Scientific and Social Research
2022, Volume 4, Issue 3

A Study on the Influencing Factors of the Demand for Home-Based Elderly Care Based on the Logistic Regression Model

Liping Zhou[1], Yenan He[2], Jian Zhang[3]*

[1]Jiangsu Aviation Technical College, China

[2]Jiangsu Normal University, China

[3]Danyang Municipal Party School of the Communist Party of China, China

***Corresponding author:** Jian Zhang, 18912831966@163.com

Abstract: As the most basic and extensive way of providing for the aged, the demand for home-based elderly care is becoming more diversified and complex. Based on the questionnaire surveys carried out in the east, central, and west of China in recent years, along with the research results of experts and scholars, this paper selects 14 independent variables from four dimensions: personal factors, family factors, social factors, and government factors. Using SPSS 19.0, a multiple logistic regression analysis is carried out, and six factors that have significant impact on the demand for home-based elderly care have been screened out, in hope to provide some reference for practical workers in the design of home-based elderly care.

Keywords: Home-based elderly care; Influencing factors; Regression analysis

Online publication: March 10, 2022

1. Introduction

At present, with the advent of aging population, as the most basic and extensive way of providing for the aged, the need for home-based elderly care is becoming more diversified and complex [1], with higher demands. Therefore, in order to ensure that the elderly spend their old age in peace, maintaining social stability and harmony, further exploring the influencing factors of the demand for home-based elderly care and promoting the healthy development of home-based elderly care have become one of the top priorities of people's livelihood [2].

2. Model selection and variable setting

2.1. Model selection

Regression analysis is known as a modeling technology used to study the relationship between variables, in which the variables studied are generally two or more. Statistical methods are used to establish the relationship function expression between dependent variables and independent variables [3]. Binary logistic regression and multivalued logistic regression are divided according to the number of dependent variables, in which the dependent variables are represented by Y, while univariate logistic regression and multivariate logistic regression are divided according to the number of independent variables, in which the independent variables are represented by X. "Yes" and "no" are the two aspects that represent the demand for home-

based elderly care, which belong to binary dependent variables. However, there are many influencing factors in regard to the demand for home-based elderly care, so the multiple logistic regression model is selected in this research [4]. Set the demand as *y* = 1 and no demand as y = 2. The influencing factors of the demand for home-based elderly care are expressed as $x_1, x_2 \ldots, x_k$.

The binary multiple logistic regression model is as follows:

$$p = p(y = 1|x_1, x_2 \ldots, x_k) = \frac{\ell xp(\partial + \beta_1 x_1 + \beta_2 x_2 + \ldots + \beta_k x_k)}{1 + \ell xp(\partial + \beta_1 x_1 + \beta_2 x_2 + \ldots + \beta_k x_k)}$$

The model of Y = 0 is as follows:

$$p = p(y = 2|x_1, x_2 \ldots, x_k) = 1 - p(y = 2|x_1, x_2 \ldots, x_k)$$

2.2. Variable setting

According to specific investigations and referring to the research results of relevant scholars and experts, 14 independent variables have been selected from four dimensions, which include personal factors, family factors, social factors, and government factors, in order to determine the significant influencing factors. The data classification, consolidation, and recoding are shown in **Table 1**.

