

# Gender Differences in Healthcare-Seeking Behaviors in China's Ageing Population: An Empirical Study of Shanghai

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## Research Article

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# **Gender differences in healthcare-seeking behaviors in China's ageing population: an empirical study of Shanghai**

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## **Abstract**

**Background:** Given the growing healthcare demands of the elderly, an improved understanding of the factors influencing their healthcare-seeking behaviors is necessary to enhance the effectiveness of the current healthcare system. This study empirically investigates the factors influencing the elderly population's healthcare-seeking behaviors in Shanghai, China, from a gender differences perspective.

**Methods:** We combine both quantitative and qualitative analyses by constructing a binary logistic regression model and identifying the relevant influential factors based on the following types of dimensions: individual, family, and cultural.

**Results:** The results indicate that gender differences exist in the elderly population with common diseases but not in those with severe diseases, and that the female elderly are more likely to choose non-tertiary hospitals than males. In addition, age, marital status, employment status, income, health conditions, medical insurance, family support, and social capital are found to be critical influencing factors.

**Conclusions:** The findings provide a better understanding of the elderly population's healthcare demands and can be used to promote healthcare equality.

**Keywords:** gender difference; healthcare-seeking behaviour; ageing; elderly population; healthcare provider preference; influencing factor

## **Introduction**

The increasing proportion of ageing populations presents enormous challenges for policymakers and service providers globally. In China, an ageing giant [1], the population aged over sixty reached 253.88 million in 2019, accounting for 18.1 per cent of the total population [2]. The increasing proportion of the elderly population creates a heavy burden for the healthcare system. It is estimated that the elderly population will bear two-thirds of the total disease burden in China by 2030 [3]. Issues concerning the elderly population are recognized as a research priority, which is evidenced by the growing body of research on the psychological, social, and healthcare demands of the elderly [4]. To enhance the effectiveness of the current healthcare system, health policies should not be focused only on the supply of healthcare but also on recognizing the changing demands for healthcare [5].

Meanwhile, the impact of inequity is one of the challenging issues regarding the healthcare system. The female elderly population is considered more vulnerable to issues with health conditions, education, and income than the male elderly population. Further, females exhibit different sick role behaviors [6], that is, actions taken by those who consider themselves ill in terms of seeking medical treatment and becoming well [7].

It is critical to respond to the growing healthcare demands of the elderly population. In the current ageing society, a demand-driven healthcare system that stresses the healthcare demands of the elderly population of both genders is needed. However, most of the current research on healthcare inequalities focuses on the differences between urban and rural areas [8, 9]. Few studies on healthcare inequalities adopt the perspective of gender differences, especially regarding healthcare-seeking behaviors, this term can also be referred to as illness behavior or sick-term behavior [10].

This study presents the gender differences in the healthcare-seeking behaviors of the elderly population in Shanghai. Shanghai is one of the cities with a large proportion of the

elderly population in China [11]. Combining both quantitative and qualitative analyses, we adopt empirical cases to investigate the gender differences of the elderly population's preferences of healthcare providers. Further, we identify the relevant influential factors from the perspectives of individuals, families, and cultural levels, examine the underlying reasons, and provide some policy recommendations.

## **Background**

Gender-based health differences is a product of gendered differences in both the prevalence and patterns of diseases and healthcare-seeking behaviors [12]. Gender differences exist in the incidence of several diseases. For instance, female is generally more frequently affected by autoimmune diseases than male [13]. Greater social anxiety disorder prevalence and severity are found in female compared with male [14]. A lower incidence and higher age at onset of Parkinson's disease are observed in female, suggesting a more benign phenotype in female [15]. The prevalence of obesity varies within and between countries, and the current sociocultural dynamics exacerbate global gender disparities in excess weight gain [16]. Among the elderly population, gender differences of disability are affected by sociodemographic factors, chronic-disease risk factors and health conditions. Greater prevalence of nonfatal disabling conditions with substantially diminished quality of life is happened more among elderly female compared with male [17]. Also, gender-based disparities exist in the diagnoses and treatment of various health conditions, thus health care gender bias can be found accordingly [18].

Gendered differences in healthcare-seeking behaviors have been studied from various perspectives. In Vietnam, gender inequity has been reported in child healthcare-seeking behaviours, with parents providing preferential treatment to boys, potentially leading to excess morbidity of girls [19]. In the traditional Chinese nuclear family, patrilineal norms are central

to familial obligations, rights and powers. Gender roles are codified by the distinct functions of male and female in the productive, reproductive and domestic spheres [20]. Therefore, gender differences and the gender roles played in the family and at different social levels may also affect an individual's healthcare-seeking behaviors. Several empirical studies have observed that females tend to self-assess their health condition as being worse, seek healthcare services more often than males, and utilize preventive healthcare services more frequently [6, 21-23]. For example, mild symptoms such as a cough have a greater impact on females, and female patients exhibit more and earlier hospitalizations than males [24]. In America, female elderly's healthcare demands are substantially greater compared with male, and they are more likely to use home healthcare due to fewer economic resources [25]. However, these gender differences often diminish or are reversed in older ages [26].

Other factors influencing healthcare-seeking behaviors have been studied in terms of the following four dimensions: individuals' sociodemographic and socioeconomic characteristics, healthcare demands, and healthcare quality.

