

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

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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 excess 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 life style 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 3.1 Characteristics respondents

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

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 3.2 Daily fluid intakes among health science and non-health science students

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

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 had been published the message in *Pedoman Gizi Seimbang* to drink water sufficiently which is at least eight glass 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, therefore 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.

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