The Willingness and Influencing Factors to Choose Institutional Elder Care Among Rural Elderly: An Empirical Analysis Based on the Survey Data of Shandong Province

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Abstract

Background: The ageing of the population has become an escalating problem in China, which has led to an increasing demand for healthcare throughout society. The care services of elderly institutions, as a more mature way of aging, can alleviate various social problems brought about by ageing to a certain extent. The aim of this paper is to explore the degree of acceptance of institutional care by rural elderly people in Shandong Province and the factors that influence whether rural elderly people accept institutional care services.

Methodology: Based on Maslow's hierarchy of needs theory, this paper constructs an analytical framework that influences rural elderly people's willingness to accept institutional care. Using survey data from 192 older people in rural Shandong province, descriptive statistics, binary logistic regression and heterogeneity analysis were conducted to analyse the willingness of rural older people to age in an elderly care institution and the factors influencing them.

Results: Only 17.71% of the respondents were willing to accept the services of an aged-care institution. Among them, literacy, annual household income, trust in elderly care institutions and children's support had a significant positive influence on whether rural elderly people accepted services in elderly care institutions; physical condition, marital status, number of children and knowledge of elderly care institutions had a significant negative influence on whether rural elderly people accepted care services in elderly care institutions.

Conclusion: The non-acceptance of institutional care by rural older people is a general phenomenon rather than a sample characteristic, thus justifying the supplementary status of institutional care services. Social circumstances such as lifestyle and ideology in particular constrain the willingness of rural older people to age in institutions. The state should strengthen public opinion guidance and education on the ageing situation to alleviate the constraints imposed by solidified traditional ideology on the willingness of rural older people to diversify their old age; encouraging older people to save and building warm and comfortable old age institutions can help to increase the willingness of rural older people to age in institutions.

1. Introduction

Because of the economic situation, physical quality, and other factors, it has been difficult for the elderly to translate their needs for healthcare services into accessible healthcare services in recent years. Especially in rural areas of China, this problem has a greater negative impact on the health and quality of life of rural elderly [1]. For this reason, the 20th Congress report proposed implementing a national strategy to actively respond to the aging population, develop the elderly care business and the elderly care industry, and promote the realization of basic elderly care services for all elderly people. This statement elevates senior care services to the level of a national strategy and conveys the country's determination to ensure that the various types of senior care needs of all older people in rural areas are met.
However, in China, children should take care of their parents no matter how busy they are and meet most of their parents’ needs before they are called filial children. Therefore, influenced by these traditional concepts of “filial piety”, the overall acceptance of elderly care homes is still at a low to medium level [2]. Most scholars’ investigations can also prove this phenomenon. For example, Liu Zi-Wei et al. (2019) found through a survey of 517 rural elderly people in Changde City, Hunan Province, China, that 78.3 percent of the elderly people were willing to accept home care and 10.8 percent were willing to accept institutional care [3]. In response to the overall low willingness of rural elderly people to enter elderly care institutions, most scholars have studied the substantive reasons affecting the willingness of elderly people to enter elderly care institutions from the perspective of objective factors. For example, Simonson et al. (2010) focused on the conditions affecting the development of elderly institutions, mainly the basic situation of the local elderly population, physical condition, income level, and local elderly policy, to analyze the influence of various objective factors on the elderly's willingness to institutionalize [4]. Williams, Straker, et al. (2014) found that the older the elderly are, the lower their level of physical fitness and health status, and the more they need more professional institutionalized care to spend their old age [5]. The sustained development of the economy and shrinking family sizes in Shandong Province, as well as the intensification of aging and the sharp increase in the number of empty nest elderly, are consistent with the current situation in most rural areas both domestically and internationally, and the research has a certain representativeness. At the same time, Shandong Province is deeply influenced by Confucianism and has certain particularities, which can provide new ideas for domestic and foreign scholars to study the elderly's willingness to provide for the elderly. Therefore, this article will select Shandong Province as the research site to explore the factors that affect the willingness of rural elderly people to provide for the elderly, and propose targeted measures based on this, in order to alleviate the pressure of social elderly care.

In terms of the willingness of the elderly to choose an elderly care institution, domestic and foreign scholars mainly focus on the basic characteristics of individuals. For example, the age, occupation, and physical condition selected by Chuang (2012) when studying the elderly's willingness to provide for the aged [6]; The basic information of family includes family income, number of children, family relationship, and other variables. When exploring the impact of the subjective will of the elderly on them, Wang Zhaoqing (2020) proposed that the subjective will of the elderly can be explained by whether they trust the elderly care institutions and whether the choice of neighbors has an impact on the choice of elderly care methods [7]. However, in general, most of the subjects of the study focus on the urban elderly, ignoring the rural elderly's pursuit of a happy life in their later years, which is not conducive to fully explaining the practical obstacles affecting the willingness of social elderly groups to provide for the elderly. Based on this, this paper will conduct a field survey on whether older people accept the services of elderly institutions based on Maslow's hierarchy of needs theory. Focusing on the influence of personal characteristics, family characteristics and subjective normative factors on the choice of rural older people, it also attempts to explore the realistic factors that influence whether rural older people are willing to accept institutional care services.
The structure of this paper is as follows: The first part is the introduction, which introduces the research background and significance of this paper; The second part is the theoretical basis and hypothesis, which mainly uses Maslow's hierarchy of needs theory to explain the variables in this paper, construct the analysis framework and put forward the research hypothesis; The third part is the research design, which mainly introduces the data source, variable selection and assignment and research methods of this paper; The fourth part is an empirical analysis and interpretation of the results on whether rural elderly people can receive institutional elderly care services, and tests the robustness of the model estimates through the method of endogeneity diagnosis; at the same time, the whole sample is grouped from the perspective of family relationships in order to test the heterogeneity of the influence of different factors on rural elderly people's willingness to retire; the fifth part is the conclusion of the study; and the sixth part is the limitations of this study.

2. Theoretical basis and research hypothesis

According to Maslow’s Hierarchy of Needs explanation of individual decision-making, human motivation is based on individual needs, which are physiological needs, security needs, social needs, respect needs, and self-realization needs from low to high [8]. Only when the lower level needs are met, will they begin to pursue the higher level needs; And after the needs of lower levels are fully met, it will no longer have an incentive effect on individual behavior. As a behavioral decision, the willingness of the elderly to provide for the aged in institutions reflects the willingness of the elderly in different situations and the different expectations of the elderly in different situations for the aged in institutions. This paper attempts to use Maslow's hierarchy of needs theory to explain the willingness of the elderly to provide for the aged under the influence of different factors.

