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Life-Cycle Spatial Strategy for Multidimensional Health-Oriented Medical Care Community—From the Perspective of Sustainable Marketing

Le Che [1], Zhijian Guo [1], Yi Yang [2], Honghao Kang [3] and Shangqing Cao [4,*]

[1] School of Architecture, South China University of Technology, Guangzhou 510641, China
[2] Hunan Provincial Architectural Design Institute, Changsha 410011, China
[3] School of Architecture, Guangzhou College of South China University of Technology, Guangzhou 510800, China
[4] School of International Education, South China University of Technology, Guangzhou 510641, China
* Correspondence: shqcao@scut.edu.cn

Abstract: The aging population and the increasing number of sub-healthy people in all age groups in China have brought huge opportunities for related industries. From the perspective of marketing and consumer psychology, there is a great demand for health care properties, especially those that provide long-term medical care. Against this situation, almost all the leading real estate companies have entered this field and tried to occupy more market shares through different products and brand marketing sustainably. In this context, it is urgent to explore a comprehensive community model combining medical and nursing care that covers all stages of life, so as to promote the health of diverse populations. In China, existing research on the growth of medical care communities for sustainable needs started relatively late, and insufficient attention has been paid to the supply–demand linkage among psychological demand, health behavior, spatial bearing, and service supply. Taking Wuzhishan city for example, we deduce the Medical-Care Maslow's Hierarchy of Needs System according to classical theories. Based on motivation theory and marketing strategy, a theoretical model of Health demand-behavior-facilities and Spatial Interaction (HBSI) mediated by healthy behavior is constructed. Then, expert group decision making processes and the Fuzzy Delphi Method (DFM) were used to screen 67 spatial impact factors of 14 categories in five dimensions, including life safety, physical health, mental health, social adaptation and resilience recovery, which fit users' multi-dimensional health needs. Finally, to provide a spatial strategy reference for the construction of sustainable and adaptive medical caring communities, spatial planning strategies and guidelines are offered based on correlation analysis, so as to fit the changeable market pattern, meet the psychological expectations and life-cycle caring needs of consumers.

Keywords: mental health; spatial interaction; medical care community; life-cycle; sustainable marketing; spatial strategy

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1. Introduction

China stepped into an aging society in 2000. It is estimated that the elderly, those over 60 years old, are expected to account for 31% of the total population by 2050. Such an aging population could bring great pressure to the medical and elderly care service system, since the number of disabled people who need care will dramatically increase. Compared with other countries, China's current elderly care system has a proportion structure of "9073", that is, 90% for home-based care, 7% for community supporting, and 3% for institution service. According to the results of searching frequency on the Internet in 2020, keywords from the field of medical and health ranked first and became the most concerned topic for the elderly group (Figure 1). To meet such a huge demand and search for a positive solution to the elderly care future, it is an innovation to integrate medical, healthcare and

wellness services into the elderly caring system in China. To sum up, more and more enterprises from diverse fields such as real estate, insurance and medicine are actively entering the medical care industry, because it has great market potential and highly fits the needs of massive consumers. However, the challenge is also significant for leading real estate companies on how to explore a suitable development path, not only providing comprehensive elderly care services that combine medical, healthcare and wellness services for senior citizens, but also to establish their own brand culture in line with the "home" philosophy in Chinese culture.

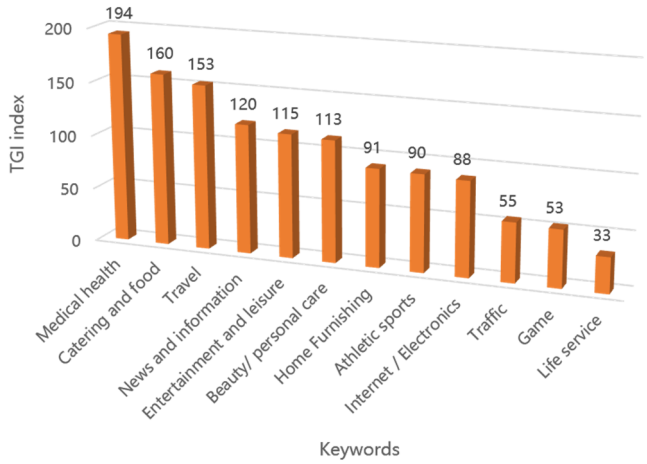

Figure 1. The results of searching frequency on the Internet in 2020.

At the same time, the number of sub-healthy people keeps rising in China. According to a survey in 2020, people of different age groups have distinct sub-health problems (Figure 2), and there is an obvious phenomenon that sub-health groups tend to be younger and show a trend of normalization. The pandemic has also worsened such trend. People often appear with an excessive "psychological stress" response, such as panic, anxiety, physical discomfort, insomnia and so on. The pandemic also indirectly promoted people's attention to healthy lifestyles, and searches for medical science, health management services and healthy lifestyle showed explosive growth. The growing sub-health and elderly population, coupled with the Chinese cultural understanding of the endless life, has together created the great demand for the life-cycle medical care community.

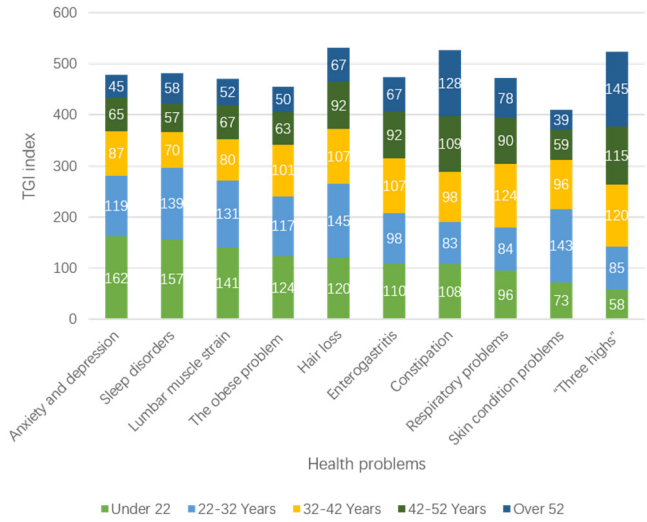

Figure 2. Main health problems of users of different ages.

In order to satisfy people's physiological and psychological needs and benefit the sustainable marketing of medical care real estate, it is urgent to keep the community (the most basic unit of human life) safe based on life-cycle health, to protect residents' health with "home" as the hub, and to strengthen the construction of medical and nursing support facilities and space from the perspective of health and space integration.

2. Literature Review

There has been a long history of research and practice on medical care community out of China. The Continuous Care Retirement Community (CCRC) of Sun City in the United States was equipped with a "one-stop" medical care facility with self-care, assistance and nursing, so that the elderly could enjoy targeted medical care services in a familiar environment when their health condition and self-care ability deteriorate [1]. Guided by the idea of continuation of the "family-oriented" lifestyle of the elderly, Japanese medical care communities embed flexible and multi-level medical and care facility modules into the original medical care facility system, forming a medical and care co-located system (ITO et al., 2020) [2]. The medical care communities in the UK have transformed from "community care" to "comprehensive care", by integrating the medical and care resources in the society and establishing institutional associations, so that high-quality and sustainable medical care services are provided for the elderly group [3] (Chen et al., 2016). The Netherlands has designed a life apartment model with the core concepts of "medical care collaboration" and "happy retirement". Singapore has also built the combination macro-medium-micro medical care system. At the macro level, there are six major public medical clusters covering the whole island, forming a network of a powerful medical and nursing service system. At the middle level, the medical care communities, such as the Health City, rely on the core medical resources in the city, forming a situation of complementary medical care. At the micro level, Wong Ting Fong General Hospital combines with Jurong East MTR station, forming a large health complex (Li Chunmei, 2016) [4].

Citespace is used to conduct keyword clustering analysis on domestic medical care communities, and its emergent word detection algorithm can extract words with a high rate of change in word frequency from a large number of subject words (Figure 3) [5]. The research topics in the field of medical care communities mainly include the integrated eldercare services with medical care, elderly care services, community-based elderly care, and the home-based elderly care model. It could be concluded that the aging population background, the home-based elderly support service model, the medical care community model that combines medical and nursing and the smart medical care community model, in the context of the normalized pandemic, emphasizes and shows hotspots in the field of medical care community research. These research hotspots show that the research of medical and elderly care has gradually extended to the field of social aspects, thus the study of socialized elderly support has gradually become the new focus. However, its policy mechanism, spatial and marketing strategies are still under study [6].

The research on the correlation between health and space can be traced back to the proposal of health communities in the 1990s. The study of the healthy community in the early stage emphasized the connection between ecosystem, community and individual health, and advocated promoting the sustainable development of communities by preventing and controlling ecological degradation [7]. For example, King et al. (1999) believed that the destruction of ecosystem would affect community health and cause the loss of community health, economy, society and culture [8]. Later on, the meaning of healthy community presents a multi-dimensional development trend, involving physical health, mental health, social adaptation and other multidimensional health areas. Its influencing factors gradually change from single to diversified, including human environment, natural environment, built environment and other elements. For example, Ellaway et al. (2001) believed that community cohesion affects residents' health behaviors, physical health and mental health [9].

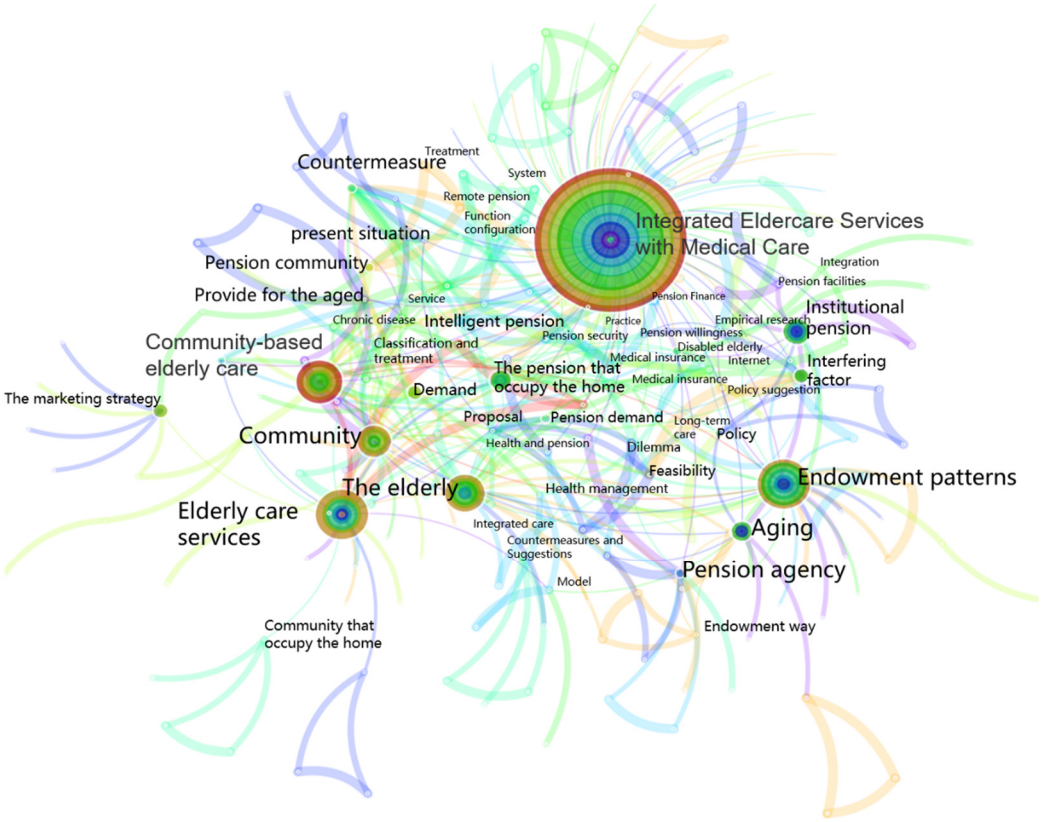

Figure 3. Knowledge map of high frequency keywords in medical care community: 2016–2022.

