# Investigation and Research Based on the Prediction and Planning of Community Home Care Service Center in Tianhe District, Guangzhou

Ningwei Wang[1], Heqi Wang[2,*]

[1] Northeastern University
[2] Northeastern University
*Corresponding author. Email: wangheqi@mail.neu.edu.cn

**ABSTRACT**

China has entered the stage of aging society, and the pension problem has become one of the hotspots of public concern. This paper uses the Grey Prediction GM (1,1) model to predict the population trend of the elderly in Tianhe District and the proportion of the elderly in Tianhe District choosing community home-based elderly care in the future. The study found that the home-based elderly care service center has a large market potential and a large target population, so there is a large development space; The elderly in this area have great demand for the basic services of community home-based elderly care, focusing on dining, medical treatment and housekeeping, and the elderly care service level needs to be further improved.

*Key words: Aging, Community home care, Grey Prediction GM (1,1) model, Quantitative modeling*

## 1.INTRODUCTION

The pension problem has always been an urgent problem to be solved in China. In the report of the 19th National Congress of the Communist Party of China, General Secretary Xi requested to actively respond to the problem of population aging, build a policy system and social environment for the elderly, filial piety and respect for the elderly, and accelerate the development of the cause of aging and industry. So how to improve the existing pension environment has attracted the constant attention of the public. According to the China family development report 2015, family types have gradually changed due to changes in population structure, single person families and empty nest families emerge one after another, and problems such as empty nest families are becoming more and more serious. With the continuous development of economy and the continuous change of population thinking mode, the traditional home-based elderly care model can no longer meet the needs of the emerging society of "miniaturization, empty nest and aging". Therefore, home-based elderly care services also begin to face great challenges. In order to meet the requirements of the times, the community home-based elderly care model came into being. In recent years, in order to implement the spirit of the 19th CPC National

Congress and focus on the most fundamental interests and needs of the elderly, Guangzhou has established and improved the care and service system for the elderly, continued to deepen the reform and planning of community home-based elderly care services, and vigorously promoted the development of community home-based elderly care services in Guangzhou. Policies such as the administrative measures of Guangzhou community home-based elderly care service have been issued successively. This research has important implications both theoretically and practically.Existing studies have shown that the traditional pension model has a series of advantages and disadvantages, but the existing research does not clarify the problems and improvement plans of the existing community home-based pension service model. related researches, make up for the deficiencies in the related fields of pension models, and provide certain inspirations for future research.By investigating the community home-based care service model in Tianhe District of Guangzhou City, we found the drawbacks of this approach, which is not only conducive to solving the problems existing in the old-age care model in Guangzhou, but also helps to promote and continuously improve this model nationwide, which is an effective reference for existing models. . At the same time, by exploring the community-based home-based care

model, we can vigorously solve the dilemma of the existing pension problems in China, help to improve the problem of difficult pension problems in an aging society, and then reduce the pressure of the public.

As of January 2022, 21 streets in Tianhe District have achieved full coverage of large catering by the end of August 2017, with 3-4 catering points in each street. There are 64 catering outlets in the region, serving nearly 5000 people per meal per day.There are more than 123460 elderly people in 21 streets of Tianhe District, accounting for 14% of the total population, but the aging is still accelerating. It is an area with a high degree of aging. On the whole, the proportion of the elderly population is higher than the average level of the elderly in cities and towns across the country. Therefore, this paper takes Tianhe District Elderly Care Service Center of Guangzhou City as an example.The research goal of this paper is to take the elderly care service center in Tianhe District, Guangzhou as an example, starting from the top-level design system of home care services, and vigorously promote the reform of the supply model of home care. services, and initially explore a new model of community home-based elderly care services. From the perspective of the government, reasonably estimate the demand for old-age service beds and formulate a reasonable development plan for old-age service beds. From the perspective of enterprises, it provides "business opportunities" for enterprises.

## 2.RESEARCH DESIGN

### 2.1 Questionnaire Design

The questionnaire mainly investigates the basic information of the elderly, the needs measurement home-based elderly care, the ability measurement of home-based elderly care and the evaluation of home-based elderly care.

### 2.2 Investigation Method

In view of the less use of electronic equipment by the elderly, the early stage of the survey mainly conducted a field survey in Tianhe District to understand the current situation of home-based elderly care in the community by means of paper questionnaires and interviews. When conducting the field survey, questionnaires were mainly distributed in public places such as streets and activity areas. In addition, interviews were conducted with the elderly in the community during the survey, and interviews were conducted on the current situation of elderly care, the current situation of community home-based elderly care services and the expectations of the elderly for the community, so as to obtain first-hand information.

