



Prevalence and influencing factors of chronic diseases among the elderly in Southwest China: A cross-sectional study based on community in urban and rural areas

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ARTICLE INFO

Keywords:

Urban-rural
Chronic non-communicable disease
The elderly
Influencing factors
Public Health

ABSTRACT

Objective: To explore the influencing factors affecting chronic diseases of elderly in Kunming.

Methods: Data were collected from November 2020 to August 2021. The cross-sectional study based on community was adopted. And hierarchical random sampling was used. A face to face questionnaire survey was conducted among the respondents or family caregivers. The contents we collected mainly include general demographic characteristics and other related influencing factors, self-reported chronic diseases and disability status.

Results: 1161 elderly were investigated in total. The percentage of non-communicable chronic disease among the rural elderly was higher than that of urban elderly. Binary logistic regression analysis showed that in urban areas, female (OR: 0.592;95 %CI:0.396 ~ 0.885), not in marriage (OR:1.643;95 %CI:1.093 ~ 2.470) and not very satisfied with family support (OR:1.858;95 %CI:1.115 ~ 3.096) are the influencing factors of chronic disease, while in rural areas are not in marriage (OR:1.961;95 %CI:1.021 ~ 3.763), more health-promoting behavior (OR:0.582;95%CI:0.350 ~ 0.970), not very satisfied with family support (OR:1.858;95 %CI:1.115 ~ 3.096), age 70–79 (OR:1.805;95 %CI:1.705 ~ 3.031), age 80 and above (OR:2.081;95 %CI:1.010 ~ 4.288), empty nest family (OR:0.389;95 %CI:0.186 ~ 0.811) and personal monthly income 2001–3000 (OR:0.353;95CI%:0.180 ~ 0.693). The influencing factors of urban-rural multimorbidity and non-communicable chronic disease with disability also exist differences at individual, family and social levels.

Conclusions: The prevalence rate of non-communicable chronic diseases among the elderly in Yunnan Province is not optimistic. Personal, family and social factors would affect the non-communicable chronic diseases of the elderly and there exist difference in influencing factor of non-communicable chronic disease between urban and rural areas.

1. Introduction

With the change in demographic structure, the global population showed an obvious aging trend (Li et al., 2019). From 2000 to 2050, the percentage of people over 60 years old in the world would double, from 11 % to 22 % (Bloom et al., 2010). In the same period, it was expected that the number of elderly people over 80 years old will reach 395 million (Organization, 2012). Since 1990s, the population aging in

China had been accelerating (Peng, 2011). In 2019, there were 254 million people aged 60 or above in China. By 2040, this number was expected to increase to 402 million, accounting for about 28 % of the population (Chen et al., 2022a; The, 2022). With the growth of age, hypofunction and senile diseases were increasing. After 60 years old, the elderly needed to face the sensory and activity dysfunction related to age, as well as the burden brought by chronic diseases such as dementia, depression, heart disease, diabetes and musculoskeletal diseases (Yang

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<https://doi.org/10.1016/j.pmedr.2024.102799>

Received 16 December 2023; Received in revised form 12 June 2024; Accepted 13 June 2024

Available online 17 June 2024

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and Li, 2019).

Non-communicable chronic diseases (NCDs), also referred to as chronic diseases, was an outbreak process that was accumulated by a variety of risk factors and can only be controlled, but cannot be cured (Di Cesare, 2019). Especially the older people get, the higher the prevalence of chronic diseases and the greater the harm. Under the background of global aging, the number of people aged 60 and over has increased rapidly, and the prevalence of chronic diseases among the elderly has gradually increasing, which has also increased the global disease burden (Partridge et al., 2018). According to the report of the World Health Organization (WHO), in 2019, the global population of elderly people aged 60 and over reached 1 billion, and it was expected to increase to 1.4 billion by 2030 and 2.1 billion by 2050. This kind of growth is happening at an unprecedented speed, and will accelerate in the next few decades, especially in developing countries. As the most populous country in the world, the population of chronic diseases was rising rapidly in China, so it was urgent to prevent and control chronic diseases (Jiehua and Jiaqi, 2023).

Chronic disease accounted for 86.6 % of the total deaths in China and contribute more than 70 % of the total disease burden (Notice of the General Office of the State Council on Printing and Distributing the Long-term Plan for the Prevention and Treatment of Chronic Diseases in China (2017-2025), 2017). According to the seventh population census, the population over 60 years old in China has reached 264 million, accounting for 20 % of the total population, and it was still showing a rapid growth trend (Seven Groups of Holographic Projections of China's Population Aging, 2021). In view of the long course of chronic diseases and complex etiology, more and more scholars had found that the co-occurrence of multiple chronic diseases had become a major feature in the course development of chronic diseases. The co-occurrence of multiple chronic diseases was first defined as co-morbidity, which was defined as multimorbidity by WHO in 2008, that is, two or more chronic diseases exist in the same individual at once (World Health, 2008). In recent years, more and more research were based on this concept. A large-scale epidemiological survey in China found that 65.6 % of the residents with multimorbidity (Zhang et al., 2022). Therefore, in the prevention and treatment of chronic diseases, we should not only pay attention to a single chronic disease, but also pay attention to multimorbidity. At the same time, some researchers pointed out that chronic diseases and different numbers of chronic diseases have significant effects on different degrees of disability (Xinxi et al., 2020; mingxu et al., 2018; Wei et al., 2021).