Here, according to the common five-step demand hierarchy, the pursuit of basic physical needs of food, clothing, housing and transportation, life security, and disease prevention are regarded as the pursuit of the elderly at the level of life support. Senior social needs, respect needs, and self-realization needs are regarded as the pursuit of the elderly to ensure their quality of life. If the physical condition of the elderly is in urgent need of special care, but the traditional family pension method is difficult to meet this demand, they will face the pressure of life support, which is the pursuit of life support; On the contrary, the better the physical condition, the less the pressure of life support. The demand for life support will no longer stimulate the elderly’s willingness to provide for the elderly but will be generated from the pursuit of ensuring the quality of life.

Maslow's Hierarchy of Needs theory analyses the actual root causes of decision making from the perspective of human needs and has strong explanatory power for the analysis of willingness. According to the above detailed analysis of the factors influencing the two main factors that generate the elderly's willingness to age, the results are: the pursuit of basic needs in the categories of food, clothing, shelter, livelihood security and disease prevention can be reflected by the variables health status, life care and emotional support [9,10]. The social needs, respect needs and self fulfilment needs of older people can be reflected by the variables social participation, cognitive ability, and social coping [11,14]. To facilitate the
measurement of the extent to which variables influence the willingness of rural older people to accept institutional care, this paper will further refine and classify the variables.

In their study, Melanie (2011) and others suggest that the likelihood of older people receiving family life care is influenced by the number of adult children, marital status and care among friends, i.e. older people who have more children or are married with a spouse are able to receive more life care than those who have fewer children and no spouse [18]. Similarly, Bella J K (2014) mentioned that older people's emotional support is equally influenced by themselves, their families and the outside world, and that when older people's self-support for the fact of being institutionalized rises, the more courageous they are to be able to accept institutional services; when family members tend to support parents staying in elderly care institutions, the willingness of rural elderly people to receive nursing services from elderly care institutions will increase. These factors can be measured by variables such as 'the degree of trust one has in an institution' and 'the degree of support one's children have for one's parents to move into an institution'[20]. In addition, the higher level needs of older people are influenced by the overlapping resources that older people have in terms of material and spiritual conditions, and according to Won I (2008), these variables can be measured by economic income, the long-term occupation of older people and the level of education [9]. In other words, the economic level of the elderly will largely influence the changes in the level of their needs. When the material resources available to the elderly are sufficient to support them to stay in a nursing home and enjoy more professional services, they will gradually develop the need to stay in a nursing home in order to guarantee their quality of life. However, when the economic level of the elderly cannot support their choice of more comfortable elderly care methods, the willingness of rural elderly people to stay in elderly care institutions will be greatly suppressed. In addition, the respect and self fulfilment needs pursued by older people are influenced by their level of self-thought, which can be measured by their long-term occupation and education [21].

Based on extensive previous research and theoretical foundations, this paper will use variables such as physical condition, marital status, number of children, annual household income, educational attainment, occupation, trust in elderly care institutions, and support from adult children to measure the impact on rural elderly people's willingness to receive institutional care services. The influencing factors belonging to the individual elderly person are divided into individual characteristics, those belonging to the elderly person's family resources and abilities are divided into family characteristics, and those belonging to the elderly person's cognitive level and subjective influence are divided into subjective normative factors. In addition, this paper adds the variable of older people's knowledge of elderly care institutions to better understand the influence of older people's subjective normative factors on their willingness to age. The analytical framework of this paper is shown in Table 1.
Individual characteristics, family characteristics and subjective normative factors combine to influence the reality of demand for institutional care services for rural older people. Secondly, as institutional care is a form of consumption, the determining factor for consumption is the capacity to demand, which comes from the various resources that older people have. Among them, the ability or resources from outside the household can be reflected by the physical condition, education level, occupation, support from children, and the level of understanding and trust in the aged-care institution; the resources or ability within the household can be reflected by the number of children, annual household income and marital status. To this end, the following research hypotheses are proposed in this paper:

(I) Individual characteristics research hypothesis

Personal characteristics have an important impact on whether the elderly accept the services of pension institutions. The existing research on personal characteristics mainly includes several aspects: basic personal information (gender, age, physical condition, education level, etc.) and personal occupational factors. Previous studies have shown that age, marital status, physical quality, and education level have a significant impact on the elderly’s choice of pension methods, which reflects that the elderly and the elderly with poor physical quality need more professional services from pension institutions. This article will focus on three factors: the health status, education level, and occupation of the elderly. First of all, health is the most basic factor to ensure the maintenance of personal life. According to Maslow's hierarchy of needs theory, having good health will lead to an increase in the pursuit of quality of life for the elderly. However, when the resources and abilities of the elderly are not enough to support them to choose nursing services in the nursing home, or when they can support the elderly to choose a more comfortable way of retirement, their willingness to accept nursing home services will decline.

Secondly, education level is the simplest way to measure the cognitive ability and ideological level of the elderly [10]. The education level of the elderly may affect their scientific understanding of the nursing
Thirdly, according to the endowment capital theory, the occupation of the elderly plays an important role in the decision-making process of whether to choose an endowment institution. The wage level and occupational nature of work will affect the choice and traditional cognition of the elderly. For example, older people who work in businesses and state institutions in the nature of their occupation shows that the elderly can timely, fully, and correctly understand the necessity and rationality of national policies and the existence of pension institutions, and the possibility of choosing pension institutions will be higher.

Based on this, the following assumptions are put forward about the impact of individual characteristics on the elderly's willingness to provide for the elderly in institutions:

H1: The impact of individual characteristics on the willingness of rural elderly to accept the services of elderly care institutions:

H1a: The worse the physical condition of the elderly, the higher the possibility of choosing institutions to provide for the elderly;

H1b: The higher the education level of the elderly, the higher the possibility of choosing institutional pension services;

H1c: Older people are more likely to be exposed to new things in their work and are more willing to accept the nursing services of elderly care institutions.

(II) Family characteristics research hypothesis

Under the influence of family culture that attaches importance to kinship in China, the elderly's willingness to provide for the elderly in institutions will be greatly affected by family factors in addition to their basic personal conditions. Just as the Xie Lili, Wang Bin (2019) summed up three social participation models of the elderly in China through the comprehensive measurement of the economic participation, political participation, public participation, and family participation of the elderly: high participation model, low participation model, and family care model. The family care model is a unique model of the elderly in China, which has not yet appeared in western research [12]. It can be seen that the rural elderly with institutional pension motivation may also face obstacles from family characteristics.