Table 1. Variable setting

Variable type	Variable name		Variable code value
Dependent variable	The need for home care by the elderly		Yes = 1; No = 2 (reference group)
Independent variable	Individual factors	Gender	Male = 1; Female = 2 (reference group)
		Age	60-65 years old = 1; 66-80 years old = 2; 80 years old and over = 3 (reference group)
		Education level	Primary school and below = 1; Junior high school = 2; High school and technical secondary school = 3; Bachelor's degree and above = 4 (reference group)
		Cadre status	Cadre = 1; Non-cadre = 2 (reference group)
		Marital status	Married, and spouse is alive = 1; Widowed = 2; Divorced = 3; Have not been married = 4 (reference group)
		Health condition	Good = 1; General = 2; Poor = 3 (reference group)
	Family factors	Residential arrangements	Living alone = 1; Living with children = 2; Others = 3 (reference group)
		Family economic situation	Surplus = 1; Roughly enough = 2; Not enough = 3 (reference group)
		Children's filial piety	Very filial = 1; Relatively filial =2; Generally filial =3; Relatively unfilial = 4; Very unfilial =5 (reference group)
	Social factors	Elderly activity room	Activity room for the elderly = 1; No activity room for the elderly = 2 (reference group)
		Civil mediation center	Civil mediation centers for the elderly = 1; No civil mediation centers for the elderly = 2 (reference group)

(Continued on next page)

(Continued from previous page)

Variable type	Variable name		Variable code value
Independent variable	Social factors	Subsidies for home-based elderly care services	Subsidies for home-based elderly care services = 1; No subsidies for home-based elderly care services = 2 (reference group)
	Government factors	Endowment insurance security	Endowment insurance = 1; No endowment insurance = 2 (reference group)
		Health and medical security	Health and medical security = 1; No health and medical security = 2 (reference group)

3. Data sources and research hypothesis

3.1. Data sources

The data used in this analysis are derived from the questionnaire survey conducted in Eastern, Central, and Western China from 2018 to 2020. The survey used the combination of on-site household survey and network professional survey. A total of 540 questionnaires were distributed among the elderly aged 60 and above, including 180 in the east, central, and west respectively, with 502 valid questionnaires recovered, and an effective recovery rate of 92.96%, of which the effective recovery rates of the questions in the east, central, and west were more than 90%. The on-site household survey of the research group was mainly carried out in Jiangsu's provincial high-tech zone (Danyang). A total of 180 questionnaires were distributed, with 168 questionnaires recovered. A QR code and link were automatically generated, so that the respondents could click the link directly on the computer through the network address to answer the questions conveniently and quickly or use the QR code with their mobile phones to access the questionnaire on the "Le Survey" platform. This has greatly improved the work efficiency and accelerated the questionnaire survey process.

3.2. Research assumptions

In consideration of the current reality and the needs of the project, several assumptions are made.

3.2.1. Gender

In a general sense, women usually engage in domestic work and provide care for others. Men's work centers around the outside, whereas women's work centers around home. Nowadays, the average life expectancy of women is higher than that of men. The proportion of elderly women suffering from chronic diseases is also increasing, and the proportion of follow-up medical care is also increasing. Therefore, **H1** is proposed.

H1: Compared with men, elderly women generally have higher demand for home-based elderly care.

3.2.2. Age

In a general sense, with aging, people's physical function is gradually deteriorating. The body and legs become more and more inflexible, and the probability of developing an illness is higher. At the same time, the older people are, the more likely they are to feel lonely. With the passing of old friends one by one, elderly people will gradually develop a sense of insecurity, helplessness, and frustration, feeling that there is little future. Therefore, for the elderly, in addition to conventional care, comfort should be given in a timely manner to assist them psychologically and spiritually. They need other people to help them overcome the pain psychologically and raise their self-confidence. Therefore, **H2** is proposed.

H2: Compared with the young, elderly people have a higher demand for home care.

3.2.3. Education level

There is a great correlation between the level of education and the ideas of a person. The higher the level of education is, the better the general living conditions and working environment are. In addition, these people have stronger ability to understand and self-adjust. Their average annual income is generally high, along with good economic conditions. They also have high requirements for the quality of life, and a series of guarantees have already been possessed. However, for the elderly with low education, as they do not have a good job, treatment, and working environment, they do not have enough savings, and they tend to have physical and mental instability. Especially with increasing age, they are plagued by diseases, and their living ability is getting weaker; therefore, they need help. In view of that, **H3** is proposed.

H3: Compared with the elderly with higher education level, elderly people with lower education level have higher demand for home care.