Vojnovic (2006) raised that shorter perceived distance and highly connected neighborhoods were conducive to the generation of healthy behaviors, but the end-type residential space would reduce people's physical activity and be detrimental to residents' health [10]. Tan et al. (2010) proposed that the natural environment could enhance human health, and the active intervention of the community-built environment could guide healthy behaviors, thus effectively preventing the occurrence of chronic diseases [11]. Wang et al. (2016) explained the correlation between land use, spatial form, road traffic, green space system, open space and public health based on ways to reduce pollution and promote physical activity [12]. The sense of security is essential to a people's mental health. The environment could be designed to reduce crime or vandalism, thereby enhancing the sense of safety in the community and health care facilities. The concept of CPTED proposed by Matlovicova (2016) offered a possible way to improve the sense of security in urban environments. Through the application of appropriate CPTED measures, vandalism and other forms of violence, property or minor crime could be minimized. This can be applied to the construction of urban environments and can play a positive role in improving the security of the elderly and sub-health patients [13,14]. Matlovičova (2014) also applied the concept of CPTED to reduce crime and improve community safety by emphasizing the important role of functional diversity, land connectivity, high-quality architecture and urban design, environmental sustainability and improving quality of life [15]. This kind of high-quality, efficient and implementable empirical strategy can provide a reference for the sustainable empowerment of medical and nursing space. In recent years, research on healthy community planning has introduced the thinking of resilient development, which emphasizes the resilience of community hardware facilities, the matching ability of governance services and the overall improvement of governance capacity [16]. The spread of COVID-19 highlights the urgency and necessity of implementing healthy community governance, and health has become the ultimate value and top priority of community epidemic prevention (Liu, 2020) [17].

In the information service industry under the background of the knowledge economy era, intellectual capital, as a unique and unlimited resource, has become the core capital of enterprise development. Many scholars made full use of intellectual capital, marketing means and other diversified knowledge systems to improve innovation ability and provide high-quality knowledge services. Since intellectual capital plays an important role in improving organizational performance and adding value by sharing and integrating different types of expertise, the introduction of the intellectual capital research method could play a key role in promoting sustainable marketing competitiveness. For example, Pachura (2018) believed that DEA analysis could help evaluate the efficiency of the process involving intellectual capital, and it also showed that intellectual capital was an important information basis in the process of regional social and economic development [18], which could provide evidence of sustainable development for identifying the development advantages and potential capabilities of medical care communities. Niwash (2022) also proposed that dynamic capabilities, sustainable competitive advantages, innovation and market response capabilities were all sources of competitive advantages, so good marketing strategies are an important basis for promoting the growth of medical care communities throughout their life cycle [19].

The aggravation of aging has aroused social concern about the quality of life of the elderly. Good living conditions could not only meet the needs of the elderly from multiple dimensions of the whole life cycle, but also help to improve the life satisfaction of the senior citizens, and have a positive marketing effect on the development of the medical care community. In recent years, many scholars have made many explorations in the aspects of elderly life quality, satisfaction model and index construction and evaluation. The quality of medical care community service is related to the quality of life and health of the elderly, and the community could objectively evaluate the quality of life of the elderly and its impact [20]. Many foreign studies also show that social support has a strong correlation with the life quality of the elderly. Li (2007) applied the Stereotype Ordinal Logit model to analyze and investigate the impact of social support on the life quality of the elderly population in China from different dimensions. The results show that social support has a positive impact on many aspects of the elderly population's quality of life. To be more precise, social support not only has a positive impact on the life quality of China's elderly population, but also has distinct characteristics of Traditional Chinese culture [21]. Zhang and Liu et al. (2011) also applied the SERVQUAL model to the evaluation of elderly care service quality, and made appropriate improvements to the qualitative analysis of community home-based elderly care service in Shanghai. The "perceptive" dimension was used to replace the "tangible" dimension, and the evaluation model of community home care service quality was constructed, so as to improve the service in a targeted way to guarantee the quality of life of the elderly [22,23].

At present, the product competition in the medical care community market focuses on the comprehensive service platform based on enterprise resources and the insight into the core value of products based on consumer demand. The research tries to explore the missing points in the intersection area of the above two. It is of core significance for product design and sustainable marketing of medical care communities to find feasible entry angles, explore the connection between users' health needs and supply, implement ways of carrying health needs in the space of medical care communities, and analyze the growth strategy of medical care communities that conform to the life cycle of consumers. To this end, the paper proposes the following two goals. First, based on the correlation between health and space, to create a community space that could meet the multidimensional health needs of residents. According to the psychological and physiological needs of users, the medical-care Maslow's hierarchy of needs system is screened and deduced, and the theoretical model of Health demand-behavior-facilities and Spatial Interaction (HBSI) is constructed. It will be used as the theoretical basis of building a health space in the medical care community. Second, through data analysis of a large number of empirical projects, the Delphi method was used to screen out the spatial impact factors that fit the five health needs, including life safety,

physical health, mental health, social adaptation and resilience recovery. Based on the spatial factor index system, the spatial design strategies and guidelines of land use function layout, spatial settlement organization, open space network, supporting service facilities and medical care house design are given to guide the marketization and healthy growth.

3. Theoretical Framework and Research Hypotheses

3.1. Sort Out the Dimensions of Health and Establish the Interactive Relationship between Health and Space

The components of the interaction model include people, health behavior, health, and space (Figure 4). Among these elements, people are the main body of implementing health behavior, and they affect space and health together. Health includes five levels, life safety, physical health, mental health, social adaptation and resilience recovery. Community space is the material carrier of health behavior, including natural space, built environment and social environment, namely all the material spaces and non-material spaces that are conducive to residents' health activities and health cognition [24]. The natural environment is the basic ecological space element, which provides the healthy supporting environment. Built environment directly affects the occurrence of health behavior and is a direct factor to promote health behavior and health cognition. The social environment can promote the residents' social communication and social adaptation, and creates a healthy and good atmosphere for activities [25]. As a medium, healthy behavior includes healthy cognition, healthy activities and a healthy supportive environment.

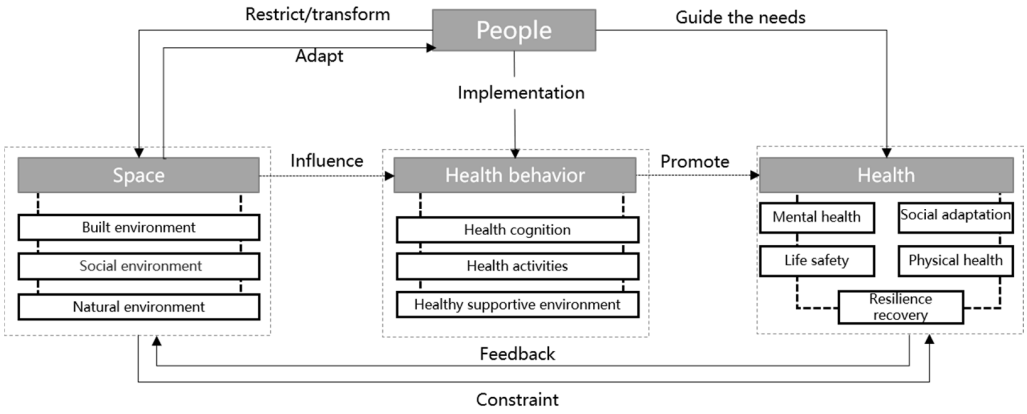

Figure 4. Interaction and influence of human, health, behavior and space.

From the perspective of environmental behavior, such a benign interaction model can be understood as follows. For people in an overlapping and interaction of environment area, these environmental factors directly or indirectly affect the human sensory stimulation, choice of environment cognition, emotion and ego. People all have security, physical, psychological, social and other diversified health needs [26], these needs constantly affect the space and promote the adaptive optimization and adjustment of space through health behaviors. It is a rational process of shaping healthy spaces and promoting people's health. Space is the material carrier of people, behavior and health. It provides an environment for people's behavior and activities, thus leading to the improvement of people's health level. The impact of space on health is also reflected in behavior, but the relationship between behavior and space is not a simple one-to-one relationship. Behavior is influenced by both individual characteristics and environment, so people's self-choice, emotional state, sensory stimulation and health cognition of the environment comprehensively affect their health-behavior-related decision making [27]. Therefore, adopting the mode of multilevel and multifactor joint intervention in a circulatory system can effectively promote health. This model integrates the health and spatial correlation theory and explains the interaction mechanism between health and space, which is the basic framework of the HBSI model.

3.2. Deducing the Medical Care Maslow's Hierarchy of Needs System and Constructing the Theoretical Model of HBSI

Based on the Maslow's hierarchy of needs theory, and combined with the physical needs and psychological needs of the population who need medical care [28], a medical care Maslow demand factor with 48 items in 5 categories of three dimensions was constructed, namely rehabilitation and safety needs of the functional dimension, social and esteem needs of the emotional dimension, and self-actualization needs of the developmental dimension. The 48 demand factors are shown in Figure 5.

