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ORIGINAL RESEARCH

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

Ying Wang[1,2,†], Jun Wang[2,*,†], Xiaofang Yan[2]

[1]School of Humanities and Management, Hunan University of Chinese Medicine, 410100 Changsha, Hunan, China
[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 = 1.549–2.200) 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 χ^2 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%)

T A B L E 1. Definition of the variables.

Variables	Definitions
Age	1 = 45–60 yr, 2 = 60–70 yr, 3 = 70–80 yr, 4 = >80 yr
Marital status	1 = Married, 2 = Divorced, 3 = Widowed, 4 = Unmarried
Education level	1 = Illiterate, 2 = Primary and below, 3 = Secondary, 4 = University, 5 = Postgraduate
Area of residence	1 = Urban areas, 2 = Rural-urban areas, 3 = Rural areas
Medical insurance	0 = No, 1 = Yes
Smoking	0 = No, 1 = Yes
Drinking	0 = No, 1 = Yes
Exercise	0 = No, 1 = Yes
Sleep time	1 = 0–6 h, 2 = 6–7 h, 3 = 7–8 h, 4 = >8 h
Internet use	0 = No, 1 = Yes
Self-rated health	1 = Fair, 2 = Good, 3 = Very good
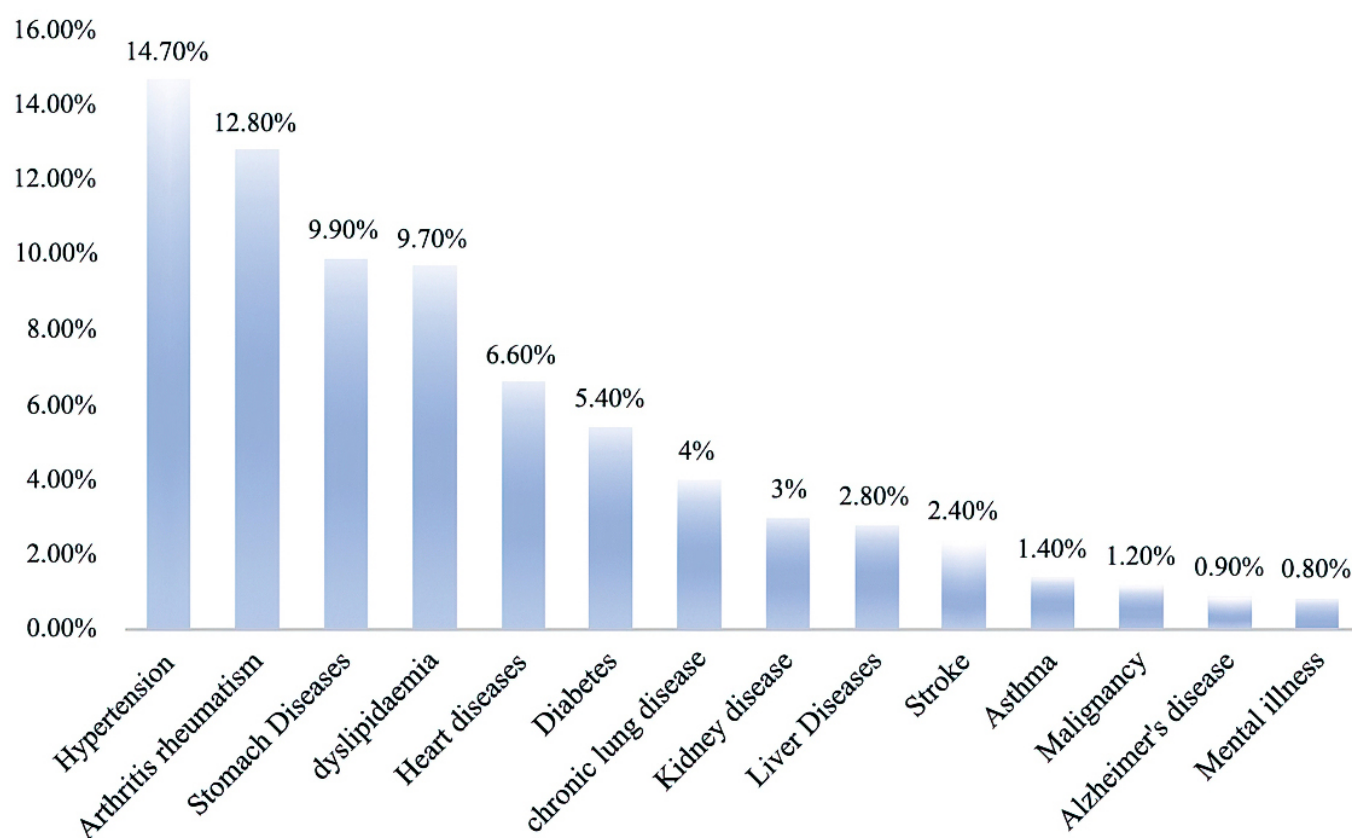
F I G U R E 1. Ranking of the prevalence of common chronic diseases among the middle-aged and elderly population in China.