First, sociodemographic characteristics constitute the main influencing factor of the elderly population's preferences of healthcare providers [27]. These characteristics include gender, age, marital status, employment status, education, income, occupation, cohabitation, and so on [6, 28, 29]. For example, one study shows that well-educated females and urban dwellers are more likely to seek care in a clinic [30]. The rural elderly population is more likely to visit lower-level providers or choose self-treatment than access higher levels of healthcare [31]. Marriage has a positive impact on sick role behaviors in both younger and elderly populations, but the benefits of marriage vary by gender, tending to be more substantial for the male elderly [32]. In addition, occupational dangers exist in some working environments involving exposure to pollutants such as asbestos, which increases the probability of illness [33]. Education significantly affects individuals' healthcare-seeking behaviors, those with

higher education tend to choose treatment from healthcare providers instead of self-treatment [34].

Second, a group of factors influencing access to medical services are socioeconomic characteristics such as medical service prices, family financial support, cost of time, distance, medical insurance, and so on [35-37]. For instance, one study investigated healthcare demand in poor rural areas of China and found that the price elasticity was higher for low-income than high-income groups, and also higher for hospitals than for village clinics. Moreover, enrollment in the New Rural Cooperative Medical Scheme significantly increased an individual's probability of seeking treatment at a public village clinic [31].

Third, it has generally been found that healthcare demands, including health condition and disease severity, also play an important role in determining individuals' healthcare-seeking behaviors [38, 39]. It has been found that individuals with a serious illness or injury would prefer to pay for treatment in a higher-quality facility. In contrast, individuals with minor illnesses or injuries are more likely to visit lower-quality facilities, as these are considerably cheaper [40].

Fourth, healthcare quality influences individuals' healthcare-seeking behaviors. Healthcare quality is generally measured by the quality of the medical institution, availability of medical professionals, quality of medical resources, medical level, availability of prescription medicine in a medical facility, and environment for medical treatment or hospitalization [41-43]. One study on preferences regarding outpatient services in Beijing shows that the most preferred choice for the general public is tertiary hospitals, and high-level private hospitals are more popular than community hospitals [44].

In terms of statistical methodologies for the econometric modeling of healthcare-seeking behaviors, current studies are mainly based on Andersen's behavioral model of health services

use and Grossman's health demand model [45, 46], The following studies have investigated healthcare provider preferences by applying these models: Jacobson [40], Bahitsch [22], Lo [47], Kim and Lee [48]. Duan, *et al.* have demonstrated that healthcare provider preferences and the level of expenses can be positively associated in a two-part model, which has become a classic analysis and modeling method in health economics [49]. For instance, Mocan, *et al.* have adopted the two-part model as well as a discrete factor model and found that healthcare demands are price inelastic [50]. Sarma has used nested multinomial logit models to examine a variety of individual- and household-specific characteristics affecting the demand for healthcare in rural India [51]. In China, the relevant studies mainly rely on large-scale national survey data to interpret the general characteristics and regular pattern of individuals' healthcare provider preferences by using the two-part model and a nested logit model [52-54]. With the development of econometrics in the field of healthcare, discrete multivariate regression models and binary logistic regression models are becoming prominent because of their stability [21, 55].

## **Methods**

### **Data and sample characteristics**

We adopted multi-stage stratified random sampling as follows. First, several districts were randomly selected from Shanghai's central urban area, and both near and far suburbs. This was followed by a random selection of several streets across the selected districts; then, several residential and village committees were randomly selected based on the selected streets. Next, the sample was restricted to individuals aged 60 and above, and the subjects of the survey were randomly selected from this elderly population. The survey covered twelve districts (Jing'an, Huangpu, Xuhui, Putuo, Yangpu, Changning, Minhang, Pudong New District, Baoshan, Jiading, Songjiang, and Fengxian), covering 39 streets (in towns), 138 residential committees

(132 urban committees and 6 village committees). These districts encompassed the central urban area, near suburbs, and far suburbs. A total of 638 questionnaires were sent and all of them were completed and returned; 625 valid questionnaires (555 urban subjects and 70 rural subjects) were included in the analysis, 224 were from men and 401 from women.

### **Study design**

The quantitative data for this study were obtained from a questionnaire survey, the questionnaire items were divided into the following five sections: the elderly population's sociodemographic characteristics, health conditions, healthcare preferences, expectations and satisfaction with healthcare services, and possession of medical insurance.

We measured and compared the elderly population's preferences of healthcare providers according to individuals' disease severity: common diseases vs. severe diseases. We define common diseases as relatively mild diseases, such as fevers, colds, migraine headaches, and diarrhea. Severe diseases refer to serious and long-term diseases that decrease the patients' quality of life due to high healthcare expenditures (HCE). Such diseases include malignant tumors, severe brain injuries, severe cardiovascular and cerebrovascular diseases, deep comas, advanced chronic diseases, permanent paralysis, life-long disabilities, severe Parkinson's disease, and severe mental illness. In addition, healthcare quality is measured in terms of access to two major groups of medical institutions: tertiary and non-tertiary hospitals. According to the grading system for Chinese hospitals, tertiary hospitals are expected to provide specialist referral services with high-quality management while non-tertiary hospitals include secondary hospitals as well as primary healthcare facilities such as village health stations, township health centers, outpatient clinics, and community health centers (stations) [56]. To measure the healthcare demands of the elderly population, we use two variables: (1) "whether an individual is suffering from severe diseases" and (2) self-assessed health condition.

In addition, we conducted interviews with community residents and institutions, such as hospitals of different grades, nursing homes, the National Development and Reform Commission, and the National Health Commission of the People's Republic of China.

