Study on Sleep Service System and Intelligent Product Design for Anxious Elderly People

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Abstract—In order to alleviate the elderly due to social environment changes and life pressure caused by bedtime anxiety. Guide the elderly to form a good bedtime habit, which can solve the problem of difficult to fall asleep and easy to wake up from the root. From the perspective of service design, in-depth research was conducted on the elderly's living habits and the causes of emotional fluctuations. Through the study of elderly users and stakeholders, the operation process of the system is visualized with the help of service system diagram, and finally the design and presentation of contact points are carried out. The constructed service system effectively solves the main demands of users and their stakeholders through the interaction of contact points such as "automatic sleep monitoring blood pressure meter", "sleep environment control terminal" and online APP. Reduce the emotional fluctuation of the elderly before going to bed, and build reasonable solutions for different pain points and needs of the elderly. To create better experience and value for users with family as the center.

Keywords- The elderly; anxious; sleep; service system； intelligent product

1 INTRODUCTION

With the aging of the population becoming increasingly severe, the health of the elderly has become a major people's livelihood issue that is highly concerned by all sectors of society and expected to be improved as soon as possible. More and more fields begin to focus on the elderly problem. We found that psychological factors play an important role in the physical health of the elderly. Therefore, we should pay more attention to the mental health of the elderly, let the elderly through a scientific and reasonable way to release the pressure, correctly understand and deal with psychological anxiety and health problems. As the physical functions of the elderly gradually age, they also have to face a new stage, which may make them unable to adapt to the changes caused by the new social role, living environment and life style in time. Therefore, it is easy to lead to anxiety, depression, loneliness and other negative emotions. If this situation is not resolved in time, its own emotions will become difficult to control, this time sleep will also be difficult to control, followed by insomnia symptoms. The psychological change of the elderly to interfere with sleep state is a continuous process. It is necessary for us to think from the perspective of users and propose innovative design solutions to alleviate the current situation from the source by means of product and service system design, so that the elderly can easily obtain high-quality sleep.

According to a sample survey conducted by the China Sleep Research Society, the incidence of insomnia in Chinese adults has reached 38.2%, among which the incidence of insomnia in

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the elderly is as high as 60%. This is because nerve cells decrease with age and sleep is an active phenomenon in the brain, so the most common symptom caused by the loss of nerve cells in the elderly is sleep disturbance. With the increase of age, the organ function of the elderly is degraded to different degrees, and it is easy to cause a variety of diseases under the influence of various factors. Ordinary diseases will cause physical discomfort for the elderly, and serious diseases will make the elderly more closely face the problem of survival, and more likely to produce psychological anxiety [1].

With the changes of social environment after retirement, the way, content and rhythm of material life and spiritual life will have great changes. And because of the poor adaptability of the elderly, there will be tension, anxiety, irritability and other emotions, and with the accumulation of these emotions, will eventually develop into elderly anxiety disorder. In addition to these factors caused by natural changes, part of the reason is that limited conditions have reduced the quality of elderly care. Anxiety caused by a variety of reasons, easy to cause the elderly's own emotions become difficult to control, followed by insomnia symptoms. Stable living security and convenient living environment can greatly reduce the pressure of elderly care, correspondingly improve the happiness of life of the elderly, so as to reduce the occurrence of anxiety, and alleviate insomnia symptoms from the source.

2 OVERALL BACKGROUND RESEARCH AND SERVICE DEMAND ANALYSIS OF THE ELDERLY

2.1 Options for older adults to relieve sleep anxiety

a）Make full use of the Internet to strengthen the connection between the elderly and their children and create a good family life atmosphere. In recent years, with the booming development of Internet information technology in China, the popularity of smart phones has not only promoted the integration of the Internet and people's life, but also gradually affected the elderly. Through investigation and study found that the family living conditions, the better, the elderly to buy higher risk of electronic equipment and use the Internet, this part of the elderly will be more closely contact with their children and the society, and these can help improve the level of mental health of the elderly, indirect positive effect on their sleep anxiety.

b）Transfer the attention of the elderly through planned leisure and entertainment programs, and keep the mental balance in the subtle way. Generally speaking, the anxiety of the elderly can be slowly recovered in the short term, but when the symptoms cannot be relieved, it can try to solve the emotional problems through self-counseling. For example, use music, yoga, exercise, and other methods to help you relax, develop healthy habits, and overcome anxiety by diverting your attention. Because when we engage in these activities, new experiences will be created psychologically, which will quickly calm the body, and the appropriate amount of exercise will also contribute to the improvement of sleep efficiency.