### 2.3 Sample Situation

420 paper questionnaires were distributed and 377 valid questionnaires were recovered. The proportion of men and women is 46.7% and 53.3% respectively, and the proportion of junior middle school and below, senior high school or technical secondary school is 41.3% and 42.8% respectively. The gender distribution of community home-based elderly care respondents is relatively balanced, their educational background is low, and most of them are after the retirement age, which is basically in line with the target population of the elderly care model.

**Table 1.** Distribution of sample basic information

| Problem | Option | Frequency |
|---------|--------|-----------|
| 1.Gender | A. Male | 46.7% |
| | B. Female | 53.3% |
| 2.Education | A.Junior high school and below | 41.3% |
| | B.High school or technical secondary school | 42.8% |
| | C.Bachelor degree or junior college | 15.2% |
| | D.Master degree or above 41.3% | 0.7% |
| 3.age | A.Under 55 | 6.8% |
| | B.55-65 years old | 17.2% |
| | C.66-75 years old | 51.4% |
| | D.Above 75 | 24.6% |

# 3. ANALYSIS OF COMMUNITY HOME CARE SERVICE CENTER IN TIANHE DISTRICT, GUANGZHOU

## 3.1 Analysis of Measurement Results of Community Home Care Service Center Demand

In order to understand the needs of the respondents for home-based elderly care, this survey mainly explores the physical conditions, living conditions, preferred living style, daily life responsibility and required elderly care services of the elderly in the community.

Among the physical conditions of the elderly, 31.4% of the elderly take care of themselves completely, 37.9% of the elderly take care of themselves basically, 23.3% of the elderly take care of themselves semi, and 7.4% are unable to take care of themselves.

Among the questions about the living conditions of the elderly, 35.5% of the elderly live alone, 40.7% of the elderly live with their spouses, and 21.7% of the elderly live with their children. It can be seen that more than 95% of the elderly live at home for the elderly, and 76.2% live alone or with their spouses, indicating that the elderly in this area mainly rely on home-based elderly care, and 21.7% of the elderly spend their old age in their own home or their children's home.

In the item of daily life responsibility of the elderly, 33.2% of the elderly are cared for by themselves or their spouses, 11.7% of the elderly are cared for by their children, and 41.4% of the elderly are cared for by the community.

Among the items of elderly care service types, 60.7% of the elderly need meal assistance services, 40.7%, 37.9% and 37.9% of the elderly need medical care, emergency assistance and day care services respectively, and 31.4% of the elderly need housekeeping services.

## 3.2 Analysis of Measurement Results of Community Home Care Service Center Ability

Among the questions of the types of state subsidies received by the elderly, 51.2% of the elderly have no subsidies, 37.5%, 6.7% and 4.6% of the elderly have minimum living subsidies, subsidies for extremely poor households and subsidies for key preferential care objects respectively. The proportion of the elderly without subsidies and with minimum living subsidies is more than 88.7%.

Among the income sources of the elderly, 31.2% of the elderly rely on pensions or savings, 37.1% of the elderly rely on children's support, and 16.4% and 15.3% of the elderly rely on government subsidies and commercial insurance respectively.

Among the items of pension expenses that can be borne every month, 51.3% of families have a per capita monthly income of less than 2000 yuan, and 27.9% of families have a per capita monthly income of 2000-4000 yuan. Family income is an important support for the participation of elderly care services, and the amount of income further limits the level of elderly care.

Among the elderly, there are 8.43 yuan of pension expenses per month that can be borne by the elderly, and 41.43% of them can afford the pension expenses per month 1% of the elderly can bear the pension cost of 1000-2000 yuan per month.

## 3.3 Analysis of Evaluation Results of Community Home Care Service Center

The survey results of the greatest advantages of home-based elderly care reflect the respondents' understanding of the advantages of community home-based elderly care services. Among them, 21.4%, 37.9% and 36.7% of the elderly believe that the greatest advantages are familiar with the home environment, high service quality and convenient and comfortable life, accounting for more than 90%.

The results of the survey on how children and the elderly evaluate home-based elderly care reflect the children's understanding of community home-based elderly care services. 67.8% agree with this model, 26.7% of the children have no opinion, and only 4.6% oppose it. Therefore, it can be seen that home-based elderly care is highly recognized among the children and women of the elderly, which is conducive to the children's support for home-based elderly care services for the elderly and further promote the implementation of elderly care services. Item 3 reflects the elderly's understanding of community home-based elderly care services. 59.6% agreed with this model, 35.2% had no opinion, and only 5.2% opposed it.