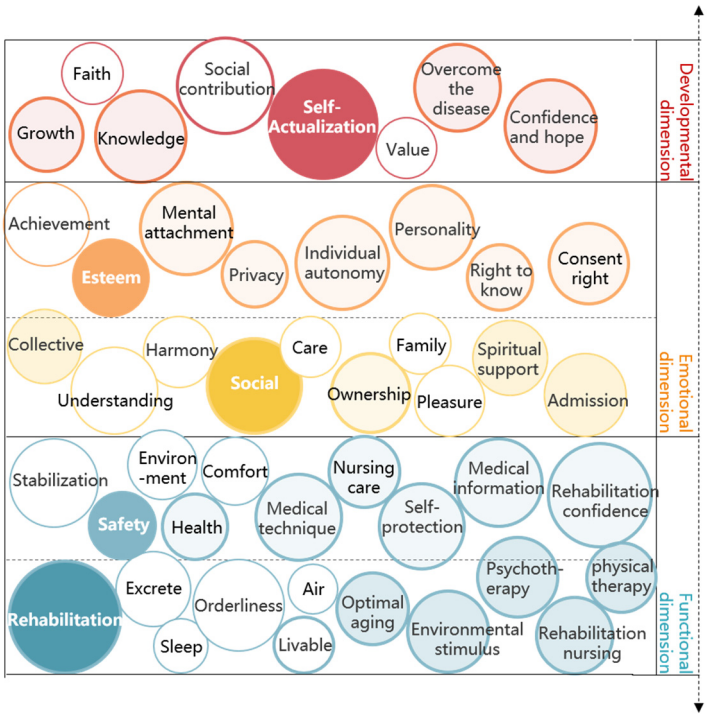

Figure 5. A subset of medical care Maslow demand factors.

Deriving effective supply from the needs of users is the essential basis for the development of medical care communities. The method of behavioral psychology analysis was introduced, and the linkage loop of "demand–psychology–motivation–behavior–space" was constructed based on motivation theory to provide the basis for the realization of medical and caring needs in service and space [29]. The paper also establishes the emotion classification system as the supply selection and evaluation standard. Using Russell's circle pattern of emotions and the Izzard model of emotional thinking for reference, the adaptive deduction is carried out to obtain the emotional state of the medical and caring population receiving various services, the degree of pleasure to the space and the suitability of their own behavior to the situation.

To sum up, based on logical relationship deduction, the study realized the linkage of "The medical care Maslow's hierarchy of needs system—Medical-care emotion—Medical-care behavior—Medical-care service and medical-care space", and completed the theoretical model of HBSI (Figure 6).

3.3. HBSI Theoretical Model Interpretation and Spatial Application

In the HBSI model (Figure 6), multidimensional health needs to guide the occurrence of health behaviors and influence the shaping of space. Specifically, people perform health behaviors based on the three levels of the medical care Maslow's hierarchy of needs and heal various psychological responses as comprehensively as possible. In order to reflect residents' health behaviors, corresponding measures should be configured in the medical and nursing space and service supply, so that people's needs could be satisfied, their health

could be guaranteed, their emotions could be calmed and their moods could be happy [30]. Next, the spatial impact factors derived from the demand–supply linkages are deduced to be planning strategies to guide spatial design. The built environment will be used as the situational carrier to carry healthy behaviors and promote individual health as a total factor, and the community will be covered with adaptive health services in the full dimension and full network (Figure 7).

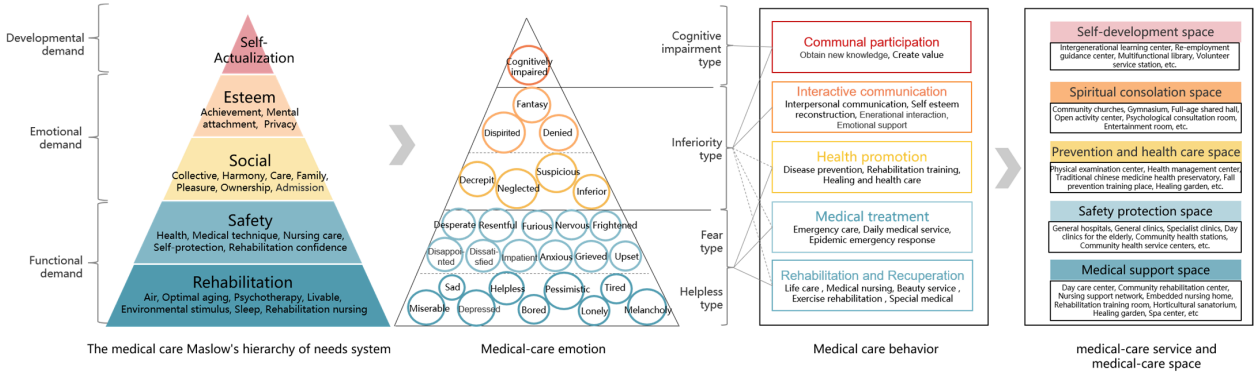

Figure 6. Construction of HBSI model.

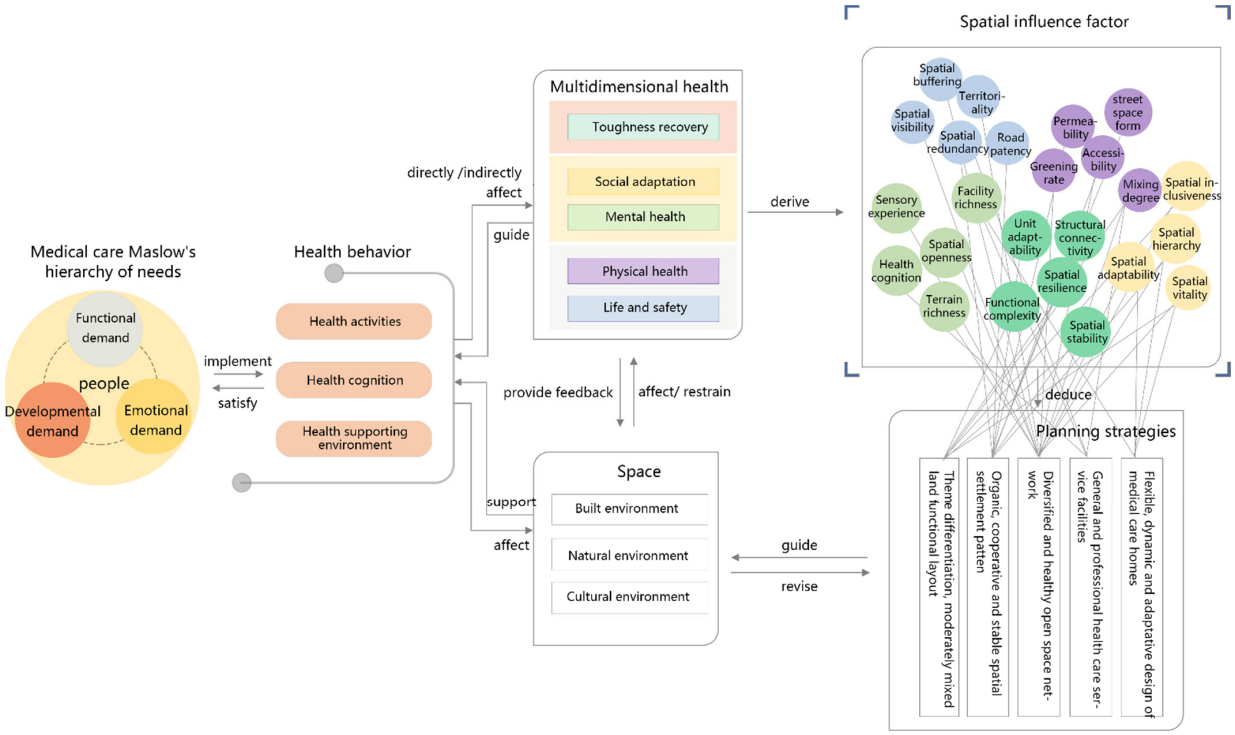

Figure 7. Space and planning application of HBSI model.

To be more specific, the functional layout of land use, spatial organization and the design of medical care homes should meet the functional needs of health, medical treatment, nursing and food therapy, thus forming a medical and caring place that is familiar to a regular living environment. At the same time, supporting service facilities should give concern to the emotional needs of medical care communities, such as spiritual attachment, trust and collective communication to create a positive therapeutic atmosphere, with the provision of an excellent care experience as the core goal to protect people's psychological and physical health, and create a warm home and harmonious neighborhood relationship [31]. On the other hand, open space needs to accommodate diverse values and beliefs, provide space for patients and residents to share their experiences and be promoted, help these consumers

to make contributions to the sustainable space and create value and eventually meet the demands of growth, learning and self-realization. In this case, these consumers might still have strong emotions to stay in the community after recovering from being taking care of to being able to take care of themselves, from sub-health to health [32]. Providing such space and functional elements will be the core competitiveness of sustainable marketing in medical care communities.

4. Materials and Methods

4.1. Construction of Spatial Factor Index System Based on Multidimensional Health

4.1.1. Research Methods

Based on a large number of case data analyses and a literature search, the empirical study selected multidimensional health spatial influencing factors. Then, according to the HBSI index consultation table, experts in related fields were invited to score the importance of each index in the first stage. Expert group decision-making was adopted to carry out a secondary screening of the spatial factor index initially screened, and experts were invited to give suggestions for improvement. Finally, based on expert scoring and feedback results, the index system of spatial factors satisfying multidimensional health factors was sorted out.

(1) Empirical case analysis

Wuzhishan ranked first in the national annual climate Health index (Hainan Provincial Health Commission, 2020). The city takes advantage of natural resources to develop the health care industry, providing the public with high-quality health treatment, chronic and occupational disease treatment, sports rehabilitation, senile disease treatment and other health products and services. The city also strives to build a health treatment destination offering natural health treatments, forest medical treatment of domestic characteristics. During the 14th Five-year Plan period, five medical and rehabilitation centers will be built with sufficient medical resources around the community. At the policy level, the policy encourages and supports the transformation of the stock real estate into the health care and medical industry, which provides the space carrier and capital foundation for the medical care community. Now, the medical care community in this city shows the initial trend of agglomeration, attracting migratory bird-type home-based elderly people from all over the country resulting in a phenomenon that the actual aging degree is much higher than the national average level, and the population diversity is prominent. Therefore, the sample of this city is representative and universal. The paper selected typical medical care communities in Wuzhishan city (Shuiyunju, Wuzhishanju, Forest Lake, Rendishan Rainforest Health Care Base and Feicuitiancheng) for market research and interview. The comparison table of spatial characteristics (Table 1) is as follows.

(2) Index selection and index consultation table

Based on the comparative analysis of the spatial characteristics of medical care communities in Wuzhishan city and sufficient market research and relevant literature review, the HBSI spatial factor consultation table was sorted out by selecting the spatial impact factors of life safety, physical health, mental health, social adaptation and resilience recovery. The consultation table of dimensional spatial factors of resilience recovery (Appendix A Table A1) is as follows.

(3) Index screening

This study invited more than 80 experts to participate in the evaluation from the fields of urban and rural planning, medicine, marketing, health management, psychology, real estate development and operation and other fields, respectively, with more than ten years of practical experience in health-related projects. The importance degree of the set index consists of five grades, and 0–10 score values are used to represent very important, relatively important, average, relatively unimportant and very unimportant, respectively. Indexes with an average of six points or more than six points are retained (Figure 8).

Table 1. Comparative Table of Spatial Characteristics of Medical Care Communities in Wuzhishan City.

