IOP Conference Series: Materials Science and Engineering

PAPER • **OPEN ACCESS**

Research on Service Design of Community Medical Facilities Based on Aging-appropriate and Elderly-centered

To cite this article: Yangfan Yao *et al* 2019 *IOP Conf. Ser.: Mater. Sci. Eng.* **573** 012075

View the article online for updates and enhancements.

This content was downloaded from IP address 47.110.130.152 on 15/10/2019 at 11:33

IOP Conf. Series: Materials Science and Engineering **573** (2019) 012075 doi:10.1088/1757-899X/573/1/012075

Research on Service Design of Community Medical Facilities Based on Aging-appropriate and Elderly-centered

Yangfan Yao[1], Xiaoru Zhou[2] and Tianyang Zhu[1*]

[1]Departments of Mechanical and Electrical Engineering, University of Beijing University of Chemical Technology, 100029,china

[2]Departments of Mechanical and Electrical Engineering, University of Beijing University of Chemical Technology, 100029,china

[*]Corresponding author's e-mail: zhuty@mail.buct.edu.cn

Abstract. Research on urban community medical service facilities, from the perspective of service design methods, combined with the community medical service system, according to the needs of the community elderly, analyze the needs of community elderly for community medical service facilities, and seek contact points between community elderly and medical facilities. Conceive community health services and build medical service facilities that meet the needs of the elderly in the community. Through the optimal design of the urban community medical facilities service system, the effectiveness of community medical service facilities will be further improved, thereby improving the satisfaction of community elderly people on community public medical service facilities, and providing reference for the research of community medical facilities service system and service mode design.

1. Introduction

According to the results of the sixth national census in 2011, China has officially entered an aging society [1]. The degree of urban aging is far greater than that of rural old age. With the increase of age, the living obstacles accompanying the elderly are gradually increasing, and medical care is increasingly becoming the biggest problem for the elderly. As a place where the elderly often travel, the community lacks medical facilities that serve the elderly and cannot meet the daily needs of the elderly in the community. Further optimize the community medical service system by analyzing the growing demand for medical services for the elderly in the community.

2.The need for community health care for the elderly under the service model

The definition of service design concept is the basic component of the service design strategic advantage seeking process. It improves the service usability, satisfaction and loyalty by starting from the user's needs, service planning, product design, visual design and environmental design. And efficiency, to provide users with a better experience, so that users get satisfaction and create value [2]. The service model is a new model based on service design. From the perspective of users, user value, contact points and value-added activities are the main research directions of service design. Through the analysis of the daily life of the elderly in the community, combined with the specific content of the service design, the design thinking of service design is applied to the optimization process of the community-based medical service system centered on the elderly, and the effective design scheme is explored through the guidance of service design.

Content from this work may be used under the terms of the Creative Commons Attribution 3.0 licence. Any further distribution of this work must maintain attribution to the author(s) and the title of the work, journal citation and DOI.
Published under licence by IOP Publishing Ltd

According to the survey, the number of chronically diagnosed patients in China has exceeded 260 million, and the number of patients aged 60 years and older is 2.3 to 3.2 times that of patients under 60 years old, and 60%. The above elderly patients have two or more chronic diseases at the same time [3]. Chronic patients rely on drugs for a long time, and they need to go to the hospital regularly to get medicine.

2.1 Contact points of the community elderly in taking medicine

Contact points occupy an important position in the service system and are important nodes that connect the various parts of the service process. Mastering the contact points is the most important for controlling the entire service system. Each contact point can have different effects on the sensory experience of the community elderly, and through the analysis and processing of appropriate contact points, the satisfaction of the elderly users in the community can be improved. By analyzing the process of taking medicines for the elderly in the community, as shown in Figure 1, it is found that the elderly in the community go out, take medicines, and go home for three periods of contact, thus further analyzing the needs of community elderly for community service medical facilities.

