Research on functional space of community-based medical-nursing combined facilities for the aged in small cities

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ABSTRACT
The aging of the population is accelerating. In China, the relationship between the differences in aged care and medical resources is being explored, but there is a lack of research on the aged care and medical needs of older people in the community and the functional space of aged care institutions. In this paper, questionnaires, interviews and observations were conducted with older adults over 60 years of age in a small urban community. Statistical methods were used to analyze their real needs in terms of living and health requirements. The results showed that 1) The number of members in the whole family was significantly associated with the choice of home care model. 2) There was a high demand for day care, emergency stations and home services among the seniors in the community. 3) Watching television, drinking tea, and growing vegetables and flowers were the most popular activities among the seniors. 4) There was a high demand for nursing services, medical services and medical equipment among the seniors in the community. Conclusion. Family service station, ornamental room, tea room, vegetable garden and healthy green environment should be the most basic functional spaces. Professional medical places for the seniors should be provided in the community.

1. Introduction
China has entered an ageing society. By 2015, 14.91 % of the total population is aged 60 and over, 10.5 % is aged 65 and over, and 1.65 % is aged 80 and over. And, there are 40 million older people with impaired mobility. According to the sixth census of China, Older people with mild and moderate mobility impairment account for 10.54% of the total population and older people with severe mobility impairment constitute 2% (Sun and Du 2016). At the same time, the number of older people who are unable to take care of themselves is increasing year by year, and there is an increased demand for different types of aged care facilities for older people with varying degrees of mobility impairment, as well as an increased requirement for health guidance, medical and nursing care services. China’s small cities account for approximately 49.68% of the population, and along with urbanization, the loss of population in small cities has led to adverse social phenomena such as changes in family structure, empty nesters living alone, and lack of care for the older people, and more and more older people with impairments need care and professional medical care. Therefore, it is important to improve the system of community aged care facilities, to provide comfortable care services for empty nesters and to provide professional medical care for the older people with impaired mobility. The close connection between medical and aged care resources is one way in which older people can be better served. “Medical care” includes health consultation and examination, disease diagnosis and treatment, major illness care and recovery, and end-of-life care, while “care” includes full-time care, day care, mental health, and recreational activities (Chen, Kang, and Lian 2016). There are three main types of aged care in China: home care, community care and nursing home care. So there are three ways to combine aged care with medical resources: aged care at home uses the medical resources in the community and in a certain area, aged care and medical services are provided in the community, and nursing homes can use the internal supporting medical resources (Li, Wang, and Yuan et al. 2018). These three modalities are not independent, they are interlinked, and aged care at home and aged care in the community are closely linked. There are no uniform industry standards for aged care facilities and medical facilities. Meeting the current living and health conditions of the older people who age at home in the community, it is increasingly important to study the functional space for the integration of medical and aged care in the community.

In 1994, “The Seven-Year Programme for the Development of China’s Ageing Work (1994–2000)” proposed increasing the number of welfare facilities for the older people, establishing community-based

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service organizations, and gradually improving the network of medical services for the older people. Subsequently, “The Outline of the Tenth Five-Year Plan for the Development of China’s Ageing Programme (2001–2005) (2001),” it was proposed that community health services should meet the basic medical needs of the older people. “The Eleventh Five-Year Plan for the Development of China’s Ageing Programme (2006),” it is proposed that medical coverage should be expanded and funding for the construction of medical and health facilities and aged care facilities should be increased. (Notice of the State Council on the Issuance of the Outline of the Tenth Five-Year Plan for the Development of China’s Aging Industry 2001; The 11th Five-Year Plan for the Development of China’s Aging Industry has been promulgated and implemented 2006). Since 2000, research has been carried out on various aspects of the community ageing model in terms of housing, service support and landscape systems. From the point of view of the occupants, the elderly themselves and the rooms in which they live were the first to receive attention. The functional types of housing, spatial relationships, accessibility, and the ageing of furniture are directly linked to the lives of older people. (Zhou, Lu, and Liu et al. 2009; Li and Li 2011; Zhou and Chen 2019; Zhou, Lin, and Lin 2012). The age, marital relationships, family relationships, physical condition, behavior, mental state and life behavior of older people reflect their real needs in the building (Hu, Qian, and Zhu et al. 2019; Lin, Song, and Lv 2012). In terms of living and activity spaces for the older people, a comparison is made between China and countries such as the UK, Japan and Korea, providing models and strategies for optimizing the design of living and activity spaces (Park, Lee, and Kim 2013; Hishida, Matsumoto, and Ueno 2010; Mu and Kang 2017).