Community Name			**Shuiyunju**	**Wuzhishanju**	**Forest Lake**	**Rendishan Rainforest Health Care Base**	**Feicuitiancheng**
Basic information and marketing status	Location		Rural	Suburban	Downtown	Downtown	Suburban
	Positioning		Ecological rehabilitation community	Spa rehabilitation community	Rehabilitation community	Medical care community	Comprehensive medical and nursing community
	Product type		Health nursing multistory residences, Elderly-care villa	Nursing apartment, Healing villa	Nursing apartment, Health nursing villa, Wellness hotel	Medical care apartment, recovery hotels	Medical care apartment, Multistory residences, Nursing villa
	Marketing strategy		International health resort community Living in slow water and fragrance	Live by Wuzhishan mountain Enjoy longevity gene, enjoy the hot spring of longevity	The Center of the Forest high-end wellness community	National Rainforest Recreation Base Life and recreation community	Let nature take its course, four seasons health care, "health care, recreation and learning" one-stop community with housekeeper
	Price (RMB/Square meters)		16,000–20,000 Daily rent: 200–800	12,000–15,000	16,000–18,000	16,000–18,000 Daily rent: 300–700 Monthly rent: 8000–9900	15,000–19,000 Daily rent 8000–9900 20-year tenure: 750–1300 thousand RMB
	Scale	Site area	8.69 ha	8.43 ha	31.3 ha	13.3 ha	27 ha
		Building area	30,400 m^2	27,016 m^2	400,000 m^2	250,000 m^2	337,500 m^2
		FAR	0.35	0.29	1.28	1.88	1.25
		Green coverage ratio	60%	55%	52%	45%	60%
		Number of households	220	321	4000	3000 wellness apartments	3750
Features of space and service	Land functional layout		Living function, Hotel function, Medical care service function, Leisure function is relatively independent.	Living function and the healing function are arranged independently.	Mainly living groups and it is equipped with a relatively complete business and health service.	The mixing degree of residential function, wellness function and medical care service function is high.	The plane layout is compatible with commercial, residential, medical complex, leisure and entertainment, etc. In the vertical layout, split-level space is used to set up public spaces such as shared meeting room, health activity room, rest room for health care, rainforest dining bar, etc.

Table 1. *Cont.*

	Community Name	**Shuiyunju**	**Wuzhishanju**	**Forest Lake**	**Rendishan Rainforest Health Care Base**	**Feicuitiancheng**
Features of space and service	Spatial settlement organization	Spatial settlements are organically organized, maintaining good independence within the clusters, and weak connection between clusters.	Divided into coconut beach, Oak Bay, palm group of three settlements according to the natural terrain space.	It is composed of high-level cluster settlements and low-level enclosure settlements, which are naturally separated by a lake.	It is arranged around the medical care facilities in a free embrace style. The corridor system on the second and third floors connects the apartments with the facilities.	The group adopts an adaptive split layout, with a corridor linking medical and other facilities to the houses.
	Open space network	The open space system is well combined with external resources and has built-in experiential health functions such as Binglang garden and Chenxiang garden. However, it is not well matched with demand, lacks consideration of user behavior characteristics, and is set too far away from daily use facilities.	Open space system consists of internal garden landscape composed of a variety of tropical plants and external natural landscape composed of local tropical mountains, tropical rainforests and other natural resources as the main line, which can meet the basic leisure needs of users, but lacks vitality elements in terms of functional implantation.	Open space system is complete, complete function configuration, creating a good health atmosphere and healing situation.	Open space considers the diverse demands of diversified medical and nursing population, and the network of open space is closely combined with the network of P-supporting service facilities, which reflect strong regional characteristics.	Three-dimensional open space network, that is, roof garden, multi-floor shared space and ground open space integrated configuration; With full consideration of diversity and suitable for aging people, it is equipped with a five-sense healing garden, medical-nursing-walking path, art and nursing-research room, etc., to enrich the slow walking experience and meet the needs of the whole age medical and nursing-care groups to carry out multi-dimensional health activities.

Table 1. *Cont.*

Community Name		Shuiyunju	Wuzhishanju	Forest Lake	Rendishan Rainforest Health Care Base	Feicuitiancheng
Features of space and service	Supporting service facilities	Mainly prepared for wellness- and elderly care-related leisure activities, with Chenxiang health garden, multimedia conference room, coffee shop, music tea house, hair and beauty massage center, leisure fishing center, swimming pool, etc.	Spa treatments installed in every home; Comprehensive leisure and entertainment clubs; Other supporting facilities are lacking.	To meet the users' rich life and health care service needs, lacking nursing, rehabilitation support functions.	To meet the needs of self-care elderly or chronic disease patients, there is less consideration for the support and care of the crowd; Although the configuration of medical and nursing facilities is diversified, the utilization rate of some facilities is low, such as molecular hydrogen immunization chamber, hyperbaric oxygen chamber, etc. The demands for traditional Chinese medicine, Li Miao health care, are huge.	The supporting facilities are divided into groups and configured in a classified way. According to the positioning of the group, facilities are configured for healthy people, chronic disease conditioning, sub-health diagnosis and treatment and rehabilitation, nursing support for semi-intermediary groups, and full-day medical care for intermediary personnel, with special emphasis on the treatment of traditional Chinese medicine and Li Miao Southern medicine.

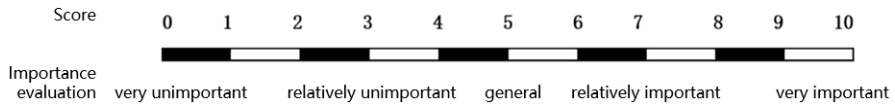

Figure 8. Index importance evaluation.

A total of 50 questionnaires were issued in the first round and 48 were eventually recalled. In the second round, 35 were issued and 34 were withdrawn. In the use of the Delphi method, if the recovery rate is >50%, the results can be used. In this survey, the recovery rate is >90%, and the data can be used for systematic analysis.

4.1.2. Results and Discussion

The survey results were statistically analyzed and sorted into 67 community spatial impact factors of 14 categories in five dimensions based on multidimensional health needs, including life safety, physical health, mental health, social adaptation and resilience recovery, and the information is as follows.

(1) Influencing factors of life safety dimension

Protecting human life can be achieved through reducing crime, promoting behavior safety and disaster response. To reduce crime is to make use of social surveillance to improve site security and sense of domain on the premise of ensuring unobstructed vision and a distinct spatial hierarchy of activity space. The space construction method of behavior safety is to guide healthy behavior by adding a health sign system. Buffer space should be reserved in the area of vehicle entrance and exit, and landscape isolation and protection should be done to ensure safe and convenient walking space and traffic connection space. Disaster relief emergency response capacity is to ensure that the community evacuation channel is unblocked, and shelter space for the community during the disaster is reserved (Figure 9).

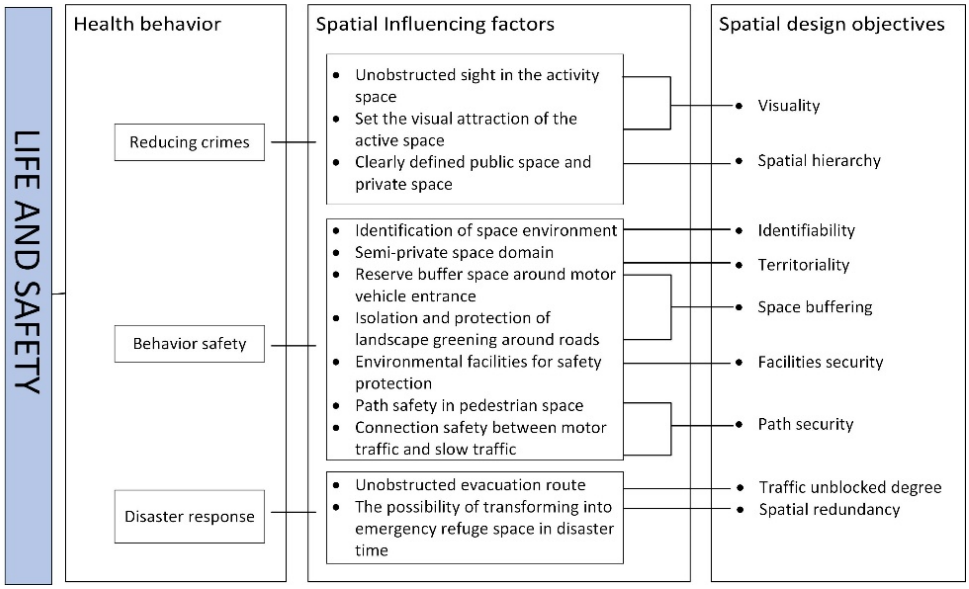

Figure 9. Influencing factors of Life safety dimension.

(2) Influencing factors of physical health dimension

Physical health is the sum total of the health state of human physical function. This can be achieved by reducing pollution exposure, enhancing physical activity and getting close to the natural environment. Firstly, reducing pollution exposure refers to the community site selection needs to be far away from pollution sources, to achieve low pollution space. Additional actions include controlling reasonable building layouts, volume ratio, building density, building height, greening rate and so on to create a good and pleasant street space,

in order to effectively reduce community pollution exposure [33]. Secondly, enhancing physical activity refers to promoting the frequency and intensity of physical activity by improving functional complexity, walking accessibility and spatial adaptability [34]. Thirdly, closeness to nature is to enhance the interaction coefficient between human and nature by strengthening the scale and aggregation degree of the natural landscape and enhancing the permeability of the green landscape. It is manifested in the factors such as green visual rate, greening rate and natural ecology (Figure 10).

