 mmHg, and the diastolic is 73.25 ± 6.97 mmHg. Most of the respondents consume instant drink every day (59.7%) and physical activity on a light exercise is 62.3%. The average subject GDP level is 83.34 ± 17.09 mg / dL and most of the students are in the normal category (71.4%).

The results of the bivariat analysis of the relationship between determinant factors and GDP levels are listed in Table 2.

Table 2: Bivariat Analysis of Factors Associated with Fasting Blood Glucose Levels.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficient</th>
<th>Correlation</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education Level</td>
<td>0.066</td>
<td>0.571</td>
<td></td>
</tr>
<tr>
<td>Blood Pressure Status</td>
<td>0.240</td>
<td>0.035*</td>
<td></td>
</tr>
<tr>
<td>Instant Drink Consumption</td>
<td>0.007</td>
<td>0.955</td>
<td></td>
</tr>
<tr>
<td>Nutritional status</td>
<td>0.162</td>
<td>0.159</td>
<td></td>
</tr>
<tr>
<td>Physical Activity</td>
<td>-0.259</td>
<td>0.023*</td>
<td></td>
</tr>
</tbody>
</table>

Note: * significant on α = 0.05

Blood pressure status and physical activity variables are significantly related to GDP levels (p = 0.035 and p = 0.023). Blood pressure status and GDP levels have a positive correlation direction with the weak correlation strength. This shows that the increase of blood pressure is in line with the increase of GDP levels. Meanwhile, the physical activity and GDP levels have a negative correlation direction with weak correlation strength. In other words, GDP levels will decrease by increasing physical activity.

4. Discussions

The results of the bivariat analysis showed that there was no significant relationship between the level of education with fasting sugar levels in the study subjects (p = 0.571). This study is in line with the research in Depok which states that there is no significant relationship between education level and fasting sugar levels of Satlantas and Sumda employees in Depok Police (Leoni, 2012). Likewise, the research which was conducted by (Yekefallah et al., 2015) that the education levels are not significantly related to fasting sugar levels. This shows that a person's fasting sugar level does not depend on the level of education. However, this research is not in line with the theory which states that the higher level of education will affect the level of knowledge, in which a person with a higher level of knowledge will be able to maintain his health (Irawan, 2010).

Blood pressure status and fasting sugar levels in the study subjects showed a significant relationship (p = 0.035). This study is in line with research in China which states that there is a significant relationship between blood pressure and fasting sugar levels (Lv et al., 2018). This
study is also in line with research in Korea which states that early blood pressure is associated with the diabetes increasing of individuals (Cho et al., 2015). Some theories that might explain the relationship of blood pressure and fasting sugar levels are the mechanism in the Rennin Angiotensin System (RAS) (Zhou et al., 2015; Jia, DeMarco and Sowers, 2016; Emdin et al., 2015), and endothelial and inflammatory dysfunction (Conen et al., 2007). However, various studies state that the mechanism of the relationship cannot be explained with certainty.

Bivariate analysis results showed that there was no significant relationship between instant drink consumption and fasting sugar levels in the study subjects (p = 0.955). This study is in line with research in Nigeria which states that the instant drink consumption does not affect the diabetes increasing, because it does not have a significant concentration in healthy individuals (Adeleke, Olaniyan and Adeousun, 2013). However, this study is not in line with research in America which states that soft drink (instant drink) can increase sugar levels in school children (Harrington, 2008). Epidemiological studies have provided substantial evidence that regular instant drink consumption can increase the risk of type 2 diabetes increasing (Frank B.Hu, 2009). The results of this study do not relate to fasting blood sugar levels, because soft drink consumption calculations can only be done by calculating how often soft drink are consumed by research subjects without calculating the amount of calories and sugar contained in various soft drink. In addition, the amount calorie and sugar content in soft drink can vary in each package.