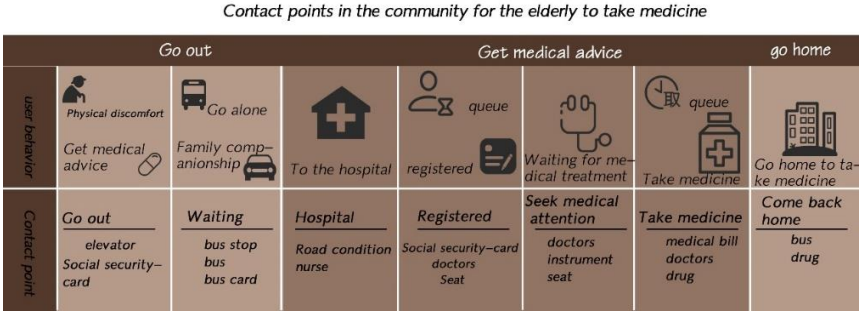

Figure. 1 Contact Diagram of Medication for Elderly People in Community

2.2 Integrate service design into community health care

The essence of service design is to design an effective model for organizing, planning people in the service system, infrastructure, communication, and the various components of tangible matter [4]. Service design integrates the design concept into the service planning and process itself, focusing on user needs and user experience, and by matching resources and requirements in specific environments, formulating system solutions for service optimization, thereby improving service quality and improving The service experience of the target user [5].

In the process of community medical service design, this model of user participation is introduced into the service design research to carry out participatory service design. By using users as the design leader, emphasizing the initiative and participation of users in research, to explore user demand information and support the development of design activities [6]. Through the participation of community seniors in the design, potential medical needs and service experiences can be further discovered, and more systematic and more targeted design solutions can be provided for the improvement of community medical service facilities.

3.Analysis of community medical service needs of the elderly

The semi-structured interview method is used to set the direction of the interview questions in advance, such as the analysis of the contact points of the elderly in the community when taking medicines, and record the sensory analysis of the contact points in the process of taking medicines for the elderly in the community, as shown in Figure 2. Except for a few major issues set in advance, other questions were randomly asked. Finding problems and solving problems in free conversations makes interviews more dynamic and makes it easier to discover the feelings of respondents.

Figure. 2 Sensory analysis of contacts

In the process of community medical experience analysis, the research is carried out around the sick elderly in an open way, summarizing many factors affecting the user experience in the medical service process, and selecting key people to construct the character role model, as shown in Figure 3. From the role model card, all factors affecting the patient can be summarized from the patient's point of view, and all formal and informal contact points can be found to gain more patient-centered experience [7].

Through the sensory analysis of the contact and the construction of the key persona model card, it is found that the community elderly people take medicine from the community to the hospital for a long time to wait and walk, which brings great to the elderly. inconvenient. As the memory of the elderly declines, the memory of the doctor in the disease, there is very little memory when returning home. The community health care in the community is insufficient to meet the needs of the elderly. In daily life, the elderly in the community lack knowledge about the life of controlling their own diseases, and do not know how to control their living habits. The elderly in the community will not have a correct lifestyle to alleviate the disease. Through the analysis of the process of taking medicines for the elderly in the community, the emotional changes of the elderly at the contact points are analyzed. Design a medical facility that serves the elderly in the community by optimizing service processes.

4.Community medical facilities in line with the community's elderly under the service design—automatic drug sales machine

Through previous research, it was found that most of the elderly in the community suffer from various chronic diseases and need to take drugs for a long time to maintain. In the process of going to the hospital to buy medicine, the distance from the hospital to the community, the waiting time, the time of the number, the distance of taking the medicine is very inconvenient for the elderly, so through the user experience map, the old people take the medicine The contact points in the middle, optimize the elderly drug collection process, and design an automatic drug dispenser that serves the elderly in the community.

4.1 Based on the design of the automatic drug dispenser

The design of the vending machine includes the shape and color of the product, and the two determine the user's first impression of the product. The shape mainly adopts the geometric form. The appearance of the product is simple and generous, the technology is strong, the operation mode is direct, and the soft chamfer is applied around the product, which can bring security and trust to the elderly users. The color is blue and white. From the perspective of color psychology, blue is the color of the sky and the ocean, which can bring refreshing and relaxing feelings to the elderly.

The feelings and feelings are conducive to the patient's emotional stability, while the gray gives people a sense of weight, increasing the patient's sense of security and trust. The body of the elderly begins to decline. In the process of design, the problems of vision and touch should be fully considered. The styling strives to combine traditional aesthetic concepts, simple and generous, and is suitable for the characteristics of the product itself. Abandoning the traditional monotonous colors in color, but it can not be made into a colorful look, which is easy to stimulate the senses of the elderly.