In 2015, WHO defined the goal of healthy aging as the functional level needed to develop and maintain the healthy life of the elderly and put forward a new concept model of healthy aging, which mainly focuses on the internal ability and functional level of the elderly, rather than "not getting sick" (Organization, 2015; Rudnicka et al., 2020). Therefore, understanding the current situation and influencing factors of chronic diseases in the elderly was very important for preventing and reversing the functional decline of the elderly and improving the public health problems of the aging population.

This study analyzes the differences between urban and rural areas in the chronic diseases of the elderly in Kunming, Yunnan Province, southwest of China and explore the influencing factors affecting chronic diseases in elderly. In order to provide objective basis for formulating public health policies.

2. Materials and methods

2.1. Study design

We collected data from November 2020 to August 2021 in Kunming, China. The cross-sectional study was used, and a community-based survey was conducted. The hierarchical random sampling was used. According to the urban and rural stratification first, and on the basis of the median Gross Domestic Product (GDP) of the target urban area and

target county of the city respectively, if the GDP of the target community was greater than the median, the economic level was better, and if it was less than the median, the economic level was worse. Twenty-two target communities were randomly selected from the five main urban areas and 6 counties of Kunming. If the sample size is not enough, the communities would continue to be extracted according to the sampling method above. The elderly have lived in Kunming for more than 3 years in the target community and administrative village and aged 60 years and above were selected as the survey subjects. Exclusion criteria: the aging surveyed with severe diseases (Elderly people who were not suitable for daily management in community health service institutions, mainly include: 1. Unstable period of disease condition. 2. Acute stage of the disease. 3. Needing for surgery, transferred to superior medical institutions.), mental disorders, senile dementia, and severe cognitive impairment who could not complete the investigation. This study was approved by the Ethics Committees of the Kunming medical University.

2.2. Setting

Yunnan province is located in the southwestern border of China and is the province with the most ethnic groups in the country. As a big frontier province of ethnic minorities, Yunnan has an uneven level of economic development, and the aging and health problems of the elderly population have shown significant regional differences, complexity and particularity (L. Yan et al., 2020; Ran et al., 2019). Yunnan Province has already entered an aging society in 2002 (Xiqiong, 2018). As the capital city of Yunnan Province, Kunming entered an aging society as early as 1991. According to the Kunming Municipal Commission on Aging, as of the end of 2019, Kunming had 1.114 million elderly people over 60 years old with household registration, accounting for 19.23 % of the total household registration population. As the number of elderly people continues to rise, the prevalence of chronic diseases also continued to increase (The Statistics Bureau of Kunming). The problem of chronic diseases of the elderly in Kunming was facing a huge challenge. China has given a lot of policy support to the combination of medical care and nursing care. However, due to the influence of location and financial resources, there is a big gap in the allocation of medical resources between urban and rural areas. Therefore, this study would analyze the urban-rural differences between chronic diseases and their influencing factors.

2.3. Data collection and measurement

The contents we collected mainly include general demographic characteristics and other related influencing factors, self-reported chronic diseases and disability status.1) According to the World Health Organization's decision analysis model of healthy society, we divided the variables into general demographic characteristics, family support environment, personal lifestyle and working status. General demographic characteristics included gender, age, ethnicity, education level, marital status, personal monthly income. Family support environment included family patterns, economic source, family monthly income, health status of spouse, support from family, satisfaction with family support and communicating with offspring. Health-promoting behavior included healthy daily life behavior, avoiding behaviors harmful to health and positive mental condition. Working status referred to whether there was still a continues working status or not. 2) The chronic disease was exposed by the subjects themselves (Including whether there was chronic disease and chronic disease types). According to the measurement standards of chronic diseases in the National Health Service survey: the respondents were diagnosed as chronic diseases by medical staff within 6 months or they had seizures within six months and took medication and other measures. 3) Disability status was assessed by Activity of daily living scale (ADL). Because disability has a great influence on the burden of disease, our evaluation of self-care ability mainly focuses on physical function. The questionnaire consists of

Barthel index scale and self-made questionnaire. In this study, Barthel index scale was used to evaluate the ability of daily living. The ability of daily living assessment scale was widely used in the pilot cities of long-term care insurance in China, and it was also used in the evaluation standard of long-term care disability rating (Trial) issued by the National Medical Insurance Bureau and other departments in August 2021, which was representative. Barthel index involves ten activities of daily life, such as eating, bathing, dressing and defecating. The total score is 100, with 0–40 as severe disability, 45–60 as moderate disability and 65–95 as mild disability (Sijuan and Zhang, 2021). Face to face self-administered questionnaire and ADL were used to investigate the subjects or their family caregivers.