In the existing studies, the family characteristics of the elderly mainly include family relationships, number of children, marital status, and annual family income. Among them, most scholars believe that the rural elderly with fewer children, more family income, and no spouse is more inclined to rely on the social pension. This article will focus on the family resources and demand capacity factors that affect the elderly's willingness to provide for the elderly in institutions, including family annual income, marital status, and the number of children.

Elderly care institutions often put forward requirements for the economic conditions of service users. Compared with the rural elderly with poor family finances, the elderly with more annual income or higher
socio-economic status can more afford the institutional pension costs, so the possibility of choosing institutional pension services will be higher. Moreover, family care is an essential and important factor in the traditional way of providing for the aged at home. However, due to the reduction of rural employment opportunities, a large number of young and middle-aged people go out to work, resulting in the reduction of necessary resources for family care. Most of the care support and emotional comfort needed by the elderly in their later years come from friends, spouses, children, and even family networks [11]. When such needs are difficult to meet, the demand for institutional pensions will increase. For example, the elderly without a spouse are more likely to choose an elderly care institution, and the more children there are, the more likely they are to be cared for by their families, thus reducing the need for institutional care. Based on this, this paper puts forward the following assumptions:

H2: The impact of family characteristics on the willingness of elderly people in rural areas to receive services from elderly care institutions:

H2a: The lower the family's annual income, the lower the possibility of the elderly choosing institutional pension services;

H2b: The elderly with spouses are unlikely to receive nursing services from elderly care institutions;

H2c: The more children, the lower the willingness of the elderly to accept nursing services in the nursing home.

(III) Subjective normative factor research hypothesis

The reason for the low proportion of institutional pensions is that on the one hand, the development of pension institutions does not meet the expectations of residents, and on the other hand, the subjective will of the rural elderly to choose the services of the elderly care institutions fluctuates under the influence of the external environment. Previous studies have shown that the subjective normative factors that affect the elderly's acceptance of institutional elderly care services usually include the impact of external public opinion, the degree of children's support for their parents to stay in the nursing home, and the impact of the elderly's perception of the nursing home [13]. In order to clearly understand the impact of cognitive ability and external resources of the elderly on whether the elderly accept pension institutions, this paper selects the support of children, the understanding of elderly care institutions, and the trust of elderly care institutions as the main research objects.

China's pension culture and tradition are unique. In the local context, the topic of pension cannot be separated from the "family" [14]. The "responsibility ethics" in China's elderly care culture requires children to "feedback" to their parents, but parents' understanding of their children's life pressure can have a positive impact on their breaking away from the shackles of traditional concepts, which is also part of China's traditional family concept, that is, parents love for their children is far higher than all the shackles of the outside world [15]. Therefore, when the children's living burden is increasing and they are supportive of their parents entering the nursing home, the parents will choose to listen to their children's
opinions because of their understanding of the pressure on their children's lives, so the possibility of choosing institutional elderly care services increases. Secondly, the more elderly people know about the location, price, service content, and other aspects of elderly care institutions, the more they can determine whether their life in their later years can be fully guaranteed and respected, so as to make the best choice according to their actual situation, that is, to accept the way of elderly care institutions [16]. At the same time, when the elderly have a supportive and trusting attitude towards the service content, service attitude, and management system of the elderly care institutions, they will also tend to choose institutions for elderly care. Based on this, this paper proposes the following research assumptions:

\[ H3: \text{The impact of subjective normative factors on the willingness of rural elderly people to accept the services of elderly care institutions} \]

\[ H3a: \text{When children hold a supportive attitude towards their parents' living in an elderly care institution, the higher the possibility of elderly people choosing institutional elderly care services;} \]

\[ H3b: \text{The higher the elderly's understanding of the elderly care institutions, the higher the possibility of the elderly choosing institutions for elderly care;} \]

\[ H3c: \text{The stronger the trust of the elderly in the elderly care institutions, the higher the possibility of the elderly choosing the institutions for elderly care.} \]

3. Data Sources and Methods

3.1. Data sources

According to the seventh census data, among the permanent residents of the province, the population aged 0–14 is 19.063 million, accounting for 18.78%; 61.244 million people aged 15–59, accounting for 60.32%; The population aged 60 and above is 21.221 million, accounting for 20.90%, of which 15.364 million are aged 65 and above, accounting for 15.13%. In recent years, due to the lack of employment opportunities in the countryside and the large number of young and middle-aged people going out to work, there has been a clear trend towards an increase in the level of ageing and the number of empty nesters in rural Shandong. At the same time, Shandong Province, as the birthplace of Confucianism, is more deeply influenced by traditional thinking and therefore the region is somewhat unique. Therefore, this paper chooses Shandong Province as the research site. The research team visited some rural areas in Shandong Province from April to June 2022 and selected rural elderly residents in Shandong Province as participants using a random sampling method. Yang Shanhua (2018) mentioned in his research that different research needs to select participants according to their own research purposes and needs [17]. In order to ensure that participants meet the objectives and needs of this study, the inclusion criteria are: (1) voluntary participation in the survey; (2) The standard of permanent residence in rural areas of Shandong Province is ≥ two years; (3) The age is ≥ 60 years old. A total of 204 questionnaires were distributed. After eliminating the obvious errors and inconsistencies, a total of 192 valid questionnaires were obtained, with an effective rate of 94.1%.
3.2. Variable selection

The dependent variable in this paper is the willingness of the elderly to provide for the elderly in institutions. According to the survey item "Are you willing to accept the institutional elderly care services", all the reasons for accepting the institutional elderly care services are classified as "willingness to provide for the elderly in institutions"; the option "will not go anyway" is defined as "willingness to provide for the elderly in institutions".

The independent variables selected in this paper are divided into three parts: personal characteristics, family characteristics, and subjective normative factors. The extensive research of predecessors has laid a good foundation for this paper (Gu D.N, 2006; Won I, 2008 et al [9]). Personal characteristics include educational level (Melanie, 2011 [18]), physical condition and career (Salmon, 2012 [19]); Second, family characteristics, including the number of children, family annual income (Anthony W [20]), and marital status (Bella J K, 2014); Third, subjective normative factors, including the degree of understanding of institutions (Asia, 1995 [10]), the degree of trust in institutions and the degree of support of adult children (Mat A. Bergman, 1991).