4.2 Functional design based on automatic drug dispenser

As a community-based medical service facility centered on the elderly, it mainly serves the elderly. Through preliminary research, it optimizes the process of taking medicine for the elderly and designs a self-selling machine for the elderly. Older people in the community are more likely to suffer from chronic diseases. The drugs needed for chronic diseases are mainly prescription drugs, and they cannot be purchased at the pharmacy. When purchasing drugs, you can purchase them through the social security card. The social security card records the chronic diseases of the elderly. The social security card can get the prescription drugs for the elderly. On the interface of the automatic drug dispenser, you can also inform the elderly through the video. The precautions for the disease in the daily life can be those preventive measures. The automatic vending machine is open at 24 o'clock, and in an emergency, the elderly can take medicine at any time. And the big ones reduce the unnecessary travel and waiting of the elderly in the process of taking medicine.

According to the investigation of shape and color in the early stage, the shape of the product is determined by the simple geometry. The color is mainly blue, supplemented by gray. The function is mainly designed to serve the elderly in the community. Two automatic drug dispensers were designed, as shown in Figure 4. Both designs are blue in color, gray in color, and slightly different in form. The shape of the sketch is relatively short, and the overall look is relatively thick. The sketch 2 is mainly slender, and the overall look is slightly lean. In the function sketch 2, there is a first aid kit below, which is convenient for emergency situations in the emergency first aid community.

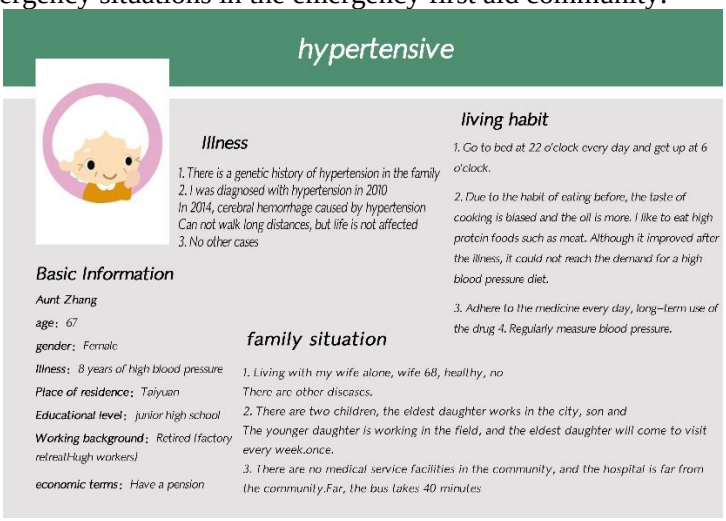

Figure. 3 Role model card

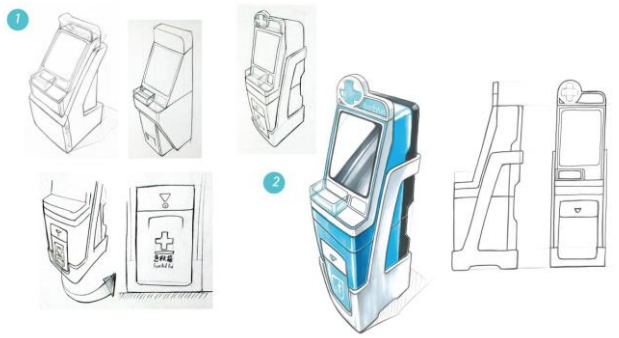

Figure. 4 Product sketch

5.Automatic drug dispenser design evaluation

5.1 Construction of Fuzzy Comprehensive Evaluation Model

In view of the fact that the product shape is difficult to objectively evaluate due to various factors, the fuzzy comprehensive evaluation method can be used to comprehensively evaluate the design scheme and achieve the selection of the best scheme [8]. The fuzzy evaluation method combines qualitative and quantitative measurement methods, and uses the idea of fuzzy mathematics to make a total evaluation of things restricted by various factors, which is characterized by clear results and strong systemicity. Through the user's perception of the shape of the automatic drug dispenser, the importance and the degree of affection of the evaluation index of the program are characterized, and the evaluation score of the evaluation index is obtained. The calculation formula of the index evaluation value is as follows:

