Analysis of the factors influencing chronic diseases in middle-aged and elderly men: a cross-sectional survey in China

Ying Wang\textsuperscript{1,2,†}, Jun Wang\textsuperscript{2,*,†}, Xiaofang Yan\textsuperscript{2}

\textsuperscript{1}School of Humanities and Management, Hunan University of Chinese Medicine, 410100 Changsha, Hunan, China
\textsuperscript{2}School of Administration and Law, Hunan Agricultural University, 410100 Changsha, Hunan, China

\*Correspondence
wangjun@stu.hunau.edu.cn (Jun Wang)

† These authors contributed equally.

Abstract
The prevalence of chronic diseases has increased in recent years among middle-aged and elderly men in China. This study focuses on the current prevalence and factors influencing chronic diseases among middle-aged and elderly men in the context of population ageing. The aim is to provide a reference for the development of preventive and control measures for chronic diseases and to improve the health of middle-aged and elderly men in China. Data was obtained from the 2018 China Health and Retirement Longitudinal Study (CHARLS), and the middle-aged and older population of men (aged 45 and above) were considered for analysis. The factors affecting the prevalence of chronic diseases were analysed using a binary logistic regression model, with the presence or absence of chronic diseases as the dependent variable and personal characteristics and lifestyle as the independent variables. The results of descriptive statistics showed that the prevalence of chronic diseases among middle-aged and elderly men in China was 42.6%, the top five diseases being hypertension (14.7%), arthritis and rheumatism (12.8%), stomach diseases (9.9%), dyslipidaemia (9.7%) and heart disease (6.6%). The results of the multivariate logistic regression analysis showed that ages between 60 and 70 years (OR (odds Ratio) = 0.565, 95% CI (confidence interval) = 0.398–0.802), living in a combination of urban and rural areas (OR = 1.276, 95% CI = 1.086–1.498), smoking (OR = 0.458, 95% CI = 0.357–0.587), sleeping for 6–7 h (OR = 1.255, 95% CI = 0.994–1.585), self-rated good health (OR = 1.846, 95% CI = 1.549–2.126) and self-rated very good health (OR = 1.758, 95% CI = 1.454–2.126) were factors that influenced the prevalence of chronic diseases among Chinese middle-aged and elderly men. The Chinese government should formulate NCD (Non-communicable diseases) prevention and control measures suitable for the middle-aged and elderly population of men according to different regions and groups. These measures can help improve the health levels of the middle-aged and elderly population and comprehensively promote the concept of healthy ageing.

Keywords
Middle-aged and elderly men; Chronic diseases; Prevalence; Influencing factors; China

1. Introduction

The social and economic standards of China are increasing steadily, and the lives of its people have improved significantly owing to the reforms and opening-up of the country [1, 2]. However, along with the improvement in living standards, diseases of affluence, such as hypertension and diabetes, have become significant dangers to the health of Chinese residents [3, 4]. Data from China’s first Healthcare Blue Book, China Health Management and Health Entrepreneurship Development Report (2018), revealed that the number of people that have developed chronic diseases in the country is approximately 300 million. Out of these, more than 50% are over 65 years of age, and the number of deaths caused by chronic diseases accounts for 88.5% of the total number of deaths [5]. It is evident that the current burden of chronic diseases in China is very serious, and with the population ageing, middle-aged and elderly individuals are at a higher risk of chronic diseases [6]. According to the data of the seventh census, the proportion of people aged 65 years and above in China has reached 13.50%, and the degree of population ageing is already higher than the world average of 9.3% [7]. This poses a significant challenge to the prevention and control of chronic diseases and the promotion of healthy ageing in China. In 2017, President Xi Jinping proposed the Healthy China Strategy during the 19th Party Congress, which clearly stated that the health of people should be prioritised as a key strategic area for development [8]. In 2021, the comprehen-
sive promotion of health was re-emphasised during the Sixth Plenary Session of the 19th Party Central Committee. The series of policies demonstrate the importance given by the Chinese government to the health of its people. In 2022, the 20th Congress of the Communist Party of China decided to continue the implementation of the Healthy China Strategy, considering the health of the population as a strategic priority for development [9]. The prevention and control of chronic diseases, as a key element of the comprehensive promotion of health in China, is of practical importance for the timely achievement of the aims of the health strategy, reducing the prevalence of chronic diseases and improving the health of the middle-aged and elderly population.