The weight gain or obesity is a major causes in the increasing of blood sugar levels so that it can cause type 2 DM, because an increase of BMI can cause a decrease of sensitivity of insulin (Hermawan, 2012). However, in this study, there was no significant relationship between nutritional status and fasting sugar levels in the study subjects (p = 0.159). This study is in line with research in Nigeria which states that there is no significant relationship between nutritional status and fasting sugar levels in diabetic patients receiving treatment at the Federal Medical Center, Owo, Nigeria (Oladapo and Koleosho, 2013) and research on high school students in North Denpasar (Astiti and Dwipayana, 2018). Anthropometric measurement to assess the nutritional status is considered practical to measure a person's nutritional status at the population level (Sugondo, 2006). However, the exact type of measurement as a predictor of DM needs to be considered. Several studies have supported the use of waist circumference and waist to hip ratio rather than body mass index as an important and independent predictor of diabetes mellitus (Etukumana, Puepet and Obadofin, 2014).

The results of the bivariat analysis showed that there was a significant relationship between physical activity and fasting sugar levels in the study subjects (p = 0.023). This study is in line with research in Palu, Indonesia which states that high level of physical activity is effective in reducing sugar levels of high school teachers (Sakung et al., 2018). The increase of glucose use by the muscles will increase when a person performs heavy physical activity, because endogenous glucose keeps the balanced blood sugar levels. Under normal circumstances, the balanced blood sugar levels can be achieved by various mechanisms of the nerve system, glucose regulation, and hormonal conditions (Kronenberg, 2008).
5. Conclusion

Blood pressure status and physical activity are factors related to blood glucose levels; while the level of education, instant drinking consumption, and physical activity were not related to the blood glucose levels. The high risk of diabetes mellitus of teenager requires quite serious attention. Screening or early detection of blood glucose levels in schools needs to be applied so that early treatment can be done for the students who are at risk. Thus, this step can prevent the type 2 diabetes mellitus in the future.
REFERENCES


Urgency Analysis of the Working Environment in the Coating Unit of Metal Industry

Putri Ayuni Alayyunnur¹, Dani Nasirul Haqi¹ and Meirina Ernawati¹

¹Department of Occupational Safety and Health, Faculty of Public Health, Universitas Airlangga, Campus C, Mulyorejo, 60115, Surabaya, East Java, Indonesia

Abstract. Workplace accidents in an industry have caused substantial losses to business owners. If the business owner owns several industries, the losses will be even greater. Therefore, aspects of occupational safety and health (OSH) in the informal industry must be encouraged. Workplace accidents and diseases can be minimized by the presence of OSH in the midst of informal sector workers. The purpose of this study is to analyze the importance of measuring the working environment conditions in the coating unit of metal industry. This research method is descriptive because it does not involve treatment to the respondent. The instruments of this research are equipment to measure noise, work climate, and lighting that are present in the workplace. The questionnaire was used to determine respondents’ perceptions related to noise conditions, work climate and lighting in the workplace. The study was conducted in June 2019 in the informal industry in the coating section in both painting and cleaning in metal manufacturing in Sidoarjo. The results of this study are as follows; the work climate is still within normal limits (27.8 °C). The average level of general lighting in the painting section is 117 lux and the cleaning section is 81 lux. The lighting is still below the maximum limit (200 lux). The results of noise measurements in the painting section are 78.6 dB and in the cleaning section are 64.0 dB, the figure is still below the threshold value (85 dB). The conclusion in this study is the working climate, lighting, and noise in the respective coatings is still within the safe limits.

Keywords: work climate, noise, lighting

1. Introduction

Workplace accidents in just one industry have caused substantial losses to business owners. If the business owner owns several industries, the losses will be even greater. Therefore, aspects of occupational safety and health (OSH) in the informal industry must be encouraged.

There were 99 small businesses and 54 industries in Waru District which is part of Waru Public Health Center work area in 2011. The number was the highest among Districts in Sidoarjo. Occupational safety and health of small industries’ workers is the responsibility of
the Community Health Center. The small industry group that was the target of the Community Health Center of Waru area was the highest target.