### **Selection of variables**

We selected twelve variables as independent variables representing the aforementioned four dimensions: gender, age, marital status, and cohabitation status for demographic characteristics; education, employment status, monthly income, household registration, and place of residence for socioeconomic characteristics; self-assessed health condition and chronic diseases for healthcare demands; and, basic medical insurance for medical security status.

For both types of disease severity, we use “whether an individual chooses a tertiary hospital” as the dependent variable in the model analysis, taking a value of 1 when a tertiary hospital is chosen, and a value of 0 otherwise. A description of the independent variables and data selection is shown in Table 1.

**< Insert Table 1 about here >**

### **Model setting**

The healthcare-seeking behaviors model for the elderly is specified as follows:

Y = 1: choosing a tertiary hospital for medical treatment,

Y = 0: choosing a non-tertiary hospital for medical treatment.

$P(y = 1|x_i) = p_i$  represents the probability that an elderly individual chooses a tertiary hospital for medical treatment, and the  $k$  independent variables that may affect the dependent variable  $Y$  are denoted as  $x_1, x_2, x_3, \dots, x_k$ . We use the following logistic regression model:

$$p_i = \frac{1}{1+e^{-(\alpha+\sum_{i=1}^k \beta_i x_i)}} = \frac{e^{\alpha+\sum_{i=1}^k \beta_i x_i}}{1+e^{\alpha+\sum_{i=1}^k \beta_i x_i}} \quad (\text{equation 1})$$

$$1 - p_i = 1 - \frac{e^{\alpha+\sum_{i=1}^k \beta_i x_i}}{1+e^{\alpha+\sum_{i=1}^k \beta_i x_i}} = \frac{1}{1+e^{\alpha+\sum_{i=1}^k \beta_i x_i}} \quad (\text{equation 2})$$

$\frac{p_i}{1-p_i}$  is the odds ratio of whether an elderly individual chooses a tertiary hospital. The logarithmic transformation of this ratio results in the linear logistic regression model

$$\ln\left(\frac{p_i}{1-p_i}\right) = \alpha + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_k x_k = \alpha + \sum_{i=1}^k \beta_i x_i. \quad (\text{Equation 3})$$

$\ln\left(\frac{p_i}{1-p_i}\right)$  is known as the logit unit of probability. In equations 1–3,  $\alpha$  represents the constant term in the model, and  $\beta_1, \beta_2 \dots \beta_k$  are the regression coefficients of the independent variables  $x_1, x_2, \dots, x_k$ , respectively, reflecting the degree to which the independent variables affect the healthcare-seeking behaviors of the elderly population.

### **Analytical strategy**

We use binary logistic regression to study gender differences in the elderly population's healthcare provider preference and further analyze the factors influencing this preference in the cases of individuals suffering from common diseases or from severe diseases with long-term treatment.

For this analysis, the independent variables entered the regression model in turn. If a regression result coefficient was greater than zero, an elderly individual is more likely to choose a tertiary hospital; if the coefficient was less than zero, the more likely he or she is to

choose a non-tertiary hospital. We fit 6 different binary logistic regression models: *Model 1* only incorporates gender variables, revealing the relationship between gender and the elderly population's healthcare provider preference. Then, we sequentially include additional explanatory variables. In *Model 2*, three additional variables are added: age, marriage, and cohabitation status. In *Model 3*, socioeconomic variables are added to *Model 2*: education, employment status, and monthly income. *Model 4* incorporates healthcare demand variables, namely, health condition and chronic disease. *Model 5* incorporates the variable representing medical security, that is, basic medical insurance. *Model 6* includes all the other independent variables, such as household registration and residence variables.

## **Results**

### **Descriptive statistics**

Table 2 presents selected sociodemographic characteristics of the elderly population for both genders. The distribution of our sample reflects that the majority of the younger elderly population (ages 60–64) are females and the proportion of the married male elderly is significantly higher than that of the married female elderly, while the proportion of the widowed female elderly is higher than that of the widowed male elderly. Accordingly, in terms of cohabitation status, the percentage of the female elderly living alone is higher than that of the male elderly.

**< Insert Table 2 about here >**

Table 3 illustrates the different socioeconomic characteristics of the elderly population for both genders. The vulnerabilities of the female elderly population are reflected in lower levels of education, a higher unemployment rate, and a lower income than those of males. In addition,

the proportion of the male elderly who work in government agencies and institutions before retirement is higher than that of the female elderly.

**< Insert Table 3 about here >**

Table 4 describes the gender differences in the elderly population's healthcare demands. The self-assessed health condition of the male elderly population is better than that of its female counterpart, which is consistent with existing studies [6, 21, 57]. Further, 38.7 per cent of the male and 44.3 per cent of the female elderly suffer from more than one kind of chronic disease. The three chronic diseases with the highest prevalence among the male elderly are high blood pressure, diabetes, and coronary heart disease while for the female elderly, they are high blood pressure, coronary heart disease, and diabetes.

**< Insert Table 4 about here >**

In addition, there is no significant gender difference in individuals' participation rate in the basic medical insurance system. The participation rate of the male elderly is 93.3 per cent, implying that 6.7 per cent are uninsured; the corresponding rates for the female elderly are 93.0 per cent and 7.0 per cent, respectively.