The elderly said that the evaluation results of the elderly on community elderly care and life care reflected the respondents' evaluation of community home-based elderly care and life care services, catering time and quality and medical service quality. It can be seen from the data of community home-based elderly care service that the service level of community home-based elderly care is good and basically meets the living needs of the elderly. However, 19% of the respondents believe that community care is not good. It can be seen that the service level of community elderly care needs to be further improved. 26.4% could not meet the needs of home-based elderly care services of the elderly. In terms of the evaluation of catering time and quality by the elderly in the community, 62% of the elderly believe that the catering time and quality are general or poor. It can be seen that the catering time and quality in the community deserve further attention from the community

managers, and the results also reflect the shortcomings of the current community home-based elderly care services. In terms of the evaluation of medical service quality by the elderly in the community, 53.3% of the elderly believe that the quality of medical service is general or poor, indicating that the medical service needs to be strengthened in the aspect of home-based elderly care, and there is a huge space for the development of the combination of medical care and elderly care. Overall, the elderly are not satisfied with the level of elderly care services currently provided by the community, indicating that the establishment of the overall framework of home-based elderly care services in the street has not been optimized.

## 4. MARKET DEMAND AND CLASSIFICATION FORECAST OF COMMUNITY HOME CARE SERVICE CENTER

This paper will predict the market demand and classification of community home-based elderly care service centers according to the population, structure and consumption level of Tianhe District, Guangzhou. In addition, from the perspective of enterprises, combined with the number and structure of existing community home-based elderly care service centers, analyze and establish appropriate models to find "business opportunities" of community home-based elderly care service centers. Finally, according to the analysis results of market research, this paper puts forward reasonable suggestions for enterprises and government management departments to solve the problems of community home-based elderly care service centers.

### 4.1 The Population Prediction of Community Home Care Service Center

The experimental data are obtained by programming and modeling with MATLAB software. Experimental Figure 1 shows the prediction results of the population aged 60 and over in 2022 by using the grey prediction method of metabolism. The prediction results are shown in Table 2:
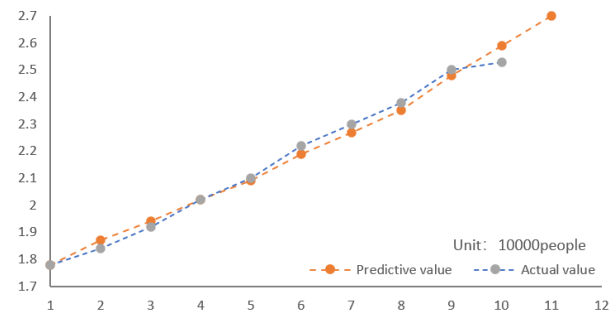


**Figure 1** Forecast results of the population aged 60 and over in 2022

**Table 2.** Experimental prediction results

| year | Predicted population (person) | Prediction accuracy test level |
|------|-------------------------------|--------------------------------|
| 2022 | 236090 | excellent |
| 2032 | 355080 | excellent |
| 2042 | 490050 | excellent |

According to the grey prediction accuracy test grade standard in the above table, the prediction effect of the model in this paper is good. The elderly population in Tianhe District of Guangzhou is expected to reach 236090 by the end of 2022, 355080 by the end of 2032 and 490050 by the end of 2042, which is in line with the population development trend of Tianhe District at this stage, indicating that the service center has great market potential, more target groups and large development space. Therefore, the number and scale of home-based elderly care service centers can be increased.

### 4.2 Forecast of Market Demand Scale of Community Home Care Service Center

Considering the economic development of Tianhe District and other factors, it is assumed that the proportion of elderly people aged 60 and over who need catering points and medical service points in Tianhe District in 2032 will be 4%, 5% and 6% respectively. The prediction results are shown in Table 3.

**Table 3.** Catering points and medical service points in 2022 and 2032

| | Catering and medical service points | | Average annual growth rate (%) |
|---|---|---|---|
| | 2022 | 2032 | |
| Scheme I | 810 | 1593 | 6.5% |
| Scheme II | 830 | 1992 | 9. 1% |
| Scheme III | 845 | 2390 | 11. 1% |

### 4.3 Demand Classification Forecast of Community Catering Points and Medical Service Points

We classify the demand of catering points and medical service points into three categories and make predictions according to:

### 4.3.1 Prediction of demand proportion of catering points and medical service points of different nursing types

Investigation on the willingness of the elderly with different self-care abilities to stay in the elderly care service center and the proportion of the obtained elderly catering points and medical service points in the number of the elderly, Calculate the demand proportion of catering points and medical service points of different nursing types (for example, M '/ 5% = 11.8% / 15.9%, 11.8% and 15.9% are the proportion of self-care elderly and some self-care elderly willing to participate in community home-based elderly care, and 5% is the proportion of elderly population requiring catering points and medical service points.