One of the villages in the work area of Waru Community Health Center is Ngingas Village. Ngingas Village is one of Small and Medium Enterprises (SME) center that accommodates 300 entrepreneurs and around 3,000 workers. They produce metal-based products such as motor vehicle spare parts, farming tools, electrical equipment, and other products (Bea Cukai, 2017).

Workplace accidents and diseases can be minimized by the presence of OSH in the midst of informal sector workers. The purpose of this study is to analyze the importance of measuring the working environment conditions in the coating unit in metal industry.

2. Method

This research is a descriptive study because it does not involve treatment to the respondent. The instruments of this research are equipment to measure noise, work climate, and lighting that are present in the workplace. Noise measurement was done using Sound Level Meter from Syantek. Work climate was measured using Heat Stress Apparatus from Questem. The measurement results were then compared with the respective Threshold Limit Value.

The population in this study is amounted to 10 people. The sampling method used total sampling so that we get 10 respondents. The questionnaire was used to determine respondents' perceptions related to noise conditions, work climate and lighting in the workplace.

The study was conducted in June 2019. This study is conducted in the informal industry in coating unit both in painting and cleaning in metal manufacturing in Sidoarjo.

3. Result

The measurement results using equipment to measure the work climate, lighting, and noise showed the results that the working climate is still within normal limits (27.8 °C), below the threshold of 29° C. The average level of general lighting in the painting section is 117 lux and in the cleaning section is 81 lux, it is still below the maximum limit (200 lux). The results of noise measurements in the painting section are 78.6 dB and in the cleaning section are 64.0 dB, the figure is still below the threshold value (85 dB).

The measurement results of the questionnaire are different from the results of the measurement of the work environment. There are still 3 workers (30%) who feel disturbed by the work climate. There are still 2 workers (20%) who feel disturbed by the noise in the coating unit. For the opinion of respondents related to lighting, they all agree with the results of measurements of the work environment. No respondent felt disturbed by the lighting in the coating unit of metal manufacturing in Sidoarjo. The measurement results are in table 1.

<table>
<thead>
<tr>
<th>Work Environment</th>
<th>Feeling Disturbed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes (%)</td>
<td>No (%)</td>
</tr>
</tbody>
</table>
### 4. Discussion

Work climate represents the combination of work temperature, humidity, airflow and radiation temperature at the workplace. In this study, only work temperature and humidity are measured. Uncomfortable and poor weather of the workplace may decrease work capacity due to decreased work efficiency and productivity (Subaris et al., 2008).

Climate change that has happened exacerbates the health effects of high environmental temperatures on occupational health and safety. Heat stress can contribute to a higher risk of accidents due to work. (Ma et al., 2019). Most respondents in this study felt that their work climate was good. They are comfortable with the conditions which are not too hot or too cold.

Most respondents in the study were in the category of not bothered with lighting in the industry. The lighting system in a workplace building involves many different aspects, especially comfort in vision and health. Light glare can reduce the comfort in vision. In addition, it can also be one of the indirect causes of accidents in the workplace (Sawicki & Wolska, 2019). This shows that enough light has an influence on work accidents.

Noise at the limits in coating material unit is equal to 78.6 dBA in painting section and 64.0 dBA in cleaning section which exceed the maximum limit of 85.0 dBA per 8 hours a day (40 hours per week) as regulated in Minister of Manpower Regulation No. 5 of 2018 on Occupational Health and Safety. This is found in the study done by Pradana (2013), claiming that most workers in Grafity division of PT Dua Kelinci experience intermediate occupational stress due to exposure to noise at 83.5-96.9 dBA generated by production machines.

### 5. Conclusions

Work climate, noise, and lighting in coating unit are still in safe limits based on the measurements but the perception of few workers is still felt disturbed with work climate and noise of this industry.

