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Research on the interface design strategy of geriatric chronic disease management APP based on user experience

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Abstract: *Objective: To study the user interface design of geriatric chronic disease management APP, summarize the pain points and propose strategies to optimize the user interface design through the current user experience of the existing APPs in the market. Methods: Firstly, we analyzed the basic process of user interface design of smartphone APP, and then analyzed the main problems of user interface design of geriatric chronic disease management APP from the perspective of user experience with examples. Conclusions: Some strategies for the user interface design of the geriatric chronic disease management APP were derived, including data visualization strategy, optimization of interaction flow and adding visual metaphors.*

Keywords: *Geriatric chronic disease management app; user interface design; user experience*

1. Introduction

China is accelerating into an aging society, and the health problems of the elderly are becoming increasingly prominent. The elderly are at high risk of chronic diseases due to their own genetic factors or long-term lifestyle influences. However, due to the scarcity and uneven distribution of medical resources in China, the treatment of chronic diseases is still limited to specialized medical institutions. Out-of-hospital treatment often relies on patients' self-regulation to alleviate their conditions. The rapid development of m-health has brought an opportunity to solve the problem of low compliance of out-of-hospital treatment for elderly patients with chronic diseases. Although there are many mobile health care APPs in the domestic market, these products are weakly targeted to this group of people and there are still major problems in terms of usability and ease of use of the products. In this paper, we will study the user interface design of geriatric chronic disease management APP through the existing APP user experience status in the market, summarize the pain points and propose strategies to optimize the user interface design.

2. The basic process of mobile smart APP user interface design

Mobile smart APP user interface design mainly includes information architecture, interactive behavior, visual interface, and its basic design process [1] "It is generally believed that user interface design is to reorganize user behavior on the basis of information structure determination, and then improve the visual design, and there is a linear progressive relationship between the organization of interactive behavior and visual design." Although user needs and behaviors are also studied in the design process, from the actual operation, it is still a design logic that starts from the product implementation model, and the design is a functional user interface with product functions as the main line. There is often an obvious difference between the design logic of functional user interface and the behavior logic of users. What designers think is a simple and effective interface design often requires users to learn to switch between various functional sections and information levels repeatedly in the process of use, which brings many troubles to users.

3. The current situation of geriatric chronic disease management APP interface design

Most of the chronic disease management APPs on the market are developed for the convenience of chronic disease management, with a wide range of user groups, and there is no product developed for the

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elderly alone yet. In most of the chronic disease management APPs, their functions can be divided into the following three categories: medical consultation, sign monitoring and medication reminder.

3.1. Medical consultation interface module

In order to better realize the communication between healthcare professionals and patients, the geriatric chronic disease management APP usually cooperates with hospitals and creates a module in the APP for doctor-patient communication. Generally speaking, the design of the consultation interface is similar to the official hospital APP, and you can find the consultation room and doctor by yourself. In addition, the patient has a personal doctor page to quickly communicate with the doctor who established the doctor-patient relationship. We can see the main features in Fig 1, the interface of APP "Buiding Health". However, the transfer of data and images is not convenient for the elderly. Older people do not understand the information well enough to transfer files on their own, do not understand the submission process, and lack interaction guidelines.