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.

3.2 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

3.3.1 Single factor analysis

A χ^2 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 intergenerational 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.

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

TABLE 3. Logistic regression analysis of the factors influencing chronic diseases in the middle-aged and elderly population.

Variables	Comparison Group	Reference group	B	SE	waldχ^2	p	OR	95% CI
Age								
	60–70 yr	45–60 yr	0.571	0.178	10.224	<0.001	1.001	0.398–0.802
	70–80 yr		−0.162	0.181	0.795	0.373	0.851	0.596–1.214
	>80 yr		0.090	0.189	0.228	0.633	0.094	0.756–1.584
Marital status								
	Divorced	Married	0.598	0.634	0.891	0.345	0.819	0.525–6.302
	Widowed		0.689	0.688	1.002	0.317	0.992	0.517–7.674
	Unmarried		0.657	0.641	1.049	0.306	0.929	0.549–6.779
Education level								
	Primary and below	Illiterate	0.019	0.051	2.940	0.713	0.036	0.118–0.812
	Secondary		0.021	0.033	2.110	0.661	0.218	0.267–1.771
	University		0.002	0.098	2.861	0.595	0.335	0.213–1.564
	Postgraduate		0.025	0.105	2.910	0.569	0.157	0.355–1.998
Area of residence								
	Rural-urban areas	Urban areas	0.243	0.082	8.797	<0.001	1.276	1.086–1.498
	Rural areas		0.167	0.119	1.951	0.163	0.182	0.935–1.493
Medical insurance	Yes	No	0.241	0.171	1.410	0.158	0.816	0.093–0.576
Smoking	Yes	No	0.782	0.127	37.976	<0.001	0.458	0.357–0.587
Drinking	Yes	No	0.179	0.082	2.190	0.266	0.359	0.023–0.357
Exercise	Yes	No	0.059	0.074	0.801	0.422	1.052	0.085–0.204
Sleep time								
	6–7 h	0–6 h	0.227	0.119	3.650	0.056	1.255	0.994–1.585
	7–8 h		0.056	0.132	0.183	0.668	0.058	0.817–1.370
	>8 h		0.003	0.132	0.000	0.985	0.003	0.775–1.297
Internet use	Yes	No	0.070	0.095	0.730	0.465	0.324	0.117–0.256
Self-rated health								
	Good	Fair	0.613	0.090	46.790	<0.001	1.846	1.549–2.200
	Very good		0.564	0.097	33.935	<0.001	1.758	1.454–2.126

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

tween 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

The data of 2018 China Health and Retirement Longitudinal Study (CHARLS) is publicly available at http://charls.pku.edu.cn/pages/data/2018-charls-wave4/zh-cn.html.

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.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

REFERENCES

[1] Liu E, Zhang Q, Feng Y. The risk of old age poverty in chronic diseases: theoretical mechanisms and empirical tests. Insurance Research. 2020; 63–78.

[2] Wu H, Ba N, Ren S, Xu L, Chai J, Irfan M, et al. The impact of internet development on the health of Chinese residents: transmission mechanisms and empirical tests. Socio-Economic Planning Sciences. 2022; 81: 101178.

[3] Shi W, Shen D, Su Y, Ma J. Healthy lifestyles and disease prevention and control. Chinese Journal of Public Health. 2020; 36: 1690–1692.

[4] Ni W, Yuan X, Sun Y, Zhang H, Zhang Y, Xu J. Anaemia and associated factors among older adults in an urban district in China: a large-scale cross-sectional study. BMJ Open. 2022; 12: e056100.

[5] Guangming Online. China health management and health industry development report. (No. 4 2021). China; 2021 Sep. 2021.

[6] Ge Y, Wang L, Feng W, Zhang B, Liu S, Ke Y. Challenges and strategic options for healthy ageing in China. World of Management. 2020; 36: 86–96.

[7] Zhang Y, Zhang H, Li S, Li Y, Hu C, Li H. Development of a short-form Chinese health literacy scale for low salt consumption (CHLSalt-22) and its validation among hypertensive patients. BMC Nutrition. 2022; 8: 101.

[8] Li Y, Dou D. The influence of medical insurance on the use of basic public health services for the floating population: the mediating effect of social integration. International Journal for Equity in Health. 2022; 21: 15.

[9] Fan C. The new mission of building Chinese path to modernization: health first. The Economist. 2022; 18–20.

[10] Song Y. Current status of chronic diseases and their influencing factors in community-based geriatric physical examinations. Chinese Journal of Gerontology. 2015; 35: 2223–2224.

[11] Han Y, Wang P, Fang Y. Analysis of the prevalence and disease spectrum of chronic diseases and their influencing factors among the elderly in Xiamen. China Health Statistics. 2017; 34: 873–876, 880.