c）Healthy eating habits can regulate the secretion of body hormones to control emotions, and inappropriate eating may also lead to mental illness. Whole grain breads, for example, are rich in tryptophan, a comforting, mood-improving brain chemical; Chicken is a low fat protein food, which is rich in tyrosine to help eliminate stress and fatigue in the elderly; Milk as containing a kind of tryptophan and trace morphine substances, the elderly can play a sedative

hypnotic effect. Many people for the understanding of diet is actually there is a misunderstanding, the old concept of health and lack of scientific diet guidance, affect the elderly diet concept, eventually lead to malnutrition and other problems, so the elderly should effectively avoid these dietary misunderstanding.

2.2 Field research and analysis on the needs of sleep assistance services for the elderly

Research part in J city community by field visits, to observe the actual process of entertainment activities in the elderly, asking if they sleep disturbances exist or anxiety, as well as for sleep to alleviate anxiety have what opinions and ideas, carry out the service requirements of field investigation, and found that most of the elderly is the old-age pension that occupy the home, living alone or living with his wife, Children will visit at random times, among which a large number of elderly people say that they do not want to cause too much burden to their children, so they will be very frugal in terms of spending. More than half of the older adults in the study had experienced a decline in memory and were more or less ill and worried about their health. Sleep troubles caused by excessive psychological worries also occupy a large proportion in the survey population. Most of these psychological worries come from family problems. However, when emotional problems occur, most of the elderly refuse to choose positive communication, instead of telling their children about their anxiety, they digest it themselves [2].

Through the analysis of the survey results, it is found that sleep problems in the elderly do have great hidden dangers, and the reasons that affect sleep often come from emotions. The anxiety of the elderly is more difficult to find, so the insomnia caused by anxiety has become a great hidden danger to the health of the elderly. If we want to relieve the old people's mood before going to bed, we need to think about problems from the perspective of users, and develop reasonable solutions according to the different pain points and needs of the old people, so as to solve problems from the source.

3 STUDY ON SLEEP AID SYSTEM FOR ANXIOUS ELDERLY PEOPLE

3.1 Research on anxious users

Fully understand the user, define the problem, extract the basic information of the user, and make the user portrait in the form of labeling. The user profile is a fictional representative user based on the user description, which is used to help the product development team make assumptions and verify them. User portrait is to identify real users through virtual representatives, extract highly refined feature identifiers through user information analysis, and show macro grasp of a group in the form of labeling.

Our target users (as shown in Figure 1) are ordinary retired workers who choose home care. They support each other and live frugally with their wives, and their children have their own families who will visit them occasionally. She is not good at communicating with her children, and always chooses to swallow the troubles and anxieties in life silently. She is highly sensitive to health and sleep, and often worries about her own physical condition.

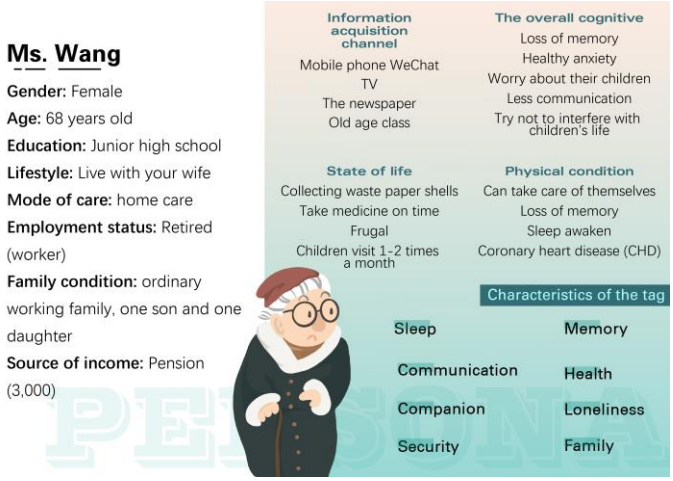

Figure 1. Persona.

3.2 User Experience Analysis

Define customer needs, motivations, expectations, service provider processes and specific constraints based on prior research to find a comprehensive sustainable solution that reaches out to all stakeholders. By discovering the individuals or organizations that have interests with users, these individuals and organizations are classified and analyzed according to their relevance, influence and importance with users. Looking for the interactions and relationships between organizations and individuals. On the basis of the research on the bedtime experience of elderly users (as shown in Figure 2), the pain points and needs should be fully understood to establish a sustainable connection between the emotions of the elderly and their living environment. It is necessary to integrate the understanding of user needs and decompose the problem level by level to find service opportunity points to improve the sleep experience.