Several recent studies conducted in China have analysed the factors influencing chronic diseases in the population. Song et al. [10] conducted physical examinations on 500 adults over the age of 60 years in the local community and found that hypertension, coronary heart disease and chronic obstructive pulmonary disease (COPD) were the main chronic diseases affecting the health of the elderly. Meanwhile, age, gender, alcohol consumption and smoking are important influencing factors for chronic diseases in the elderly [10]. Han et al. [11] conducted a study on elderly individuals aged 60 years and above in Xiamen using a multi-stage sampling method and found that the prevalence of chronic diseases was 63.3%. The prevalence increased with age, with a higher prevalence among women than men and in urban than rural areas [11]. Ma et al. [12] conducted a survey on bleeding pathology on 1750 elderly people in a community in Xinjiang and found that the prevalence of hypertension and diabetes was the highest [12]. Wu et al. [13] reported that risk factors can be classified according to the characteristics of chronic diseases as socio-environmental (social determinants) factors, general risk factors, and intermediate (biological) factors, which significantly influence chronic disease prevention and control [13]. Liang et al. [14] conducted a cross-sectional status study by selecting rural and urban elderly people in the Hubei Province from 2015–2017. The study reported significant differences in the prevalence of chronic diseases between urban and rural areas, and that factors such as the patient’s environment, age, education level, per capita income, behaviour during physical examination, smoking status, and the frequency of physical exercise had significant effects on the occurrence of chronic diseases [14]. The findings of the aforementioned studies show that chronic diseases are closely related to an individual’s lifestyle, and the majority are caused by poor lifestyles. However, the studies have mainly focused on the entire population and not specifically on middle-aged and elderly individuals.

Based on the aforementioned findings, the present study used data from the 2018 China Health and Retirement Longitudinal Study (CHARLS) to focus on the prevalence of chronic diseases and their influencing factors among middle-aged and elderly men in China. The study provides evidence for relevant authorities to formulate policies on chronic disease prevention and control.

2. Materials and methods

2.1 Data sources
The data for this study were obtained from the 2018 CHARLS database. The data collection and survey were hosted by the National Development Institute of Peking University and co-organised by the China Social Science Research Centre of Peking University and the Peking University Youth League Committee. The data were obtained from one of the most commonly used databases in China for studying the health of the middle-aged and elderly population. It is a high-quality set of microdata representing households and individuals aged 45 years and above in China. The CHARLS data survey began in 2011 with a random sample of 17,000 respondents from approximately 10,000 households in 150 counties (cities and districts) and 450 villages (neighbourhood committees) in 28 provinces (municipalities and districts) across China. The 2018 questionnaire covers information on the demographic and sociological characteristics, family background, economic status, health status and lifestyle of the respondents. In line with the purpose of the study, men aged 45 years and above were selected as the sample for analysis. A total of 3921 valid samples were finally obtained by removing missing values, processing outliers and filtering the data.

2.2 Definition of variables
In the 2018 CHARLS, chronic diseases are categorised into 14 types, namely, hypertension, dyslipidaemia, diabetes, malignancy, chronic lung disease, liver disease, heart disease, stroke, kidney disease, stomach disease, mental illness, dementia, rheumatoid arthritis and asthma. A value of 1 is assigned in the presence of any one of these diseases; otherwise, the value is mentioned as 0. In the present study, we have also performed a literature review [15–17]. The variables of basic personal characteristics (age, marital status, education level, area of residence, availability of health insurance, etc.), personal lifestyle (sleep duration, smoking and alcohol consumption habits, access to the internet, etc.) and personal self-rated health were included in a single-factor regression model with the assigned values. Table 1 presents the definitions of the specific variables.

2.3 Statistical analysis
Stata 17.0 software (version 15.0, StataCorp., College Station, TX, USA) was used to collate and analyse the data. We used frequency and other indicators for descriptive statistical analysis of the data. We performed a one-way χ² test to compare differences in the prevalence of chronic diseases among people with different characteristics. Logistic regression models [18, 19] were used for the analysis of influencing factors, with p < 0.05 being considered a statistically significant difference.