In 2015, “The Guiding Opinions on Promoting the Integration of Medical Care and Health Care with Older people Services”, it was proposed that medical care and health care services should be integrated with aged care facilities (The General Office of the State Council forwarded the Guidance on Promoting the Combination of Medical and Health Care and Senior Care Services 2015). In 2017, “The 13th Five-Year National Plan for the Development of the Aging and the Construction of an Aging System”, it was proposed to establish a cooperation mechanism for medical and aged care and promote the integration of medical care (Notice of the State Council on the Issuance of the “Thirteenth Five-Year Plan” for the Development of the National Aging Career and the Construction of the Aging System 2017). Community healthcare resources, nursing home healthcare configurations and hospital configurations are very different within cities. From an overall resource placement perspective, planning interventions, age-appropriate renovation of older neighborhoods, community commercial support, landscape design, and recreational and cultural activities are necessary (Hu, Xu, and Che 2018; Xiong 2012; Ito, Zhou, and Qin 2020). In addition, the flow line of medical personnel, medical equipment usage, storage, work, rest and ancillary functions need to be considered. From the patient’s point of view, the study of the health care service condition, functional demand, functional structure, spatial characteristics and spatial layout related to the elderly is directly related to the health condition of the older people. (Chen and Chen 2018; Lin and Fu 2018; Wang, Yu, and Zhang 2018; Xu, Zhou, and Yu 2011; Lianghua, Zhou, and Wang 2018). Existing studies have investigated and studied the current state of aged care facilities and health care facilities in large cities and small cities. Most of these studies have focused on the study of the interior space of existing aged care buildings and the behavior of the older people, while there is less research on the requirements of the older people in the community. There is a lack of bottom-up research on the combined community-based aged care and medical care type. This paper selects typical old communities in small cities to distribute questionnaires and interviews to the older people in the field, using statistical methods to analyze the real senior living needs and medical needs of older people in small urban communities. The results of the study show that 1) the older population in the community is highly aged and the number of whole family members is significantly correlated with the choice of home care model. Age, family condition, number of older people and education level were significantly correlated with health condition. 2) A large number of empty nesters in the community stay at home during the day, so there is a high demand for day care, emergency help stations and home-based services. 3) The older people in the community have a small range of activities and a low quantity of activities. Watching TV, drinking tea, growing vegetables and flowers and strolling are the favorite activities of the older people. 4) The older people in the community require a high level of nursing services, medical services and medical equipment, and the demand for geriatric medical care is greater than the basic medical needs.

According to the real needs, it is transformed into a functional space for community aged care facilities. Provide ideas for the construction of combined aged
care and medical facilities for China and other aging countries, small Chinese cities and similar cities in other countries.

2. Current situation of old communities and medical resources in small cities

2.1. Urban classification and old communities in central cities

In China, cities are divided into 5 categories based on the number of people living in urban areas (Notice of the State Council on the Adjustment of the Standard of City Size Classification 2014). In China, cities are divided into 5 categories based on the number of people living in urban areas. Cities with an urban resident population of 10 million or more are considered biggest-city, 10 million to 5 million are mega-cities, 5 million to 1 million are large cities, and less than 500,000 are small cities. Small cities include: cities with 500, thousands-200, thousands of people are Type I small cities, and those with less than 200, thousands are Type II small cities. The “Green Paper on Small and Medium-sized Cities” indicates that by the end of 2019, most of the 368 county-level municipalities had urban populations in the tens of thousands. And, the country’s 1,580 county-level administrative divisions (1,463 counties and 117 autonomous banners) are not established cities, but their central towns gather a certain size of population, are close to established urban areas in terms of infrastructure and public services, and their residents enjoy urbanized life, so they belong to small cities (Committee on Economic Development of Small and Medium-sized Cities, China Society of Urban Economics 2010). On the whole, the number of small and medium-sized cities has nearly exceeded 2,160. Neixiang County is part of the established counties, the central city urbanization, urban resident population of 235,500 people, belonging to the type I small cities.

In 1980, when the reform and opening up began, the National Urban Planning Conference established the policy of “developing medium-sized cities reasonably and small towns actively”. Neixiang County is one of the communities in the development policy. Now there are 6 communities in Neixiang County, among which Beicheng Community (110 households), Xicheng Community (260 households) and Jiaoyu Community (300 households) are located in the center of the city, the earliest. The community is composed of almost all workers and cadres of that time, such as: doctors, teachers, lawyers, civil servants, employees of state-owned enterprises. Most of the residents are almost all older people, who entered retirement 10 years ago. These three communities, which were planned and built by the county government in a unified manner, so that the communities were built in the same era, with similar community size, indoor space, and outdoor environment, and a concentrated older population. So the studies of these three communities are representative.

2.2. The current situation of medical care in small cities – Neixiang county as an example

Medical resources within the city are divided into three levels of ten in accordance with the “Hospital Grading Management Standards” from five major aspects such as hospital size, technical level, equipment, management level, and service quality. According to on-site statistics, there are three hospitals within a 2 km radius of the community, the Second People’s Hospital, the Chinese Hospital, and the Town Health Service Center in the outer circle of the three communities. There are two geriatric clinics, one general clinic, and four private

![Image of hospitals and clinics](image_url)

**Figure 1.** Exterior of hospitals and clinics.
pharmacies within a 1 km radius of the community on Dacheng Road (Figure 1). The current medical and aged care resources are not closely enough connected. During the interview process, we knew that private clinics for the aged near the community did not have professional medical staff and medical equipment. Nevertheless, the First People’s Hospital in the county used to run a recreation center for the elderly, but because of the high price, distance of more than 2 km, and lack of green environment for recovery, the number of people going there became less and less, and finally it was discontinued. However, community health care type facilities are not within the hospital hierarchy management, its scale, technology, equipment, management and service quality are smaller than hospitals and larger than clinics and pharmacies.