### 4.3.2 Scale prediction of elderly population with different self-care ability

**Table 4.** Different prediction results of elderly self-care ability in 2032 and 2042

| year | General type | Semi nursing type | Full nursing type |
|------|-------------|-------------------|-------------------|
| 2032 | 13981 | 2518 | 61 |
| 2042 | 18437 | 2562 | 705 |

### 4.3.3 Scale Prediction of Catering Points and Medical Service Points of Different Nursing Types

For the prediction results of the demand proportion of catering points and medical service points of different nursing types and the scale of the elderly population with different self-care ability, refer to the prediction model of the total scale of catering points and medical service points. The prediction model:

$$X_i = A_I * M_i + B_i * N_i$$

$A_I$ = number of elderly people with different self-care ability in Guangzhou in I year;

$B_i$ = number of elderly people with different self-care ability in Tianhe District in I years;

$M_i$ = demand proportion of catering points of different nursing types in cities and towns in I year (%);

$N_i$ = demand proportion of medical service points of different nursing types in rural areas in I (%).

**Table 5.** Forecast results of elderly population with different self-care ability in 2032 and 2042

| year | Take care of oneself | Partial self care | I can't take care of myself at all |
|------|---------------------|-------------------|-----------------------------------|
| 2032 | 564.2 | 94.3 | 20.1 |
| 2042 | 1106 | 199.3 | 42.6 |

## 5.CONCLUSIONS

### 5.1 The Base of the Elderly Population is Large and Rising Year by Year

As far as the community pension population forecast is concerned, this paper predicts that the elderly population in Tianhe District, Guangzhou will reach 236,090 by the end of 2022, 355,080 by the end of 2032, and 490,050 by the end of 2042, which is basically in line with the current population development trend of Tianhe District, indicating that Community aged care service centers have great potential for development and a large target audience base. Therefore, the number and scale of community home-based elderly care service centers need to be further expanded.

### 5.2 The Scale of Community Home Care Centers has Increased, and the Classification Content has Gradually Enriched

As far as the market demand scale of community home-based elderly care service centers is concerned, this paper predicts that by the end of 2022, there will be 793 meal distribution and medical service points in Tianhe District, 1,209 in 2032, and 1,838 in 2042. It can be seen that with the continuous expansion of demand, the scale of the service center will also achieve a certain increase. It can be seen from the foregoing that the elderly in this area currently have a greater demand for basic services

for community-based home-based elderly care, which is different from only focusing on dining in the past. While focusing on these aspects, it is also necessary to continuously enrich the content of old-age care, formulate a reasonable old-age care system according to the actual needs of the elderly population, and further meet the needs of old-age care.

### 5.3 Food Catering is Closely Related to Medical Needs and is Highly Targeted

The survey results show that with the weakening of self-care ability, the elderly population is more willing to need meals and medical services, and has higher requirements for the level and service content of meals and medical service points. In terms of the size of the elderly population with different self-care abilities and the scale of catering and medical care, in 2030 and 2040, the number of full-nursing elderly will reach 610,000 and 7.05 million, respectively, and the number of catering and medical service points will be 20.1 and 40.6, respectively. The demand for medical care is relatively concentrated, but the full-nursing and semi-nursing groups are still worthy of attention. Therefore, targeted attention to people with different self-care abilities, and effective allocation of reasonable elderly care services for various types of elderly has become the content that needs to be optimized now and even in the future.

From the perspective of policy support, more subsidies in areas with less added value can achieve a higher degree of satisfaction under unit subsidies. However, combined with the actual situation, it is found that the medium-level elderly care service center faces a large elderly population and the overall market is large, which constitutes the main body of the elderly care market. The government and enterprises should increase investment and support in this regard. At the same time, drawing on the rich experience of other aging areas in Guangdong Province, this paper puts forward the following suggestions.