## **Regression results**

### *1) Common diseases*

The regression results for gender differences in the elderly population with common diseases are shown in Table 5. In *Models 1–6*, the influence of gender on healthcare-seeking behaviors is significant, as the coefficient of gender is negative, indicating that more of the female elderly with common diseases prefer non-tertiary hospitals than the male elderly with this type of diseases. The significance level changes from 0.01 (*Models 1 and 2*) to 0.05

(*Models 3–6*), which shows that the gender differences in healthcare provider preferences decreased after sequentially controlling for additional factors, including other sociodemographic and socioeconomic variables, and healthcare demands, medical security, household registration, and residence variables. Compared with the group aged 60–69, the group aged 70–79 is more likely to choose non-tertiary hospitals when suffering from common diseases. Those living with relatives instead of living alone are more likely to choose a tertiary hospital for medical treatment when suffering from common diseases, and the coefficient is significant at 0.10 level. However, in the case of individuals suffering from common diseases, the influence of marital status on healthcare-seeking behaviors is not significant.

In *Models 3–6*, compared with the unemployed elderly population, those who worked in government agencies and institutions before retirement tend to choose non-tertiary hospitals, while those who worked in private and other units prefer to visit tertiary hospitals. The two latter categories of employees are significant at the 0.1 and 0.01 levels, respectively. Compared with the elderly with a monthly income of less than 2,000 yuan, those with a higher income tend to choose tertiary hospitals, and the corresponding variables are all significant at the 0.01 level.

*Model 6* shows that the following factors significantly impact the healthcare-seeking behaviors of the elderly population with common diseases: gender, age (70–79 years old), employment status (government organizations and institutions, private enterprises, and others), monthly income (4000–5999 yuan, and 6000 yuan and above), and place of residence (city). For instance, compared with the elderly living in rural areas, the elderly living in cities are more likely to choose a tertiary hospital for medical treatment when they suffer from common diseases, and this is significant at the 0.05 level. The significance of the effect of income on whether the elderly choose a tertiary hospital in *Model 6* is weaker than in *Models 3–5*, which shows that economic factors exhibit a relatively weaker effect.

**< Insert Table 5 about here >**

## 2) *Severe diseases*

Table 6 shows the regression results for the gender differences in the elderly population with severe diseases requiring long-term treatment. In contrast to the cases mentioned above, these differences in healthcare-seeking behaviors are not statistically significant (in all the models).

From the regression results (*Models 3–6*), it can be seen that compared with unemployed seniors, those working in private and other areas before retirement are more likely to choose tertiary hospitals for medical treatment, and this is significant at the 0.10 level. In addition, compared with the elderly with a monthly income of less than 2,000 yuan, the higher the income an individual earns, the more likely he or she is to choose a tertiary hospital for medical treatment; the effects of all income groups above 2,000 yuan are significant at the 0.01 level. This indicates that the elderly population's economic situation may play a larger role in their hospital choices in the long-term treatment of severe diseases.

Marital status is shown in the regression results of *Models 4–6*. Compared with the unmarried elderly, the married elderly are less likely to choose tertiary hospitals for follow-up treatment of severe diseases; this is significant at the 0.1 level. This shows that marital status has a certain impact on the elderly's healthcare provider preferences for the follow-up treatment of severe diseases.

In addition, the impact of basic medical insurance on the healthcare-seeking behaviors of the elderly population with severe diseases with long-term treatment is significant at the 0.05 level (*Models 5 and 6*), indicating that the elderly with basic medical insurance are more likely to choose non-tertiary hospitals for medical treatment than those without basic medical insurance. This may be related to the reimbursement ratio of basic medical insurance; the higher the grade of the medical institution, the lower the medical insurance reimbursement rate is, subsequently leading to higher individual HCE burden.

In the full model (*Model 6*), factors such as marriage, income, employment status (at private enterprises and other), and basic medical insurance have a significant impact on the elderly's healthcare provider preferences in the follow-up treatment of severe diseases. Level of education has no significant effect on the healthcare-seeking behaviors of the elderly.

< Insert Table 6 about here >

### **Influencing factors**

As not all factors influencing healthcare-seeking behaviors could be quantified and incorporated into the econometric models above, we also conducted qualitative interviews as a supplement to the analysis. The factors considered in the interviews are divided into three dimensions: individual, family, and social.

#### *1) Individual factors*

Individual factors influencing gender differences in the elderly's healthcare-seeking behaviors are explored from six aspects: sociodemographic characteristics, socioeconomic characteristics, healthcare demands, lifestyles, medical security status, and personality.

As shown in the regression results (Section 4.2), gender differences in the healthcare provider preferences only occur in the elderly population with common diseases, and the male elderly are more inclined to choose a tertiary hospital for medical treatment. It is further confirmed based on our interviews that the gender differences in healthcare-seeking behaviors might be influenced by a male's role as the "backbone of the family." However, this gender difference diminishes in the case of the elderly suffering from severe diseases with long-term treatment. A possible explanation in this case is that individuals consider that staying alive is critical, regardless of gender. In addition, we found that marital status influences the gender differences in healthcare-seeking behaviors regarding the follow-up treatment of severe diseases. As this is a long-term process, the elderly patients not only have to bear the suffering

from the disease and the large amounts of medical expenses but also need practical and mental support from their family members.

Occupation is an important factor affecting an individual's social and economic status. Different occupations imply various types of medical security, which, in turn, affect the healthcare-seeking behaviors of the elderly. Elderly individuals who worked in government agencies and institutions before retirement are more inclined to choose non-tertiary hospitals for medical treatment when suffering from common diseases. Since their work benefits, such as medical and pension services are relatively comprehensive, they do not need to go to hospitals when they suffer from common diseases. However, this does not apply to those suffering from severe diseases.

Income determines the elderly's medical service quality and payment ability. Our results show that income has a significant impact on the elderly's healthcare-seeking behaviors: the elderly with higher income are more likely to choose a tertiary hospital both in the case of common diseases and that of severe diseases.