3. Results

3.1 Basic results
A total of 3921 men aged 45 years and older were included in this study. Of these, 2205 (56.2%) were aged between 45 and 60 years, 1068 (27.2%) were between 60 and 70 years, 489 (12.5%) were between 70 and 80 years, and 159 (4.1%)
TABLE 1. Definition of the variables.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>1 = 45–60 yr, 2 = 60–70 yr, 3 = 70–80 yr, 4 = &gt;80 yr</td>
</tr>
<tr>
<td>Marital status</td>
<td>1 = Married, 2 = Divorced, 3 = Widowed, 4 = Unmarried</td>
</tr>
<tr>
<td>Education level</td>
<td>1 = Illiterate, 2 = Primary and below, 3 = Secondary, 4 = University, 5 = Postgraduate</td>
</tr>
<tr>
<td>Area of residence</td>
<td>1 = Urban areas, 2 = Rural-urban areas, 3 = Rural areas</td>
</tr>
<tr>
<td>Medical insurance</td>
<td>0 = No, 1 = Yes</td>
</tr>
<tr>
<td>Smoking</td>
<td>0 = No, 1 = Yes</td>
</tr>
<tr>
<td>Drinking</td>
<td>0 = No, 1 = Yes</td>
</tr>
<tr>
<td>Exercise</td>
<td>0 = No, 1 = Yes</td>
</tr>
<tr>
<td>Sleep time</td>
<td>1 = 0–6 h, 2 = 6–7 h, 3 = 7–8 h, 4 = &gt;8 h</td>
</tr>
<tr>
<td>Internet use</td>
<td>0 = No, 1 = Yes</td>
</tr>
<tr>
<td>Self-rated health</td>
<td>1 = Fair, 2 = Good, 3 = Very good</td>
</tr>
</tbody>
</table>

Figure 1. Ranking of the prevalence of common chronic diseases among the middle-aged and elderly population in China.

3.2 Results of chronic disease prevalence

The top five chronic diseases among the middle-aged and elderly men were hypertension (578 patients, 14.7% prevalence), rheumatoid arthritis (500 patients, 12.8%), stomach diseases (390 patients, 9.9%), dyslipidaemia (380 patients, 9.7%) and heart disease (257 patients, 6.6%). The rank-based prevalence rates of chronic diseases are shown in Fig. 1.

3.3 Analysis of the factors influencing chronic diseases

were over 80 years of age. In terms of marital status, 3440 (87.7%) were married, 59 (1.5%) were divorced, 410 (10.5%) were widowed, and 12 (0.3%) were unmarried. Regarding the education level, 841 (21.4%) were illiterate, 1617 (41.2%) had primary education or less, 1350 (34.4%) had secondary education, 110 (2.8%) had a university education, and three (0.1%) had postgraduate education. A total of 858 (21.9%) individuals lived in urban areas, 343 (8.7%) in combined urban and rural areas and 2720 (69.4%) in rural areas. A total of 3760 (95.9%) individuals were covered by health insurance, while 161 (4.1%) were not.
3.3.1 Single factor analysis

A χ² test was used for the univariate analysis of the prevalence of chronic diseases in middle-aged and elderly men with different characteristics. The results showed statistically significant differences in the prevalence rates of chronic diseases according to age, marital status, area of residence, smoking status, sleep duration and self-rated health (p < 0.05). The results are presented in Table 2.

3.3.2 Results of the multi-factor logistic regression analysis

With the presence or absence of chronic disease as the dependent variable, all variables that were statistically significant in the univariate analysis were included in the model for logistic regression analysis. The results showed that ages between 60 and 70 years (OR = 0.565, 95% CI = 0.398–0.802), living in a combination of urban and rural areas (OR = 1.276, 95% CI = 1.086–1.498), smoking (OR = 0.458, 95% CI = 0.357–0.587), sleeping for 6–7 h (OR = 1.255, 95% CI = 0.994–1.585), self-rated good health (OR = 1.846, 95% CI = 1.549–2.200) and self-rated very good health (OR = 1.758, 95% CI = 1.454–2.126) were the factors that influenced the prevalence of chronic diseases. The results showed that older men in the lower age group (60–70 years) were more susceptible to chronic diseases compared with other age groups. Surprisingly, the better the self-rated health status, the higher the prevalence of chronic diseases among middle-aged and elderly men. The results are presented in Table 3.

