

# Designing an inclusive home self-management website for seniors

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**Abstract:** In the modern society, chronic diseases are a major problem plaguing many elderly people. The problem that comes with chronic diseases is how to do proper self-management. Therefore, this study will research this issue from the perspective of the elderly to explore the root of the problem. At the same time, this study will discuss three aspects of health care, diet, and exercise. This study will research existing apps and websites, identify problems and propose solutions. At the same time, this study will design a database on the self-management of the elderly at home based on the survey results and survey data on the elderly. This study got inspiration from the DNA database classification project. This study hoped to integrate the information on the use of the drug, the number of daily use, and taboos according to the instructions of the drug, and finally integrate it into a general database.

**Keywords:** Senior, Web Design, Chronic Disease, Medical Care.

## 1. Introduction

According to 2022, more than 25% of older adults will have diabetes, or about 78.13 million people [1]. Although the disease afflicts many seniors, the disease is not directly life-threatening and most seniors with diabetes stay home to recover from the disease according to medical advice. However, there are many things to keep in mind when treating diabetes, and many elderly people with memory loss are unable to cure the disease at home alone. At the same time, the number of elderly users is gradually increasing due to the promotion of the Internet as a technology. Therefore, it is extremely important to design mobile software centered on elderly diabetic patients. This paper, this study focus on several points that elderly diabetic patients need to be aware of at home and those that are lacking in the current software available in the market, mainly through participant observation method and questionnaire survey. Participant observation is widely used in studies with a variety of patients, with a greater focus on accurate information and psychological factors of the subject. Its most significant advantages are three main points. First, Participant observation can capture changing attitudes. This option for qualitative research does not always need to focus on the big picture. Businesses often use this approach because it is an authentic way to capture a targeted demographic's changing attitudes about specific

consumer products or services. Moreover, it provides practical advantages to data collection that other methods cannot use. When a specific demographic has trust issues with researchers or people living in isolation, then accessing these groups can be challenging. Also, it provides results that lend validity to a proposed theory. The participant observation approach collects an abundant amount of qualitative data that is useful in a variety of postulations. It allows researchers to receive a clear picture of how people are living and interacting with each other [2]. The questionnaire is also a survey method that is widely used in academic research and has very many advantages. It is an economical way of accumulating information. It is economical both for the sender and for the respondent in time, effort, and cost. The cost of conducting the study with the help of the questionnaire method is very low. Replies may be received very quickly in the questionnaire method. In this case, there is no need to visit the respondent personally or continue the study over a long period. It is probably the best method to collect information, compared to the other methods like interviews or observation when the sample population is spread over a large territory. It permits nationwide or even international coverage [3,4]. Both methods are very effective for this situation and can be better for us to obtain information. This study also designed a solution to these problems and finally software for the home care of elderly diabetic patients.

## 2. Related works

### 2.1. Participation observation

In order to understand more specifically the specifics of diabetic patients' eating habits and lifestyles. With the permission of a local volunteer organization and the patient himself, the author began a companion observation of Mr. Wang's diabetic home regimen to better study the aspects of home regimens for diabetic patients. The four main areas of observation were medication, eating habits, home care, and exercise routine, and much useful information was obtained.