In addition, the healthcare-seeking behaviors of the elderly largely depend on their health conditions. Chronic diseases are the main risk factors that threaten the health of the elderly, and long-term medical treatment increases the economic burden and psychological pressure. We found that chronic diseases did not have a significant impact on the healthcare provider preferences of the elderly. This may be due to the stability of long-term medical treatment for the elderly population with severe diseases. They can regularly obtain their medicines in community health service centers, village clinics, or pharmacies, which reduces the frequency of their visiting tertiary hospitals. When the elderly suffer from diseases, the better their self-assessed health condition, and the more inclined they are to choose a non-tertiary hospital. From the interviews, we learned that lifestyles, such as physical exercise, affect the elderly's healthcare-seeking behaviors. Healthy habits such as exercise, not smoking, and not drinking

improve the physical and mental health of the elderly. Accordingly, their demand for healthcare services is reduced.

With the tendency for the prevalence of ageing societies, high morbidity significantly increases the private, government, and social HCE, resulting in high economic pressure, especially for the elderly population. The burden of HCE on the elderly and their attitude toward these expenditures also deeply affect their healthcare-seeking behaviors. In particular, we found in the interviews that these behaviors differ between the elderly living in urban vs. rural areas: the elderly living in urban areas cover most of the HCE by themselves and are unwilling to add financial burden to their children while the HCE of the elderly living in rural areas are mostly covered by their children; they often worry that their children are unwilling to support them.

In terms of medical security status, the data show that the elderly with basic medical insurance prefer non-tertiary hospitals as they can afford the HCE in the follow-up medical treatment of severe diseases. The data from the questionnaire survey show that the elderly's participation rate in commercial medical insurance is relatively low: only 7.0 per cent (44 people) of all respondents participate in such insurance programs. Most of the elderly indicated that they no longer needed to purchase commercial medical insurance because they participated in the basic medical insurance program. We also learned from the interviews that some elderly people did not purchase commercial medical insurance due to economic reasons, and some people were not able to purchase it at the right time. Some of the elderly said that they were confused by the too many types of commercial insurance with high premiums and strict participation standards. Thus, the basic medical insurance program is relatively more effective in protecting the elderly from medical treatment costs than commercial insurance.

Finally, for individuals, the gender differences in the elderly's healthcare-seeking behaviors may be related to personal characteristics, which are mainly influenced by a variety of psychosocial factors [58, 59]. In addition, leisure participation is positively related to

subjective well-being among the elderly of both genders, and it could play a critical role in promoting healthy ageing [60].

## 2) *Family factors*

In terms of influencing factors based on families, we studied family decision-making power, housework participation, and intergenerational (economic and non-economic) support.

The gender differences in healthcare provider preferences are not only due to the factors considered in the models above but may also be affected by the elderly's family status. Over the past thousands of years, Chinese society has been deeply influenced by Confucianism and Taoism [61]; family traditions and relationships are highly regarded. Family is considered to be the decisive factor in healthcare-seeking behaviors. Under the traditional influence of the "male outside, female inside" rule, females are stereotyped as the ones responsible for housework and do not play important decision-making roles [62]. However, in our interviews, we found that women's status inside families has been well established in Shanghai, and female family members can participate in family decisions as equals of male members. Moreover, in most Chinese families, the female elderly play an important role in taking care of family members; thus, they might have less spare time for their personal lives. This may also explain why the female elderly tend to choose non-tertiary hospitals for medical treatment when suffering from common diseases.

In addition, intergenerational support has an important impact on the elderly's healthcare-seeking behaviors.

Financial support from children can improve the quality of the elderly's healthcare services resources, although we learned from the interviews that most elderly people are unwilling to increase the financial burden of their families. In addition, intergenerational connections

provide emotional support for the elderly, as the sick elderly need their children's company and care. Some elderly individuals have one-on-one care from a live-in maid [1]. As the number of empty-nest elderly is increasing, especially in rural areas of China, such individuals have a higher incidence of depression [63].

### 3) *Social factors*

Social factors, such as medical policies, access to medical resources, medical quality, and social capital also affect individuals' healthcare-seeking behaviors.

The influence of medical policies on the elderly's healthcare-seeking behaviors is mainly observed in the basic medical insurance program. This program has shared the burden of HCE of the elderly population; more than 90 per cent of the surveyed elderly have participated in the basic medical insurance program, indicating a high participation rate. As mentioned above, the reimbursement ratio of medical insurance varies according to the level of the medical institutions; for instance, the lower the hospital level, the higher the reimbursement ratio and the lower the proportion of self-finance. Thus, non-tertiary hospitals are favored by the low-income elderly population. In addition, this program promotes a tiered diagnosis and treatment system and relieves the burden of tertiary hospitals. However, some of the elderly indicated that the reason tertiary hospitals are expensive is because of their more experienced doctors and high quality of medical treatment.

In addition, the offsite settlement and management element of the basic medical insurance program addresses the settlement of cross-provincial offsite medical expenses, mainly for relocated retirees, long-term residents, permanent staff, and referrals. This policy mainly affects the healthcare-seeking behaviors of the non-Shanghai registered elderly population; they can reduce their out-of-pocket expenses without returning to their hometown. However, we found in the survey that Shanghai exhibits a relatively low utilization rate for this type of

medical insurance settlement. The main reason is that part of the elderly population does not meet the requirements for the policy, and some do not know about the application process. Third, some of the elderly think that the application process is cumbersome and they are in good health; thus, there is no need for them to apply for this type of particular insurance.