Control variables. In addition to gender and age as control variables, it also includes the impact of family relations and the impact of neighbors' choice of pension methods. Zhu Rulin (2023) mentioned in the study that whether the elderly can be cared for by their relatives in their later years is an important variable, but it is also affected by family relations [21]. For example, when the family relationship is relatively bad, even if the number of children is large, it is easy to produce the phenomenon that children shirk their obligations to support each other. At this time, the emotional comfort needs of the elderly are far from being satisfied. Therefore, it is necessary to control the influence of family relationships of the elderly on family characteristics and institutional endowment intention. Finally, whether the elderly accept the subjective will of institutional pension, in addition to the views of their children and their own views of pension institutions, may also be affected by public opinion. When studying the subjective factors that affect the elderly's willingness to provide for the aged, Su Baozhong (2019) found that when most of the elderly in society choose traditional home-based elderly care, home-based elderly care seems to have become the most representative way of providing for their children to be filial to their parents, while the majority of the elderly will think that the result of their children's disregard for their parents [22]. This kind of public opinion guidance will also affect the subjective will of the elderly, so it is necessary to control the impact of this factor on the elderly's willingness to provide for the elderly in institutions. See Table 2 for specific variable index selection criteria.
Table 2
Sources of Study Indicators

<table>
<thead>
<tr>
<th>Classification</th>
<th>Independent variable</th>
<th>Indicator reference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Physical Condition</td>
<td>Melanie, Sereny (2011)</td>
</tr>
<tr>
<td></td>
<td>Career</td>
<td>Cai, Salmon (2012)</td>
</tr>
<tr>
<td>Family Characteristics</td>
<td>Marital Status</td>
<td>Won I (2018)</td>
</tr>
<tr>
<td></td>
<td>Family annual income</td>
<td>Anthony W, Straker J K</td>
</tr>
<tr>
<td></td>
<td>Number of children</td>
<td>Bella J K (2014)</td>
</tr>
<tr>
<td>Subjective normative factors</td>
<td>Degree of knowledge of senior living institutions</td>
<td>Asia (1995)</td>
</tr>
<tr>
<td></td>
<td>Trust in elderly care institutions</td>
<td>Mat A. Bergman (1991)</td>
</tr>
</tbody>
</table>

3.3. Variable Interpretation

(i) Dependent variable

The dependent variable is the willingness of the elderly to provide for the elderly in institutions. For the convenience of statistics, assign the option "Willing to stay in a nursing home" a value of 1, and "Not willing to stay in a nursing home" a value of 0.

(ii) Independent variable

Independent variables include individual characteristics of the elderly (health status, education level, occupation), family characteristics (annual family income, number of children, marital status) and Subjective normative factor (Knowledge of pension institutions, Trust in pension institutions, Support of adult children). Among them, the health status is measured by the self-rated health status in the questionnaire, and the self-rated health "very good" and "good" are set as "good health status"; Self-rated health "general" is set as "general health"; Self-rated health "bad" and "very bad" are set as "poor health". According to the four-stage education system, the "uneducated", "unfinished primary school", "private school graduation" and "primary school graduation" in the questionnaire are set as "primary school and below"; "Junior high school graduation" is set as "junior high school"; "High school graduation" and "secondary school graduation" are set as "high school"; "College Graduation", "Undergraduate Graduation", "Master Graduation" and "Doctor Graduation" are set as "College or above". Occupation is measured by the question "What is your main job" in the questionnaire. The family's annual income is measured by the range of income. It is measured by the "range of your family's annual income" in the questionnaire. The items are divided into four levels: "10000 yuan and below", "10000 yuan and above", "30000 yuan and above", and "50000 yuan and above". The number of children is measured by the question "How many
children do you have in total" in the questionnaire. The options are divided into "no children", "one and more", and "three and more". The marital status is determined by the "What is your current marital status" in the questionnaire. The options include "unmarried", "divorced", "widowed" and "married". Among them, "unmarried", "divorced" and "widowed" are considered as the status without a spouse for the time being, and "married" people are considered as the status with a spouse. The degree of understanding of the elderly care institutions is measured by the degree of understanding of the self-assessment in the questionnaire. The self-assessment of "very understanding" and "understanding" is set as "understanding"; Self-rated "heard" and "know a little" is set to "general"; Self-rated "don't understand" and "don't understand" are set to "don't understand". The degree of trust in elderly care institutions is also measured by the degree of understanding of the self-assessment in the questionnaire. The self-assessment of "very trust", "trust" and "basic trust" is set as "trust"; Self-rated "general" and "hesitant" are set to "general"; Self-rated "extremely untrusted" and "untrusted" are set as "untrusted". The degree of support of adult children is measured by the question "What is your child's attitude towards your stay in the nursing home?", and those who answer "support", "very supportive" and "have this idea" are set as "support"; Those who answered "hesitant", "uncertain" or "general" were set to "general"; Those who answered "very resistant", "disagree" or "do not support" were set to "do not support".