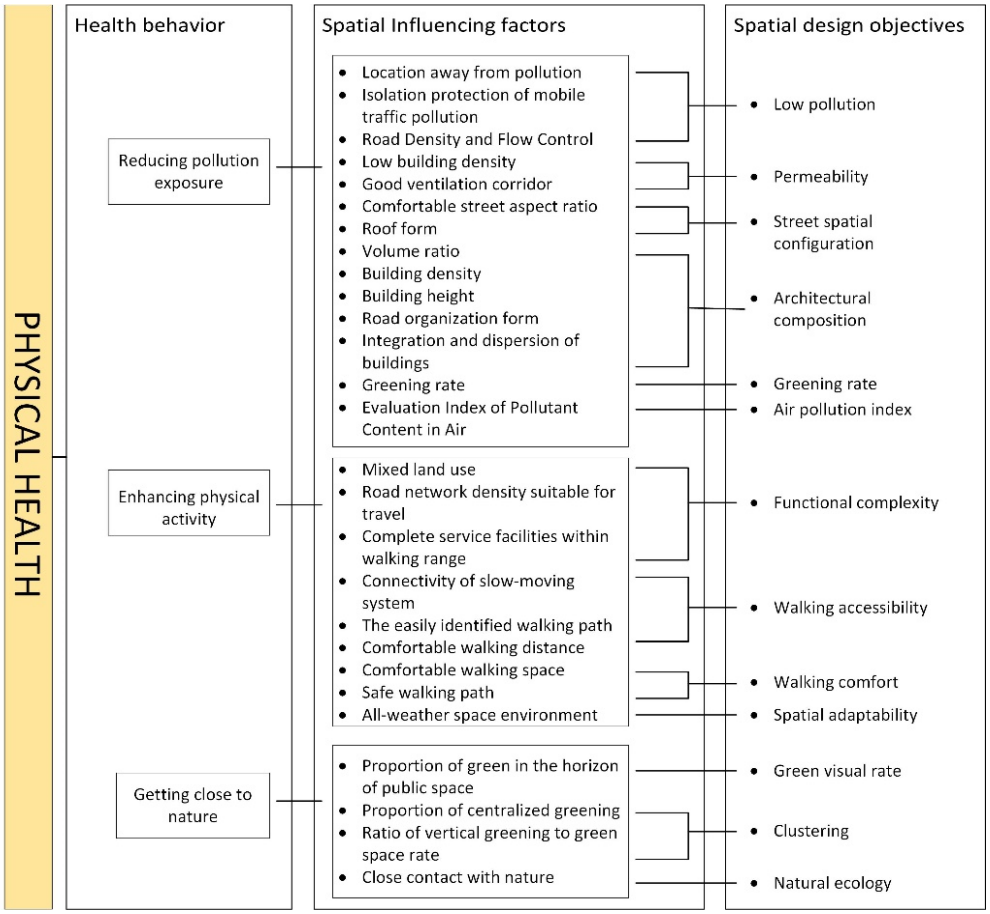

Figure 10. Influencing factors of mental health dimension.

(3) Influencing factors of mental health dimension

Mental health refers to the absence of psychological problems and mental problems, and having positive emotions, relaxed mood and so on. Health behaviors promoting mental health include visual comfort, health cognition, landscape healing and natural experience [35]. Spatial visual comfort is the result of the joint action of spatial environment quality and the user's psychological state. The aesthetics of space environment and the comfort of space can improve human activity state and social cohesion, and then improve human function and activity level. Openness can relieve tension and anxiety [36]. Health awareness is the intervention and control of people's health behavior through the psychological level. By using health education facilities in the space to guide healthy behavior, it will help residents to develop a healthy lifestyle. Landscape therapy involves using the richness of plant configuration, sensory experience, natural ecology and facility richness to directly or indirectly stimulate people's senses and ultimately achieve the purpose of rehabilitation [37]. The natural experience is to enhance the interaction between human and nature through rich micro-terrain transformation and local plant configuration, thus relieving psychological fatigue and restoring attention (Figure 11).

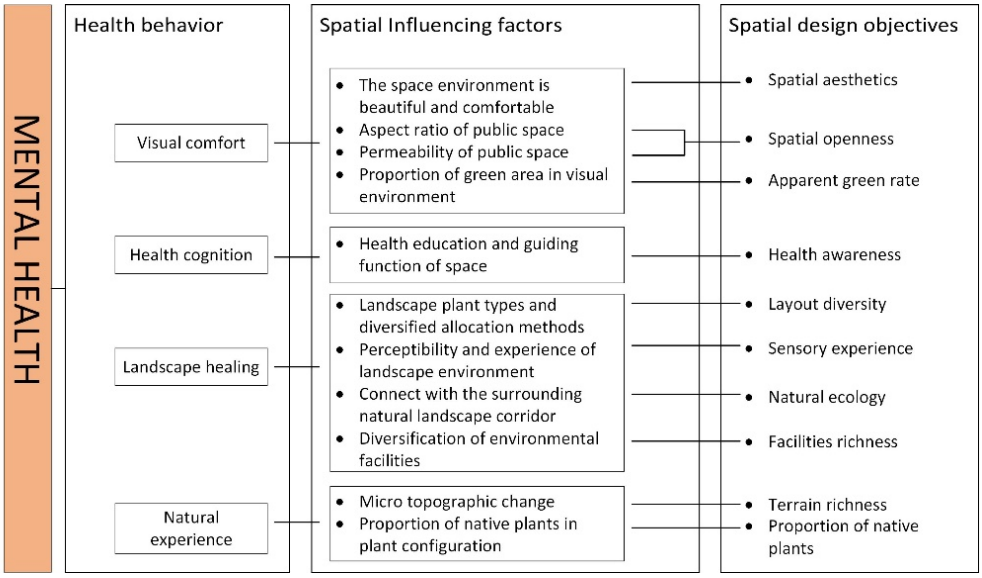

Figure 11. Influencing factors of mental health dimension.

(4) Influence factors of social adaptation dimension

Social adaptation is a state of psychological quality that could keep a good relationship with people's social environment, that is, to keep good contact with the natural and social environment and have good adaptability to the surrounding environment [38]. The social adaptive health behaviors are divided into social interaction and leisure activities, including six spatial design objectives and eight spatial influencing factors (Figure 12), including spatial inclusion, spatial vitality, spatial hierarchy, functional complexity, spatial adaptability and spatial richness.

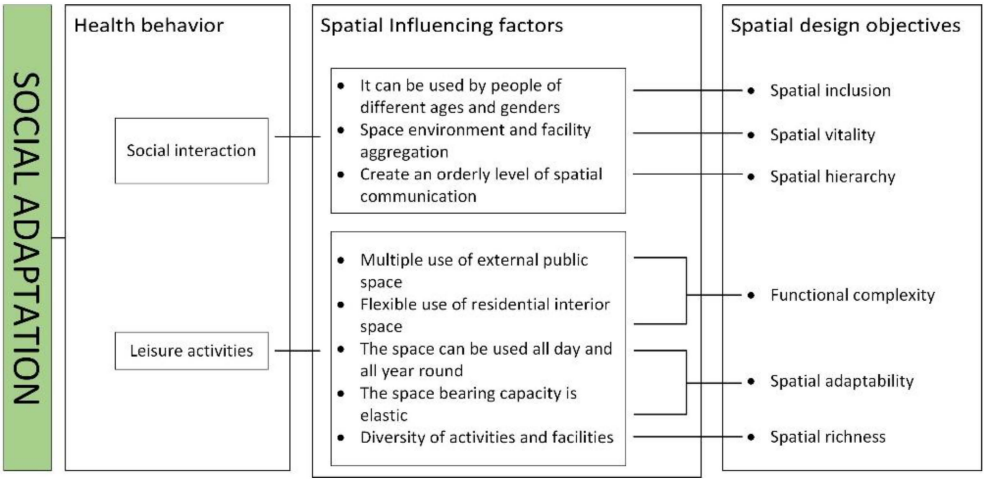

Figure 12. Influence factors of social adaptation dimension.

(5) Influencing factors of resilience recovery dimension

Community resilience recovery refers to the ability of communities to self-mitigate negative impacts, self-adjust and timely respond to disasters and self-recover when they are impacted by disasters [39–41]. With these three abilities, the community itself could have low vulnerability and high resilience, and could maintain its own function and structural stability [42]. The spatial influencing factors of resilience recovery include the spatial resilience index and facility resilience index (Figure 13).

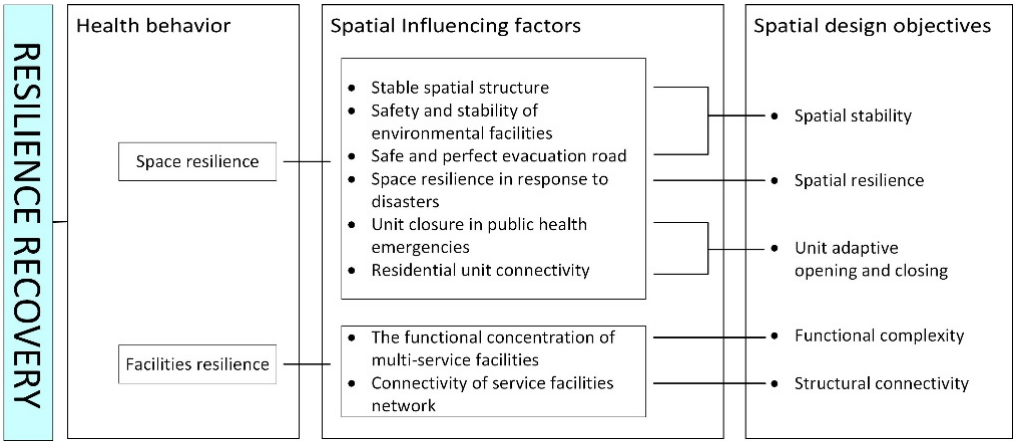

Figure 13. Influencing factors of resilience recovery dimension.

4.2. HBSI Design Strategy and Guidelines

Based on the HBSI spatial factor index system and spatial design objectives, this paper summarizes and deduces spatial design guidelines from five aspects: land functional layout, spatial settlement pattern, open space network, service facilities and house design.

(1) Theme differentiation, moderately mixed land functional layout

The starting point of land function layout design guidelines is to form compactness [43], functional mixing degrees, diversification and facilities as well as concentration of space design. The guidelines put forward the medical care community boundary compactness recommended interval, encourages function of land to be moderately mixed in plane space and vertical space and provides a facility type compatible with the specific implementation suggestions (Figure 14).

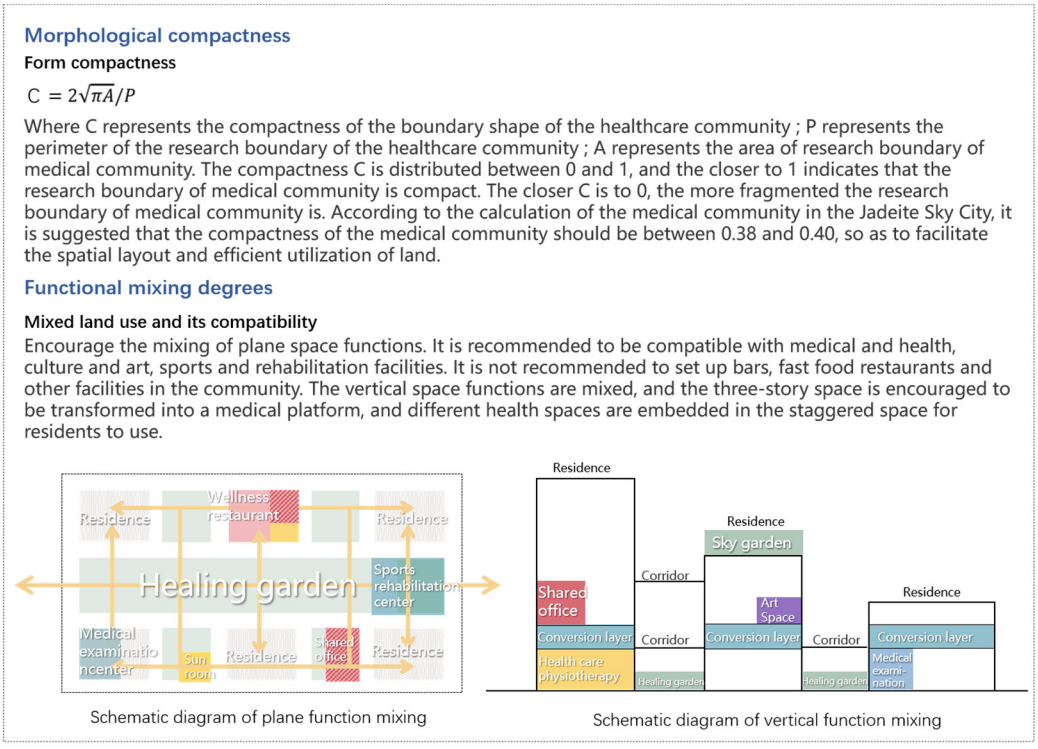

Figure 14. Design guidelines for land function layout.