2.4. Sample size

According to the epidemiological survey, The resident elderly population in Kunming is 778,088, accounting for 19 %. According to the calculation formula of sample size,

$$n = p(1 - p) / \left(\frac{e^2}{1.96^2} + \frac{p(1 - p)}{N} \right) n$$

$p = 19\%$, $e = 0.05$, $Z = 1.96$, $N = 778,088$. The sample size is 236 cases, and the respondents are divided into four layers according to urban and rural areas and economic level. Considering the loss of 10 % of the respondents, the final sample size is 1038 cases. At least 47 elderly people were randomly selected from each community.

2.5. Definition of covariates

Our study included general demographic characteristics, family support environment, personal lifestyle and working status. General demographic characteristics included gender, age, ethnicity, education level, marital status, personal monthly income. Family support environment included family patterns, economic source, family monthly income, health status of spouse, support from family, satisfaction with family support and communicating with offspring. Health-promoting behavior is the behavior that individuals or groups show and is objectively beneficial to the health of themselves and others. Working status referred to whether there was still a continues working status or not.

2.6. Statistical processing

Epidata 3.1 was used to construct the database, and the data were entered into the database. IBM SPSS STATISTICS V25.0 白金版 (IBM Singapore Pte Ltd), Number:DOEJNLL software was used for statistical analysis. Demographic characteristics such as age, marital status, education level, personal monthly income and family monthly income were described by statistical methods. The measurement data are described by the mean standard deviation ($\bar{x} \pm s$) if they conform to the normality and variance homogeneity, and the median (m) Inter Quartile Range, IQR) if they do not conform to the normal distribution. Proportion is used to describe the distribution of counting data. The chi-square test was used to compare the rates. The binary Logistic regression analysis was used for analysis of influencing factors (Odds ratios(OR) > 1, indicating that the factor is a risk factor, and OR < 1 is a protective factor). P < 0.05 indicated statistically significant difference.

2.7. Quality control

Investigators received unified training and conducted pre-investigation. When collecting chronic disease information, we used community chronic disease management information with the permission and support of community staff to ensure the accurate information of chronic disease. Samples were selected according to strict inclusion and exclusion criteria. Data input stage adopted double input, check

data to ensure the accuracy of the input.

3. Results

3.1. Characteristics

We selected 24 communities finally. A total of 1190 questionnaires were distributed, and 1161 questionnaires were collected, with a response rate of 97.56 %. Their age ranged from 60 to 98 (73.76 ± 8.49). There are 637 people in urban areas and 524 people in rural areas, Table 1. The gender, ethnicity, education level, personal monthly income and age were different between urban and rural group.

3.2. Prevalence of chronic diseases among the elderly in Kunming urban and rural areas

In 1161 elderly people, 78.2 % (75.8 %,80.6 %) suffer from chronic diseases, 31.5 % (28.9 %,34.2 %) suffer from multimorbidity, and 47.3 % (44.4 %,50.2 %) suffer from chronic diseases with disability. Among them, the percentage of self-reported chronic disease [81.3 % (78.0 %,84.6 %) VS 75.7 % (72.3 %,79.0 %), P = 0.021] and the percentage of chronic disease combined with disability [54.6 % (50.3 %,58.8 %) VS 41.3 % (37.5 %,45.1 %), P < 0.001] in the rural aged 60 years and above were higher than those in the urban areas, and the differences were statistically significant. The percentage of the urban aged 60 years and above suffering from multimorbidity was higher than that in the rural areas but there was no statistically significant difference. The ranking of the top 5 self-reported chronic diseases of the elderly in rural areas was hypertension (39.1 %), arthritis (22.9 %), diabetes (13.5 %), stroke (13.0 %), coronary and heart disease (8.8 %), while that of the elderly in urban areas was hypertension (43.2 %), arthritis (20.7 %), diabetes (16.5 %), coronary heart disease (10.2 %) and stroke (9.3 %), Table 2.

3.3. Comparison of population with different demographic characteristics

3.3.1. Chronic diseases

Personal, family and social level factors of the elderly in urban and rural areas were analyzed. Among them, gender, marital status, number of health-promoting behavior, personal monthly income, age, educational level, support from family, satisfaction with family support, working status and communication with offspring were compared. The differences were statistically significant (P < 0.05, Table 3).

3.3.2. Multimorbidity

The differences in marital status, number of health-promoting behavior, personal monthly income, age, support from family, satisfaction with family support and communication with offspring were statistically significant (P < 0.05, Table 3).

3.3.3. Chronic diseases with disability

Significant differences were found in ethnicity, marital status, number of health-promoting behavior, family patterns, economic source, educational level, age, support from family satisfaction with family support, working status, and communication with offspring (P < 0.05, Table 3).