(iii) Control variable

The control variables include gender, age, family relationship, and the influence of neighborhood choice. Among them, gender is divided into "male" and "female". The age is "what is your age range" in the questionnaire, and the options are divided into "60–74", "75–89", and "90 years old and above". According to the WHO standard, the population of "90 years old and above" is divided into longevity elderly. Among them, The family relationship was measured by the self-assessment family relationship in the questionnaire, and the self-assessment family relationship "harmonious" and "harmonious" was set as "good family relationship"; Self-rated family relationship "general" is set as "general family relationship"; Self-rated "contradiction", "bad" and "bad" of family relations are set as "poor family relations". The impact of the choice of the way of providing for the elderly in the neighborhood is measured by the impact of the self-evaluation of the choice between the neighbors in the questionnaire. The "impact judgment", "great impact" and "impact" of the self-evaluation of the choice between the neighbors are set to "high impact of the choice between the neighbors", and the "occasional impact" and "possible impact" of the self-evaluation of the choice between the neighbors are set to "average impact of the choice between the neighbors", Self-evaluation of the influence of neighborhood selection "not affected" and "indifferent" is set as "the influence of neighborhood selection is low". See Table 3 for specific variable assignment.
<table>
<thead>
<tr>
<th>Variables</th>
<th>Name</th>
<th>Assignment Description</th>
</tr>
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<tbody>
<tr>
<td>Independent variable</td>
<td>Personal Characteristics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Education level</td>
<td>Elementary school and below = 1; Middle school = 2; High school = 3; College and above = 4</td>
</tr>
<tr>
<td></td>
<td>Physical Condition</td>
<td>Good health status = 1; General health = 2; Poor health = 3</td>
</tr>
<tr>
<td></td>
<td>Career</td>
<td>Farming = 1; Working = 2; Enterprises and institutions = 3; Self-employed = 4</td>
</tr>
<tr>
<td>Family Characteristics</td>
<td>Number of children</td>
<td>None = 0; 1 and more = 2; 3 and more = 3</td>
</tr>
<tr>
<td></td>
<td>Annual household income</td>
<td>10,000 and below = 1; 10,000 ~ = 2; 30,000 ~ = 3; 50,000 and above = 4</td>
</tr>
<tr>
<td></td>
<td>Marital Status</td>
<td>No spouse = 0; Having a spouse = 1</td>
</tr>
<tr>
<td>Subjective normative factors</td>
<td>Trust in elderly care institutions</td>
<td>Trusting = 3; Average = 2; Distrustful = 1</td>
</tr>
<tr>
<td></td>
<td>Level of knowledge of senior living facilities</td>
<td>Knowledgeable = 3; Average = 2; Distrustful = 1</td>
</tr>
<tr>
<td></td>
<td>Support from children</td>
<td>Supportive = 3; Fair = 2; Unsupportive = 1</td>
</tr>
<tr>
<td>Control variable</td>
<td>Gender</td>
<td>Male = 1; Female = 2</td>
</tr>
<tr>
<td></td>
<td>Age</td>
<td>60 ~ 74 years old = 1; 75 ~ 89 years old = 2; ≥ 90 years old = 3</td>
</tr>
<tr>
<td></td>
<td>Family Relations</td>
<td>Cordial = 1; Commonly = 2; Poor = 3</td>
</tr>
<tr>
<td></td>
<td>Influence of neighbor selection</td>
<td>Influential = 1; Average = 2; Not influential = 3</td>
</tr>
</tbody>
</table>
3.4. Statistical Methods

The dependent variable in this paper is the willingness of the rural elderly to provide for the elderly in institutions, which is a binary variable, and is suitable for the use of binary logistic regression model. Let the dependent variable be \( y \), with a value of 1 indicating that the rural elderly are willing to choose institutional pension, and a value of 0 indicating that the rural elderly are not willing to choose institutional pension. The \( m \) independent variables affecting \( y \) are recorded as \( x_1, x_2, \ldots, x_m \). Control variables are \( C_1, C_2, \ldots, C_k \). Suppose that the conditional probability of rural elderly people willing to choose institutional endowment is \( p (y = 1/x) = p \) and \( 1-p \) represents the probability of rural elderly people unwilling to choose institutional endowment.

\[
 p_i = \frac{1}{1 + e^{-(\alpha + \sum_{i=1}^{m} \beta_i x_i + \sum_{k=1}^{m} \beta_k c_k)}} = \frac{e^{\alpha + \sum_{i=1}^{m} \beta_i x_i + \sum_{k=1}^{m} \beta_k c_k}}{1 + e^{\alpha + \sum_{i=1}^{m} \beta_i x_i + \sum_{k=1}^{m} \beta_k c_k}}
\]

The probability ratio \( p/(1-p) \) of the rural elderly who are willing to choose institutional pension and who are not willing to choose institutional pension is called the event occurrence ratio, abbreviated as "Odds". The odds is positive (because \( 0 < p_i < 1 \)) and has no upper bound. Perform logarithmic transformation on Odds to obtain the linear expression of the logistic regression model:

\[
 \ln \left( \frac{p_i}{1 - p_i} \right) = \alpha + \sum_{i=1}^{m} \beta_i x_i + \sum_{k=1}^{m} \beta_k c_k
\]

In the first and second formulas, \( \alpha \) is a constant term; \( m \) is the number of independent variables; \( \beta_i \) is the coefficient of the independent variable, \( \beta_k \) is the coefficient of the control variable, reflecting the influence direction and degree of the independent variable on the willingness of the rural elderly to provide for the elderly in institutions.

4. Results and Analysis

4.1. The willingness level of the rural elderly to provide for the elderly in institutions

According to the analysis results in Table 4, 17.71% of the elderly are willing to accept the nursing service of the nursing home, and 82.29% of the rural elderly are unwilling to accept the nursing service of the nursing home, indicating that the majority of the rural elderly have little motivation to choose institutional pension. This statistical result is similar to the existing research results (refer to Tang Liping, 2010 [23]; Liu Zi-Wei et al., 2019 [3]). From the perspective of the willingness of rural elderly of different sexes, there are certain differences between men and women, but the difference is very small.
Table 4
The willingness of rural elderly of different gender groups to provide for the aged

<table>
<thead>
<tr>
<th>Willingness to provide for the aged</th>
<th>Gender grouping</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Would you choose to spend your old age in a nursing home?</td>
<td>Yes(%)</td>
<td>9.37</td>
</tr>
<tr>
<td></td>
<td>No(%)</td>
<td>31.25</td>
</tr>
</tbody>
</table>

Note: Pearson chi-square value = 2.598, P = 0.107

Moreover, the chi-square test results (P = 0.107) show that this difference does not exist in the whole population. In other words, the reluctance of rural elderly people to accept nursing services in nursing homes is not only a sample feature but also a common phenomenon. The inspiration from this is that in rural areas, it is reasonable to position institutional pension as a supplementary position in the pension service system, at least this is more in line with the wishes of the current rural elderly.

4.2. Factors affecting the willingness of rural elderly to provide for the elderly in institutions

In the model of the influence of personal characteristics, family characteristics and subjective normative factors on the willingness of rural older people to receive care services from an institution, Model 1 controls for the influence of gender, age, neighborhoods choice and family relationships on the willingness of rural older people to receive services from an institution. Among the control variables, family relationship has a significant negative impact, while the choice of neighborhood pension has a significant positive impact. That is, the higher the degree of family harmony and the influence of neighborhood choice, the lower the willingness of the elderly to provide for the elderly in institutions. The older people with poor family relations and less influence by the choice of elderly care methods in the neighborhood have higher willingness to provide for the elderly in institutions.

This model examines the impact of different types of independent variables on institutional pension willingness. The results show that individual characteristics, family characteristics and subjective normative factors have a significant impact on the willingness of rural elderly to provide for the aged in institutions.