(2) Organic, cooperative and stable spatial settlement patten

The spatial settlement patten should pay attention to the ability of group units' adaptability to divide and merge and build resilient transformation and resilient community space. Also, community spatial stability and facility structural connectivity should be strengthened to form synergistic and stable organic clusters (Figure 15).

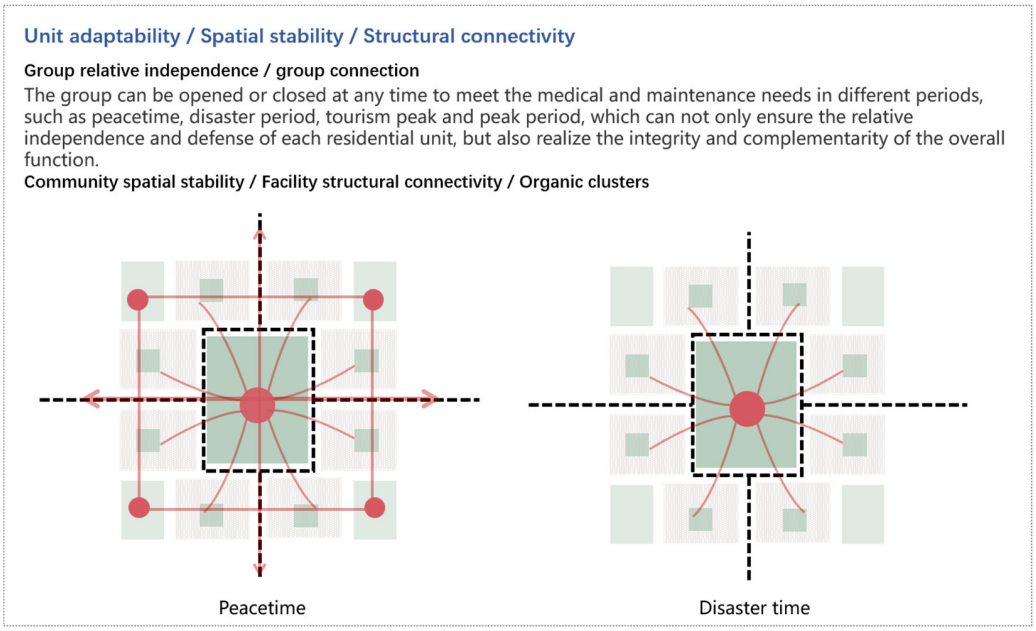

Figure 15. Design guidelines for spatial settlement mode.

(3) Diversified and healthy open space network

Open space network design should not only guide the spatial vitality, spatial quality, spatial accessibility, spatial adaptability and inclusion, but also promote the diversified and efficient use of open space. By taking advantage of the healing effects of gardening therapy, the landscape system of the five senses of medical and nursing is built to provide residents with a healthy and happy activity place (Figure 16).

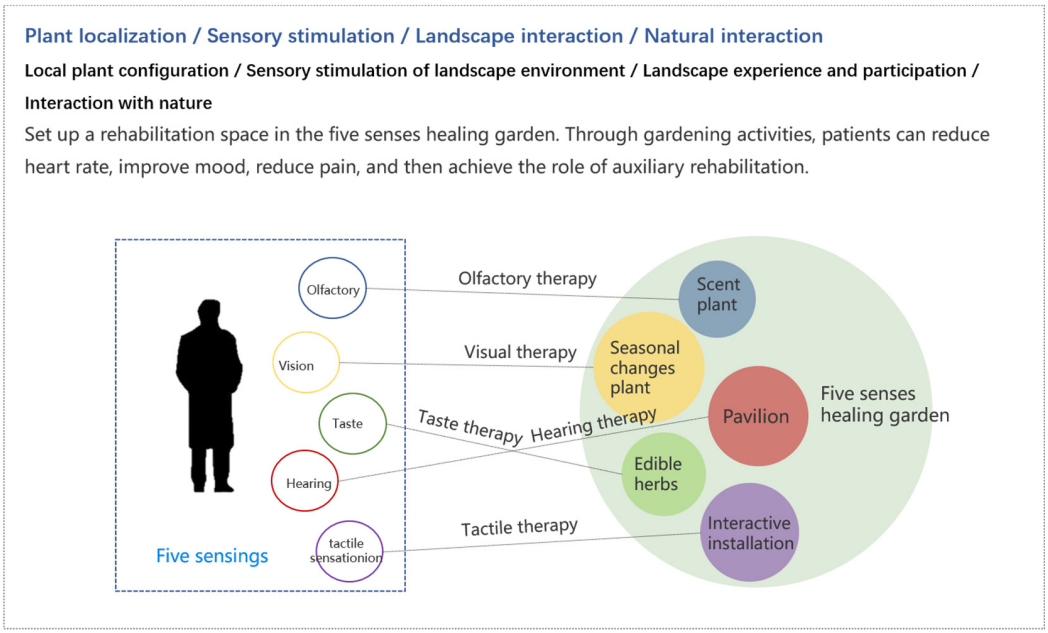

Figure 16. Design guidelines for open space network.

(4) General and professional health care supporting service facilities

On the one hand, the guidelines for service facilities are based on healthy cognition and healthy lifestyle, and provide professional suggestions and proportion ranges for the allocation of medical and nursing facilities for communities, so that residents can enjoy professional medical services in the "de-medicalization" community environment. On the other hand, attention should be paid to the redundancy of spatial transformation of facilities and the versatility and robustness of facilities in space disasters [44] (Figure 17).

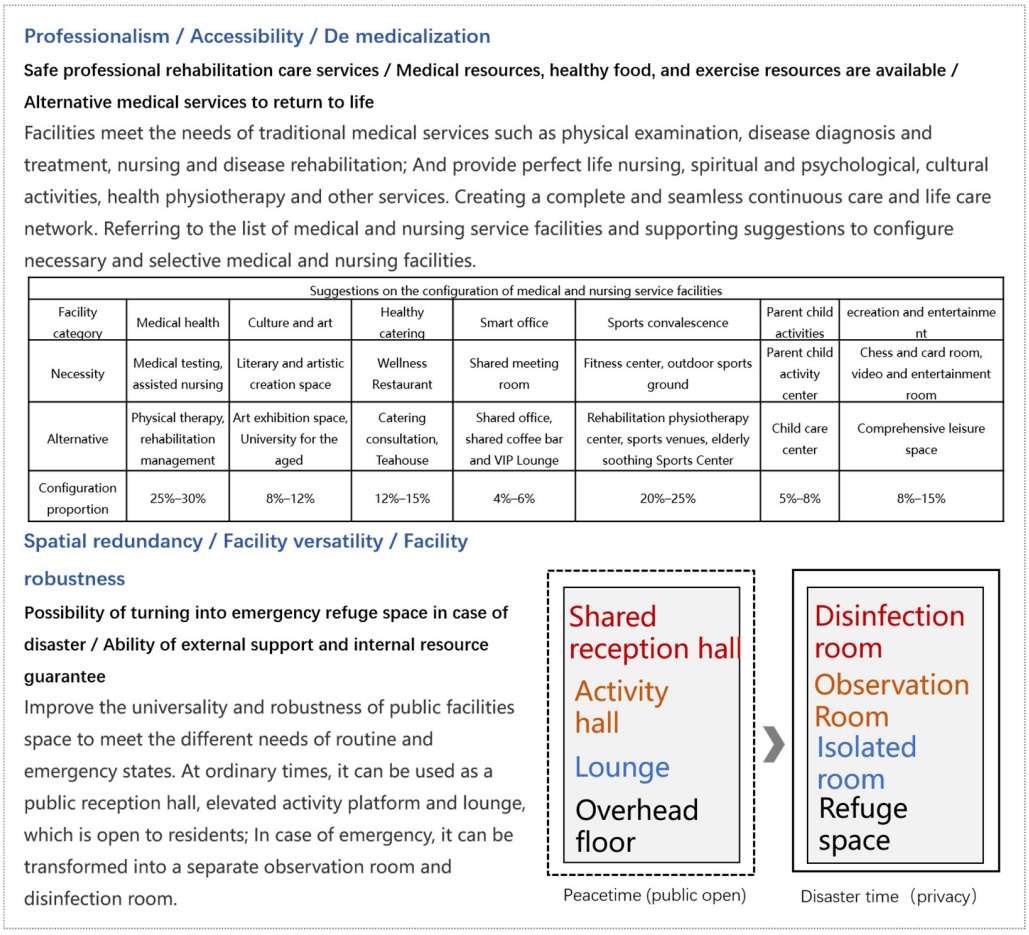

Figure 17. Design guidelines for supporting service facilities.

(5) Flexible, dynamic and adaptative design of medical care house

The plane function design of the medical care homes takes into full consideration the spatial flexibility and epidemic adaptability of the house, providing a new idea for the transformation of home life. Renovation space suitable for aging and medical care should be reserved in the design of housing space to meet the requirements of adaptive renovation in different stages of the whole life cycle (Figure 18).