3.2.4. Cadre status

Elderly people with cadre status have a broader vision because when they are young, they have a wide range of work contacts with the society, tend to accept more difficult tests, have stronger self-adjustment ability and legal awareness, as well as have high requirements for the quality of health. Such elderly people generally have various guarantees. Elderly people who are not cadres have poor conditions in all aspects, less security, and weak willpower. Therefore, **H4** is proposed.

H4: Compared with the elderly with cadre status, elderly people without cadre status generally have higher demand for home-based elderly care.

3.2.5. Marital status

Marital status directly affects the need for home-based elderly care. An elderly who has a spouse tend to have more psychological comfort and confidence in life than an elderly who is widowed, divorced, or single. The spouses can take care of each other by providing daily care and spiritual comfort, chatting with one another, etc. In that case, those without a spouse tend to need more medical care. Therefore, H5 is proposed.

H5: Compared with the elderly with spouse, elderly people who are widowed, divorced, or single have higher demand for home care.

3.2.6. Health status

If the health status of a person is good, he or she can take care of himself or herself without receiving care from others. However, with aging, a person's health status worsens, gradually showing a downward trend, and various chronic diseases tend to appear. Therefore, the ability of an elderly to care for himself or herself declines. It is often necessary to go to the hospital for medical treatment or medium and long-term traditional Chinese medicine physiotherapy. Some elderly people are even bedridden, so professional medical staffs are required to provide all-round care and nursing. Therefore, **H6** is proposed.

H6: Compared with the elderly with good health, elderly people with poor health have a higher demand for home-based care.

3.2.7. Residential arrangements

Different living arrangements will affect the need for home-based elderly care. Living arrangements do not only affect the mental state of the elderly, but also have a certain impact on the behavior of their children. When elderly people live with their children, their children are more likely to help their parents in daily living, providing door-to-door medical care and spiritual comfort for their loneliness. In other words, elderly people who live with their children are more likely to receive comprehensive care from their children, and vice versa. Therefore, **H7** is proposed.

H7: Compared with the elderly living with their children, those living alone with other related conditions have higher demand for home-based elderly care.

3.2.8. Family economic status

For families with poor economic conditions, pension, medical insurance, and other services are not fully guaranteed. Therefore, these elderly people have more urgent need for home-based care. For families with good economic conditions, due to the abundant security, the demand for home-based elderly care services is not very urgent. Therefore, **H8** is proposed.

H8: Compared with the elderly with good economic status, elderly people with poor economic status have a higher demand for home care.

3.2.9. Children's filial piety

Under the guidance of the traditional concept of bringing up sons to support parents in their old age and the social public opinion, children are still the main players in supporting their parents, and they should bear that responsibility. Generally speaking, in the context of a family, the more filial the children are, the lighter the burden is on each child; that is to say, the greater the support the family provides for the elderly, the more care and help the elderly receives. Therefore, elderly people with filial children will have less demand for home-based elderly care because of the comprehensive care given by their children, whereas those with unfilial children will have higher demand for home-based elderly care because they lack comprehensive care from their children. Therefore, H9 is proposed.

H9: Compared with the elderly with filial children, elderly people with unfilial children have higher demand for home-based elderly care.

3.2.10. Activity room for the elderly

The elderly activity room is an entertainment place for the elderly. A relatively high-quality activity environment can enrich the daily cultural and sports life of the elderly. It also encourages communication activities among the elderly while providing them the opportunity to play chess, drink tea, and play cards for entertainment. By participating in rich and colorful cultural and sports activities in the elderly activity room, the physique of the elderly can be enhanced, their physical and mental health can be promoted, and they are given opportunities to do something through these activities. Therefore, **H10** is proposed.

H10: Compared with the elderly who have an elderly activity room nearby, those who do not have an elderly activity room nearby have higher demand for home-based elderly care.