4. Discussion

The middle-aged and elderly populations of men are most vulnerable to chronic diseases due to the gradual deterioration of various bodily functions. Due to their insidious nature, long duration and high cost, chronic diseases place a heavy burden on the quality of life of middle-aged and elderly men as well as national healthcare expenditure in China [20]. The present study reveals that the prevalence of chronic diseases among middle-aged and elderly men in China is 42.6%, which is slightly lower than that reported in previous studies [21, 22]. The reason for this is that most of the previous studies were conducted on different regional populations, and chronic diseases are influenced by individual characteristics, such as age and lifestyle [23]. The population of China varies significantly between the north and south, urban and rural areas, and different ethnic groups in terms of their lifestyle and eating habits. Therefore, each local government should develop chronic disease prevention and control policies appropriate to the local population. The results of the present study show that hypertension, rheumatoid arthritis and gastric diseases are the top three chronic diseases, similar to that reported in previous studies [24, 25]. With the economic development in China, the most prevalent chronic diseases are those more closely related to food habits, such as high blood pressure, stomach diseases and diabetes, among others. This factor, coupled with specific dietary preferences in some regions (such as high consumption of oil and salt in northern China and chilli peppers in central China), has led to an increased incidence of hypertension and stomach diseases. The Chinese Center for Disease Control and Prevention (CDC) reported that the number of people with hypertension in China in 2020 was 420 million, and that of overweight and obese people was 507 million. Based on these data, China ranks first globally in terms of overweight and obese individuals [26]. These data indicate that changing poor dietary habits and promoting a healthy lifestyle should be the focus of future chronic disease prevention and treatment efforts.

The results of the multifactorial analysis revealed that age between 60 and 70 years, living in a combination of urban and rural areas, smoking, sleep duration of 6–7 h, and better self-rated health were important factors influencing the prevalence of chronic diseases in middle-aged and elderly men. The findings of our study are generally consistent with those reported in previous studies. First, bodily functions decline with age, and the ability of middle-aged and older individuals to resist disease decreases. Consequently, men in the young-old age group (60–70 years) are more likely to suffer from chronic diseases compared with those in the middle- or oldest-old age groups. In addition, the elderly are generally newly retired and in Chinese society, parents often assume certain inter-generational support functions after retirement, which is an important reason for the rapid deterioration of body functions that increases their chances of developing chronic diseases. In terms of residence, middle-aged and elderly people living in a combination of urban and rural areas are 1.276 times more likely to suffer from chronic diseases than those in urban areas. The reason is a large gap in the medical infrastructure and service capacity between urban and rural areas in China. Urban areas have sufficient healthcare resources and better infrastructure; therefore, middle-aged and elderly men living in cities tend to enjoy better medical services and have higher health levels. Middle-aged and elderly people living in a combination of urban and rural areas do not have adequate medical resources; therefore, they are more prone to chronic diseases and have lower health levels. In terms of lifestyle, middle-aged and older men who smoke tend to be more susceptible to chronic diseases, which is consistent with that reported in previous studies [27, 28]. Several studies have shown that tobacco contains high levels of carcinogenic substances and is a major factor that negatively affects human health [29]. A surprising finding of our study was that men with a self-rated good health status were more likely to suffer from chronic diseases than those with average self-rated health. This may be because self-rated health is a subjective judgment of an individual’s health, and several studies have shown that people are generally more optimistic about their health [30]. This positive perception tends to lower proper self-management of health, thus increasing the probability of developing chronic diseases.