3.4. Binary logistic regression

3.4.1. Chronic diseases

Taking disability as the dependent variable, combined with univariate analysis and meaningful variables in professional judgment as the independent variables, a binary logistic regression analysis was performed. The results showed that gender, marital status and satisfaction with family support were the influencing factors of chronic disease in the elderly in urban areas (P < 0.05). Among them, non-marital status and dissatisfaction with support from family were the risk factors for chronic

Table 1
Demographic characteristics of the elderly in urban and rural areas in Southwest China, 2020–2021 [n(%)].

| Characteristics | N | Urban(n = 637) | Rural(n = 524) | χ^2 | P |
|----------------------------------|----------------|----------------|----------------|----------|--------|
| Gender | | | | 8.718 | 0.003 |
| Male | 499 (43.0) | 249 (39.1) | 250 (47.7) | | |
| Female | 662 (57.0) | 388 (60.9) | 274 (52.3) | | |
| Age | | | | 32.258 | <0.001 |
| 60–69 | 418 (36.0) | 207 (32.5) | 211 (40.3) | | |
| 70–79 | 424 (36.5) | 212 (33.3) | 212 (40.5) | | |
| ≥80 | 319 (27.5) | 218 (34.2) | 101 (19.3) | | |
| Ethnicity | | | | 50.686 | <0.001 |
| Han | 1051 (90.5) | 612 (96.1) | 439 (83.8) | | |
| Other ethnicities | 110 (9.5) | 25(3.9) | 85(16.2) | | |
| Education level | | | | 111.286 | <0.001 |
| Primary school and below | 785 (67.6) | 347 (54.5) | 438 (83.6) | | |
| Above primary school | 376 (32.4) | 290 (45.5) | 86(16.4) | | |
| Marital status | | | | 17.449 | <0.001 |
| Married | 798 (68.7) | 405 (63.6) | 393 (75.0) | | |
| Not in marriage | 363 (31.3) | 232 (36.4) | 131 (25.0) | | |
| Personal monthly income | | | | 109.398 | <0.001 |
| ≤2000 yuan | 666 (57.4) | 278 (43.6) | 388 (74.0) | | |
| 2001–3000 yuan | 263 (22.7) | 186 (29.2) | 77(14.7) | | |
| ≥3001 yuan | 232 (20.0) | 173 (27.2) | 59(11.3) | | |
| Monthly household income | | | | 111.387 | <0.001 |
| ≤2000 yuan | 429 (37.0) | 150 (23.5) | 279 (53.2) | | |
| 2001–4000 yuan | 249 (21.4) | 160 (25.1) | 89(17.0) | | |
| 4001–6000 yuan | 216 (18.6) | 139 (21.8) | 77(14.7) | | |
| ≥6001 yuan | 267 (23.0) | 188 (29.5) | 79(15.1) | | |
| Family patterns | | | | 50.282 | <0.001 |
| Core family | 296 (25.5) | 164 (25.7) | 132 (25.2) | | |
| Stem family | 462 (39.8) | 201 (31.6) | 261 (49.8) | | |
| Joint family | 156 (13.4) | 103 (16.2) | 53(10.1) | | |
| Empty nest family | 247 (21.3) | 169 (26.5) | 78(14.9) | | |
| Economic source | | | | 47.261 | <0.001 |
| From own | 846 (72.9) | 516 (81.0) | 330 (63.0) | | |
| From others | 315 (27.1) | 121 (19.0) | 194 (27.0) | | |
| Support from family | | | | 42.195 | <0.001 |
| Often | 880 (75.8) | 530 (83.2) | 350 (66.8) | | |
| Occasionally or never | 281 (24.2) | 107 (16.8) | 174 (33.2) | | |
| Satisfaction with family support | | | | 28.940 | <0.001 |
| Very | 460 (39.6) | 297 (46.6) | 163 (31.1) | | |
| General or not | 701 (60.4) | 340 (53.4) | 361 (68.9) | | |
| Communicating with offspring | | | | 31.988 | <0.001 |

Table 1 (continued)

| Characteristics | N | Urban(n = 637) | Rural(n = 524) | χ^2 | P |
|-------------------------------------|---------------|----------------|----------------|----------|--------|
| Often | 813 (70.0) | 490 (76.9) | 323 (61.6) | | |
| Occasionally, or never | 348 (30.0) | 147 (23.1) | 201 (38.4) | | |
| Number of health-promoting behavior | | | | 2.487 | 0.115 |
| ≤4 | 498 (42.9) | 260 (40.8) | 238 (45.4) | | |
| >4 | 663 (57.1) | 377 (59.2) | 286 (54.6) | | |
| Working status | | | | 352.163 | <0.001 |
| On duty | 34(2.9) | 23(3.6) | 11(2.1) | | |
| Retired | 453 (39.0) | 400 (62.8) | 53(10.1) | | |
| Farmers or others | 674 (58.1) | 214 (33.6) | 460 (87.8) | | |