3.2.11. Civil mediation center for the elderly

Civil mediation centers for the elderly, such as elderly civil mediation teams, elderly civil mediation stations, elderly civil mediation clubs, etc., can effectively mediate a large number of elderly related cases as well as timely coordinate and solve disputes or cases against the elderly by carrying out publicity, explanation, and consultation activities on rights protection for the elderly. With nearby elderly mediation institutions, elderly people can obtain legal aid in time to prevent the further escalation of disputes. At the same time, the costs for their rights protection can be reduced, so that their life order and legal safety in terms of life and property can be protected in time from infringement. Therefore, **H11** is proposed.

H11: Compared with the elderly with nearby civil mediation centers, those without nearby civil mediation centers have higher demand for home care.

3.2.12. Subsidies for home-based elderly care services

Subsidies for home-based elderly care services can reduce the economic burden of the elderly at home,

especially for those who are old, poor, seriously ill, and living alone. These subsidies are undoubtedly a timely rain, enabling the elderly to obtain urgently needed services in time, thus partially or fully meeting their daily care needs and door-to-door medical care needs. However, elderly people without home care subsidies can only continue to suffer from pain as well as physical and mental suffering because of financial constraints and the lack of medical services. Therefore, **H12** is proposed.

H12: Compared with the elderly with subsidies for home care services, those without subsidies have higher demand for home care.

3.2.13. Endowment insurance security

This guarantee provides a certain source of income and is mainly for those who are old or unable to labor because of the loss of labor ability. With endowment insurance, the later stages of life will be more stable as various needs can be met; thus, the need for home care may be less. On the contrary, if an elderly do not have old-age insurance, there is more demand for home-based elderly care services. Therefore, **H13** is proposed.

H13: Compared with the elderly with endowment insurance, those without endowment insurance have higher demand for home-based care.

3.2.14. Health and medical security

Health and medical security is an important aspect of the social security system, which needs to be enforced through national legislation. The relevant expenses should be jointly paid by units and individuals. As a form of compensation for medical expenses, the guarantee includes outpatient services, hospitalizations, nursing, and many other aspects. In actual situation, elderly people are afraid of having no money to seek medical care. Therefore, health and medical security is very important for the elderly. Those with health and medical security have always enjoyed more considerate nursing and medical care for their own body, while those without health and medical security are afraid of getting sick because the cost of treatment is unbearable. Therefore, **H14** is proposed.

H14: Compared with the elderly with health insurance, those without health insurance have higher demand for home care.

4. Results

Based on SPSS 19.0, a binary multiple logistic regression analysis is carried out using the data obtained in the survey. The model adopts the method of all entry, in which all variables are included in the regression model at the same time. The results are shown in **Table 2**. Based on the actual situation of Wald statistics and concomitant probability, its significant influence can be further verified.