$$b_i = \sum_{i=1}^{n} r_{ij} w_j$$

In the fuzzy comprehensive evaluation method, U, V, R are the three most important elements, U is the evaluation index set, and the sensory image pairs to be evaluated are integrated and sorted, and the evaluation index set can be obtained. $U=\{u_1, u_2, ..., u_n\}$; V is a collection of reviews, visual senses are very good, good, general, poor, very poor and other fuzzy concepts as the main filling vocabulary of the comment set, can get the comment set $V=\{v_1, v_2, ..., v_m\}$; The evaluation matrix R of the indicator is formed by the evaluation value obtained by the i-th index evaluation index on the j-th comment set, and the requirement is $\sum_{j=1}^{m} r_{ij} = 1$。The evaluation index is assigned to the corresponding weight coefficient, and the index weight matrix $W=\{w_1, w_2, ..., w_n\}$, Claim $\sum_{i=1}^{n} w_i = 1$。The decision matrix is calculated from the weight matrix and the evaluation matrix.The ecision matrix can be expressed as:

$$B = WR = [w_1 \quad w_2 \quad ... \quad w_n] \begin{bmatrix} r_{11} & r_{12} & ... & r_{1m} \\ r_{21} & r_{22} & ... & r_{2m} \\ \vdots & \vdots & ... & \vdots \\ r_{n1} & r_{n2} & ... & r_{nm} \end{bmatrix} [b_1 \quad b_2 \quad \cdots \quad b_m] =$$

Where V={10, 7.5, 5, 2.5, 0}, the decision matrix B is multiplied by the vector to obtain a comprehensive evaluation index.

5.2 Determine the indicator set U

In order to collect representative vocabulary, it can be done in the following ways: (1) access to relevant literature; (2) through structured access with consumers and use of self-administered questionnaires; (3) through network search Related terms. In the end, we collected a total of 112 related words, and after completing the vocabulary screening, we got 55 words. The KJ method and the cluster analysis method were used to screen the vocabulary again. Finally, 16 vocabulary words about the automatic drug dispenser were obtained, as shown in Table 1, and they were sorted into four categories, which are the evaluation index set U. content.

Table. 1 Glossary of the Appearance of Drug Vending Machines

Sensual imagery	Style vocabulary
Delicate, natural, dexterous, friendly	Conspicuous - neglected
Comfortable, beautiful, full, smooth	Comfortable - stimulating
Convenient, precise, beautiful, fast	Simple—complex
Personal, novel, direct, creative	Simple—complex

5.3 Establish evaluation matrix and calculation decision matrix

Invited 30 community seniors to participate in structured interviews and self-administered questionnaires. The comment set is set at 5 levels, which are very good, good, average, poor, and very poor. The evaluation index set U and the comment set V are combined to price each evaluation, and the percentage of the number of the reviews in each indicator is counted to form an evaluation matrix R. Invite 30 evaluators to give weights to the evaluation indicators based on the survey data, with a conspicuous of 0.3, a comfortable of 0.3, and a simple of 0.3. Innovative is 0.1, then there is $W=\{0.3,0.3,0.3,0.1\}$; The fuzzy comprehensive evaluation method matrix algorithm is different from the

ordinary matrix algorithm. It follows the principle of multiplying and multiplying, adding and maximizing. After the matrix is obtained, the sum of the data is not equal to 1, so it needs to be normalized to obtain a scheme. The final decision matrix. The purpose of data mining is to obtain the relationship between perceptual reviews and samples, and to obtain the best solution from the order of preference, so as to deepen the design.

Decision matrix of scenario one:

$$B = WR = \begin{bmatrix} 0.3 & 0.3 & 0.3 & 0.3 \end{bmatrix} \begin{bmatrix} 0.45 & 0.34 & 0.05 & 0.04 & 0.01 \\ 0.43 & 0.33 & 0.03 & 0.02 & 0.00 \\ 0.33 & 0.42 & 0.02 & 0.01 & 0.01 \\ 0.40 & 0.38 & 0.06 & 0.04 & 0.02 \end{bmatrix}$$

$$= \begin{bmatrix} 0.417 & 0.417 & 0.086 & 0.056 & 0.028 \end{bmatrix}$$

B and the V^t vector are subjected to a point multiplication operation to obtain a comprehensive evaluation value of B·=7.868.