*2.1.1. An example.* Mr. Wang is a 74-year-old man who suffers from diabetes in the home care conditioning program. After the author's observation, I found that the elderly need to pay attention to a lot of points in the home conditioning diabetes, which can be divided into 4 major points. First, diabetics need to do aerobic exercise every day, but for the elderly, it is difficult to run and jump rope like young people. Through observation, Mr. Wang is taking walks and playing tai chi as aerobic exercises, also to avoid the harm of being sedentary to diabetic patients. The second point is that diabetic patients need to test their blood sugar regularly, 4~5 times a day during the period of unstable blood sugar, and 2 times a day when the blood sugar is stable. When patients feel dizzy or have another physical discomfort, they need to test their blood sugar immediately. The third point is the diet of diabetic patients. Due to the high blood sugar of diabetic patients, the amount of carbohydrates in the diet also needs to be strictly required, and in Mr. Wang's home, there is a measurement of the specific intake of carbohydrates at home specially prepared for the elderly. At the same time, although the impression of high blood sugar is given to diabetics, in fact, diabetics also often have low blood sugar, so you should also have some candy at home for emergencies. Also, for nutritional balance, diabetics need to consume vitamins and fiber, so some low-sugar vegetables and fruits should also be prepared in the diet to supplement other aspects of the patient's nutritional needs. I often have low-sugar fruits such as pears, guavas, and cherries at home. Diabetic patients also need to consume high-quality protein, and the patient's family often prepares high-quality protein such as chicken breast and fish for Mr. Wang [5]. Finally, the most important point is to take medication, I found that diabetes drugs are divided into many kinds, such as pre-meal drugs and post-meal drugs, taking time requirements are different, and Mr. Wang, as an elderly person, often forget to take medication on time, which is also the cause of the slow effect of treatment. In addition, diabetic patients sometimes need insulin injections, which also increases the difficulty of regulating diabetes in the elderly at home. And by observing diabetes conditioning also needs to pay attention to many details, such as the need to cut nails often to prevent wounds or minor illnesses such as colds that do not heal within two or three days, you need to go to the hospital immediately to check if there are complications. And This study can make a special website so that study can better help

elderly people with diabetes to take care of themselves at home on time and remind them.

## 2.2. Questionnaire

This study also entered the diabetic community through the grandfather, so researchers gave them a handout at the hospital. A questionnaire to eliminate part of the invalid questionnaire, a total of valid questionnaire recovery? Copies. The questionnaire aimed to understand the pain points of home care for diabetic patients and their daily lives to create new needs. This study sent out questionnaires to patients who had diabetes. However, they do not just have diabetes; they also have high blood pressure, high blood lipids, and poor kidney function. All these conditions can be complications of diabetes. Furthermore, because of the coronavirus, the epidemic is severe. Older adults often do not have the means to go to the doctor to review their condition. If the condition changes, this dose cannot be corrected in time. If the dosage is not changed, the older man's body will likely develop other complications. The object of study can have a cerebral infarction or a heart attack. Both are deadly diseases. Older adults often want to eat snacks or fruits at home every day. It is only possible to control this amount if the object of study eats it regularly. Moreover, older people are unaware of the amount of sugar in their food, so it is easy to have too much sugar. There is a general number of fruits, vegetables, and staple foods that the elderly eat at home every day. This study can design a website to keep track of the food. This study eats daily [6].

*2.2.1. Problem 1: How should older adults use and buy medicine?* How to use medicine for the elderly. Medication is a very troublesome thing for the elderly. Because older adults do not have a good memory, so they tend to forget when to take medicine. If the object of study does not take the drug on time, the object of study may be unable to control the disease. Not taking medication on time is not a good thing for diabetes. So This study can design a website to remind the elderly to take medicine. This study needs to input the prescription the elderly should take and how often and when they need to take treatment into this website. The background of the site will automatically form a reminder form. The website will automatically alert seniors when they are taking medication. This website will link the mobile phone numbers of the elderly and automatically send a message to the elderly's mobile phones to remind them to take medicine. It can also be linked to portable phone alarms to remind the elderly to take their medication. Older adults can take a selfie when they take medicine to prove they took the treatment [7].

After taking medicine, the elderly can post a selfie on the website, and the background will determine whether the picture is accurate or not. If it were true, the elderly would no longer be reminded to take medicine. The system will alert the elderly every 15 minutes when they have not uploaded a photo until the older man finishes eating and posts the picture. Researchers will end this reminder. Furthermore, every time This study uploads photos, it will compare them to ensure that they are not the same and that the elderly take medicine. How should older adults buy medicine? This study can set up a website to help the elderly buy medicine. The text on this website must be significant to make it convenient for the elderly to read.