3. Research subjects and research methods

The research object of this paper is the older people above 60 years old in Beicheng Community, Xicheng Community, and Jiaoyu Community of Chengguan Town, Neixiang County. The North City community was built in 1980, and the West City and Education communities were built in 1985, making them “senior” communities where more than half of the residents are over 60 years old. According to the data from the population department of the town government, it is known that According to the town government’s population department, 67% of the people in these three communities are over 60 years old, 21% are nearly 60 years old, and 12% are middle-aged people, young people and children.

In this paper, we obtained information about the older adults in the community through in-community observation, questionnaires, and door-to-door interviews. Secondly, statistical methods were used to describe the basic information of the older people using mean, frequency and percentage using SPSS Statistics 24, and correlation analysis was conducted between the choice of aged care modes and health condition and the basic information. Then, the living, recreational and medical needs of the older people were analyzed using a combination of quantitative and qualitative methods, which were translated into the space. The research process was divided into three stages: in the first stage, in order to better understand the residents’ living and medical environment and to ensure the authenticity of the older people’s interviews. Before the interviews, the researchers were stationed in the community life from April 25th to May 1st, 2019 to observe the older people. A questionnaire was developed based on the information in the literature, and a pre-study of five older adults was conducted on May 2nd. In the second stage, the content of the questionnaire was adjusted in the evening of May 2nd to add the content of recreation and fitness for the older people based on the interviews. From May 3rd to May 9th, 2019, the researchers distributed 240 questionnaires to the resident older people, and when the questionnaires were returned, appointments were made with the older people for the interviews (Figure 2). A total of 210 valid questionnaires were returned (62 in the North City community, 76 in the West City community, and 78 in the Education community), and 30 of the questionnaires were judged invalid. Among them, 15 questionnaires were missing more than 15% of their content, 8 questionnaires had a high degree of similarity, and 7 questionnaires had contradictory content.

The content of the questionnaire was divided into three parts:

(1) The basic situation of the older people, including age, income, occupation, health insurance, family members, number of seniors and young

| Table 1. Basic information for older people. |
| NO | Content                                      |
|----|---------------------------------------------|
| 1 | How old are you?                            |
| 2 | What is your profession?                    |
| 3 | How much is your pension                    |
| 4 | Do you have health insurance?               |
| 5 | How many people live in your household?     |
| 6 | Do the children still live locally?         |
| 7 | What is your living style? Single or couple? |
| 8 | Are you happy with your life now?           |
| 9 | What kind of retirement do you prefer?      |
| 10| What is most needed in community aged care facilities |
Table 2. Health status of the older people.

| Level | Disease |  
|-------|---------|
| Severe| Needs a wheelchair or assistance when walking, often at home |
| Moderate| Needs a stick to walk but does not require assistance |
| Mild | Hypertension, diabetes, heart disease, others |
| Health | Occasionally cold, fever, cough, arthritis |

Severe, moderate and mild of people may suffer from 1–2 chronic diseases at the same time, for example: hypertension, heart disease, diabetes and others. The distinction is that the severe requires another person and a wheelchair to live, the moderate requires a care, and the mild can be independent.

Table 3. Medical care needs of the vulnerable groups.

| Seek Medical Treatment | Distances | Reasons |
|------------------------|-----------|---------|
| Pharmacy | ≤0.5 km | 1. What disease do you have? |
| Clinic | 0.5 km–1 km | 2. Where did you go for treatment in a fortnight? |
| Hospital | 0.5 km–1.5 km | 3. Why did you choose to go to this place for treatment? |

Table 4. Daily life for the older people.

| Category | Disease |  
|----------|---------|
| Interests | Do you have any leisure and recreational activities in your daily life? |
| Strolling spot | Do you have a place where you exercise and walk regularly? |
| Retirement life | What is your ideal retirement life? |

In the third stage, interviews were conducted at home from May 10 to 9 June 2019, with seven people interviewed each day. The questionnaires and interviews were entered into SPSS Statistics 24 in time for the day. Finally, the information was organized and analyzed.

4. Analysis of the needs of older people in the community for aged care and medical treatment

4.1. Basic information analysis of the older people

The Standard for design of care facilities for the aged JGJ450-2018 classifies older people according to their self-care ability: intact (healthy), mildly impaired mobility (mild), moderately impaired mobility (moderate), and severely impaired mobility (severe). Mildly impaired older adults require mediated external assistance for mobility, moderately impaired older adults require human assistance for walking, and severely impaired older adults require complete human care. During the interview process, the elderly were categorized by observation and chatting with them.

Statistically (Table 5), the lower age group within the three communities accounted for 24.76% (60 to 69 years old). The largest number of people was middle-aged seniors accounting for 42.86% (70 to 79 years old). The next highest number of senior citizens (80 years old and above) accounted for 32.38%. The minimum age of respondents was 60 years old and the maximum was 92 years old, with an average age of 76.65 ± 7.946 (± s), and the number of seniors aged 70 and above was more than 75%. Twenty-six older adults had children who were also approaching 60 years of age, so the number of older adults is expected to continue to increase in the coming years. In terms of family condition, more than half of the sons and daughters chose a new home after starting a family and no longer live with their parents. 73.4% of the elderly were empty nesters, of which 50.5% were couples and 22.9% were singles. The percentage of seniors living with their children was 26.7%, with 20.9% more singles (23.8%) than couples (2.9%). Consequently, 97.2% of seniors are home alone during the day when adults go to work and children go to school, and the incidence of safety problems due to falls, wrong medication, and acute attacks of disease in seniors alone at home is as high as 38.03% (Zhang and Han 2020; Tang, Xie, and Chen et al. 2021). The lower age of the older adults in the community tends to be higher. There will be a large number of empty nesters staying home during the day, mainly those aged 70 and above.