Decision matrix of scenario 2:

$$B = WR = \begin{bmatrix} 0.3 & 0.3 & 0.3 & 0.1 \end{bmatrix} \begin{bmatrix} 0.28 & 0.24 & 0.20 & 0.05 & 0.01 \\ 0.45 & 0.25 & 0.20 & 0.02 & 0.01 \\ 0.25 & 0.45 & 0.15 & 0.03 & 0.01 \\ 0.40 & 0.25 & 0.35 & 0.04 & 0.03 \end{bmatrix}$$

$$= \begin{bmatrix} 0.361 & 0.361 & 0.181 & 0.060 & 0.036 \end{bmatrix}$$

B and the V^t vector are subjected to a point multiplication operation to obtain a comprehensive evaluation value of B·=7.375.

It can be seen from the calculation results that the final score of the design scheme is 7.868, which is a relatively good score. Therefore, the scheme has market value and has certain feasibility.

5.4 Product Description

The first option is a medical facility that is more suitable for the elderly in the community, as shown in Figure 5. In designing this device, the reasons for the mobility of the audience are taken into consideration. Therefore, in order to avoid the person from squatting and bending down, the medicine outlet is designed to be easily accessible to the elderly, and the medicine port is blocked by the box to prevent The drug fell. There is an emergency first aid function in the function. In the community, there may be sudden illness in the elderly. In this case, proper first aid measures and necessary first aid tools are very important, if there are no suitable drugs and props. After the first aid, then the difficulty of the hospital's rescue work will be greatly increased, and this automatic drug dispenser uses the space below to place the first aid kit to deal with similar emergencies.

Figure. 5 Product Scenario Diagram

6.Conclusion

This paper examines community medical care from the perspective of service design, and conducts research on the process of medical treatment for the elderly in the community. It analyzes the contact points of the elderly when the community takes medicine, studies the sensory changes of the elderly contacts in the community, and constructs the character model card. Conduct a specific analysis. It is found that the elderly in the community spend most of their time traveling and waiting during the process of taking medicine, which brings great inconvenience to the elderly. The community lacks the medical facilities that serve the elderly with long-term medication. To this end, in response to the discovery of the previous problems, propose a solution strategy, reduce the process of buying drugs for the elderly, facilitate the elderly to buy medicines, and design a service and community automatic drug sales machine for the elderly. The preliminary product plan uses the fuzzy evaluation method, constructs the program evaluation model, collects the vocabulary about the product, conducts the questionnaire analysis and focus interview on the user, and calculates the data and matrix calculation to obtain the comprehensive evaluation value of the two programs. Screening for the program. The fuzzy evaluation method is used to comprehensively evaluate the program, and the automatic drug selling machine serving the elderly in the community is obtained, and new ideas for community medical service facilities are provided in the future.

References:

[1] The Office of Population Census of the State Council. Main Data of the Sixth National Population Census in 2011 [M], China Statistics Publishing House, 200, 11.
[2] Mali. Study on the Design Model of User-Centered Urban Community Public Facilities Service [J]. Packaging Engineering, 2017,38(12): 253-258.
[3] XUE Li-mei. The Role Redirection of CommunityHealth Service Center in the Nursing Care of ElderlyPatients with Chronic Diseases[J]. Laodong BaozhangShijie, 2015(S2): 201—203.
[4] VARGO S L, MAGLIO P P, AKAKA M A. On Value and Value Co-creation: a Service Systems and Service Logic Perspective[J]. European Management Journal, 2008, 26(3): 145—152.
[5] Zhang Xiao, Xu Xiaoyun, Li Jie, Yang Aihui and Myrica rubra. Research on participatory community medical service design methods for elderly chronic diseases [J]. Packaging Engineering, 2018, 39 (12): 197-202.
[6] Li Xueliang. Participatory User Research for Health Medical Design [D]. Wuxi: Jiangnan University, 2016.
[7] Gao Jiawei. Research on Virtual Display Design from the Perspective of Service Design [J]. Packaging Engineering, 2014, 35 (14): 89-93.
[8] Li Fuxing, Sun Jian. Evaluation method of product design scheme [J]. Mechanical design, 2017,34 (04): 104-108.