The accessibility of healthcare resources is an important factor influencing the healthcare-seeking behaviors of the elderly, which cannot be ignored. Not only the distribution of healthcare resources in different regions, but also the difference between urban and rural healthcare resources affects and restricts an individual's healthcare providers preference. Insufficient healthcare resources and uneven geographical distribution have affected and restricted residents' medical treatment behaviors. For example, the ratio of doctors to the general population is 1:735 in China, much lower than that of Western countries (1:280–1:640) [64]. In addition, the distinct regional disparities in health are associated with socioeconomic factors, health resources, and health services delivery factors [65], and regional attributes determine the extent of medical resources and people's access to them. According to a public report on tertiary hospitals in Shanghai released by the Shanghai Municipal Health Commission, by 2018, more than 60 per cent of the tertiary hospitals were distributed in the central urban area, while 20.8 per cent and 13.2 per cent of such hospitals were located in the near and far suburbs, respectively. The distribution of medical resources affects the convenience of obtaining healthcare resources for the elderly. The elderly living in the city are more inclined to choose a tertiary hospital for medical treatment when suffering from severe diseases with long-term treatment, which might be due to the convenience in terms of close distance and easy transportation.

Medical quality can be measured by variables such as the recovery rate, mortality, survival rate, bed utilization rate, and medical professionals' performance. In this study, we measured the medical quality of medical institutions by hospital grade. Particularly, Shanghai has rich

and high-quality medical resources, including a large number of tertiary hospitals, which provide relatively sufficient healthcare services for the elderly and increase these individuals' attention to health awareness.

Furthermore, healthcare-seeking behaviors also depend on social capital [66]. The trust and sense of belonging generated by the social support network increase the ability of the elderly to utilize healthcare service resources. For instance, we learned from the interviews that if the elderly had relatives or friends working in a medical institution, they consulted them at first.

## **Conclusion**

In an ageing society, given the growing healthcare demands of the elderly population, the structure of healthcare demands needs to change accordingly [67]. Under the background of rapid ageing and gender inequality in China, we carefully examine the factors influencing gender differences in the elderly's healthcare-seeking behaviors. By exploring the combined effects of various factors such as individual, family, and cultural ones, we observe that healthcare-seeking behaviors extend far beyond individual behaviors. This is also shown by gender differences to a certain extent. The results presented in this study can help improve the understanding of the gender differences in the elderly's healthcare-seeking behaviors and promote equality in the development of public health services.

In Shanghai, a modern city in China, the cultural atmosphere is relatively equal, open, and inclusive. Shanghai men have an image of usually being "new good men" who love doing housework and respect women, and Shanghai plays a pioneering role in leading gender equality in Chinese society [62]. Thus, the gender differences in healthcare providers preferences we found, for example, that the male elderly with common diseases are more likely to choose high-quality resources, could be the result of voluntary choices of family members,

due to the labor division instead of gender inequality. Hence, cultural differences between regions may affect individuals' investment in healthcare and their healthcare-seeking behaviors to a large extent, which is worth exploring in future research. Additionally, our results agree with the statement that gender differences found in healthcare-related research are quite modest, as the gender issue can be influenced by many variables and processes [68].

This study has some limitations. First, data on factors indirectly influencing healthcare-seeking behaviors have not been considered. Individuals' preferences are sensitive to the following: (1) changes in patients' healthcare-seeking behaviors over time, (2) the amount of knowledge individuals have acquired about their conditions, and (3) individuals' previous experiences with healthcare [69]. Among individuals' interactions and experiences with health professionals, the doctor-patient relationship in particular influences healthcare-seeking behaviors in various ways [70]. Future studies should take these aspects into account. Second, the influencing factors included in the models may provide insufficient explanations for the gender differences in the elderly's healthcare-seeking behaviors. For instance, as most of the participants had retired, occupation and income factors may not truly reflect their current socioeconomic characteristics. It would be optimal to pay attention to the long-term cumulative effects of these factors. Third, health condition was measured based on self-assessment data, which might be affected by the elderly population's physiological and psychological conditions. Fourth, the study cannot measure individual preferences for healthcare providers. Healthcare-seeking behaviors are determined by a complex interplay among a variety of characteristics, including many patient characteristics, as well as several structural, process, and outcome characteristics of the providers [71]. Thus, there is no "typical" elderly population.

The empirical findings suggest four major conclusions with policy implications: 1) To achieve greater personalization of the healthcare system, the government should develop a more specific supply model of medical resources and public health services that is guided by

healthcare equality. The optimal allocation of high-quality medical resources should be promoted, and women's healthcare demands should be considered by combining the individual, social, and cultural perspectives. 2) Apart from improving the accessibility of healthcare services, the affordability of public health services should also be addressed. The economic burden of healthcare for the low-income elderly is still heavy. Thus, launching policy support, such as financial empowerment, especially for the low-income elderly population, could be an important way of reducing gender disparities in access to healthcare services. 3) The monopoly effect of high-grade hospitals is highlighted; the uneven availability of healthcare resources has exacerbated the problem of seeing a doctor for the elderly population. The government's intervention should increase. 4) The time and financial costs of visiting high-grade hospitals for the rural elderly population are relatively high. The government should increase healthcare investment in remote suburban areas, promote the construction of a government-led universal medical system, and achieve a high level of medical services to benefit the local population. For example, by improving the construction of community hospitals, rural hospitals, and healthcare service stations, residents can enjoy high-quality medical services located near them. Further, to achieve the proper sharing of medical institutions and stress their commonality, the government should put efforts in advocating Internet technology and telemedicine, to accomplish high diagnosis and treatment standards at lower-grade medical institutions.