In terms of self-care ability, 39% of older adults can walk and live independently, however, they cannot complete the contents of their lives independently, 60.95% (128) of them are moderate and severe, and 22.9% need care completely. In terms of medical insurance, most of them are retired workers with employee medical insurance, and the rest of the seniors have new rural cooperative medical insurance. The seniors generally have low income, but all have medical insurance. In terms of pension, merely 16.67% are greater than or equal to 3,000 yuan, more than 60% of the older adults pension between 1,000–2,999 yuan (26.19% in 1,000 to 1,999 yuan, 40.95% in 2,000–2,999 yuan), but 13.33% of the pension is less than 1,000 yuan, 2.86% of the senior have no source of income, relying on children to support. The average pension for seniors in the community is 2000 yuan. In addition, three types of aged care (home care, community care and nursing home care) are available for seniors to choose. The result is that 93.33% expect community aged care combined with medical care (72.86% choose aged care at home, 20.47% prefer community aged care) and 6.66%
choose nursing home care. Meanwhile, Spearman’s correlation analysis of aged care model and health condition separately with basic attributes found that family condition and the number of older people were correlated with the choice of aged care model. In particular, the number of whole family members was significantly correlated with the choice of retirement mode. Age, family status, number of older people and education were significantly correlated with health condition (Table 6).

### 4.2. Analysis of the life needs of the older people

The life of the seniors is very regular and simple. Basic life consists of waking up, cooking, eating breakfast, grocery shopping, relieving oneself, traveling, making lunch, napping, doing housework, maintenance, dinner, bathing, and sleeping (Li, Zhao, and Tang et al. 2019; Wu, Hu, and Zhan et al. 2016; Li, Wang, and Li et al. 2016). There is variability in the needs of older adults (Table 7). There are six categories in total. The largest part was in emergency care (Health 47, Mild 28, Moderate 13, Severe 17), accounting for 50%. Within the community, the provision of meals (Health 8, Mild 5, Moderate 3, Severe 7) and home delivery of vegetables (Health 12, Mild 10, Moderate 4, Severe 11) constituted 11% and 17.6%. Housekeeping and maintenance (Health 6, Mild 9, Moderate 3, Severe 12) is at 14.3%. The least is in bathing (Health 9, Mild 4, Moderate 4, Severe 4) with just 7.1%.

In terms of providing housework and maintenance. The needs of severely and slightly impaired seniors were high (40% and 30% respectively), significantly higher than the needs of healthy seniors (20%). On the contrary, in terms of emergency help, the healthy older people have twice the needs of the severely seniors (44.8% and 16.2%, respectively). In bathing, the needs of the healthy seniors are six times greater than the needs of the severely elderly, accounting for 60% and 6.7%. These figures are different from the conventional knowledge that the needs of the healthy seniors are greater than the needs of the impaired seniors in terms of emergency assistance.

In providing community meals. The number of choices was 8 and 7 for severe seniors and healthy combinations.

### Table 6. Sample characteristics of the survey.

| Variable                           | Primary School | Percentage | Variable                           | Primary School | Percentage |
|------------------------------------|----------------|------------|------------------------------------|----------------|------------|
| Age 60 - 69                         |                | 24.76%     | Age 60 - 69                         |                | 80%        |
| Age 70 - 79                         |                | 42.86%     | Age 70 - 79                         |                | 13%        |
| Age 80+                             |                | 32.38%     | Age 80+                             |                |            |
| Family situation                    |                |            |                                    |                |            |
| Living with children                |                | 28.1%      | Living with children                |                |            |
| Not living with children            |                | 71.9%      | Not living with children            |                |            |
| Single                             |                | 26.7%      | Single                             |                |            |
| Couple                             |                | 73.3%      | Couple                             |                |            |
| E-N Singles                        |                | 22.9%      | E-N Couples                        |                |            |
| E-N Couples                        |                | 50.5%      | SLC                                 |                |            |
| SLC                                |                | 23.8%      | CLC                                 |                |            |
| CLC                                |                | 2.9%       | Health Insurance                   |                |            |
| Employee health insurance           |                | 89%        | Pension                             |                |            |
| New Rural Cooperative Medical Insurance |        |            |                                     |                |            |
| Education                          |                |            |                                     |                |            |
| Secondary School                   |                | 31%        | Secondary School                   |                |            |
| Middle School                      |                | 86%        | Middle School                      |                |            |

E-N = empty nest, SLC = Single living with children, CC = Couple living with children.