Table 2. Parameter estimation

The need for home care services	B	Standard Error	Wald	df	Significant level	Exp(B)	Confidence interval of Exp(B) 95%	
							Lower limit	Upper limit
Intercept	20.950	1.619	167.459	1	.000			
[Gender = 1]	-.326	.296	1.209	1	.271	.722	.404	1.291
[Gender = 2]	0	.	.	0	.	.	.	.
[Age = 1]	.028	.426	.004	1	.947	1.029	.447	2.369
[Age = 2]	.029	.374	.006	1	.938	1.030	.494	2.144
[Age = 3]	0	.	.	0	.	.	.	.
[Education level = 1]	.445	.567	.617	1	.432	1.560	.514	4.736
[Education level = 2]	.189	.531	.127	1	.721	1.209	.427	3.419
[Education level = 3]	-.642	.498	1.662	1	.197	.526	.198	1.397
[Education level = 4]	0	.	.	0	.	.	.	.
[Cadre =1]	-.023	.373	.004	1	.951	.977	.471	2.029
[Cadre =1]	0	.	.	0	.	.	.	.
[Marital status = 1]	-2.192	1.088	4.057	1	.044	.112	.013	.943
[Marital status = 2]	2.650	1.163	5.193	1	.023	14.161	1.449	138.384
[Marital status = 3]	3.847	1.577	5.953	1	.015	46.849	2.131	1029.838
[Marital status = 4]	0	.	.	0	.	.	.	.
[Health condition = 1]	.396	.648	.374	1	.541	1.486	.418	5.286
[Health condition = 2]	.100	.635	.025	1	.875	1.105	.318	3.838
[Health condition = 3]	0	.	.	0	.	.	.	.
[Residence status =1]	-.599	.530	1.279	1	.258	.549	.194	1.552
[Residence status =2]	-.269	.493	.298	1	.585	.764	.290	2.009
[Residence status =3]	0	.	.	0	.	.	.	.
[Economic situation = 1]	488	.544	.807	1	.369	1.629	.561	4.728
[Economic situation = 2]	.004	.425	.000	1	.993	1.004	.437	2.307
[Economic situation = 3]	0	.	.	0	.	.	.	.
[Filial piety = 1]	-19.451	.822	559.778	1	.000	3.570E-9	7.126E-10	1.788E-8
[Filial piety = 2]	-17.347	.753	530.656	1	.000	2.925E-8	6.685E-9	1.280E-7
[Filial piety = 3]	-15.678	.777	407.296	1	.000	1.552E-7	3.387E-8	7.117E-7
[Filial piety = 4]	-15.891	.000	.	1	.	1.255E-7	1.255E-7	1.255E-7
[Filial piety = 5]	0	.	.	0	.	.	.	.
[Activity room for the elderly =1]	-1.603	.334	22.970	1	000	.201	.105	.388
[Activity room for the elderly =2]	0	.	.	0	.	.	.	.
[Civil mediation = 1]	-1.221	.364	11.276	1	.001	.295	.145	.601
[Civil mediation = 2]	0	.	.	0	.	.	.	.
[Pension subsidy = 1]	-1.193	.364	10.729	1	.001	.303	.149	.619
[Pension subsidy = 2]	0	.	.	0	.	.	.	.

(Continued on next page)

(Continued from previous page)

The need for home care services	B	Standard Error	Wald	df	Significant level	Exp(B)	Confidence interval of Exp(B) 95%	
							Lower limit	Upper limit
[Endowment insurance = 1]	-.672	.336	4.002	1	.045	.510	.264	.986
[Endowment insurance = 2]	0	.	.	0	.	.	.	.
[Healthcare =1]	-.618	.337	3.363	1	.067	.539	.279	1.043
[Healthcare =2]	0	.	.	0	.	.	.	.

5. Results analysis

The estimation results of the logistic regression parameters showed that the significant levels of marital status, filial piety of children, activity room for the elderly, civil mediation center for the elderly, old-age subsidy, and old-age insurance security are less than 0.05, which can be inferred that the impact is significant, whereas the others have no significant impact.

5.1. The significant impact of marital status

The influence of marital status has been confirmed. It has passed the significance test, showing that the influence of marital status is significant. This is consistent with the theoretical hypothesis. The results of logistic regression showed that the direction of the influence is both positive and negative based on different situations. For those who are married and with surviving spouse, the influence direction is negative, whereas for those who are widowed and divorced, the influence direction is positive. This shows that those who are married and have a living spouse have low demand for home care. On the other hand, if they are widowed or divorced, the demand is higher. This is consistent with the aforementioned hypothesis. When other variables are controlled, the need for home-based elderly care by those who are married and have surviving spouses accounts for only 11.2%.

5.2. The significant influence of filial piety

The influence of filial piety has been confirmed. It has passed the significance test, showing that the influence of filial piety is significant. This is consistent with the theoretical hypothesis. The logistic regression results showed that the influence direction is negative; that is, the more filial the children are, the less the need for home-based elderly care services.