First, the impact of individual characteristics on the willingness of rural elderly to provide for the elderly in institutions. Among the individual characteristics, older people in good health are less willing to accept institutional care, which is similar to the research results of Melanie and Sereni (2011) [24]. The reason may be that the elderly with poor physical quality have a greater demand for medical services and daily care, and traditional family care cannot meet their needs, so they are also more willing to accept institutional care. According to the prediction of Maslow’s hierarchy of needs theory, the elderly at this stage have met the needs of maintaining life, and the pursuit of a higher level requires the elderly to meet certain conditions and capabilities, so the demand for elderly care institutions has become less intense.
Secondly, the higher the level of education, the more likely the elderly are to support the elderly in institutions. In other words, the higher the level of education, the stronger the ability of the elderly to accept new things. This result is similar to that of Zhang L W (2018) [25]. The possible explanation is that the lower the educational level of the elderly, the less opportunities they have to accept new things. Their knowledge of elderly care methods only stays in the traditional home-based elderly care methods, so this group of people are more excluded from receiving the services of elderly care institutions. However, occupation has no significant impact on the willingness of rural elderly to provide for the aged in institutions. Therefore, $H1a$ and $H1b$ have passed hypothesis verification, while $H1c$ has yet to be verified.

Table 5
Regression results

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model I</th>
<th>Model II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control variable</td>
<td>Gender</td>
<td>0.108</td>
</tr>
<tr>
<td></td>
<td>Age</td>
<td>-0.499</td>
</tr>
<tr>
<td></td>
<td>Family Relations</td>
<td>-2.311**</td>
</tr>
<tr>
<td></td>
<td>Influence of neighbor selection</td>
<td>1.863**</td>
</tr>
<tr>
<td>Personal Characteristics</td>
<td>Physical Condition</td>
<td>-1.341***</td>
</tr>
<tr>
<td></td>
<td>Career</td>
<td>0.081</td>
</tr>
<tr>
<td></td>
<td>Education level</td>
<td>0.853***</td>
</tr>
<tr>
<td>Family Characteristics</td>
<td>Number of children</td>
<td>-0.756***</td>
</tr>
<tr>
<td></td>
<td>Marital Status</td>
<td>-0.542*</td>
</tr>
<tr>
<td></td>
<td>Annual household income</td>
<td>0.144*</td>
</tr>
<tr>
<td>Subjective normative factors</td>
<td>Trust in elderly care institutions</td>
<td>1.158***</td>
</tr>
<tr>
<td></td>
<td>Level of knowledge of senior living facilities</td>
<td>-1.038*</td>
</tr>
<tr>
<td></td>
<td>Support from children</td>
<td>1.448*</td>
</tr>
<tr>
<td>Constant</td>
<td></td>
<td>1.304*</td>
</tr>
<tr>
<td>Wald chi2</td>
<td></td>
<td>194.54</td>
</tr>
<tr>
<td>Observations</td>
<td></td>
<td>192</td>
</tr>
</tbody>
</table>

Second, the effect of household characteristics on rural elderly people's willingness to accept institutional care. There is a significant positive effect of annual household income on the willingness of elderly people to accept institutional care. That is to say, the lower the annual household income of an older person, the less willing he or she is to accept institutional care. This is consistent with the research results of Dong X Q (2017) [26]. The number of children and marital status have a significant negative impact on
the willingness of rural elderly to receive institutional care, which confirms the research conclusion of Jianjun(2014) [27]. The possible explanation is that the nursing home has certain requirements for the economic ability of the elderly, but for families with low annual income, the annual income and pension reserve of the family are not enough to pay the institutional nursing expenses. Therefore, these families are less willing to accept institutional care. Secondly, compared with the population without spouse and the population with fewer children, the larger number of spouse and children means that the elderly have more network resources of family, friends and even the community, which can effectively meet the spiritual comfort needs of the elderly and relieve the loneliness and loneliness in their later years, thus reducing the elderly's institutional pension needs. Therefore, $H2a$, $H2b$ and $H2c$ all passed the hypothesis test.

Finally, the impact of subjective normative factors on rural elderly people's willingness to accept institutional care. The degree of trust in pension institutions and the degree of support of adult children have a significant positive impact on the willingness of the elderly to accept institutional care, which is consistent with Kimberly et al (2015) [28]. However, the level of understanding of the elderly care institutions has a significant negative impact on the elderly's willingness to admission to a nursing home, which is inconsistent with the statistical results of Folland (2008) [29]and Gordon G. Liu (2016) [30]. The reason may be that residents' trust in the elderly care institutions is closely related to the service quality of the elderly care institutions themselves. The elderly care institutions can gain residents' trust by improving their service quality, which can effectively improve residents' willingness to institutionalize and satisfaction with the services of the elderly care institutions. Secondly, Chen and Ye (2013) pointed out in the study that the elderly have a limited understanding of new things [31]. When adult children continue to output objective information about nursing homes to the elderly and maintain a supportive attitude towards the admission of nursing homes, the elderly will make a clearer and more rational choice, so they are also more inclined to stay in nursing homes. Therefore, $H3a$ and $H3b$ pass hypothesis verification, $H3c$ failed validation.

It is worth noting that the objective understanding of elderly care institutions is an important factor affecting the subjective will of the elderly. However, this study shows that the more elderly people know about the elderly care institutions, the lower their willingness to accept the services of the elderly care institutions, which is completely contrary to previous studies. This is a very interesting discovery. The possible explanation is that: First, Shandong Province, as the birthplace of Confucianism, has a deep-rooted traditional concept of old-age care. Under the intervention of public opinion, the elderly will also have a sense of shame and insecurity when living in the nursing home [32]. This psychological state will also affect the subjective judgment of the elderly. Secondly, the development of elderly care institutions in rural areas of Shandong Province is still in its infancy. When the elderly understand that the development of elderly care institutions has not met their expectations and cannot meet the elderly's needs for the elderly, it will reduce the willingness of the elderly to accept the services of elderly care institutions. Turrell et, al. (2001) found in their research that the current service content and quality of the elderly institutions make it difficult to meet the high-level needs of the elderly, which also confirmed the above speculation [33].
4.3. Robustness Check

Robustness testing of model estimation results is an important element in testing the quality of empirical results. In general, endogenous diagnostics is an important method for testing the robustness of model estimation results. Therefore, in this paper, we mainly use the endogenous diagnostics to test the robustness of the model estimation results.