### Table 7. Living needs of older people.

| Requirement                          | Frequency | Percentage |
|--------------------------------------|-----------|------------|
| Housekeeping and maintenance         | 24        | 14.3%      |
| Emergency assistance                 | 58        | 50%        |
| Home delivery of vegetables           | 25        | 17.6%      |
| Bathing                              | 6         | 7.1%       |
Table 8. Recreational needs of older people.

| Requirements                        | Frequency | Percentage |
|-------------------------------------|-----------|------------|
| Watching TV and drinking tea        | 98        | 46.7%      |
| Reading books or playing chess      | 17        | 8.1%       |
| Strolling                           | 23        | 11%        |
| Growing vegetables and flowers      | 60        | 28.6%      |
| Playing badminton                   | 12        | 5.7%       |

Table 9. The intensity of the recreational program.

| Place                              | Hobbies             | Intensity Level |
|------------------------------------|---------------------|-----------------|
| Bedroom and living room            | Watching TV, Drinking tea, Reading books, Playing chess | Low             |
| Park or riverfront (0.5 km-1.5 km) | Strolling           | Low             |
| Balcony and Courtyard              | Gardening           | Medium          |
| Community or square (0.5 km-1.5 km)| Badminton           | High            |

seniors (30.40% and 34.8%, respectively). Similarly, in providing vegetables at home, the number of choices was high for the severe seniors and healthy seniors, 29.7% and 32.4%. This is because, the severe seniors do not self-care, and the healthy seniors’ family members go out during the day. As with common sense, the impaired seniors were weaker than the healthy seniors in terms of mobility (Figure 3).

4.3. Analysis of the life needs of the older people

Hobbies and proper exercise are beneficial to the health of the older people. The leisure life of the seniors in the community includes watching TV, drinking tea, reading books, playing Chinese chess, planting vegetables, gardening, playing badminton, taking walks and watching the scenery. More than half of the older adults chose low-activity activities, with 46.7% of them (Health 36, Mild 27, Moderate 12, Severe 23) watching TV and drinking tea at home during the day and 8.1% (Health 6, Mild 4, Moderate 2, Severe 5) read a book in the morning or play chess with friends in the afternoon. The 11% of older adults who like to go to the plaza to chat or laze around in the yard on a daily basis have no hobbies. On the other hand, 28.6% of seniors choose moderately active activities, with 25.78% (Health 27, Mild 16, Moderate 5, Severe 12) of seniors spending more time in the yard growing vegetables or flowers. However, 5.7% of the older adults use their leisure time to play badminton. (Tables 8, 9).

They generally walk around the community and have a small range of activities. roads, alleys (Health 25, Mild 27, Moderate 11, Severe 35) and town plazas (Health 29, Mild 30, Moderate 31, Severe 65) in the community within 0.5 km are Older adults go for morning and evening walks. Fewer people (Health 2,

Table 10. The intensity of the recreational program.

| Range of activities for older people | Courtyard, Community | Pliazza | Senior Activity Centre | Park or riverfront 0.5 km-1.5 km |
|--------------------------------------|----------------------|---------|------------------------|----------------------------------|
| Level                               | 0.2-0.5 km           |         | 0.95%                  | 12.38%                           |
| Health                              | 11.9%                |         | 13.81%                 |                                  |
| Mild                                 | 12.86%               |         | 14.29%                 | 3.81%                            |
| Moderate                             | 5.24%                |         | 14.76%                 |                                  |
| Severe                               | 16.67%               |         | 15.24%                 | 0.48%                            |

Figure 3. The relationship of life needs between different health states.
Mild 2, Moderate 2, Severe 1) go to the senior activity center (3.9%) because that place is noisy. They (Health 26, Mild 8, Moderate 0, Severe 6) prefer to go to a place with good natural environment, to a green area by the river at a distance of 0.5–1 km for viewing and walking (10.15%). They can exercise and feel comfortable (Table 10).

Among the static activities, watching TV and drinking tea were the most popular activities among the older adults. It has four times the number of people than the other two activities. Among dynamic activities, growing vegetables and flowers in the yard brings many benefits to older adults. But the number of healthy older adults is significantly lower in the exercise program (Figure 4). Contrary to conventional perceptions, almost none of the older adults go to the nearest senior activity center in their community and have little choice of fitness equipment in the plaza. Therefore, simple, healthy, physically and mentally pleasing activities that are easy to accomplish are needed in the lives of older adults.

### 4.4. Recreational Needs of the Older people

Among them, 90% suffer from 1–3 chronic diseases. For example: hypertension, coronary heart disease, diabetes, hyperlipidemia, lung disease, indigestion, allergies, arthritis and other chronic diseases. Older people have more daily illnesses, such as: cold, fever, cough, arthritis, etc. The need for daily visits to the doctor is highly related to the medical resources in the community (Lin, Yan, and Yang et al. 2020; Cheng, Cao, and Hou et al. 2019; Zhai, Yang, and Song et al. 2015), The demand for pharmacies, clinics, hospitals and the requirement for medical resources in the community interact with each other among the older adults. In the survey, older adults frequently went to 2–3 different places for treatment over a two-week period. This study then took the place they went to most often as the place they needed and the reason they went to that place as their most needed requirement.

Statistically, 27.35% of seniors (Health 22, Mild 18, Moderate 4, Severe 13) frequent pharmacies within 0.5 km outside of their community because they have a cold or flu and ask the clerk for simple health advice or to buy over-the-counter medications, their needs are simple (Figure 5). When 46.09% of seniors (Health 10, Mild 32, Moderate 11, Severe 16) suffer from

![Figure 4](image-url)  
**Figure 4.** Relationship of recreational needs between different health states.
dizziness, nausea, indigestion, allergies, arthritis, etc., they choose to go to private clinics, Chinese massage and private geriatric clinics within 0.8 km of their communities for consultation. Because massage, acupuncture, and long-term medication can relieve the pain caused by chronic diseases in old age, their needs are for consultation, buying Chinese medicine, massage, and acupuncture services. When they need specialized medical services such as professional medical check-ups, specialized geriatric care, routine hospital laboratory tests, specialized medical services, medical equipment and rehabilitation training, 26.56% of the seniors (Health 32, Mild 6, Moderate 9, Severe 34) choose the second people's hospital slightly farther away (within 1 km) because they suffer from serious diabetes, heart disease, hypertension, asthma, etc (Tables 11,12).