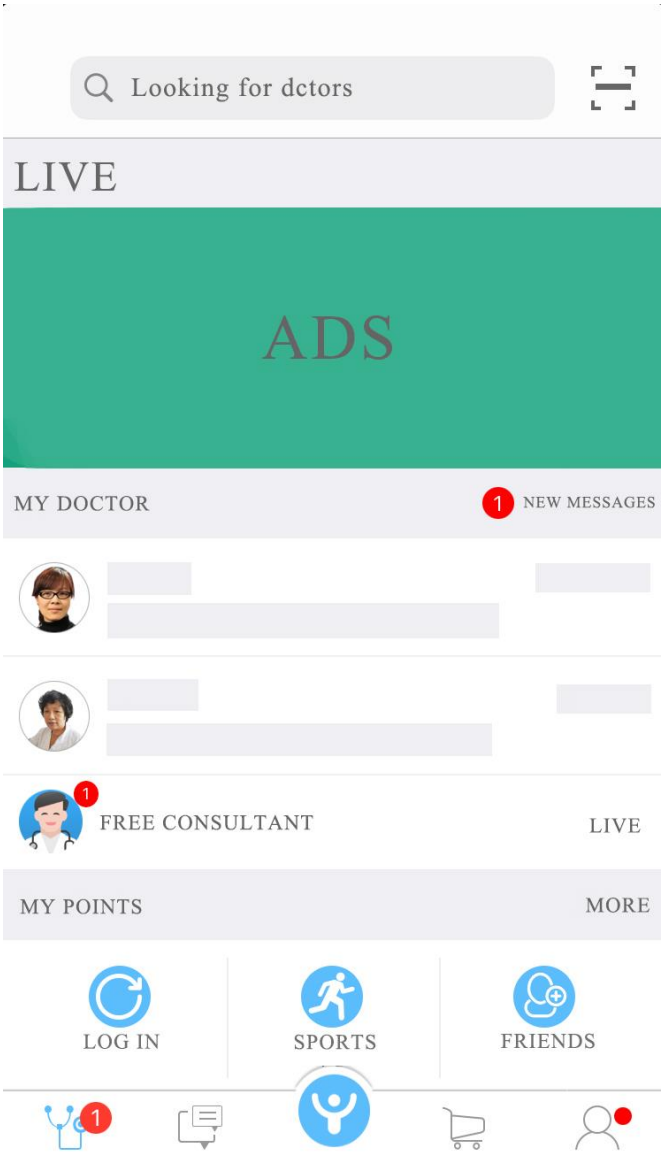

Figure 1: APP "Buiding Health"

3.2. Signs Monitoring Interface Module

Physical monitoring is common in chronic disease management software. Because it is important for patients with chronic diseases to control their physical indicators, regular physical data monitoring can

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effectively achieve control of their health. The current monitoring function of physical signs is mainly through external monitoring devices to achieve body data collection, and then store data to obtain data changes over a period of time, as shown in *Figure 2* is the monitoring interface of "First Bird" APP. The biggest problem of the monitoring interface is that it is difficult for the elderly to respond to the complicated data charts, so they have no way to know their own physical condition, which causes anxiety. The most important issue is how to better inform the elderly about their own data.

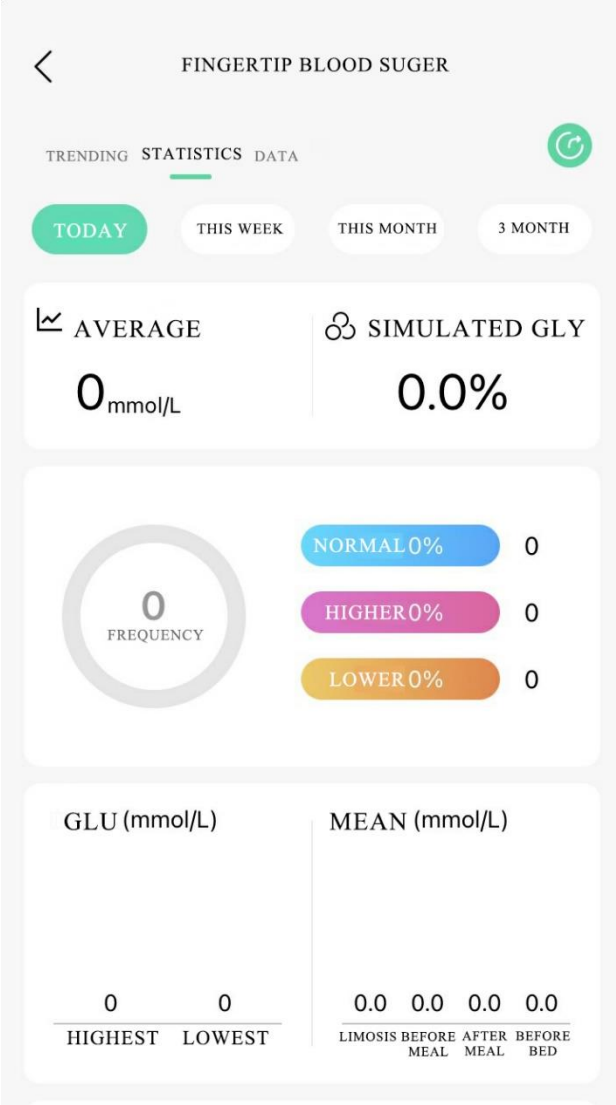

Figure 2: APP "First Bird"

3.3. Medication Reminder Module

The medication reminder module is mainly used to remind patients to take medication on time, which is an important auxiliary function. It is an important part of chronic disease management, just like the sign monitoring module, and the APP usually requires to set the reminder time and ring the bell to remind patients to take medication at the required time. The main problem of the medication reminder module is that it is difficult to mobilize the patient's initiative and has little effect on ensuring the patient's implementation rate. In addition, the reminder method is single, mostly using auditory reminders.