### Acknowledgements

The authors would like to thank Universitas Airlangga for funding of this research. We would also like to thank the participants involved this study.
References


Improvement of Marketing Strategy Through Industrial Chicken Halal Food on Herbal SMEs, Ponorogo

Annas Syams Rizal Fahmi¹, Ahmad Muqorobin¹ and M. Qoshid Al Hadi²

¹Universitas Darussalam Gontor

Abstract. SMEs are an essential part to be developed by local Governments. In developing the SME needs to be comprehensive, study models so easy in policy formulation, program development, and SME development activities, especially in Bandung, in accordance with the vision and mission to build dignified Roxburgh. This study uses a conceptual approach to the strategic management approach to making models of the development of SMEs in Ponorogo. These study models can generate referrals and a description of the formulation of policies, programs, and activities that can develop SMEs in Ponorogo that can increase social welfare. Small and Medium Enterprises (SMEs) as one element of the economic plant that occupies a strategic position to Accelerate the structural change to improve the lives of many people. SME, through its role, can expand the provision of employment, Become a source of sustainable economic growth, and say the Increase in revenues. This inspires the research to find an approach that can bring success in the area of Cibaduyut. This research replicating research conducted by Bontis (1998) with the intention to know how much Intellectual Capital influences the SME business advancement in the perception of Cibaduyut, as well as to know how much influence Intellectual Capital of SME'S business progress with the role of social capital,

Keywords: Strategic, SMEs, Structural, Intellectual & Development.

1. Introduction

1.1 Background

Strategic planning is a systematic management process that can be interpreted as a decision-making process on the programs to be implemented by the organization and the approximate amount of resources that will be allocated in each program over the next few years. Planning a crucial strategic position, since it determines something comprehensive, coherent, and the balance of long-term plans and short-term plans produced by the organization.

The empowerment of SMEs amid globalization and high competition make SMEs must be able to face the global challenges, such as improving product and service innovation, development of human resources and technology, as well as the expansion of the marketing area. This needs to be done to increase the selling value of SMEs itself, especially in order to compete with foreign products are increasingly flooding the industrial and manufacturing
centers in Indonesia, considering that SMEs are the economic sectors that could absorb the largest labor force in Indonesia. 

1.2 Problem Formulation and Objectives Discussion

a. Formulation of the problem
   1. How does the concept of SMEs in marketing herbal chicken Ponorogo?
   2. How could herbal chicken be one of the sharia marketing industry?

b. Our purposes
   1. To find out how herbal chicken could be one of sharia marketing
   2. To find out how the concept of SMEs in marketing herbal chicken Ponorogo

2. Discussion

2.1 Definition of SMEs

What it SMEs? Definition of SMEs is a productive enterprise owned by individuals or businesses that have met the criteria as micro-enterprises, As stipulated in the legislation No. 20 In 2008, the SME within the meaning of the criteria for SMEs to distinguish each include microenterprises, small businesses, and medium-sized enterprises

Law and Regulations on SMEs

To understand the definition of SMEs and MSMEs further understanding, there is a need to look at the regulations and laws in force. Here are some lists Act and Regulations relating to Micro, Small and Medium Enterprises in Indonesia.

a. Act (UU) no. 9 of 1995 concerning Small Business
b. Government Regulations (PP) 44 of 1997 concerning Partnership
d. Presidential Decree No. 10 of 1999 on Business Empowerment Medium
e. Presidential Decree 127 of 2001
f. Presidential Decree 56 of 2002 on Credit Restructuring Small and Medium Enterprises
g. SOE Permenneg Per-05 / MBU / 2007 concerning the Partnership Program State-Owned Enterprises with Small Business and Community Development Program
h. SOE Permenneg Per-05 / MBU / 2007 concerning the Partnership Program State-Owned Enterprises
i. Act No. 20 Year 2008 on Micro, Small and Medium Enterprises

---

2 Abdullah Thamrin And voila Francis, Marketing Management, (Jakarta: Rajawali Press, 2016), Hal.38
3 Law Number 20 Year 2008 on Micro, Small, Medium
2.2 Herbal Chicken as one of the Syariah Marketing

Herbal bestselling Chicken because many people want a healthy and tasty chicken. Their Chicken presented by Herbal Chicken Resto is a good breakthrough for lovers of healthy food. It is compared to other types of chicken. The other, self-produced chicken, has many advantages, both in terms of nutrition, benefits and other advantages. During this time, synonymous with healthy food tasteless delicious. However, this presumption does not apply to offerings presented by Herbal Chicken.