Moreover, the steps to purchasing medicine must be straightforward. Otherwise, older adults would not buy the medicine. This study can also record in the background the amount of medication the elderly need to buy. So next time the object of study can directly buy one button, it is very convenient.

*2.2.2. Problem 2: How should older adults control meal quantity?* The elderly will be relatively small, but they may prefer to eat steamed bread, flower rolls, and other staple foods. These staples are easy to digest and easy to sugar up. These foods are less suitable for older people with diabetes. The elderly can eat more slow-carb, such as rice, which is good for the body. This study can design a website, and on the website's homepage, write out which foods are recommended for the elderly to eat and which foods are recommended for the elderly to eat less. So the elderly know what they can eat more of. This study can also make a small program on this website to record what older adults eat daily. Older adults can input how much food they eat daily so the website can help calculate the sugar content. If sugar consumption reaches a peak, this study should remind older people to eat fewer foods. Otherwise, the

body will be unfamiliar. So older people do not struggle to figure out how much sugar is in their food daily.

*2.2.3. Problem 3: How should the elderly exercise?* Older adults need exercise—especially older people with diabetes. Because movement can use up sugar in the body, it allows the elderly to digest the excess sugar. So this study can design a web page that shows the minimum amount of physical activity that older people do in a day, how much physical activity they do, and the average amount of physical activity. Seniors can be asked to estimate their physical activity based on this value. If the object of study is in good health, the object of study can increase some exercise. If the elderly are not in good health, restrict some movement appropriately. This is all adjustable.

### *2.3. Design principle*

*2.3.1. Functional design.* Researchers will make the words on the website tremendous so that even the elderly with evil eyes can read them. This study will also make the left and right steps very simple so that all seniors can quickly learn how to operate the site. For example, when it is time to take medicine, this study will design a unique ringtone so the elderly knows when to take medication. There is also a page for uploading photos; we will show pictures in big letters right in the middle of the page. Seniors need to click the word "photo" to close the photo gallery on their phones and select the photos they want to upload. So, it is very convenient for older adults.

*2.3.2. Interaction design.* When the elderly buy medicine, they will put the number of medications they purchased in a database. So the database will have an accurate dose. The elderly can be reminded to buy new medicines when they have had enough to eat. Furthermore, every time an older adult takes a pill, it has recorded in the database. The database can also help remind the elderly to take medicine [8]. In this way, the elderly will also find it convenient and not be afraid of remembering to take their medication. The database also records the amount of sugar in older people's daily foods. When the elderly eat a peak, it can appropriately remind them to control their appetite. This is also a good thing for sugar control. The database also has a function that can remind the elderly to exercise for half an hour to an hour every day, and ordinary walking is also OK. Walking is also suitable for health.

## **3. Discussion**

Having a good daily plan is important for caring for old people with chronic diseases. This plan should conclude exercise, daily diet, and medical care. Doing exercise could decrease the possibility of having heart disease, reduce fat, and slow down the aging process. A well-planned daily diet would recuperate the body and keep all of the nutrition of the body in a reasonable range. One of the most important parts of the plan is medical care; leading old people to use the medicine correctly is a serious issue for chronic diseases care. This study used our predecessors' survey methods on the app and website's practicality to investigate factors such as website size and access data and confirmed the website's access and popularity. Multiple sites, including China and the United States, were studied simultaneously, ensuring that the study's sample size would not limit the results [9].

### *3.1. Survey and discussion*

This study found a few good factors and improvable fields based on the research of the top 20 famous apps related to medical care, including medicine online shopping and medicine usage tools. First, most apps designed a special mode for older people to help them use the app more easily. In this mode, the buttons and the words in-app will be larger than in the standard mode, which can help older people see and click on buttons more easily. One of the top 20 apps has a unique design to make this mode more acceptable for the aged. For example, they ensure that the pages for older adults are clean. There is no eye candy title or navigation in this mode, and there are no ads. This unique design could prevent older people from misclick on some unrelated button because of presbyopia. However, most of the old-care

modes are required to be turned on by users themselves, and this function is usually hidden in an inapparent subpage. Most older people have trouble using modern technologies, and apps are one of those technologies. Even for younger people (if they do not find this function on purpose), it is a difficult task, not to mention the elderly. To avoid the issues like this, starting the app in the old-care mode is a good solution. The old-care mode is always easier for everyone, so it is no issue for younger people to turn this mode into a regular one, but it is not easy for older adults to turn it on. Making a confirm page is also necessary to make sure older adults will not turn off the mode by accident.