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### **Abbreviations**

HCE: healthcare expenditures.

### **Availability of data and materials**

The datasets for this study are available from the corresponding author upon reasonable request.

### **Ethics approval and consent to participate**

The study followed the required guidelines and regulations of East China Normal University. The protocol was approved by the Research Ethical Committees of East China Normal University (KJC[2019]04). Written informed consent was obtained from each participant before starting the interviews for the study.

### **Competing interests**

The authors declare that they have no competing interests.

### **Consent for publication**

Not Applicable.

### **Authors' contributions**

Each author has participated sufficiently in the study to take responsibility for appropriate portions of the content as follow: LL participated in the design of the study and wrote the initial draft of the paper. CW was responsible for monitoring the interview process, performing the statistical analysis; SY participated in the planning of the study and in the revisions of the manuscript; KL provided critical feedback for the finalization of the manuscript. XY serves as the corresponding author for the paper. All authors have read and approved the manuscript.

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**Table 1.** Assignment of variables

<b>Variable</b>	<b>Variable Assignment</b>	<b>Mean</b>	<b>Standard deviation</b>	<b>Minimum</b>	<b>Maximum</b>
Gender	male=0, female=1	0.65	0.48	0	1
Age	60-69=1, 70-79=2, 80 and above=3	1.50	0.67	1	3
Marital Status	unmarried=1, married=2, divorce/widow=3	2.16	0.41	1	3
Cohabitation Status	living alone =1, couple living together =2, live with relatives =3, live with children =4, live with three generations =5	2.84	1.25	1	5
Education	elementary school and below =1, junior high school=2, (technical) secondary school =3, college and above=4	2.27	0.93	1	4
Employment Status	unemployed =1, government agencies and institutions =2, collective enterprises =3, private enterprises and others=4	2.21	0.78	1	4
Monthly Income (yuan)	2000 and below =1, 2000-3999=2, 4000-5999=3, 6000 and above=4	2.17	0.82	1	4
Physical Condition	unhealthy = 1, basic health = 2, health = 3	2.31	0.69	1	3
Chronic Diseases	no = 0, yes = 1	0.70	0.46	0	1
Basic Medical Insurance	not participated = 0, participated = 1	0.93	0.25	0	1
Household Registration	non-Shanghai = 0, Shanghai = 1	0.95	0.21	0	1
Place of residence	village = 0, city = 1	0.89	0.32	0	1

**Table 2.** Gender differences in the sociodemographic variables (unit: person, per cent)

Characteristics	Sample attributes	Male		Female	
		Number	percentage	Number	percentage
Age (year-old)	60 - 64	42	18.8	140	34.9
	65 - 69	72	32.1	123	30.7
	70 - 74	47	21.0	75	18.7
	75 - 79	33	14.7	31	7.7
	80 and above	30	13.4	32	8.0
Marital Status	unmarried	5	2.2	6	1.5
	married with a spouse	198	88.4	307	76.6
	divorce	2	0.9	10	2.5
	widowed	19	8.5	78	19.5
Cohabitation Status	living alone	11	4.9	45	11.2
	Couple living together	120	53.6	187	46.6
	live with relatives	8	3.6	13	3.2
	live with children	56	25.0	113	28.2
	live with three generations	29	12.9	43	10.7

**Table 3.** Gender differences in the socioeconomic characteristics (unit: person, per cent)

Characteristics	Sample attributes	Male		Female	
		Num ber	perce ntage	Num ber	perce ntage
Education	No schooling	2	0.9	15	3.7
	primary school	31	13.8	83	20.7
	junior high school	86	38.4	180	44.9
	(technical) secondary school	60	26.8	90	22.4
	college and above	45	20.1	33	8.2
Employment Status	unemployment	19	8.5	57	14.2
	government agencies	12	5.4	11	2.7
	governmental institutions	40	17.9	48	12.0
	nationalized business	106	47.3	183	45.6
	collective enterprises	23	10.3	67	16.7
	private enterprise	12	5.4	13	3.2
	social group	2	0.9	0	0.0
	foreign companies	2	0.9	4	1.0
	others	8	3.6	18	4.5
Monthly Income* (yuan)	below 2000	35	16.3	86	21.7
	2000 - 3999	54	25.1	249	63.0
	4000 - 5999	100	46.5	45	11.4
	6000 and above	26	12.1	15	3.8

\*Note: In the section of monthly income, male (N = 215) and female (N = 395).

**Table 4.** Gender differences of the healthcare demands (unit: person, per cent)

Characteristics	Sample attributes	Male		Female	
		Number	percentage	Number	percentage
<b>Health Conditions</b>	<b>Healthy</b>	100	44.7	276	43.9
	very healthy	32	14.3	38	9.5
	relatively healthy	68	30.4	138	34.4
	<b>Moderate healthy</b>	98	43.8	169	42.1
	<b>Unhealthy</b>	26	11.6	56	14.0
	relatively unhealthy	25	11.2	52	13.0
	very unhealthy	1	0.4	4	1.0
<b>Chronic Disease</b>	yes	150	67.0	289	72.1
	no	74	33.0	112	27.9
<b>Diseases*</b>	high blood pressure	97	64.7	186	64.4
	diabetes	42	28.0	57	19.7
	coronary heart disease	24	16.0	70	24.2
	chronic respiratory diseases	17	11.3	44	15.2
	digestive system diseases	16	10.7	45	15.6
	stroke	8	5.3	15	5.2
	cancer	8	5.3	13	4.5
	other	17	11.3	24	8.3
<b>Number of Diseases*</b>	one	92	61.3	161	55.7
	two	37	24.7	91	31.5
	three or more	21	14.0	37	12.8

\*Note: In the sections of diseases and number of diseases, male (N = 150) and female (N = 289).