In presenting the processed organic chicken, Chicken Herbal always keeps an emphasis on flavor. Chicken meat served using cultured chicken since hatching to harvest using natural food, such as corn bran, fish meal, and others as food. As well as the use of 'herbal cattle' in the form of herbs, as a natural probiotic substitute for antibiotics and anti-stress chemical. In addition, Herbal Chicken is cut by hand shari chicken slaughterhouse, which has pocketed halal certificate from the Indonesian Ulema Council.

During this time, synonymous with healthy food tasteless delicious. However, this presumption does not apply to offerings presented by Herbal Chicken. Presenting processed organic chicken, Chicken Herbal still maintaining the taste. Organic chicken served by the restaurant, which is a cultured chicken with a special feed of the material of choice. In addition to special feed intake, organic chicken also got an extra "herb farm" in the form of herbs as a natural probiotic substitute for antibiotics and anti-stress.

Aquaculture produces low chicken fat and high nutritional value. Besides, the texture of chicken meat is more dense and soft. Well, in our place, organic chicken mixed with a variety of condiments selection, resulting in good taste.

2.3 The concept of SMEs Herbal Chicken Marketing Strategy

The first strategy once the definition proposed by Chandler, stating that the strategy is a long-term goal of an enterprise, as well as the utilization and allocation of all the resources that are important to achieving the objective. According to Rangkuti, the strategy is a tool to measure in goal.

Marketing strategy in business is a way to obtain the desired result based on prevailing conditions and structure. This strategy is useful to anticipate problems and future opportunities in the right condition in a systematic, rational, critical, comprehensive and integrative.\(^4\)

The first step in the sales process is to choose the prospect of identifying people who can sign in as a potential subscriber. Although the company provides some guidelines, the required skills of the salesperson to find them. Salespeople can ask existing customers. Salespeople can build reference sources, such as suppliers, agents, sales that do not compete directly, and Bakir.\(^5\)

\(^5\) Philip Kotler and Gary Armstrong, Principles of Marketing, jil.2, Pt surge script, (Jakarta, 2001), h.224
2.4 Herbal Chicken Marketing Concepts

Marketing is a social process through which the process of individuals and groups obtain what they need and want by creating, offering, and freely exchanging products and services of value with others. Meanwhile, according to Rangkuti,

Marketing is a process that is influenced by many factors of social, political, economic, and managerial. And according to marketing Stanton covers the entire system related to business activities, aimed at planning, pricing, to promote and distribute goods or services that will satisfy the needs of buyers, both actual and potential. The main goal of marketing is to give satisfaction to the consumer.

Marketing is a human activity that is geared to meet the needs and wants through an exchange process. 6 The marketing concept is a business philosophy that states that the company's needs of consumers are a prerequisite for the economic and social viability of the company. The idea of marketing is as follows:

a. Production concept

The production concept insists that it will choose a product that is widely available and inexpensive. Business managers concentrate production-oriented to achieve high efficiency, low cost, and mass distribution. They consider that the primary consumers will be interested in the availability of products, and prices are low. This trend makes sense in developing countries. Consumers are more interested in getting the product from the apparatus. It can also be used if the company wants to expand the market. So consumers were more concerned with quality products, and goods are cheaper and easy to reach the market.

b. Sales concept

The concept of selling is one of the standard business trends. The concept of the sale stated that consumers and businesses, if left alone, would not buy enough products from specific organizations. Thus, organizations must conduct business and aggressive sales and promotions. This concept assumes that consumers generally showed inaction or refusal to stimulate the purchase of more. 7

2.5 Marketing environment

Marketing environment is the actors and forces outside marketing that affect marketing management's ability to develop and maintain the transaction. A successful transaction with the target customer. The marketing environment can be divided into two general categories: the internal environment and the external environment.