Table 2

The ranking of the top 5 self-reported chronic diseases among elderly in urban and rural areas in Southwest China, 2020–2021 [n(%)].

| Sequence | Urban | Rural |
|----------|---------------------------------|--------------------------------|
| 1 | Hypertension 275(43.2) | Hypertension 205(39.1) |
| 2 | Arthritis132(20.7) | Arthritis120(22.9) |
| 3 | Diabetes105(16.5) | Diabetes 71(13.5) |
| 4 | Coronary heart disease 65(10.2) | Stroke 68(13.0) |
| 5 | Stroke 59(9.3) | Coronary heart disease 46(8.8) |

n(%)= Number and proportion of people suffering from a certain type of chronic disease.

disease, and female were the protection factors for chronic disease, [Table 4](#). In rural areas, marital status, number of healthy behaviors, satisfaction with family support, age, family patterns, and personal monthly income were the influencing factors of chronic disease among the elderly (P < 0.05). Among them, not in marital status, not too satisfied with the support given to family members, age ≥ 70 years old were the risk factors of chronic disease, and more healthy behaviors, empty nest family, and personal monthly income from 2001 to 3000 were the protection factors of chronic disease, [Table 5](#).

3.4.2. Multimorbidity

According to the analysis, the influencing factors of a total of two or more chronic illnesses in cities included the number of healthy behaviors, the degree of satisfaction with family support, and age (P < 0.05). Risk factors included dissatisfaction with family support while protective factors included more healthy behaviors and the age of 70–79 years old, [Table 4](#). In rural areas, influencing factors included marital status, support from family, family patterns and family monthly income (P < 0.05). Among them, non-marital status, infrequent support from family members, and monthly family income ≥ 6,000 were risk factors, while empty nest family was the protection factor, as shown in [Table 5](#).

3.4.3. Chronic diseases with disability

The results showed that the effects of chronic disease combined with disability included marital status, number of healthy behaviors, satisfaction with family support, and age (P < 0.05). Among them, not being in marriage, not being satisfied with the support provided by family members, and age ≥ 80 years old were the risk factors for chronic disease combined with disability, and more healthy behaviors were the protection factors for chronic disease combined with disability, as shown in [Table 4](#). In rural areas, the effects of chronic disease combined with disability included the number of healthy behaviors, satisfaction with family support, age, family patterns, economic source, and monthly personal income (P < 0.05). Among them, the risk factors were less satisfied with family support, age ≥ 70 years old, joint family, and

Table 3
Comparison of chronic diseases with different characteristics among elderly in urban and rural areas in Southwest China, 2020–2021 [n(%)].