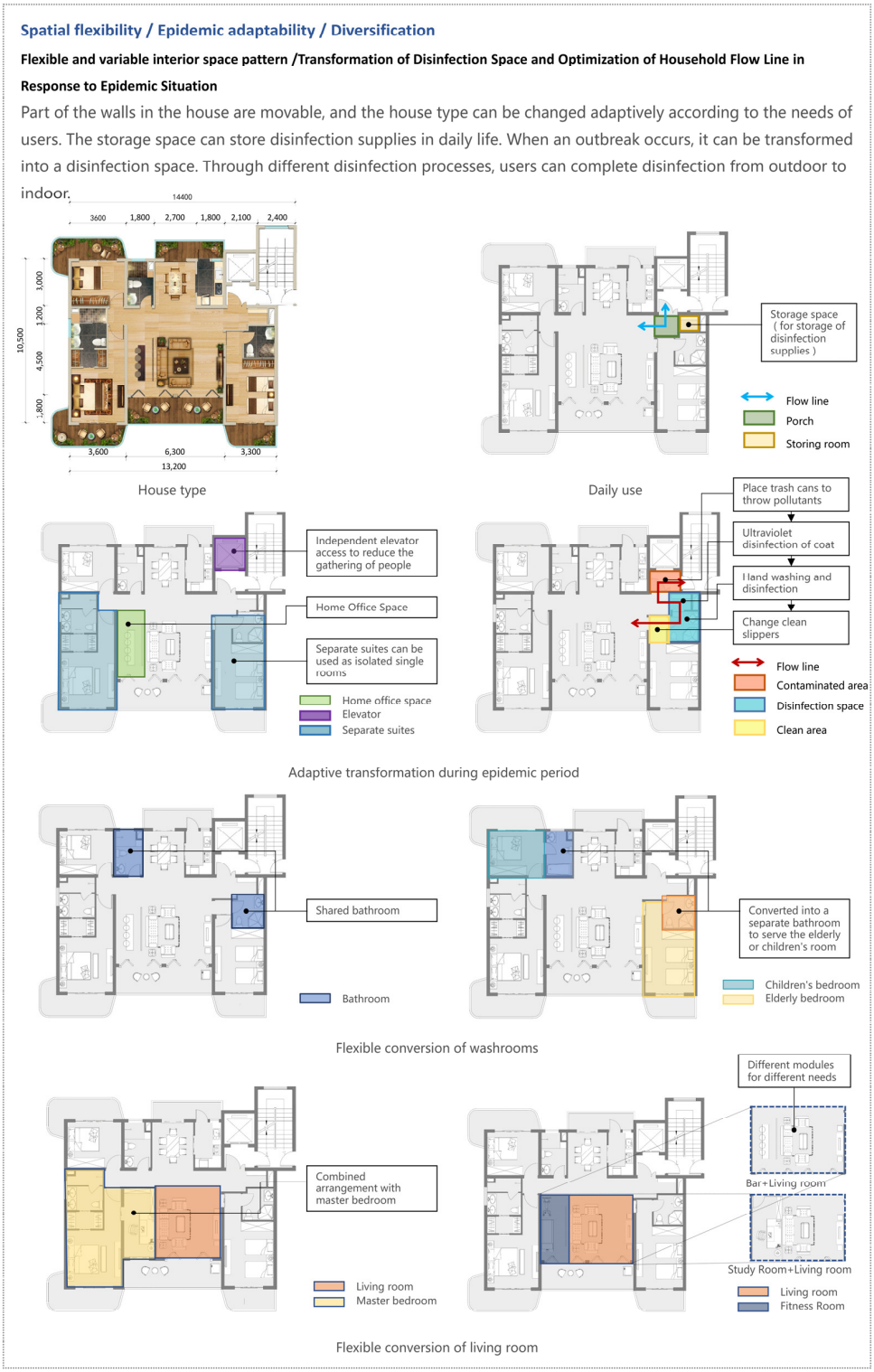

Figure 18. Design guidelines for medical care house type.

5. Conclusions

As the elderly caring demand is becoming increasingly diverse, leading enterprises have put forward the "warm equals the distance of a bowl of soup" marketing concept. This model conforms to the Chinese traditional "elderly caring at home, close community" tradition. This paper discusses the life-cycle of the medical care community and is a perfect practical adaption to this kind of "traditional Chinese filial piety culture". Exploring the inner connection between health and space from a new perspective is the foundation of

building a comprehensive service platform based on enterprise resources. Meanwhile, establishing a product value, which, based on consumer demand, is of great significance for the spatial translation of health demands in the new era. Based on the cross-study of behavioral psychology and environmental behavior, this paper firstly sorted out five aspects of community health including life safety, physical health, mental health, social adaptation and resilience recovery. Combined with the service needs and physiological/psychological needs of the target population, we screened the rehabilitation and safety needs of the functional dimension, the social and respect needs of the emotional dimension and the self-actualization needs of the developmental dimension, namely, the medical and nursing Maslow needs subset with 48 items in 5 categories of three dimensions. Then, based on the motivation theory, the linkage loop of "demand–emotion–motivation–behavior–space supply" is constructed to deduce what effective supply is from the needs of users, providing a theoretical basis for the realization of medical and nursing needs in service and space. In addition, based on the empirical research and analysis of the Wuzhishan medical care housing market, the spatial factors of the HBSI model were consulted and analyzed, and the spatial design theory was applied to translate the spatial factors into spatial planning strategies: planning theme differentiation and moderately mixed land use function layout; Building organic and cooperative stable spatial settlement organization; Setting up diversified, shared and healthy open space networks; Equipped with general and robust professional health care service facilities; Designing flexible and dynamic medical care homes that are adaptable and sustainable.

In view of the limitations of space, the study explored the sustainable growth of the life-cycle strategy for medical care communities based on the interaction of health and space. Referring to the Kano demand model [45], which classifies and prioritizes user needs, the service and space elements provided are divided into five categories. They consist of elements of Must-be, One-dimension, Attractive, Indifference and Reverse. Among them, irrelevant elements may change with time and community development stage. Based on this, the spatial configuration of the planning strategy is subdivided into basic strategy, selective strategy, growth strategy and substitution/transformation strategy (Figure 19). According to its spatial characteristics, marketing planning, construction investment status and selective allocation of development stage, medical care communities could have a strong index of staying in the community from self-care to semi-care and mediation, and from sub-health to health, hoping to achieve the core competitiveness of sustainable marketing of medical care communities. It provides a feasible path for the whole life-cycle development of the all-age medical care communities.

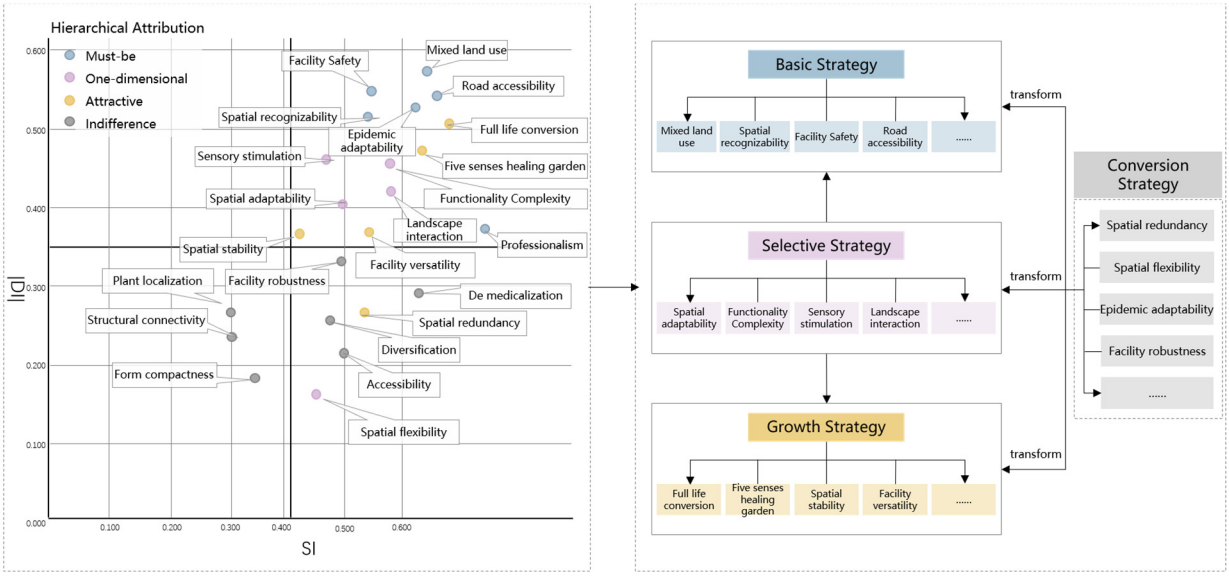

Figure 19. Classification of planning strategies based on Kano model.

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Appendix A

Table A1. HBSI Spatial Factors Consultation Table.

Health Dimension	Health Behavior Path	Space Design Objectives	Spatial Influence Factor	Very Unimportant 0 Point	Relatively Unimportant 3 Points	Regular 5 Points	Relatively Important 7 Points	Very Important 10 Points
Life safety	Reducing crime	Visibility	Unobstructed vision of activity space					
			The visual attraction of the activity space					
		Spatial hierarchy	Clear boundaries between public space and private space					
	Behavior safety	Identifiability	Identification of space environment					
		Territoriality	Semi-private space domain					
		Space buffering	Buffer space reserved around the entrance and exit of motor vehicles					
			Isolation and protection of landscape greening around roads					
		Facility security	Environmental facilities for safety protection					
		Path security	Path safety in pedestrian space					
			Safe connection between motor traffic and slow traffic					
	Disaster response	Traffic unblocked degree	The degree of patency of evacuation passages					
		Spatial redundancy	The possibility of being converted into an emergency shelter during a disaster					
Physical health	Reducing pollution exposure	Low pollution	Site away from pollution					
			Motor traffic pollution isolation and protection					
			Road density and flow control					
		Permeability	Lower building density					
			Good ventilation corridor					
		Street spatial configuration	The ratio of the height of buildings on both sides of a street to the width of the street					
			Roof form					
		Architectural layout	FAR					
			Building density					
			Building height					
			Road organization					
			Integration and dispersion of buildings					
		Greening rate	The proportion of greening land in total space					
		Air Pollution Index	Grade evaluation index of pollutant content in the air					

Table A1. *Cont.*

Health Dimension	Health Behavior Path	Space Design Objectives	Spatial Influence Factor	Very Unimportant 0 Point	Relatively Unimportant 3 Points	Regular 5 Points	Relatively Important 7 Points	Very Important 10 Points
Physical health	Enhancing physical activity	Functional complexity	Degree of mixed use of land					
			Road network density suitable for travel					
			Full range of services within walking distance					
		Walking accessibility	Connectivity of slow traffic systems					
			Clear and easily identifiable walking paths					
			Suitable walking length					
		Walking suitability	Comfortable walking space and facilities					
			Comfortable and pleasant walking environment					
			Safe walking paths and space facilities					
		Spatial adaptability	Works well in different seasons and weather conditions					
	Get close to nature	Green visibility	Proportion of green landscape in public space view range					
			Proportion of green landscape in master bedroom view area					
		Clustering	The proportion of centralized green space in the total green space					
			Vertical greening accounts for the proportion of total green space					
		Natural ecology	Intimate contact with the natural landscape space					
Mental health	Visual comfort	Spatial aesthetics	The visual sense of space environment is beautiful and comfortable					
		Space openness	Length-width ratio of public space					
			The permeability of space					
		Apparent green rate	The proportion of green plants in the visual environment					
	Health cognition	Healthy cognition	Health education and guidance of space					
	Landscape healing	Layout diversity	Diversity of landscape plant types and disposition					
		Sensory experience	Perceptibility and experience of landscape environment					
		Natural ecology	The continuity of the corridor with the surrounding natural landscape					
		Facility richness	Diversification of types of environmental facilities					
	Natural experience	Terrain richness	Topographic changes in the landscape environment					
		Proportion of native plants	Proportion of native plants in landscape configuration					