It is appropriate in the book Rival V, Nuruddin A and Ananda Arfa, Islamic business ethics and economics. The product according to Islam is everything efficient, edible, useful, and

---

generate value for material improvement, moral, spiritual for consumers. There are three factors contained in the product, among other:

a. Quality or quality, which in this case states that the owner of Herbal chicken Bakpia product quality is guaranteed and kosher for not wearing preservatives and colorings

b. Privileged, products made Herbal Chicken has distinctive features; this is evidenced by one of the customers, Herbal Chicken.

c. The design and style, Chicken Herbal products, are not made too large according to Chicken in general.

The theory that explains about customer satisfaction or dissatisfaction of consumers formed is the expectancy model of disconfirmation model in the book Suwarman sonny, consumer behavior theory and its application in marketing, that satisfaction, and dissatisfaction of consumers is a result of a comparison between the expectations of the consumer before the purchase of the real obtained by consumers of the product bought.9

The purpose of a business can not be separated for-profit and benefit, the price has been determined in accordance with the quality, and the quality of these products proved their consumers remain. New consumer product like this, the employer also get a turnover of sales of the product so that production can be carried out continuously. It was stated by the owner of the "Herbal Chicken" price in "Herbal Chicken" adjust with raw material prices, and salary employees are encouraged, and taking profit or gain here does not reach 50%. With the hope that business can go on and not only in material benefits can be but also immaterial. This was evidenced by one of the consumer "Herbal Chicken" that prices are affordable and appropriate herb chicken with a chicken herbal quality.

This fits in Sofyan Assauri book, namely the pricing policy, management must determine the base price of the product and then determine the wisdom of discounts, payment of postage and other matters relating to the price.10

3. Conclusions

SMEs are enterprises owned productive individuals or businesses that have met the criteria as micro-enterprises.

Chicken Herbs can be one of the halal industry because it has a marketing strategy in accordance with the wishes of consumers in the business. This is a way to obtain the desired result based on prevailing conditions and structure. This strategy is useful to anticipate problems and future opportunities in the right situation in a systematic, rational, critical, comprehensive, and integrative.

---

8 rival V, Nuruddin A And Ananda Arfa, Islamic Business And Economics Ethics, (Jakarta: PT.BUMI Literacy, 2012). Hal.325
9 Suwarman Ujang, Consumer Behavior Theory and Its Application in Marketing, (Bogor: Ghalia Indonesia, 2002), Hal.329
10 Rival V, Nuruddin A And Ananda Arfa, Islamic Business And Economics Ethics, (Jakarta: PT.BUMI Literacy, 2012). Hal.379
Herbal chicken Marketing also uses a social process through which the process of individuals and groups obtain what they need and want.
References

[8] Undang-Undang Nomor 20 Tahun 2008 Tentang Usaha Mikro, Kecil, Menengah
The EAI Computing and Communication in Emerging Regions Series have already published proceedings from more than 20 conferences of various scopes. In line with EAI’s values of equality and openness, their mission is to give greater visibility to research and innovation from emerging regions and share the knowledge worldwide. The audience for the proceedings consists of researchers, industry professionals, graduate students as well as practitioners in various fields. CCER harnesses the Open Access platform to simultaneously guarantee free exposure and distribution, under the Creative Commons license. In addition to being available in European Union Digital Library, the proceedings are disseminated to an even wider audience by being indexed in ProQuest, CNKI, Google Scholar and EBSCO.

European Alliance for Innovation

EAI is a non-profit organization with free membership and the largest open professional society for advancing research careers through community collaboration and fair recognition. Members benefit from finding feedback and mentorship for their work and they are guaranteed to be evaluated fairly, transparently, and objectively through community.

ISSN: 2593-7650

http://eudl.eu/series/CCER | www.eai.eu