Healthy older adults had the highest proportion of visits to pharmacies and hospitals because they can be cured at pharmacies if they have a common illness, and they can go to hospitals alone if they have a serious geriatric attack (Figure 6). Conversely, older adults with mild mobility impairment had the highest visits to geriatric clinics, followed by pharmacies, and the least visits to hospitals, because minor symptomatic conditions can be relieved by treatment at geriatric clinics. The situation for moderate impairment is similar to that for mild impairment. Nevertheless, the high percentage of severely impaired seniors in hospitals is due to the fact that they are severely ill not only need to go to hospitals for review, but also receive professional medical care from health care professionals to provide them with professional medical services, such as regular diagnosis, medication feeding, body scrubbing, clothing changes, and using professional medical equipment in hospitals, such as oxygen machines, nursing beds, and electrocardiogram. It can be seen that the functions of pharmacies and clinics around the community can satisfy the basic medical needs of the older adults. The medical services, nursing services and

Figure 5. The interior of a geriatric clinic in the community.

Figure 6. The relationship of medical needs between different health states.
medical equipment in the community do not meet the needs of the older adults.

5. The requirements of the older people are converted into functional space

Through the above analysis, the living needs, recreational needs and medical needs of the older people have been obtained. The functional space of community aged care facilities is discussed according to the requirements, and we refer to two Chinese architectural design codes in the transformation process. The standard does not specify the basic functional space of medical rooms, recreational rooms and management rooms, and this paper adds some content. Community aged care facilities should contain four modules, aged care module, recreation and fitness module, medical module, and management module.

5.1. Aged care module

The existing model of aged care in the community is home care. There are a large number of senior citizens and empty nesters living in the community who tend to stay at home, and they face unattended conditions during the day and are likely to have safety problems. So the demand for day care is greater than the demand for full day care.

Emergency assistance is the most important function needed by all seniors, followed by the provision of household and maintenance services, and finally, the provision of meals and vegetables at home in the community. Seniors with mobility impairment who are unable to care for themselves at home during the day have the greatest need for housekeeping and maintenance services, and the provision of vegetables at home. They have a greater need for temporary in-home services. Therefore, emergency help station > home service > community service.

The community aged care module contains home service rooms, day care rooms and full day care rooms. The home service station contains two basic functions: emergency assistance and temporary home service, with staff on 24 h shifts, and should be used as a basic functional space for community aged care facilities. The day care room should be the main module, and the full day care room should be supplementary. Standard for design of care facilities for the aged” JGJ450-2018 and Community Day Care Center for the Aged Construction Standard Jianbiao 143–2010, which has detailed requirements for the size, scale and accessibility of living rooms. The construction standards for day care rooms and full day care rooms can refer to the specifications. Day care rooms should be set up for dining, meal preparation, rest rooms, health rooms, bathing and other rooms. The seniors with moderate mobility impairment are configured according to living units, providing necessary functional spaces such as resting space, bathroom, toilets, dining, bathing, and dirt room. On the other hand, nursing beds are provided for the seniors with severe mobility impairment. The living room should be configured according to the material unit, providing necessary functional spaces such as rest space, daily living room, family visiting room, meal preparation, dining, independent toilet, washing, independent bathing, medicine storage, dirt room, cleaning room, washing room, nursing station, etc.

5.2. Recreation and fitness module

Older adults in small urban communities prefer simple, enjoyable, and easy to accomplish recreational activities. Most older adults move around in yards, neighborhoods, and squares within a 1 km radius from their homes, but they rarely use the fitness equipment in the squares. Their favorite activities are watching TV and drinking tea, and due to their educational background, they seldom read books or play chess. However, they like growing vegetables and flowers because they had farming experience as children and are self-sufficient.

The recreation and fitness module contains indoor rooms and outdoor areas. Older people in the community prefer lower activity levels, and healthy older people have low activity levels. In order to create a natural and quiet outdoor environment and promote proper exercise for the older people, the construction of outdoor environment is more important than indoor. Indoors, viewing rooms and tea rooms should be used as the most basic functional rooms, and reading rooms and chess rooms should be set up according to the actual situation. In outdoor, green environment and vegetable planting should be used as basic functions. Rehabilitation grounds can be set up in conjunction with the green environment, while badminton courts should be set up as the case may be. The field should use the outdoor open space or roof.

5.3. Medical module

A medical module within a community senior living facility can closely link aged care at home with medical resources. Existing pharmacies and clinics around the community can satisfy seniors with treatment for colds, fevers, and minor geriatric illnesses (dizziness, nausea, indigestion, etc.). Nonetheless, the high level of nursing services, medical services and medical equipment do not meet the needs of the elderly who age in place in the community (hypertension, diabetes, lung disease, etc.). Therefore, the demand for geriatric care in the community is greater than the basic medical needs.