4. Geriatric chronic disease management APP user interface design strategy

4.1. Data visualization strategy

Elderly chronic disease patients are more sensitive to changes in their physical conditions, which is

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highlighted by the concern for key physiological indicators. For example, slight changes in heart rate, blood pressure, blood sugar and other data may cause psychological fluctuations in patients. Therefore, the presentation of physical health data should take into account the physiological and psychological characteristics of elderly patients with chronic diseases to avoid misinterpretation, misunderstanding and excessive anxiety due to their limitations (vision, logical thinking ability, etc.). Data visualization can present complex and abstract values in a vivid and intuitive form, and at the same time convey numbers that require logical judgment and interpretation to patients in a graphical way, and build up the internal logical relationships between values (e.g., upward trend, downward trend, etc.). The visualization of patients' health data is a solution to the problem of elderly people's weak digital recognition and degraded logical thinking ability, and helps them interpret their own health conditions. For example, in blood glucose measurement, blood can be collected and measured with a blood collection pen, and the patient's daily measurement records are automatically generated into easy-to-understand charts and further generated into blood glucose analysis reports to help patients interpret their health data.

4.2. Optimize the interaction process to reduce user misuse

The declining logical thinking ability of the elderly is mainly reflected in the lack of ability to understand the abstract logic chain and product architecture. Therefore, in the design of the task chain, reasonable guidance should be added at the steps that may easily create barriers to the understanding of the elderly, such as information prompts for the operation mode and operation purpose; feedback on the operation or rewards for completing a certain task. This will not only help the elderly to identify with the purpose of the operation, but also effectively improve the efficiency of the operation. On the contrary, the lack of guidance and corresponding prompts will increase the frustration of the elderly in performing the operation and make it difficult for them to form a complete understanding and practical experience of the task flow, which will eventually affect the user stickiness and usage of the product. Therefore, in the design, we should provide guidance tips or instructions in the corresponding operation steps to help the elderly to complete a certain task without any obstacles. A long task chain is an important factor that affects the smooth completion of operations by the elderly. For more complex tasks, we should insist on simplifying the operation method and unifying the feedback form of operation.

4.3. Adds of visual metaphors

Metaphor is an effective design method to reduce user unfamiliarity. "In interaction design, the establishment of a metaphorical interaction model is the key to linking the user's imaginary model and the designer's imaginary model. By finding the common features of the product in both models and expressing the features in design language to communicate with the user, the user can understand and grasp the structure, function, usage and other information of the product most quickly. [2] Metaphors are increasingly used in interaction design as a design tool to quickly bring users closer to products. For example, in the medication reminder module, the elderly are unfamiliar with numbers, so the wheel can be used to transform the demand of blood glucose value entry into an easy-to-understand operation task for the elderly. The elderly only needs to dial the wheel, and the corresponding value will be displayed at the top of the wheel.

In addition, because the ability of the elderly to learn new things is relatively weak, the product design and operation experience should also follow the requirement of consistency. A unified and standardized design language can help elderly users quickly establish a mental model and greatly reduce the difficulty of learning and using the product. When users are familiar with one interface of the product, they can presume various functions and operation methods based on their experience when switching to other interfaces, so that they can quickly adapt to the product.

5. Conclusions

As most mobile health vertical products cannot meet the needs of elderly patients with chronic diseases, exploring the characteristics of the target group and optimizing the user experience of the product is an effective way to improve the retention rate of users. The design of mHealth products for elderly patients should not only improve the efficiency of chronic disease management and physical health monitoring, but also meet the emotional needs of this group at the psychological level. The design strategy proposed in this article can provide some theoretical basis and reference value for the design practice of geriatric chronic disease management APP.

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