The omission of important variables, reverse causality and other factors lead to the endogenous nature of the model, which is an important reason for the poor robustness of the estimation results [34]. There are many kinds of test methods for endogenous problems, such as variable transformation, using new analysis methods, adding new control variables, and using tool variables [35]. In order to avoid the problem that the difference between the degree of understanding of the elderly care institutions is simply attributed to the omission of important variables that may be caused by the difference between understanding and not understanding, this paper adds the control variable of the impression of the elderly care institutions, and replaces the original model with Probit model, and analyzes the impact of each factor respectively.

<table>
<thead>
<tr>
<th>Variable classification</th>
<th>Include new control variables</th>
<th>Probit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impression on pension institutions (bad = 0)</td>
<td>0.771***</td>
<td>0.777***</td>
</tr>
<tr>
<td>Physical Condition</td>
<td>-1.298***</td>
<td>-0.754***</td>
</tr>
<tr>
<td>Career</td>
<td>0.060</td>
<td>0.031</td>
</tr>
<tr>
<td>Education level</td>
<td>0.938***</td>
<td>1.161***</td>
</tr>
<tr>
<td>Number of children</td>
<td>-0.711***</td>
<td>0.379***</td>
</tr>
<tr>
<td>Marital Status</td>
<td>-0.601*</td>
<td>-0.198*</td>
</tr>
<tr>
<td>Annual household income</td>
<td>0.473*</td>
<td>0.817*</td>
</tr>
<tr>
<td>Trust in elderly care institutions</td>
<td>1.388***</td>
<td>1.132***</td>
</tr>
<tr>
<td>Level of knowledge of senior living facilities</td>
<td>-0.827*</td>
<td>-0.704*</td>
</tr>
<tr>
<td>Support from children</td>
<td>1.014*</td>
<td>0.896*</td>
</tr>
<tr>
<td>Constant</td>
<td>1.380**</td>
<td>2.192*</td>
</tr>
<tr>
<td>Wald chi2</td>
<td>154.34</td>
<td>522.16</td>
</tr>
<tr>
<td>Observations</td>
<td>192</td>
<td>192</td>
</tr>
</tbody>
</table>
From the regression results in Table 6, although the degree of influence of different in dependent variables on the dependent variable in the final regression results has changed, the direction of influence of the main independent variables on the dependent variable is basically the same as that of the original model. It can be seen that the estimation results in this paper are robust and reliable.

4.4 Heterogeneity analysis

In order to examine the heterogeneity of the impact of individual characteristics, family characteristics and subjective normative factors on whether the elderly accept the services of elderly care institutions, this paper will conduct a grouping test on the whole sample from the aspects of family relations and the impact of neighborhood selection.

The regression results of family relationships show that the trust degree of pension institutions and the support degree of children have a significant positive impact on the elderly with different family relationships. However, with the decline of the harmony degree of family relationships, the positive impact on the trust degree of pension institutions has gradually increased. Marital status and the number of children have always had a significant negative impact. The annual income and degree of education have a significant positive impact on elderly people with harmonious family relationships. The physical condition has a positive impact on rural elderly people with harmonious family relationships. For the elderly with harmonious family relations, family resources he has can basically meet the emotional pursuit of being cared for by their relatives in their later years [36]. Therefore, even if the annual income of the family can meet the standard of living in the nursing home and the physical condition is poor and needs special care, they are also more willing to choose home care. For the elderly with poor family relations, the necessary economic ability and personal cognitive ability limit their willingness to accept institutional pension services.
Table 7
Heterogeneity analysis

<table>
<thead>
<tr>
<th>variable</th>
<th>Family relations</th>
<th>Influence of neighbor selection</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Good</td>
<td>Average</td>
</tr>
<tr>
<td>Physical condition</td>
<td>0.218**</td>
<td>-0.356*</td>
</tr>
<tr>
<td>Degree of education</td>
<td>0.265*</td>
<td>0.406*</td>
</tr>
<tr>
<td>Career</td>
<td>0.007</td>
<td>0.336</td>
</tr>
<tr>
<td>Marital Status</td>
<td>-0.643**</td>
<td>-0.429***</td>
</tr>
<tr>
<td>Annual household income</td>
<td>-0.094*</td>
<td>0.546**</td>
</tr>
<tr>
<td>Number of children</td>
<td>-1.448***</td>
<td>-0.696***</td>
</tr>
<tr>
<td>Trust in elderly care institutions</td>
<td>0.157*</td>
<td>0.297*</td>
</tr>
<tr>
<td>Level of knowledge of senior living facilities</td>
<td>-0.079*</td>
<td>-0.159</td>
</tr>
<tr>
<td>Support from children</td>
<td>0.652**</td>
<td>0.130**</td>
</tr>
</tbody>
</table>

The regression results of the influence of the choice of the way of providing for the aged in different neighborhoods show that the physical condition, marital status, and the number of children all play an encouraging role in the willingness of the elderly to provide for the aged in institutions with different degrees of influence in the neighborhoods. Children's support and trust in the elderly care institutions have a positive impact on the elderly who are greatly affected by neighborhood choice. Because of the special psychological state of the elderly who are greatly affected by the neighborhood choice, they need the support of their children and their own recognition of the elderly care institutions to have the courage to choose to accept the services of the elderly care institutions [37]. Therefore, richly emotional and external environmental support can significantly improve the elderly's willingness to provide for the elderly who are greatly affected by neighborhood choice.

Different from previous studies, occupation has no significant impact on the rural elderly in different groups. Zhao Jingjing (2020), when investigating the elderly working outside the country, found that the experience of working outside the country can significantly promote the transformation of the concept of elderly care in rural areas from traditional to modern, but for the returning elderly who have worked outside the country for less than 10 years, the experience of working outside the city has not changed their traditional concept of family elderly care, and still cannot accept the socialized way of elderly care. It shows that when working outside for a short time, the life experience and contact with modern values in
the city are not enough to compete with the traditional ideas of farmers, and the old people are still used to making judgments and choices with traditional thinking [38]. Therefore, even though the rural elderly have the opportunity to contact new things in their work, it is difficult to change the deep-rooted traditional concepts in people's minds due to the limitation of working hours [39]. It can be seen that as the historical accumulation of traditional agricultural civilization, China's traditional concept of old-age pension has a strong path-dependent effect.