[12] Ma X, Li Y. Analysis of the current situation of chronic diseases of the elderly in the community and their influencing factors. Corps Medicine. 2018; 19–21.

[13] Wu Z, Li W, Zhang X, Wang J, Wang S, Zhang Y, et al. Risk factors and prevention and control strategies of chronic diseases. Chinese Journal of Clinical Healthcare. 2019; 22: 443–446.

[14] Liang B, Huang Y. Investigation on the prevalence of elderly patients with chronic diseases in Hubei province from 2015 to 2017, its influencing factors and patient prognosis. Chinese Journal of Health Education. 2019; 35: 340–345. (In Chinese)

[15] Zhang Y, Meng X, Yan K, Chen Z, Li N, Ren X, et al. Analysis of the prevalence of major chronic diseases and their influencing factors among adult residents in Weifang city. Modern Preventive Medicine. 2021; 48: 1854–1858.

[16] Li W, Su Y, Zhuge J, Wang Y, Wang S, Yao H. Current status of chronic disease prevalence and influencing factors among residents of Xinyuan county, Xinjiang. Occupation and Health. 2021; 37: 639–643. (In Chinese)

[17] Yang J, Zheng X, Hou L, Xue Y, Li M, Zou J, et al. Prevalence of multiple chronic diseases among the elderly in Taiyuan and the factors affecting them. Chinese Journal of Disease Control. 2021; 25: 78–83, 107.

[18] Bender R, Grouven U. Ordinal logistic regression in medical research. Journal of the Royal College of Physicians of London. 1997; 31: 546.

[19] Stoltzfus JC. Logistic regression: a brief primer. Academic Emergency Medicine. 2011; 18: 1099–1104.

[20] Wu Y, Jin S, Guo J, Zhu Y, Chen L, Huang Y. The economic burden associated with depressive symptoms among middle-aged and elderly people with chronic diseases in China. International Journal of Environmental Research and Public Health. 2022; 19: 12958.

[21] Yan W, Lu Y, Zhang R, Chang F. A study on the current status of co-morbidity among the elderly in China based on CHARLS data analysis. Chinese Journal of Disease Control. 2019; 23: 426–430.

[22] Ma J, Lan Z, Tao R, Tang N, Chen Z, Pang G, et al. Analysis of the current situation of chronic diseases among middle-aged and elderly people in Changsha and the factors affecting them. Chinese Journal of Preventive Medicine. 2021; 22: 321–328.

[23] Jing R, Zhang J, Li J, Li J, Ma S, Bian F, et al. A study on the current status of hypertension prevalence, treatment and management among residents in China's chronic disease prevention and control demonstration areas. Chinese Journal of Epidemiology. 2018; 39: 401–406.

[24] Zhu Y, Cao C, Zhang L, Xia J, Leng Z. Survey on the prevalence of hypertension and diabetes among empty nesters in Hangzhou and the knowledge and beliefs of the elderly. Chinese Journal of Chronic Disease Prevention and Control. 2020; 28: 444–447.

[25] Zhang R, Lu Y, Zhang S, Chang F. Analysis of co-morbidity patterns and disease correlates of chronic diseases among the elderly in China. China Journal of Public Health. 2019; 35: 1003–1005.

[26] China Cardiovascular Disease Center. China cardiovascular health and disease report. China; 2021 Jun. 2021.

[27] Feng X, Hua Z, Zhou Q, Shi A, Qian D. Analysis of the current status of major chronic diseases and the factors affecting them among residents aged 40–70 in Yangzhong City. General Medicine in China. 2020; 23: 2564–2570, 2575.

[28] Eberth B, Olajide D, Craig P, Ludbrook A. Smoking-related disease risk, area deprivation and health behaviours. Journal of Public Health. 2014; 36: 72–80.

[29] Cao Y, Ning L. Chronic disease status of rural empty nesters and its influencing factors. Chinese Journal of Gerontology. 2020; 40: 866–869.

[30] Cohen D, Flood C. Health economics. Health Studies. 2022; 369: 269–294.

[31] Li L, Ding H. The relationship between internet use and population health: a cross-sectional survey in China. International Journal of Environmental Research and Public Health. 2022; 19: 1322.

[32] Li L, Ding H, Li Z. Does internet use impact the health status of middle-aged and older populations? Evidence from China health and retirement longitudinal study (CHARLS). International Journal of Environmental Research and Public Health. 2022; 19: 3619.

[33] Ding H, Luo J. Analysis of chronic disease prevalence and influencing factors among residents of different occupational groups. China Medical Management Science. 2019; 9: 59–63.

[34] Ding H, Luo J, Jia Z, Lin Z, Pan P, Liu F. An empirical analysis based on CHARLS data on the prevalence of chronic diseases and the factors influencing them among Chinese residents. China Medical Management Science. 2020; 10: 48–52.