5. Conclusions

In the present study, we used data from the 2018 CHARLS and a binary logistic regression model was constructed to analyse the current prevalence and influencing factors of chronic diseases among middle-aged and elderly men in China. The multi-factor logistic regression analysis revealed that age be-
TABLE 2. Results of the univariate analysis in the middle-aged and elderly population.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Definitions</th>
<th>People surveyed</th>
<th>Sick people</th>
<th>$\chi^2$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>45–60 yr</td>
<td>2205 (56.2)</td>
<td>810 (36.7)</td>
<td></td>
<td>76.649</td>
<td>$&lt;0.001$</td>
</tr>
<tr>
<td>60–70 yr</td>
<td>1068 (27.2)</td>
<td>511 (47.8)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>70–80 yr</td>
<td>489 (12.5)</td>
<td>264 (54.0)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;80 yr</td>
<td>159 (4.1)</td>
<td>85 (53.5)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Marital status</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>3440 (87.7)</td>
<td>1433 (41.7)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Divorced</td>
<td>59 (1.5)</td>
<td>29 (49.2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Widowed</td>
<td>410 (10.5)</td>
<td>204 (12.2)</td>
<td></td>
<td>11.295</td>
<td>$&lt;0.001$</td>
</tr>
<tr>
<td>Unmarried</td>
<td>12 (0.3)</td>
<td>4 (33.3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Education level</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illiterate</td>
<td>841 (21.4)</td>
<td>364 (43.3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary and below</td>
<td>1617 (41.2)</td>
<td>694 (42.9)</td>
<td></td>
<td>2.100</td>
<td>0.717</td>
</tr>
<tr>
<td>Secondary</td>
<td>1350 (34.4)</td>
<td>559 (33.5)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>University</td>
<td>110 (2.8)</td>
<td>52 (3.1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Postgraduate</td>
<td>3 (0.1)</td>
<td>1 (0.1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Area of residence</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban areas</td>
<td>858 (21.9)</td>
<td>409 (47.7)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural-urban areas</td>
<td>343 (8.7)</td>
<td>157 (45.8)</td>
<td></td>
<td>14.930</td>
<td>$&lt;0.001$</td>
</tr>
<tr>
<td>Rural areas</td>
<td>2720 (69.4)</td>
<td>1104 (40.6)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Medical insurance</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>161 (4.1)</td>
<td>60 (37.3)</td>
<td></td>
<td>1.946</td>
<td>0.163</td>
</tr>
<tr>
<td>Yes</td>
<td>3760 (95.9)</td>
<td>1610 (42.8)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Smoking</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>3502 (89.3)</td>
<td>1417 (40.5)</td>
<td></td>
<td>60.727</td>
<td>$&lt;0.001$</td>
</tr>
<tr>
<td>Yes</td>
<td>419 (10.7)</td>
<td>253 (60.4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Drinking</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>2883 (73.5)</td>
<td>1229 (42.6)</td>
<td></td>
<td>0.006</td>
<td>0.936</td>
</tr>
<tr>
<td>Yes</td>
<td>1038 (26.5)</td>
<td>441 (42.5)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Exercise</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>2671 (68.1)</td>
<td>1148 (43.0)</td>
<td></td>
<td>0.518</td>
<td>0.471</td>
</tr>
<tr>
<td>Yes</td>
<td>1250 (31.9)</td>
<td>522 (41.8)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sleep time</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0–6 h</td>
<td>1894 (48.3)</td>
<td>867 (45.8)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6–7 h</td>
<td>824 (21.0)</td>
<td>334 (40.5)</td>
<td></td>
<td>15.744</td>
<td>$&lt;0.001$</td>
</tr>
<tr>
<td>7–8 h</td>
<td>826 (21.1)</td>
<td>320 (38.7)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;8 h</td>
<td>377 (9.6)</td>
<td>149 (39.5)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Internet use</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>3193 (81.4)</td>
<td>1365 (42.7)</td>
<td></td>
<td>0.177</td>
<td>0.674</td>
</tr>
<tr>
<td>Yes</td>
<td>728 (18.6)</td>
<td>305 (41.9)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Self-rated health</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fair</td>