5.3. The significant impact of a nearby activity room for the elderly

The influence of a nearby activity room for the elderly has been confirmed. It has passed the significance test, indicating that the influence of a nearby activity room for the elderly is significant. This is consistent with the theoretical hypothesis. The results of logistic regression showed that the influence direction of a nearby elderly activity room is negative, indicating that those with a nearby elderly activity room have lower demand for home-based elderly care, which is consistent with the aforementioned hypothesis. When other variables are controlled, the need for home-based elderly care by those who have a nearby activity room accounts for only 20.1%.

5.4. The significant impact of a nearby civil mediation center for the elderly

The influence of a nearby civil mediation center for the elderly has been confirmed. It has passed the significance test, indicating that the influence of a nearby civil mediation center for the elderly is significant. This is consistent with the theoretical hypothesis. The results showed that the influence direction of a nearby civil mediation center is negative, indicating that those with a nearby civil mediation center have lower

demand for home-based elderly care, which is consistent with the aforementioned hypothesis. When other variables are controlled, the need for home-based elderly care by those who have a nearby civil mediation center accounts for only 29.5%.

5.5. The significant impact of home-based pension subsidy

This factor passed the significance test and is consistent with the theoretical hypothesis. The results showed that the influence direction of the home-based pension subsidy is negative, indicating that those with home-based pension subsidies have lower demand for home-based elderly care, which is consistent with the aforementioned hypothesis. When other variables are controlled, the need for home-based elderly care by those with home-based pension subsidies accounts for only 30.3%.

5.6. The significant impact of endowment insurance

The influence of endowment insurance for the elderly has been confirmed. It has passed the significance test, indicating that the influence of endowment insurance for the elderly is significant. This is consistent with the theoretical hypothesis. The results showed that the influence direction of the endowment insurance is negative, indicating that those with endowment insurance have lower demand for home-based elderly care, which is consistent with the aforementioned hypothesis.

5.7. Others

The estimated values of the parameters of other variables included in the model, such as gender, age, education level, cadre status, health status, residence status, family economic status, as well as health and medical security, are not significantly effective as their *P* values are greater than 0.05. Based on the existing survey, the above variables are not significant influencing factors in regard to the need for home-based elderly care.

6. Conclusion

This paper verified the significant impact of the six factors influencing the demand for home-based elderly care: marital status, the degree of filial piety, activity room for the elderly, civil mediation center, home-based elderly care subsidies, and old-age insurance security. From this study, several conclusions are made. Firstly, from the regression analysis, it can be seen that marital status and children's filial piety are the most significant factors affecting the need for home-based elderly care. This is reflected from the idea where a less ideal marital status results in less filial children; in that case, these elderly people tend to feel more lonely. It can be inferred that the need for spiritual comfort by the elderly is an aspect that requires great attention. This has important guiding significance for the design and deployment of how to care for the elderly and meet their needs for home care. Secondly, activity rooms for the elderly and civil mediation centers also have significant impact on the demand for home care, indicating that elderly people in society today are increasingly concerned about their own quality of life, self-rights, and interests. In other words, the establishment of activity rooms and civil mediation centers for the elderly is to meet the needs of the elderly. Finally, in terms of endowment subsidies and endowment insurance guarantees, it can be appreciated that at present, under the new historical conditions, elderly people are very concern about the government's pension security system with the expanding of China's aging population. The degree of perfection of the government's pension security system is becoming a crucial factor in influencing the endowment demand of the elderly.

Disclosure statement

The authors declare no conflict of interest.

References

[1] Li S, 2019, Literature Review of Research on Community Home Care in China. Labor Security World, 2019(17): 23.

[2] Zhou L, Jin L, 2019, Intelligent Robot Companion for Home Care. Information Technology, 2019(08): 155-158, 162.

[3] Mu G, 2015, Successful Aging – Strategic Vision of China's Aging Management. Journal of the Party School of the Central Committee of the CPC (Chinese Academy of Governance), 2015(07): 55-61.

[4] Zhang H, 2013, Experience Review on Localization of Home Care Service in China. Journal of Northwest University, 2013(09): 140-146.