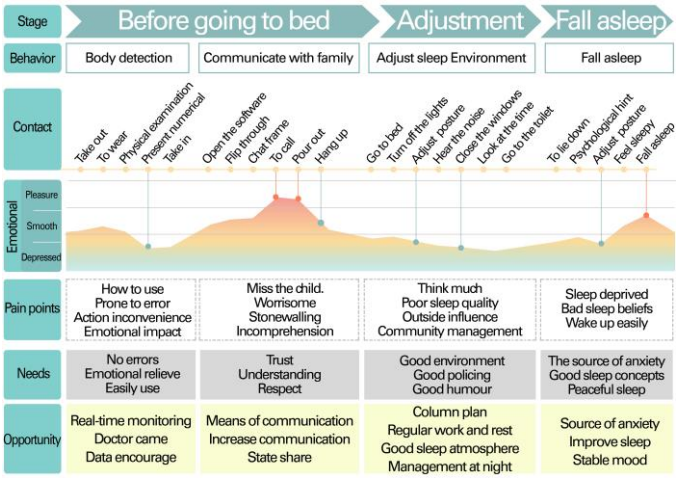

Figure 2. User journey chart

The results of using health products before bed can easily become a trigger for health anxiety among the elderly. And the nervous state of mind will also affect the numerical changes of the detection products, leading to errors in the measurement results. Change the presentation time and presentation mode of results appropriately to monitor the presentation form of results by encouraging data. It can provide a good measurement experience for the elderly and improve their enthusiasm for health management.

Older people often choose to talk to their children or family members at the end of the day before going to bed to share their lives and emotional state. However, most elderly people hide their negative emotions in the process of communication to avoid worrying their family members. The amount of information they receive on the phone before going to bed may also aggravate their thoughts. It can allow the elderly to have independent emotional space and transform the elderly's passive sharing into active sharing. Stimulate the elderly desire to talk, through a variety of ways of communication to help family members timely understand the psychological state.

The elderly's daytime activity is small, the sleep time is short, the quality is poor, so it is easy to be affected by the external environment such as light, sound, temperature and so on. The effect of reducing nocturnal cortical activity can be achieved by increasing daytime activity in the elderly. And to create a good and comfortable sleep environment must also be paid attention to, should be integrated from all aspects of the system to build a good sleep environment.

Mood and sleep problems affect each other in a closed loop. The more you want to fall asleep quickly, the more likely it is to trigger unhealthy sleep beliefs and make yourself more and more awake in the face of the feeling of powerlessness that you want to sleep but can't. Through music can achieve the effect of affecting mood, and then improve sleep focus, improve sleep efficiency, regular sleep and rest time.

4 SERVICE SYSTEM CONSTRUCTION

4.1 Construction of sleep aid service system

Service system diagram is to list the organizations, people and products related to users to find the relationships, and create new relationships from the opportunity point. In the traditional bedtime process, the information between service providers and users is asymmetric, which makes it difficult to identify and cooperate with each other, and there are many service gaps. It can be used to build a two-way communication channel between the service provider and the recipient, keep the user's needs smoothly feedback to the service provider, and help them make timely adjustments. Integrate tangible products and intangible services into a total solution and feedback to users.

Through the construction of the service system (as shown in Figure 3) and the application of intelligent products, users will link with the APP after purchasing health monitoring products, and their personal health information will be synchronized to the "online APP". At the same time, the health manager can view your personal health information, and put forward the corresponding health management requirements for you. The user's family can also monitor the health status of the elderly at any time, and make an appointment for the elderly doctor's

home service at any time to ensure that the elderly's status feedback to the family at any time. In the offline behavior, community hospitals conduct corresponding management and assessment of health managers, and health managers are responsible for corresponding health management of elderly users. Users can purchase smart home appliances from the home appliance market according to their needs, so as to ensure the comfort of living environment and obtain better life experience [3].