<td>1902 (48.5)</td>
<td>869 (45.7)</td>
<td></td>
<td>51.521</td>
<td>$&lt;0.001$</td>
</tr>
<tr>
<td>Good</td>
<td>1178 (30.0)</td>
<td>534 (45.3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very good</td>
<td>841 (21.4)</td>
<td>267 (31.7)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### TABLE 3. Logistic regression analysis of the factors influencing chronic diseases in the middle-aged and elderly population.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Comparison Group</th>
<th>Reference group</th>
<th>B</th>
<th>SE</th>
<th>wald $\chi^2$</th>
<th>p</th>
<th>OR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60–70 yr</td>
<td>45–60 yr</td>
<td>0.571</td>
<td>0.178</td>
<td>10.224</td>
<td>&lt;0.001</td>
<td>1.001</td>
<td>0.398–0.802</td>
<td></td>
</tr>
<tr>
<td>70–80 yr</td>
<td></td>
<td>−0.162</td>
<td>0.181</td>
<td>0.795</td>
<td>0.373</td>
<td>0.851</td>
<td>0.596–1.214</td>
<td></td>
</tr>
<tr>
<td>&gt;80 yr</td>
<td></td>
<td>0.090</td>
<td>0.189</td>
<td>0.228</td>
<td>0.633</td>
<td>0.094</td>
<td>0.756–1.584</td>
<td></td>
</tr>
<tr>
<td><strong>Marital status</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Divorced</td>
<td>Married</td>
<td>0.598</td>
<td>0.634</td>
<td>0.891</td>
<td>0.345</td>
<td>0.819</td>
<td>0.525–6.302</td>
<td></td>
</tr>
<tr>
<td>Widowed</td>
<td></td>
<td>0.689</td>
<td>0.688</td>
<td>1.002</td>
<td>0.317</td>
<td>0.992</td>
<td>0.517–7.674</td>
<td></td>
</tr>
<tr>
<td>Unmarried</td>
<td></td>
<td>0.657</td>
<td>0.641</td>
<td>1.049</td>
<td>0.306</td>
<td>0.929</td>
<td>0.549–6.779</td>
<td></td>
</tr>
<tr>
<td><strong>Education level</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary and below</td>
<td>Illiterate</td>
<td>0.019</td>
<td>0.051</td>
<td>2.940</td>
<td>0.713</td>
<td>0.036</td>
<td>0.118–0.812</td>
<td></td>
</tr>
<tr>
<td>Secondary</td>
<td></td>
<td>0.021</td>
<td>0.033</td>
<td>2.110</td>
<td>0.661</td>
<td>0.218</td>
<td>0.267–1.771</td>
<td></td>
</tr>
<tr>
<td>University</td>
<td></td>
<td>0.002</td>
<td>0.098</td>
<td>2.861</td>
<td>0.595</td>
<td>0.335</td>
<td>0.213–1.564</td>
<td></td>
</tr>
<tr>
<td>Postgraduate</td>
<td></td>
<td>0.025</td>
<td>0.105</td>
<td>2.910</td>
<td>0.569</td>
<td>0.058</td>
<td>0.355–1.998</td>
<td></td>
</tr>
<tr>
<td><strong>Area of residence</strong></td>
<td>Rural-urban areas</td>
<td>Urban areas</td>
<td>0.243</td>
<td>0.082</td>
<td>8.797</td>
<td>&lt;0.001</td>
<td>1.276</td>
<td>1.086–1.498</td>
</tr>
<tr>
<td>Rural areas</td>
<td></td>
<td>0.167</td>
<td>0.119</td>
<td>1.951</td>
<td>0.163</td>
<td>0.182</td>
<td>0.935–1.493</td>
<td></td>
</tr>
<tr>
<td>Medical insurance</td>
<td>Yes</td>
<td>No</td>
<td>0.241</td>
<td>0.171</td>
<td>1.410</td>
<td>0.158</td>
<td>0.816</td>
<td>0.093–0.576</td>
</tr>
<tr>
<td>Smoking</td>
<td>Yes</td>
<td>No</td>
<td>0.782</td>
<td>0.127</td>
<td>37.976</td>
<td>&lt;0.001</td>
<td>0.458</td>
<td>0.357–0.587</td>
</tr>
<tr>
<td>Drinking</td>
<td>Yes</td>
<td>No</td>
<td>0.179</td>
<td>0.082</td>
<td>2.190</td>
<td>0.266</td>
<td>0.359</td>
<td>0.023–0.357</td>
</tr>
<tr>
<td>Exercise</td>
<td>Yes</td>
<td>No</td>
<td>0.059</td>
<td>0.074</td>
<td>0.801</td>
<td>0.422</td>
<td>1.052</td>
<td>0.085–0.204</td>
</tr>
<tr>
<td>Sleep time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6–7 h</td>
<td>0–6 h</td>
<td>0.227</td>
<td>0.119</td>
<td>3.650</td>
<td>0.056</td>
<td>1.255</td>
<td>0.994–1.585</td>
<td></td>
</tr>
<tr>
<td>7–8 h</td>
<td></td>
<td>0.056</td>
<td>0.132</td>
<td>0.183</td>
<td>0.668</td>
<td>0.058</td>
<td>0.817–1.370</td>
<td></td>
</tr>
<tr>
<td>&gt;8 h</td>
<td></td>
<td>0.003</td>
<td>0.132</td>
<td>0.000</td>
<td>0.985</td>
<td>0.003</td>
<td>0.775–1.297</td>
<td></td>
</tr>
<tr>
<td>Internet use</td>
<td>Yes</td>
<td>No</td>
<td>0.070</td>
<td>0.095</td>
<td>0.730</td>
<td>0.465</td>
<td>0.324</td>
<td>0.117–0.256</td>
</tr>
<tr>
<td>Self-rated health</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td>Fair</td>
<td>0.613</td>
<td>0.090</td>
<td>46.790</td>
<td>&lt;0.001</td>
<td>1.846</td>
<td>1.549–2.200</td>
<td></td>
</tr>
<tr>
<td>Very good</td>
<td></td>
<td>0.564</td>
<td>0.097</td>
<td>33.935</td>
<td>&lt;0.001</td>
<td>1.758</td>
<td>1.454–2.126</td>
<td></td>
</tr>
</tbody>
</table>