| Characteristics | Chronic diseases | | P | Multimorbidity | | P | Chronic diseases with disability | | P |
|-------------------------------------|------------------|-----------|--------|----------------|-----------|--------|----------------------------------|-----------|--------|
| | Urban | Rural | | Urban | Rural | | Urban | Rural | |
| Gender | | | 0.002 | | | 0.769 | | | 0.096 |
| Male | 201(41.7) | 211(49.5) | | 85(41.1) | 70(44.0) | | 109(41.4) | 141(49.3) | |
| Female | 281(58.3) | 215(50.5) | | 122(58.9) | 89(56.0) | | 154(58.6) | 145(50.7) | |
| Age | | | 0.010 | | | <0.001 | | | <0.001 |
| 60–69 | 151(31.3) | 156(36.6) | | 53(25.6) | 52(32.7) | | 54(20.5) | 91(31.8) | |
| 70–79 | 158(32.8) | 181(42.5) | | 71(34.3) | 64(40.3) | | 76(28.9) | 120(42.0) | |
| ≥80 | 173(35.9) | 89(20.9) | | 83(40.1) | 43(27.0) | | 133(50.6) | 75(26.2) | |
| Ethnicity | | | 0.053 | | | 0.474 | | | <0.001 |
| Han | 462(95.9) | 352(82.6) | | 195(94.2) | 12(5.8) | | 249(94.7) | 226(79.0) | |
| Other Ethnicities | 25(4.1) | 74(17.4) | | 133(83.6) | 26(16.4) | | 14(5.3) | 60(21.0) | |
| Education level | | | <0.001 | | | 0.843 | | | 0.001 |
| Primary school and below | 272(56.4) | 367(86.2) | | 116(56.0) | 130(81.8) | | 151(57.4) | 247(86.4) | |
| Above primary school | 210(43.6) | 59(13.8) | | 91(44.0) | 29(18.2) | | 112(42.6) | 39(13.6) | |
| Marital status | | | 0.003 | | | <0.001 | | | <0.001 |
| Married | 296(61.4) | 309(72.5) | | 123(59.4) | 103(64.8) | | 133(50.6) | 200(69.9) | |
| Not in marriage | 186(38.6) | 117(27.5) | | 84(40.6) | 56(35.2) | | 130(49.4) | 86(30.1) | |
| Personal monthly income | | | 0.023 | | | 0.086 | | | 0.828 |
| ≤2000 yuan | 219(45.4) | 321(75.4) | | 95(45.9) | 114(71.7) | | 112(42.6) | 206(72.0) | |
| 2001–3000 yuan | 138(28.6) | 58(13.6) | | 54(26.1) | 18(11.3) | | 76(28.9) | 44(15.4) | |
| ≥3001 yuan | 125(25.9) | 47(11.0) | | 58(28.0) | 27(17.0) | | 75(28.5) | 36(12.6) | |
| Family monthly income | | | 0.563 | | | 0.035 | | | 0.965 |
| ≤2000 yuan | 118(24.5) | 227(53.3) | | 51(24.6) | 77(48.4) | | 62(23.6) | 141(49.3) | |
| 2001–4000 yuan | 122(25.3) | 71(16.7) | | 55(26.6) | 29(18.2) | | 73(27.8) | 47(16.4) | |
| 4001–6000 yuan | 99(20.5) | 67(15.7) | | 38(18.4) | 17(10.7) | | 49(18.6) | 50(17.5) | |
| ≥6001 yuan | 143(29.7) | 61(14.3) | | 63(30.4) | 36(22.6) | | 79(30.0) | 48(16.8) | |
| Family patterns | | | 0.117 | | | 0.182 | | | <0.001 |
| Core family | 132(27.4) | 108(25.4) | | 66(31.9) | 36(22.6) | | 73(27.8) | 65(22.7) | |
| Stem family | 146(30.3) | 212(49.8) | | 57(27.5) | 96(60.4) | | 65(24.7) | 146(51.0) | |
| Joint family | 78(16.2) | 50(11.7) | | 29(14.0) | 12(7.5) | | 57(21.7) | 43(15.0) | |
| Empty nest family | 126(26.1) | 56(13.1) | | 55(26.6) | 15(9.4) | | 68(25.9) | 32(11.2) | |
| Economic source | | | 0.123 | | | 0.052 | | | <0.001 |
| From own | 394(81.7) | 258(60.6) | | 165(79.7) | 88(55.3) | | 207(78.8) | 150(52.4) | |
| From others | 88(18.3) | 168(39.4) | | 42(20.3) | 71(44.7) | | 56(21.3) | 136(47.6) | |
| Support from family | | | 0.042 | | | 0.023 | | | <0.001 |
| Often | 396(82.2) | 280(65.7) | | 160(77.3) | 102(64.2) | | 210(79.8) | 171(59.8) | |
| Occasionally or never | 86(17.8) | 146(34.3) | | 47(22.7) | 57(35.8) | | 53(20.2) | 115(40.2) | |
| Satisfaction with family support | | | <0.001 | | | <0.001 | | | <0.001 |
| Very | 199(41.3) | 124(29.1) | | 57(27.5) | 47(29.6) | | 99(37.6) | 67(23.4) | |
| General or not | 283(58.7) | 302(70.9) | | 150(72.5) | 112(70.4) | | 164(62.4) | 219(76.6) | |
| Communicating with offspring | | | 0.009 | | | 0.017 | | | <0.001 |
| Often | 361(74.9) | 258(60.6) | | 145(70.0) | 94(59.1) | | 187(71.1) | 163(57.0) | |
| Occasionally, or never | 121(25.1) | 168(39.4) | | 62(30.0) | 65(40.9) | | 76(28.9) | 123(43.0) | |
| Number of health-promoting behavior | | | 0.03 | | | 0.001 | | | <0.001 |
| ≤4 | 204(42.3) | 206(48.4) | | 105(50.7) | 79(49.7) | | 139(52.9) | 160(55.9) | |
| >4 | 278(57.7) | 220(51.6) | | 102(49.3) | 80(50.3) | | 124(47.1) | 126(44.1) | |
| Working status | | | 0.031 | | | 0.101 | | | <0.001 |
| On duty | 16(3.3) | 8(1.9) | | 5(2.4) | 0(0.0) | | 4(1.5) | 2(0.7) | |
| Retired | 299(62.0) | 40(9.4) | | 126(60.9) | 19(11.9) | | 172(65.4) | 30(10.5) | |
| Farmers or others | 167(34.6) | 378(88.7) | | 76(36.7) | 140(88.1) | | 87(33.1) | 254(88.8) | |

economic source from others. The protective factors were the monthly personal income from 2001 to 3000, [Table 5](#).

4. Discussion

With the deepening of aging in China, chronic diseases have become a major public health issue affecting the economic and social development in China. The survey of health services in China shows that the prevalence rate of chronic diseases in cities has always been higher than that in rural areas, but the growth rate in rural areas has been greater than that in cities in recent years, and the gap between them has gradually narrowed ([Lijiao et al., 2018](#)). This study found that the prevalence of chronic diseases among the elderly in Kunming, Yunnan Province was not optimistic and there were differences between urban and rural areas. The prevalence and disability rate of chronic diseases in rural areas were higher than those in cities, and the prevalence of urban co-morbidities was higher than that in rural areas. This was consistent with domestic and Brazilian research ([Yao et al., 2020](#); [Qiao et al., 2022](#); [Höfelmann et al., 2014](#)), but different from India situation ([Jana and](#)

[Chattopadhyay, 2022](#)). Sixty years old and above the elderly chronic disease spectrum is changing in Kunming. Arthritis is on the rise, consistent with the results of the sixth national health services survey ([Yuan, 2022](#)).