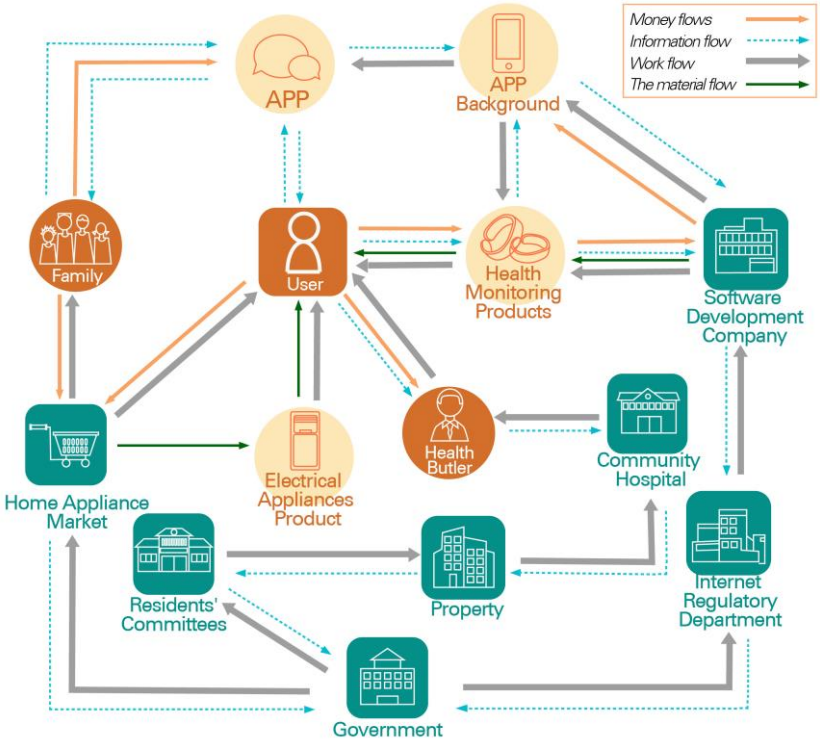

Figure 3. Service System Diagram

4.2 Service blueprint

As the recipients of services, the elderly perceive intangible service value in specific scenes through contact with tangible media such as mobile phone interface, intelligent blood pressure meter and sleep appliance control terminal. When users click the APP home page, they automatically punch in the health card to know whether to choose the health score today and communicate with the doctor online, so as to obtain a more targeted health plan to face pain points. Record your day through a handheld diary, complete your to-do list in time, and get bonus points, which can be used to exchange for doctor visits. Then wear a smart blood pressure meter when you are ready to fall asleep. More accurate measurement results can be obtained through 24-hour night intermittent dynamic monitoring [4].

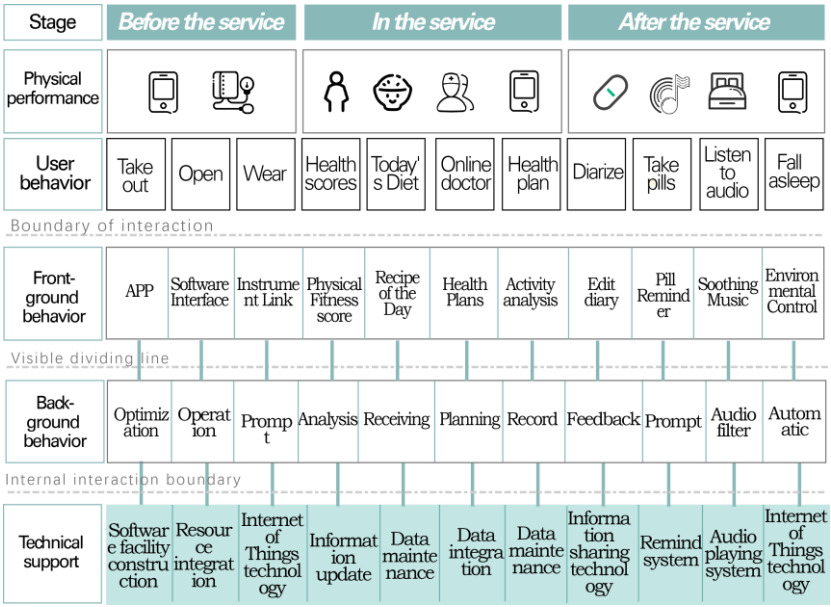

Figure 4. Service blueprint

5 SERVICE PLATFORM APP INTERFACE SETTINGS

Through the analysis of the contact points in the sleep behavior of elderly users, the pain points, problems and needs of elderly users in multiple contact points are found. Under the framework of the whole service system, the automatic sleep blood pressure monitor, bee sleep environment control terminal and service platform APP are mainly produced. The online APP (as shown in Figure 5) is named "Bee Mian". Bees symbolize diligence, pragmatism and self-discipline. It is expected that users can develop self-discipline lifestyle and enhance their confidence in sleep health services. Text information, layout arrangement, color collocation and other visual information integration, to achieve a peaceful, bright visual effect, at the same time can let the user associate with a comfortable and relaxed sleep environment. The line and surface ICONS adopt a simple style biased toward life, highlight the main functions, and enhance users' confidence in sleep health services [5].