Another advantage of those medical apps is that most of the developers of those apps have created a detailed index for people. People who have requirements could find the medicine they need by searching the name of the medicine, or if people do not know the specific medicine, they can also find the medicine they need through the index of medicines to treat a specific disease by searching. If by any chance, people still have a question about the medicine they need, the developers also prepared an online consultation platform with professional doctors. Not only younger people but seniors can also find medicine by any of two indexes, or they can have an online meeting with doctors anytime they need.

At the same time, this study got inspiration from the generalization of professional terminology in the supervision system, and This study found that some websites and apps have the problem of too professional terminology [10]: some descriptions of medicine are too professional to understand for people who do not work in the medical field. Researching to understand those vocabularies is not a hard thing for younger people, but most old people lack the skill of online searching, so they might have some problems understanding the manuals. So making an easier description for medicines is always required. For example, when people turn a video game on, they might see a word called “photosensitive epilepsy.” Most of the people around the authors have not heard about this disease, not to mention the performance of that disease. In this case, adding more understandable descriptions of photosensitive epilepsy, a disease caused by visual stimuli such as strong light source stimulation and flash stimulation, will help understand it. The database This study designed can also solve this problem properly because it can skip the steps of people reading manuals. This database concludes all the information people need, so it can automatically create a complete plan for people.

### *3.2. Exercise and diet*

In most chronic support apps, only conclude one part of the three functions This study listed before. For example, the “Zhu Jian Kang” app will record a person's exercise in one day and calculate the energy expended by the movement. It not only calculates the expended energy easily, but it will also ask people to insert their height and weight of themselves into the app and use these data to calculate the energy, which makes this function fit for more people and make the data more accurate. However, it will not calculate the energy intake but only tell users how many Calories they spent. This is not convenient for most people because they do not know how to calculate energy intake, so they cannot compare the intake and expenditure of Calories. In this case, combining the “diet calculator” apps and the “energy consuming calculator” could solve this problem properly. Another issue that will be discussed is that when older adults use some medicines, there are specific foods they cannot eat because of drug rejection issues. It is not easy for people who eat multiple drugs to remember every food they cannot eat, so helping them to remember these is important. This study can add all the information to the database This study designed based on the advice from doctors and the manuals of drugs. So when people use the drugs, the database will push the information about all the food rejections once they tell the app what medication they need to use. Compared to food, exercise is the way how people consume energy. Tons of highly complete apps could be used; they can calculate how much work you did for the last day. The health app from the IOS system is a good example, it will record the walking time, running time, and even the stairs users climbed. Nevertheless, no app could make a special plan for each user. So This study want to combine this function with the previous database and make a special plan for each user depending on what food they eat and their body stats. In this case, the users will have a topic daily and a healthy schedule.

#### 4. Conclusion

According to the survey on the daily life of the elderly, this study can find that most seniors are troubled by chronic diseases. Some elder people with chronic diseases cannot even exercise normally, so they must find corresponding alternative ways to exercise. Most chronic diseases have dietary restrictions and require regular medical examinations and health care. Therefore, this study has put forward targeted solutions for these situations, aiming to solve the needs of the elderly from point to point and help them manage themselves. At the same time, this study also researched the relatively well-known apps and websites on the market (judged by the popularity of search results), put forward their advantages and disadvantages, and proposed a modification plan. Among the functions, this study designed ourselves, accommodated the advantages of some apps and websites, and corrected and supplemented some insufficient designs. This study hopes our design can truly serve the elderly and positively impact their lives.

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