Chronic disease in the elderly with different characteristics in different regions is different and is affected by many factors. In cities, non-marital status is a risk factor for chronic disease and its combination with disability, which is consistent with Indian and domestic research that older people who are not in marriage have poorer health conditions ([Perkins et al., 2016](#); [Chen et al., 2022b](#)). Dissatisfaction with family support is a risk factor for chronic disease and multimorbidity, which may be related to the lack of family support for the elderly according to the family size reduction ([Zimmer and Kwong, 2003](#)). Age greater than 80 years increases the risk of disability in the elderly. Gender as a female was a protective factor for chronic disease, which was inconsistent with the results of the study ([Wu et al., 2013](#)). This may be related to the percentage of urban female elderly people without chronic diseases is higher than that of men in this study. More healthy behaviors and the age of 70–79 were the protective factors for the multimorbidity, which

Table 4

Binary logistic regression analysis on influencing factors of chronic disease among elderly people in urban areas in Southwest China, 2020–2021.

| Variable | | OR(95 %CI) |
|-------------------------------------|-----------------|-------------------|
| Chronic diseases | | |
| Gender | Male | 1.00(ref) |
| | Female | 0.59(0.40 ~ 0.89) |
| Marital status | Married | 1.00(ref) |
| | Not in marriage | 1.64(1.09 ~ 2.47) |
| Satisfaction with family support | Very | 1.00(ref) |
| | General or not | 2.32(1.63 ~ 3.47) |
| Multimorbidity | | |
| Number of health-promoting behavior | ≤4 | 1.00(ref) |
| | >4 | 0.67(0.47 ~ 0.96) |
| Satisfaction with family support | Very | 1.00(ref) |
| | General or not | 3.18(2.20 ~ 4.60) |
| Age | 60–69 | 1.00(ref) |
| | 70–79 | 0.54(0.35 ~ 0.84) |
| | ≥80 | 0.85(0.56 ~ 1.29) |
| | | |
| Chronic diseases with disability | | |
| Marital status | Married | 1.00(ref) |
| | Not in marriage | 1.90(1.31 ~ 2.76) |
| Number of health-promoting behavior | ≤4 | 1.00(ref) |
| | >4 | 0.46(0.33 ~ 0.66) |
| Satisfaction with family support | Very | 1.00(ref) |
| | General or not | 1.73(1.22 ~ 2.47) |
| Age | 60–69 | 1.00(ref) |
| | 70–79 | 1.49(0.96 ~ 2.31) |
| | ≥80 | 3.55(2.27 ~ 5.58) |
| | | |

might be due to the improvement of health awareness and more emphasis on healthy behaviors, which reduced the possibility of multiple chronic diseases among the urban elderly.

In rural areas, non-marital status was the risk factor of chronic disease and multimorbidity, infrequent support from family members, family monthly income ≥ 6001 were the risk factors of multimorbidity. According to a survey of the rural elderly in China, the rate of not seeing a doctor increases obviously with the decrease of income (Chen, 2012). The reason may be that high income has a higher utilization rate of health services, which leads to an increase in the detection rate of diseases (Speybroeck et al., 2010). And personal monthly income 2001–3000 was the protective factor of chronic disease and chronic disease with disability, and empty nest family was the protective factor of combined chronic illness and disability. On the contrary, they showed less high risk of chronic disease in the data. This is inconsistent with the research by Wu et al. (2022). The disability occurred earlier in rural areas than in cities, probably due to the terrain and economic impact of Yunnan, where most rural people need to engage in farming and manual labor. The long-term previous stress and impact on the body was larger, leading to a higher incidence of osteoarticular disease. Furthermore, rural areas are mostly mountainous and semi-mountainous, which hinders the implementation of medical health promotion and accessibility (Yuan, 2022; Yan et al., 2023; Zhang et al., 2017).

Common risk factors for chronic disease among urban and rural seniors are related to perceived social support possibly because the majority of seniors are facing retirement with little or decreasing income. However, people with low socioeconomic status are more likely to be exposed to adverse social and psychological environment and have less social and psychological resources such as optimism, coping styles and social support (Shaozhe, 2019; Wu and Sheng, 2019).