**Table 5.** Coefficients from the ordered logistic regression (common diseases)

<b>Independent Variable</b>	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>	<i>Model 4</i>	<i>Model 5</i>	<i>Model 6</i>
<b>Gender (Male)</b>	-0.554***	-0.753***	-0.513**	-0.572**	-0.574**	-0.567**
<b>Age Group (60-69 years-old)</b>						
70-79		-0.838***	-	-	-	-
80 and above		-0.096	-0.090	-0.081	-0.097	-0.114
<b>Marital Status (Single)</b>						
Married with a spouse		-0.197	-0.243	-0.337	-0.355	-0.481
Divorce / widow		0.816	0.805	0.730	0.725	0.595
<b>Cohabitation status (living alone)</b>						
Couple living together		0.802	0.872*	0.806	0.804	0.820
Live with relatives		1.245*	1.290*	1.122	1.137	1.071
Live with children		0.715	0.609	0.564	0.567	0.590
Live with three generations		0.103	0.218	0.198	0.239	0.241
<b>Education Level (elementary school and below)</b>						
junior high school			0.302	0.371	0.375	0.387
(technical) secondary school			0.543	0.617	0.606	0.612
college and above			0.154	0.274	0.291	0.311
<b>Employment Status (unemployed)</b>						
governmental institutions			-0.917*	-0.953*	-0.938*	-1.063**
collective enterprises			0.250	0.230	0.226	0.139
private and others			1.131***	1.026**	1.000**	0.980**
<b>Monthly Income (less than 2,000) (yuan)</b>						
2000-3999			1.244***	1.254***	1.235***	0.644
4000-5999			1.578***	1.533***	1.490***	0.900*
6000 and above			1.933***	1.916***	1.910***	1.352**

<b>Physical Condition (unhealthy)</b>						
moderate				-0.265	-0.254	-0.312
healthy				0.385	0.392	0.378
<b>Number of Chronic Disease (none)</b>						
One				-0.120	-0.111	-0.118
Two				0.446	0.461	0.466
Three or more				0.217	0.216	0.183
<b>Basic Medical Insurance (none)</b>					0.430	0.458
<b>Household Registration (Non-Shanghai)</b>						0.484
<b>Place of residence (Village)</b>						1.533**
<b>Constant Term</b>	-1.020***	-1.324	-2.279**	-2.260**	-2.655**	-3.794***
<b>Pseudo R<sup>2</sup></b>	0.012	0.048	0.080	0.096	0.097	0.110
<b>N</b>	611	611	611	611	611	611

Note: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 6.** Coefficients from the ordered logistic regression (severe diseases)

<b>Independent Variable</b>	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3</i>	<i>Model 4</i>	<i>Model 5</i>	<i>Model 6</i>
<b>Gender (Male)</b>	-0.146	-0.185	-0.111	-0.141	-0.129	-0.105
<b>Age Group (60-69 years-old)</b>						
70-79		0.011	0.010	0.001	0.010	0.028
80 and above		0.188	0.067	0.071	0.102	0.093
<b>Marital Status (Single)</b>						
Married with a spouse		-1.145	-1.160	-1.221*	-1.211*	-1.198*
Divorce / widow		-0.764	-0.760	-0.816	-0.842	-0.838
<b>Cohabitation status (living alone)</b>						
Couple living together		-0.122	-0.055	-0.081	-0.086	-0.100
Live with relatives		-1.026	-0.967	-1.073	-1.134*	-1.112
Live with children		0.129	0.125	0.121	0.111	0.067
Live with three generations		0.290	0.450	0.476	0.390	0.317
<b>Education Level (elementary school and below)</b>						
junior high school (technical)			-0.011	0.005	0.005	-0.005
secondary school			-0.193	-0.169	-0.143	-0.156
college and above			-0.260	-0.226	-0.249	-0.272
<b>Employment Status (unemployed)</b>						
governmental institutions			-0.371	-0.359	-0.368	-0.324
collective enterprises			0.331	0.331	0.338	0.377
private and others			0.700*	0.660*	0.683*	0.684*
<b>Monthly Income (less than 2,000) (yuan)</b>						
2000-3999			0.891***	0.885***	0.925***	1.060***
4000-5999			1.040***	1.013***	1.093***	1.248***
6000 and above			1.429***	1.410***	1.414***	1.557***
<b>Physical Condition (unhealthy)</b>						
moderate healthy				-0.227	-0.239	-0.218
healthy				-0.003	-0.015	-0.0168

<b>Number of Chronic Disease (none)</b>						
One				-0.112	-0.126	-0.126
Two				0.250	0.229	0.222
Three or more				-0.178	-0.179	-0.153
<b>Basic Medical Insurance (none)</b>					-0.728**	-0.645*
<b>Household Registration (Non-Shanghai)</b>						-0.257
<b>Residence (Village)</b>						-0.651
<b>Constant Term</b>	0.065	1.148	0.578	0.769	1.432	2.041**
<b>Pseudo R<sup>2</sup></b>	0.009	0.017	0.034	0.039	0.044	0.047
<b>N</b>	611	611	611	611	611	611

Note: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1