The medical module contains general medical rooms and geriatric medical rooms. The corresponding functional spaces of general medical rooms are
comprehensive consultation office, comprehensive outpatient clinic, pricing and charging, dispensary for western medicine, Chinese traditional medicine, nurses’ station, infusion room, health care massage room, acupuncture room, and geriatric consultation room. On the other hand, the needs of older people with geriatric diseases are complex. Impaired older people in the community need blood pressure measurement, physical examination, blood chemistry, and geriatric diagnosis services. Older people with severely impaired mobility need professional medical examination, regular diagnosis, medication feeding, body scrubbing, clothing change, nursing beds, oxygen machines, diagnostic equipment, and regular rehabilitation training. Therefore, the functional spaces corresponding to geriatric medical rooms are physical examination room, laboratory room, examination room, geriatric consultation room, medicine changing room, washing room, nurse’s station, medicine preparation room, first aid room, treatment room, rehabilitation training room and other functional spaces.

5.4. Management module

The management maintains the normal operation of the aged care facility. The director, office staff, and security guards are the management staff, who are responsible for the operation of the entire facility. Doctors, nurses, home-based caregivers, and medical caregivers are the service staff who are responsible for serving and caring for the impaired seniors.

The management service module contains operation rooms and supporting service rooms. The operation room should be equipped with office, lounge, meeting room, registration room, reception room, security monitoring room and waiting room. The supporting service room should be set up with a file room, medical office, rest room, duty room and other spaces. The kitchen and laundry room are also service rooms. The kitchen should avoid interference with the elderly room, and the laundry room needs to meet the needs of laundry, disinfection, folding and storage. The specific function, spatial scale and size are determined according to the actual situation.

6. Conclusion

This paper obtains information about the elderly in small communities through observations, questionnaires, and door-to-door interviews in small urban communities. Statistical methods were used to analyze the needs of the older people. The results show that 1) the older adults in the community are highly aged, family condition and the number of seniors have a great influence on their choice of aged at home, and the number of whole family members is significantly correlated with the choice of aged at home model. Age, family condition, number of seniors and education level are significantly correlated with health condition. 2) A large number of empty nesters in the community stay at home during the day, and there is a great demand for day care, emergency assistance stations and home care services. 3) The older people in the community have a small range of activities and a small amount of activities. Watching TV, drinking tea and planting vegetables and flowers are the favorite activities of the senior citizens. 4) The senior citizens in the community need a high level of nursing services, medical services and medical equipment, and the demand for geriatric medical care is greater than the basic medical needs.

The following conclusions were obtained after the discussion: 1) In the aged care module, the family service station should be used as the basic functional space of community aged care facilities, containing two basic functions of emergency assistance and temporary home service. (2) In the recreation and fitness module, the viewing room and tea room should be the most basic functional rooms, and other rooms should be set up according to specific conditions. Outdoor basic functions should have vegetable planting garden and healthy green environment. Activity rooms and fitness equipment with high intensity of activities should not be set up. 3) In the medical module, general medical rooms can satisfy the basic requirements, while medical rooms for geriatrics should be built according to high standards, with additional professional equipment and medical personnel.

In China’s small cities with aging populations, the adequate integration of aged care facilities and medical resources in the community is beneficial to the healthy aging life of the aged. It is hoped that this article will provide data for similar studies in small cities in China and in other countries, and that it will draw the attention of experts and scholars to the integration of health care in small urban communities.

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References

The 11th Five-Year Plan for the Development of China’s Aging Industry has been promulgated and implemented.
25 September 2006. http://www.gov.cn/jrzg/2006-09/25/content_397488.htm

Chen, Y., J. Kang, and F. Lian. 2016. “Analysis and Experience Learning of Medical and Health Care Integration Model in UK Elderly Facilities.” Journal of Architecture (11): 84–88.

Chen, Z., and G. Chen. 2018. “Exploring the Spatial Types and Adaptive Development of Medical and Nursing Care Facilities—a Case Study of Beijing Region.” Journal of Architecture (S1): 29–33.

Cheng, Y. Y., Z. Cao, J. Hou, et al. 2019. “Survey on the Current Status of Chronic Diseases and Co-morbidity Association Analysis in Chinese Middle-aged and Aged Population.” Chinese Journal of Disease Control 23 (6): 625–629.

Committee on Economic Development of Small and Medium-sized Cities, China Society of Urban Economics. 2010. Report on the Development of Small and Medium-sized Cities in China. Social Science Literature Press.

The General Office of the State Council forwarded the Guidance on Promoting the Combination of Medical and Health Care and Senior Care Services. 20 November 2015. http://www.gov.cn/xinwen/2015-11/20/content_2969404.htm

Hishida, K., M. Matsumoto, and J. Ueno. 2010. “Types of Human Gathering in Small-scale Elderly Care Facility.” Journal of Asian Architecture and Building Engineering 9 (2): 415–421. doi:10.3130/jaabe.9.415.

Hu, B., X. Qian, B. Zhu, et al. 2019. “Willingness of Older Adults in Xuzhou Urban Area to Age at Home in the Community and Factors Influencing Them.” Chinese Journal of Gerontology 39 (6): 1475–1479.

Hu, H., Z. Xu, and G. Che. 2018. “A Methodological Exploration of Converting Residences into Residential Care Facilities for the Elderly in Old Communities—A Case Study of Chaoyang District, Beijing.” Journal of Asian Architecture and Building 17 (3): 409–416.