Table A1. *Cont.*

Health Dimension	Health Behavior Path	Space Design Objectives	Spatial Influence Factor	Very Unimportant 0 Point	Relatively Unimportant 3 Points	Regular 5 Points	Relatively Important 7 Points	Very Important 10 Points
Social adaptation	Social interaction	Spatial inclusion	Accommodate people of different ages and genders					
		Spatial vitality	Aggregation and continuity of environment and facilities					
		Spatial hierarchy	An open, private and orderly level of communication space					
	Leisure activities	Functional complexity	Multiple uses of external public space functions					
			Diversified and flexible use of the interior space of the house					
		Spatial adaptability	Space usability throughout the day and all ages					
			Adaptability of capacity					
		Spatial richness	Diversity of space activities and facilities					
Resilience recovery	Spatial resilience	Spatial stability	Stable community spatial structure					
			Stability of medical and residential spatial elements					
		Unit adaptability	The relative independence of nursing units					
			The interconnectedness of health care groups					
		Spatial redundancy	The possibility of changing the space among rescue, epidemic prevention and daily activities					
	Facility resilience	Structural connectivity	Structural connectivity of rehabilitation infrastructure					
		Functional complexity	Diversified and concentrated functions of medical and caring service facilities					

References

1. Zhu, J. The Demand and Satisfaction about "Combined Medical and Nursing" in the Community Care for the Elderly: Take Xuanwu District of Nanjing as an Example. Master's Thesis, Nanjing University, Nanjing, China, 2016.
2. ITO, M.; Zhou, Y.; Qin, L. Inspirations from the Deployment and Development Experiences of the Community-based Elderly Facilities in Japan for China. *Urban Plan. Int.* **2020**, *35*, 20–28.
3. Chen, Y.; Kang, J.; Lian, F. An Analysis of the Model of Integrated Health and Social Care for the Elderly Facilities in the UK and Its Impact. *Archit. J.* **2016**, *11*, 84–88.
4. Li, C. Health City: A Singapore Model for Integrating Health Care. *China Eng. Consult.* **2016**, *6*, 52–55.
5. Tong, C.; Wang, S. Review on the Combination of Medical Care and Pension. *Sci. Res. Aging* **2016**, *4*, 63–72.
6. Yu, Z.; Xu, Y. Cutting-edge Research and Hotspot Issues of in the Sphere of Elderly Care Service in China (1998–2018): An Analysis Based on CiteSpace. *Sci. Res. Aging* **2020**, *8*, 33–45.
7. Wu, Y.; Yang, J.; Chen, Q. Research Progress and Key Dimension Exploration of Healthy Community Construction: Based on the Analysis of International Knowledge Map. *Urban Plan. Int.* **2020**, *35*, 80–90.
8. King, L.A.; Hood, V.L. Ecosystem Health and Sustainable Communities: North and South. *Ecosyst. Health* **1999**, *5*, 49–57. [CrossRef]
9. Ellaway, A.; Macintyre, S.; Kearns, A. Perceptions of Place and Health in Socially Contrasting Neighbourhoods. *Urban Stud.* **2001**, *38*, 2299–2316. [CrossRef]
10. Vojnovic, I. Building Communities to Promote Physical Activity: A Multi-Scale Geographical Analysis. *Geogr. Ann.* **2006**, *88*, 67–90. [CrossRef]
11. Tan, S.; Guo, J.; Jiang, Y. Impact of Human Settlements on Public Health: New Frontier in Urban Planning Research. *Urban Plan. Forum* **2010**, *4*, 66–70.
12. Wang, L.; Liao, S.; Zhao, X. Exploration of Approaches and Factors of Healthy City Planning. *Urban Plan. Int.* **2016**, *31*, 4–9. [CrossRef]
13. Matlovicová, K.; Mocák, P.; Kolesárová, J. Environment of estates and crime prevention through urban environment formation and modification. *Geogr. Pannonnica* **2016**, *20*, 168–180. [CrossRef]
14. Au-Yong-Oliveira, M.; Sousa, M.J. Sustainable Marketing and Strategy. *Sustainability* **2022**, *14*, 3642. [CrossRef]
15. Matlovičová, K.; Mocák, P. Intraurbánna kriminalita a jej prevencia v konceptuálnom rámci CPTED (príklad mesta Prešov). *Geogr. Časopis* **2014**, *66*, 199–223.
16. Dong, J. The Construction of Urban Healthy Living Unit Based on Behavior Change Theory. Ph.D. Thesis, Harbin Institute of Technology, Shenzhen, China, 2010.
17. Liu, J. Community Epidemic Prevention Planning and Governance System against COVID-19 Epidemic. *Planners* **2020**, *36*, 86–89.
18. Pachura, P.; Nitkiewicz, T.; Matlovičová, K.; Matlovič, R. *Identification of Intellectual Capital Performance Using Data Envelopment Analysis*; Springer International Publishing: Cham, Switzerland, 2018; pp. 115–130.
19. Niwash, M.N.K.; Cek, K.; Eyupoglu, S.Z. Intellectual Capital and Competitive Advantage and the Mediation Effect of Innovation Quality and Speed, and Business Intelligence. *Sustainability* **2022**, *14*, 3497. [CrossRef]
20. Alexandre, T.D.S.; Cordeiro, R.C.; Ramos, L.R. Factors associated to quality of life in active elderly. *Rev. Saude Publ.* **2009**, *43*, 613–621. [CrossRef]
21. Grönroos, C. *Service Management and Marketing*; Lexington Books: Lexington, MA, USA, 1990; Volume 27.
22. Zhang, X.; Liu, B. Study on Quality Model of Community Home Care Service: A case study of Shanghai. *Chin. J. Popul. Sci.* **2011**, *3*, 83–92.
23. Grönroos, C. A service quality model and its marketing implications. *Eur. J. Mark.* **1993**, *18*, 36–44. [CrossRef]
24. He, W. Research on Architectural Design of Old-Age Facilities under the Combination of Medical Treatment and Health Care in Urban Community. Master's Thesis, Xi'an University of Architecture and Technology, Xi'an, China, 2017.
25. Waldron, V.R.; Gitelson, R.; Kelley, D.L. Gender differences in social adaptation to a retirement community: Longitudinal changes and the role of mediated communication. *J. Appl. Gerontol.* **2005**, *24*, 283–298. [CrossRef]
26. Chen, Z. A Study on the Adaptation of Existing Communities Based on Environmental Behavior. Master's Thesis, Nanjing University of Science & Technology, Nanjing, China, 2018.
27. Wang, Y. Research on the Impact of Urban Community Public Space on Residents' Emotions. Master's Thesis, Huazhong University of Science and Technology, Wuhan, China, 2020.
28. Du, M. A Study on Functional Design Strategy of Community Elderly Health-Care Facilities from Maslow's Hierarchy of Needs. Master's Thesis, Shenzhen University, Shenzhen, China, 2020.
29. McKenzie-Mohr, D. Fostering sustainable behavior through community-based social marketing. *Am. Psychol.* **2000**, *55*, 531–537. [CrossRef] [PubMed]
30. Li, Z.; Xie, X.; Zhang, Y. Review and Prospect on the Research of the Relationship between Built Environment and Mental Health: Literature Review Based on the Perspective of Restorative Environment. *J. Hum. Settl. West China* **2020**, *35*, 34–42.
31. Li, X. Research on Design Strategy of Urban Community Health and Care Complex for the Elderly. Master's Thesis, Shenzhen University, Shenzhen, China, 2020.
32. Zhang, K. Research on Planning and Design of Whole Age Community—A Case Study of Zhengding Community in Shijiazhuang. Master's Thesis, Beijing Jiaotong University, Beijing, China, 2020.

33. Zhang, Y.; Qin, B. The impact of urban built environment on residential physical health: Based on propensity score matching. *Acta Geogr. Sin.* **2018**, *73*, 333–345.
34. Hua, Y. Research on the Vitality Shaping of Living Street Space Based Behavioral Psychology—A Case Study of Dongguan Street in Yangzhou. Master's Thesis, East China University of Science and Technology, Shanghai, China, 2020.
35. Yu, S.; Liu, Y.; Cui, C.; Xia, B. Influence of outdoor living environment on elders' quality of life in old residential communities. *Sustainability.* **2019**, *11*, 6638. [CrossRef]
36. Luque-Reca, O.; Augusto-Landa, J.M.; Pulido-Martos, M. Emotional intelligence and depressive symptoms in Spanish institutionalized elders: Does emotional self-efficacy act as a mediator? *PeerJ* **2016**, *4*, e2246. [CrossRef]
37. Othman, A.R.; Fadzil, F. Influence of Outdoor Space to the Elderly Wellbeing in a Typical Care Centre. *Procedia Soc. Behav. Sci.* **2015**, *170*, 320–329. [CrossRef]
38. Afshar, P.F.; Foroughan, M.; Vedadhir, A.; Tabatabaie, M.G. Psychometric properties of the Persian version of Social Adaptation Self-evaluation Scale in community-dwelling older adults. *Clin. Interv. Aging* **2017**, *12*, 579. [CrossRef]
39. Wang, L.; Li, X.; Yang, X. Health in 15-minute Life Sphere: Community Response to Public Health Emergency. *Planners* **2020**, *36*, 102–106.
40. Fransen, J.; Peralta, D.O.; Vanelli, F.; Edelenbos, J.; Olvera, B.C. The emergence of urban community resilience initiatives during the COVID-19 pandemic: An international exploratory study. *Eur. J. Dev. Res.* **2022**, *34*, 432–454. [CrossRef]
41. Conroy, K.M.; Krishnan, S.; Mittelstaedt, S.; Patel, S.S. Technological advancements to address elderly loneliness: Practical considerations and community resilience implications for COVID-19 pandemic. *Work. Older People* **2020**, *24*, 257–264. [CrossRef]
42. Du, S.; Tan, H. Location Is Back: The Influence of COVID-19 on Chinese Cities and Urban Governance. *Sustainability* **2022**, *14*, 3347. [CrossRef]
43. Lv, B.; Sun, T. Study on Spatial form Compactness from Low-Carbon Perspective. *Geogr. Res.* **2013**, *32*, 1057–1067.
44. Wang, S.; Wei, C.; Yuan, Y.; Shan, Z.; Xiang, K.; Huang, J.; Zhang, T. Academic Discussions on Human Settlement Environmental Plan and Design in the Background of COVID-19 Epidemics. *South Archit.* **2020**, *3*, 49–56.
45. Hou, B. Research on the Demand Level and Satisfaction Strategy of Community Home-Based Care Service for Urban Elderlv. Ph.D. Thesis, East China Normal University, Shanghai, China, 2018.