5. Conclusion

Based on Maslow's hierarchy of needs, this paper constructs an analytical framework that reflects the actual needs of older people and the resource capacity that affects the actual needs of older people in rural areas. It mainly examines the impact of individual characteristics, family characteristics, and subjective normative factors on whether the rural elderly accept the services of pension institutions. Through empirical analysis, the following conclusions are drawn:

First, the reluctance of rural elderly to accept the services of elderly care institutions is not only a sample feature but a common phenomenon. Based on the analysis of the questionnaire data in rural areas of Shandong Province, this paper shows that the vast majority (82.29%) of the rural elderly are unwilling to accept the elderly care services of the elderly care institutions. If we take into account the elderly who are willing to choose institutions but are unable to provide for the elderly, in fact, there will be fewer elderly who can provide for the elderly in institutions. From the perspective of the willingness of the rural elderly of different genders to provide for the aged in institutions, there are certain differences between men and women, but the difference is small and has not passed the chi-square test, indicating that this difference does not exist in general.

Secondly, among the individual characteristics, the level of physical fitness is consistent with Maslow's hierarchy of needs theory in explaining the rural elderly's willingness to accept institutional care. This study found that there was a significant negative impact between the physical quality of the elderly and their willingness to provide for the elderly in institutions. When physical fitness declines, the degree of the elderly's willingness to provide for an institution rises to a certain level, reflecting the elderly's pursuit of the value of life security. This stage of need is necessary for the elderly. However, when the body is in a healthy state, the willingness of the elderly to enjoy their later years in a retirement institution decreases. At this stage, the elderly seek to ensure their quality of life, but this value need is not as urgent as compared to maintaining their vital signs [40]. Therefore, the pursuit of value at this time is limited in many ways, such as the resources and abilities of the elderly, which corroborates the ideas of Maslow's hierarchy of needs theory used in this paper.

Third, there are group differences in the willingness of rural elderly people to receive care services from residential care institutions. The poorer the physical quality of the elderly with harmonious family relations and the higher the annual income of the family, the less they want to accept the services of the elderly care institutions; The poorer the physical quality of the elderly with poor family relations, the
higher the annual family income, and the stronger the willingness to accept the services of the elderly care institutions. Elderly people who are less affected by neighborhood choice are often more willing to accept the nursing services of elderly care institutions unless restricted by economic conditions and the service level of elderly care institutions. However, regardless of the degree of influence of family relationships and neighborhood selection, marital status and the number of children have a significant negative impact on different groups of elderly people. Trust in elderly care institutions consistently has a positive impact on rural elderly people with different family relationships. With the decline of family relationship harmony and the increase of the degree of influence of neighborhood selection, the degree of influence in different directions will gradually weaken. In general, the rural elderly with poor family relations are more inclined to choose nursing services from elderly care institutions, even if they are constrained by actual ability and resources; The elderly, who are less affected by the choice of neighbors, are more able to rationally choose their own way of providing for the aged when they need to receive special care, and the higher the acceptance of the elderly care service in the nursing home.

It is worth noting that individual characteristics represent the actual needs and personal abilities of the elderly; The family resources and abilities of the elderly are represented by family characteristics and the cognition and evaluation of the elderly represented by subjective normative factors are mutually restricted, which together affect the willingness of the rural elderly to provide for the elderly in institutions. One of the most obvious factors, however, is the influence that the ideology of older people brings to bear on their willingness to age. There is a significant negative impact between the elderly's understanding of the elderly care institutions and whether they accept the services of the elderly care institutions found in the study, and even if the old people are exposed to new things, their acceptance of modern concepts is still not strong [41], which shows that the elderly's choice of the elderly care methods is not only limited by the objective factors of their own economic capacity and the development level of the elderly care institutions but also related to the external evaluation and public opinion [42]. This just shows that social environment constraints such as lifestyle and ideology particularly limiting the willingness of rural older people to access institutional care, and also brings us some important enlightenment.

First of all, in the construction of a rural elderly care service system, it is difficult for institutional elderly care to play a solid "supporting" role [43]. Positioning institutional elderly care as a "supplementary" position is in line with the actual needs of the rural elderly, is a more reasonable and feasible strategic arrangement, and can be standardized. Secondly, encourage the elderly to save. For example, encourage the rural elderly to set up personal pension asset savings accounts in banks, which will help improve the institutional pension willingness of the rural elderly [44]. Finally, the country should pay attention to the correct public opinion guidance and education on the national conditions of population aging to alleviating the constraints of entrenched traditional thinking on the willingness of rural older people to diversify their retirement. And build a warm and comfortable living environment for the elderly in institutions [45], which will help improve the willingness of the elderly in rural areas to provide for the elderly in institutions and promote the healthy development of elderly care institutions.
6. Limitations of the study

Based on Maslow's hierarchy of needs theory and the concept of endowment capital, this paper focuses on the analysis of the actual needs, family resources and abilities, cognitive ability of the elderly and external evaluation factors that affect the willingness of rural elderly to accept nursing services in nursing homes. However, there are still some deficiencies in this study. For example, due to the limited data collection capacity of the author on whether the rural elderly in Shandong Province accept the care services of the elderly care institutions, it is impossible to fully understand whether the rural elderly in Shandong Province accept the care services of the elderly care institutions in terms of time, sample size and content. Secondly, when selecting independent variables, this paper only considers the most influential aspects that are generally considered by people at present, and does not include some more detailed factors.

The author will continue to improve the existing research, understand more comprehensive pension needs, make the empirical results more scientific and comprehensive, and provide a more comprehensive and richer theoretical basis for improving China's pension system.

Declarations

Consent for publication: Not applicable.

Availability of data and materials: The datasets employed by the researchers in the analysis of the study is available by the authors upon reasonable request. We confirmed that informed consent was obtained from all participants.

Competing interest: The authors declare no conflict of interest.

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Ethical Approval and Consent to participate: The data was obtained by the author in March 2022 in some rural areas of Shandong Province, and passed the review of the ethics organization of Jiangsu University.

Informed Consent Statement: Not applicable.

Data Availability Statement: Not applicable.

Corresponding author: Correspondence to Xinglong Xu

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Author's note: XX: Holds a PhD in Management Science with research and teaching interest in Health Economics and Health Policy Management. He has 10 years of teaching and research experience in this area. He is currently a professor at the School of Management at Jiangsu University. P Li: She is a graduate student of Jiangsu University. She has 4 years of learning experience and half a years of research experience in health reform. Sabina Ampon-Wireko: She is a postdoctoral fellow of Jiangsu University. She has been engaged in research in this field for 10 years and has rich experience in research and collaboration.

Authors contribution: XX responsible for the conception and involved in critically revising the manuscript for important intellectual content. PL design of the study, analyzed and explained the data, then drafted the manuscript. Sabina Ampon-Wireko consulted during the analysis and interpretation process. All the authors read and approved the final manuscript.

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