Ito, M., Y. Zhou, and L. Qin. 2020. “Implications of Japan’s Experience in the Development of Community-embedded Aged-care Facility Configuration for China.” International Urban Planning 35 (1): 20–28.

Li, B., and Q. L. Li. 2011. “A Comparative Study on the Spatial Structure and Living Behavior Expansion of Nursing Care Facilities.” Journal of Architecture (S1): 153–159.

Li, B., Y. M. Wang, X. Li, et al. 2016. “Demand for Urban Community Aged Care Services and Its Influencing Factors”. Journal of Architecture (S1): 90–94.

Li, X., F. Wang, S. Yuan, et al. 2018. “A Study on the Current Situation of Community Health Service Centers’ Participation in Combined Medical and Health Care Services.” China Health Policy Research 11 (11): 51–55.

Li, Y., J. Zhao, Q. Tang, et al. 2019. “Current Status of Disability among Aged People Living in Residential Care Institutions and Factors Affecting Quality of Life of Disabled Elderly People.” Chinese Journal of Gerontology 39 (5): 1213–1216.

Lianghua, D., D. Zhou, and L. Wang. 2018. “Study on the Spatial Strategy of Combined Medical and Health Care Facilities in Urban Communities.” Modern Urban Research (8): 7–12.

Lin, L., C. Yan, Y. Yang, et al. 2020. “Bypass Behavior of the Elderly in Guangzhou for Minor and Chronic Diseases and Its Influencing Factors.” Tropical Geography 40 (6): 993–1003.

Lin, W. J., and B. P. Fu. 2018. “Study on the Configuration and Spatial Design of Medical Rooms in Medical and Nursing Care Institutions.” Journal of Architecture (S1): 34–39.

Lin, W. J., N. N. Song, and X. Lv. 2012. “A Preliminary Study on the Current Living Situation and Community Service Needs of Senior Citizens Living at Home.” Journal of Architecture (S2): 174–177.

Mu, J., and J. Y. Kang. 2017. “A Comparative Study on the System and Spatial Design of Nursing Care Facilities in China and Britain.” Journal of Architecture (3): 102–106.

Notice of the State Council on the Adjustment of the Standard of City Size Classification. 29 October 2014. http://www.gov.cn/zhengce/content/2014-11/20/content_9225.htm

Notice of the State Council on the issuance of the “Thirteenth Five-Year Plan” for the Development of the National Aging Career and the Construction of the Aging System. 28 February 2017. http://www.gov.cn/zhengce/content/2017-03/06/content_5173930.htm

Notice of the State Council on the issuance of the Outline of the Tenth Five-Year Plan for the Development of China’s Aging Industry. 22 July 2001. http://www.gov.cn/zhengce/content/2016-09/23/content_5111148.htm

Park, S. J., H. Lee, and M. J. Kim. 2013. “Mixed-Use Facility Model for the Welfare of the Elderly Based on Lifestyle.” Journal of Asian Architecture and Building Engineering 12 (2): 245–252. doi:10.3130/jaabe.12.245.

Sun, J., and P. Du, eds. 2016. China’s Population Aging and Aging Career Development Report 2015. People’s University of China Press.

Tang, S. Y., Y. F. Xie, L. H. Chen, et al. 2021. “A Survey of Home Safety Risk Factors among Urban Empty Nesters in Fuzhou.” Nursing Research 35 (8): 1384–1389.

Wang, F., L. H. Yu, and Q. Zhang. 2018. “Functional Enhancement and Optimal Configuration of Urban Community Medical Service Facilities from the Perspective of Medical and Health Care Integration.” Journal of Architecture (S1): 23–28.

Wu, K., X. Hu, Y. Zhan, et al. 2016. “Analysis of Residents’ Demand for “Combined Medical and Nursing Care” in Chengdu.” Medicine and Philosophy(A) 37 (12): 52–54.

Xiong, W. 2012. “Countermeasures of Aging-friendly Design in Residential Planning.” Planner 28 (S1): 89–92.

Xu, Y., D. Zhou, and Z. Yu. 2011. “An Analysis of Planning and Design of Health Care Facilities for the Aged in Urban communities–A Survey on the Reality of Aged Users in Xi’an.” Urban Planning 35 (9): 68–73.

Zhai, J. H., H. X. Yang, A. Q. Song, et al. 2015. “A Study on the Demand and Utilization of Health Services for Empty Nesters and Its Influencing Factors.” China Health Care Management 32 (4): 306–309.

Zhang, L., and R. Han. 2020. “A Study of End-of-life Locations and Influencing Factors of the Aged in China.” Journal of Population 42 (3): 102–112.

Zhou, B., W. Lu, H. Liu, et al. 2009. “Exploration on the Relationship between Spatial Elements and Behavior Types of Institutional Nursing Facilities: The Example of Institutional Nursing Homes in Dalian”. Journal of Architecture (S2): 20–23

Zhou, Y., and Y. Chen. 2019. “A Summary of Practical Experience in Spatial Design of Nursing Facilities.” Journal of Architecture (2): 38–43.

Zhou, Y., Z. Lin, and J. Lin. 2012. “Research on the Design of Public Bathrooms in Nursing Facilities.” Time Architecture (6): 20–25.