Note: SE: standard error; OR: odds ratio; CI: confidence interval.

Between 60 and 70 years, living in a combination of urban and rural areas, smoking, sleeping for 6–7 h, self-rated good health, and self-rated very good health were the factors that influenced the prevalence of chronic diseases. Specifically, men in the 60–70 years’ age group were more likely to have chronic diseases than those in the middle-aged and elderly groups. Middle-aged and older men living in a combination of urban and rural areas were more likely to have chronic diseases than those living in urban or rural areas. In terms of lifestyle, those who smoked and slept for 6–7 h were more likely to develop chronic diseases. The surprising finding was that the group with a self-rated good health status was more prone to chronic diseases. The reason for this is a subject for future exploration.

In summary, several factors, such as individual characteristics and lifestyle, affect the development of chronic diseases among middle-aged and elderly men. The health department should develop chronic disease prevention and control measures according to the different regions and groups to empower and help improve the health of middle-aged and elderly men in China and promote healthy ageing. In view of this, we propose the following countermeasures: First, many middle-aged and elderly people lack knowledge about the prevention and treatment of chronic diseases. Therefore, the government should use popular short video platforms (such as TikTok) to produce relevant science-based videos to improve the literacy of the population [31, 32]. Second, medical checkups should be included in health insurance schemes to promote regular monitoring and prompt treatment. At present, the participation rate in medical checkups in China is low due to the high cost and the influence of traditional beliefs. Many people fear the
word “checkups” and thus avoid them. Therefore, if medical checkups are included in health insurance schemes, there is a possibility of acceptance and early detection and treatment of chronic diseases. Third, the government should strengthen the sense of joint participation between society and individuals [33, 34]. At present, the prevention and control of chronic diseases in China are led by the government; however, the participation of various sectors of society and individuals is not strong. Chronic diseases are complex and are associated with multiple factors, which means that their prevention and control will require the cooperation of various health departments to achieve the desired effects. Therefore, awareness must be increased and the chronic disease prevention and control model should be implemented by the government through multi-sectoral cooperation and participation of society.

AVAILABILITY OF DATA AND MATERIALS


AUTHOR CONTRIBUTIONS

YW and JW—designed the research study. XFY—performed the research. YW—analyzed the data, wrote the manuscript. All authors contributed to editorial changes in the manuscript. All authors read and approved the final manuscript.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Not applicable.

ACKNOWLEDGMENT

The data used in this article are from the 2018 China Health and Retirement Longitudinal Study implemented by the National Development Research Institute of Peking University. We would like to thank the above institution for providing data assistance, but we are responsible for the content of this article.

FUNDING

This research was funded by the National Social Science Fund of China (21FGLB089); Hunan Provincial Social Science Achievement Review Committee Project (XSP2023GLZ001); 2022 Project of Hunan Health Economics and Information Society (2022B03).

CONFLICT OF INTEREST

The authors declare no conflict of interest.

REFERENCES