The "Bee Mian" APP mainly develops functions from the emotional regulation of the elderly, and produces reasonable solutions for different pain points and needs. The online platform clearly presents the user's life and physical health status in a visual way, and reasonably recommends targeted solutions to pain points.

- The diary function helps users to record their life at any time and get positive feedback from their families, rejecting the wrong cognition that the elderly choose to digest by themselves when they have anxiety.

- Use music therapy to alleviate the difficulty of falling asleep caused by bad sleep beliefs. Through the specific environment atmosphere and music melody, make people psychologically self-regulation, so as to achieve the purpose of improving sleep efficiency.

- Patients with more basic diseases can be solved through the "ask Doctor" function in the APP, so that they can consult the doctor online at any time. Family members can also make an appointment with the family doctor for home service for the elderly, so as to avoid spending more time and money due to lack of timely relief.

- By referring to users' living habits and health scores recorded in the APP, doctors can make more targeted health plans and solve problems from the essence

6 SYSTEM CONTACT PRODUCT DESIGN

The main functions of the automatic sleep monitoring blood pressure meter (as shown in Figure 6) include 24-hour dynamic monitoring, fractional presentation of body index, intermittent blood pressure measurement, and generation of sleep blood pressure data. It is suitable for the elderly to wear it to sleep when they feel sick before going to bed, and reflect health information in time.

- The balloon telescopic way is applied to the skin, flexible to adapt to the arm size;

- The display is directly connected to the cuff, making it more portable;

- The blood pressure fluctuation is captured in real time to make the measurement result more accurate, and the Bluetooth link with the mobile phone software presents the health status clearly in the form of fractions.

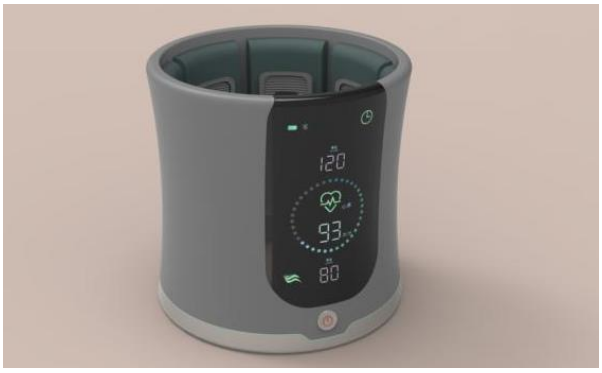

Figure 5. Automatic sleep monitoring blood pressure monitor

When the sleep is light and easily affected by external factors, the main function of the bee sleep environment control terminal (as shown in Figure 8) is to link home appliances and automatically adjust the sleep environment. Through the control of indoor humidity, brightness, temperature, etc., to ensure that the elderly sleep to minimize the interference caused by external reasons, to create a comfortable sleep environment. Bionic bee morphology, the main body is divided into infrared monitoring and control terminal two parts, data collection is more accurate.

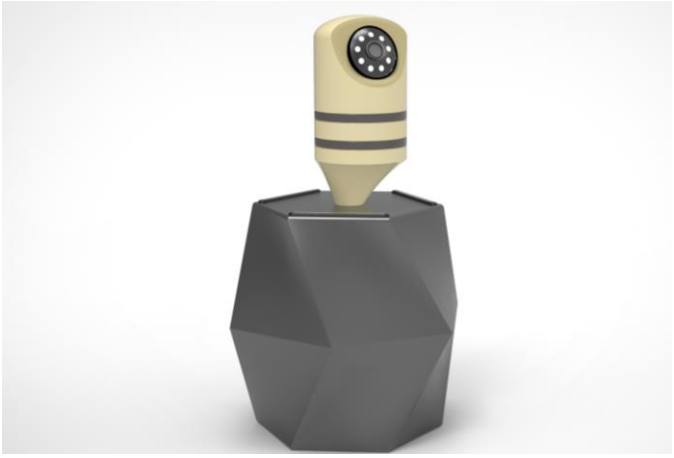

Figure 6. The bee sleep environment control terminal

7 CONCLUSION

Elderly anxiety is caused by life pressure and emotion is difficult to vent, this emotion has gradually become one of the main sources of insomnia in the elderly. To solve insomnia at its root, we need to think with empathy, dig deep into our customers' needs and dare to break the status quo. Application service design thinking opens up online and offline service contact points to meet user needs to the greatest extent.

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