### 5.4 Improve the Community Pension Mechanism

At present, the government has not established a perfect legal system and standards for home-based elderly care services, the elderly security system is chaotic, and the community acts in its own way, which seriously reduces the enthusiasm of the elderly to participate in community elderly care services. Although the existing enterprises invest in the elderly care community and provide certain supporting facilities, corresponding services and charging standards, due to the lack of guidance at the policy and institutional level, the combination between the existing services and the additional services of the elderly care community is still not close enough, and the protection for the elderly is not

comprehensive enough. In view of the lack of existing policies, the study believes that the government should step up the introduction of relevant special laws on home-based elderly care for the elderly, deeply understand the protection of the interests of the elderly through a detailed investigation of the current or future problems, and issue laws and regulations in line with the interests of the elderly and conducive to the long-term development of elderly care services with the help of community service institutions, Design special policies for elderly care projects to promote the implementation of elderly care services. In addition, by improving the elderly care service mechanism, including the quality of elderly care service, the elderly care service process and the standardization of service personnel, an independent and specific supervision system can be formed, which is conducive to the community to improve the service quality, correct deviations in time and promote the standardization of home-based elderly care services.

### 5.5 Develop Characteristic Elderly Care Services and Increase the Sdded Value of Home-based Elderly Care Services

As far as the existing services are concerned, they mainly focus on catering and medical treatment, and the needs of different types of people vary greatly. For the elderly who are completely and basically self-care, the demand for services is not limited to this. Therefore, enterprises and communities should be encouraged to deeply explore the needs of the elderly. For the elderly with different ages and health conditions, the community elderly care services developed by communities and enterprises only meet their basic needs. However, for the special needs of the elderly in different regions and income levels, and even the personalized needs of the elderly in other aspects, the community may not be able to provide targeted elderly care services. Communities or enterprises should make full use of community service resources, deeply explore and investigate the needs of the existing elderly, find the potential needs of different types of elderly, and provide targeted high-quality services.

### 5.6 Improve Service Capability and Build a People-oriented Service Platform

In view of the current problem that some elderly people are not satisfied with home-based elderly care services, this paper believes that we should start with service personnel and effectively solve the problem of insufficient service ability of existing personnel. Combined with the current social development, the research believes that strengthening the construction of elderly care service team in the community is a necessary strategy to improve elderly care services. On the one hand, in the face of existing internal service personnel, the community needs to improve on-the-job training, regularly check the ability of service personnel, formulate

certain job requirements and management system, and form a relatively perfect professional system of service personnel. In addition, establish a humanized incentive mechanism to improve the ability and quality of service personnel innovatively. On the other hand, in order to attract external personnel, the community should gradually alleviate the problem of low salary and insufficient attraction of service personnel, and improve the salary level of service personnel with the help of external capital channels, so as to further improve their service status and enhance the recognition of community and Society for community elderly care service personnel. Through internal and external continuous improvement, build a high-quality and capable service team, provide a higher quality and more sound service platform, better people-oriented and improve the deficiencies of community elderly care services.

## AUTHORS' CONTRIBUTIONS

Wang ningwei,Wang heqi contributed to the conception of the study;Wang ningwei contributed significantly to analysis and manuscript preparation;Wang heqi performed the data analyses and wrote the manuscript;Wang ningwei,Wang heqi helped perform the analysis with constructive discussions.

## ACKNOWLEDGMENTS

## REFERENCES

[1]Xingxing Gao, Ruiqi Li,Ya-jun Li (Eds.),Study on the Layout and Function Allocation of Community Home Care Service Center in Nanjing,International Conference on Human-Computer Interaction,2018,pp.133-139,DOI:https://doi.org/10.1007/978-3-319-92279-9_18

[2]Clive Sealey,Joy Fillingham,Peter Unwin (Eds.),Social Policy, Service Users and Carers,2021,DOI:https://doi.org/10.1007/978-3-030-69876-8

[3]Yinghong Sui(Eds.),Construction of the Integrated Network Service Platform for Smart City Community Home Care Under the Background of "Internet+",2020,DOI:https://doi.org/10.1007/978-981-15-1468-5_163

[4]Jasmine C. Mah, Susan J. Stevens(Eds.),Andrew Social factors influencing utilization of home care in community-dwelling older adults: a scoping review,2021,DOI:https://doi.org/10.1186/s12877-021-02069-1

[5]Gregory J. Norman(Eds.),Home and community-based services coordination for homebound older adults in home-based primary care,2018,DOI:https://doi.org/10.1186/s12877-018-0931-z

[6]Aobo Lyu(Eds.),Research on the Demands of the Elderly in the Community Home-Based Care Model,2021,DOI:https://doi.org/10.1007/978-981-16-3631-8_6