5. Conclusion

The chronic disease situation of the elderly aged 60 or above in rural areas of Kunming City, Yunnan Province is more serious than that in cities, and the elderly suffering from chronic disease combined with disability is at greater risk. We should pay attention to the early prevention of high-risk groups of chronic disease, especially the elderly in rural areas. Musculoskeletal system diseases are listed as the second

Table 5

Binary logistic regression analysis on influencing factors of chronic disease among elderly in rural areas in Southwest China, 2020–2021.

| Variable | | OR(95 %CI) |
|-------------------------------------|-----------------------|--------------------|
| Chronic diseases | | |
| Marital status | Married | 1.00(ref) |
| | Not in marriage | 1.96(1.02 ~ 3.76) |
| Number of health-promoting behavior | ≤4 | 1.00(ref) |
| | >4 | 0.58(0.35 ~ 0.97) |
| Satisfaction with family support | Very | 1.00(ref) |
| | General or not | 1.86(1.12 ~ 3.10) |
| Age | 60–69 | 1.00(ref) |
| | 70–79 | 1.81(1.08 ~ 3.03) |
| | ≥80 | 2.08(1.01 ~ 4.29) |
| | | |
| Family patterns | Core family | 1.00(ref) |
| | Stem family | 0.88(0.50 ~ 1.55) |
| | Joint family | 3.32(0.88 ~ 12.53) |
| | Empty nest family | 0.39(0.19 ~ 0.81) |
| Personal monthly income | ≤2000 yuan | 1.00(ref) |
| | 2001–3000 yuan | 0.35(0.18 ~ 0.69) |
| | ≥3001 yuan | 0.59(0.29 ~ 0.81) |
| Multimorbidity | | |
| Marital status | Married | 1.00(ref) |
| | Not in marriage | 2.32(1.51 ~ 3.59) |
| Support from family | Often | 1.00(ref) |
| | Occasionally or never | 1.61(1.03 ~ 2.51) |
| Family patterns | Core family | 1.00(ref) |
| | Stem family | 1.37(0.85 ~ 2.20) |
| | Joint family | 0.59(0.25 ~ 1.38) |
| | Empty nest family | 0.46(0.22 ~ 0.94) |
| Family monthly income | ≤2000 yuan | 1.00(ref) |
| | 2001–4000 yuan | 1.18(0.69 ~ 2.02) |
| | 4001–6000 yuan | 0.75(0.39 ~ 1.44) |
| | ≥6001 yuan | 2.10(1.23 ~ 3.58) |
| Chronic diseases with disability | | |
| Number of health-promoting behavior | ≤4 | 1.00(ref) |
| | >4 | 0.56(0.37 ~ 0.84) |
| Satisfaction with family support | Very | 1.00(ref) |
| | General or not | 2.24(1.46 ~ 3.43) |
| Age | 60–69 | 1.00(ref) |
| | 70–79 | 1.59(1.04 ~ 2.43) |
| | ≥80 | 3.73(2.13 ~ 6.52) |
| | | |
| Family patterns | Core family | 1.00(ref) |
| | Stem family | 1.12(0.71 ~ 1.78) |
| | Joint family | 2.81(1.15 ~ 6.84) |
| | Empty nest family | 0.57(0.31 ~ 1.06) |
| Economic source | From own | 1.00(ref) |
| | From others | 1.62(1.05 ~ 2.51) |
| Personal monthly income | ≤2000 yuan | 1.00(ref) |
| | 2001–3000 yuan | 0.49(0.26 ~ 0.92) |
| | ≥3001 yuan | 0.88(0.48 ~ 1.62) |

most common cause of disability, and arthritis diseases have made great contributions to the global disability burden related to musculoskeletal system (Brennan-Olsen et al., 2017). The prevalence of arthritis in urban and rural areas of Kunming city rose to the second place, which should be paid attention to. The prevalence and influencing factors of chronic disease among the elderly in urban and rural areas are different. The family structure in China is facing the change of miniaturization, which makes the traditional way of providing for the aged face a great impact (Menglu, 2022). Therefore, the government should consider the differences between urban and rural areas and take targeted measures. Based on different regions, age, demographic characteristics and family patterns, formulate personalized service programs for the elderly, so that the elderly should form good habits, strengthen the accurate community management and social support of the elderly (Feng et al., 2020) and decompose socio-economic health inequality. At present, the WHO Integrated Caring for Older People project has been piloted. It aims to help the elderly maintain, delay or reverse any decline in their physical and psychological abilities, and is designed on the basis of the community,

focusing on the needs of the elderly rather than caregivers, and hopes to achieve effective coordination and cooperation between health and social care services and care providers. With the efforts of people all over the world, the gap of health inequality will be gradually bridged.

CRedit authorship contribution statement

Wenqian Su: Writing – original draft, Writing – review & editing, Formal analysis. **Yan Lin:** Writing – original draft, Resources, Conceptualization. **Lingli Yang:** Validation, Project administration. **Wenyang Zhang:** Investigation. **Zhengjiao Dong:** Data curation. **Jingjing Zhang:** Supervision, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

The authors do not have permission to share data.

Acknowledgement

This work was supported by Yunnan Provincial Education Department (2016ZZX098, 2016ZZX091); The Planning Fund of Philosophy and Social Science of Yunnan Province (YB2019064).

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.pmedr.2024.102799>.

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