



Variety of Chronic Diseases of the Elderly in a Pension Institution in Guilin

Meiting Wu^a, Shangyuhui Huang^b, Jingwen Liang^c, Tao Jiang^{b*}

^a School of Nursing and Health Management, Shanghai University of Medicine and Health Sciences, Shanghai, China;

^b School of Humanities and Management, Guilin Medical University, Guilin, China;

^c Maternal and Child Health Hospital of Guangxi Zhuang Autonomous Region, Nanning, China

*Corresponding author: tj290uow@163.com

Abstract. Objective: According to the clinical characteristics and types of chronic diseases of an elder care institution in Guilin, the number of multiple chronic disease types, basic physiological indicators, and influencing factors were counted. This paper aims to explore the establishment of an efficient risk management system for elderly care institutions in Guilin, Guangxi Province, based on the clinical characteristics and types of chronic, existing literature and the experience of Aged care institutions. Methods: SPSS22.0 was applied for statistical data analysis. Descriptive analysis was used to analyze the characteristics of the general situation, and the Chi-square test was used to compare the prevalence of multiple chronic diseases in the elderly with sex, age, and other data. The laboratory indicators are measurement data, which determine whether it meets the normal distribution, and the mean \pm standard deviation is expressed in line with the normal distribution, and independent samples t-tests are used between different groups. The difference of $p < 0.05$ was used to determine whether it was statistically significant. Result: The number of chronic diseases and age, gender, marital status, and BMI were not statistically significant, hypertension, cerebrovascular disease and diabetes had a higher incidence in the elder care institution, and the most common two chronic diseases were combined with hypertension + cerebrovascular disease, followed by hypertension + diabetes, and the most common three chronic diseases were combined with hypertension + diabetes + cerebrovascular disease. LDL-C data were significantly different in the control group of older adults with more than 4 chronic diseases. Conclusion: Among the elderly with multiple chronic diseases hospitalized in this elder care institution, the proportion of elderly people suffering from 2 and 3 chronic diseases was the highest. Among the elderly with multiple chronic diseases hospitalized in this elder care institution, the mean value of LDL-C in the elderly control group with more than 4 chronic diseases was relatively low.

Keywords: Multiple chronic diseases, health management, Basic physiological indicators

1 Introduction

With the development of science and technology, people's living standards and medical technology are improving day by day, people's life expectancy is constantly increasing, and the proportion of the elderly population is increasing. Due to the change in ideology and concepts, people's fertility rate is constantly declining, and the problem of population aging is gradually emerging. At present, population aging has become a severe situation that the world needs to face, and countries around the world need to attach great importance to the social issue of population aging^[1]. According to the demographic statistics released by the National Bureau of Statistics, as of the end of 2020, there were about 264.02 million people aged 60 and over in China, accounting for 18.7% of the total population, of which 190.64 million were aged 65 and over, accounting for 13.5% of the total population^[1]. It is predicted that China's elderly population aged 60 and above will exceed 300 million in 2025, and by 2050, China's elderly population aged 60 and above will reach 480 million, entering a stage of rapid aging^[1]. How to actively respond to the aging of the population and promote the health of the elderly has become a key concern of China's social development.

1.1 Population ageing and chronic diseases

The deepening of China's aging problem has prompted people to pay attention to the health problems of the elderly. Since the physical and mental health of the elderly is at a relative disadvantage, the physical and mental health of the elderly is a concern to achieve healthy aging. Since the beginning of the 21st century, the global disease spectrum has undergone great changes, with the prevalence of infectious diseases declining and the prevalence of chronic noncommunicable diseases (referred to as "chronic diseases") continuing to increase^[1, 2]. Chronic diseases are diseases that last a long time and usually develop slowly, such as high blood pressure, diabetes, stroke, heart disease, and cancer. Due to the complex pathogenesis of chronic diseases and long-term diseases, patients often fall into a state of co-occurrence of multiple diseases, especially elderly patients are very prone to the phenomenon of "accumulation" of multiple chronic diseases, and the elderly patient population with multiple chronic diseases has become the focus of chronic disease management^[1, 3]. A number of studies have found that compared with a single chronic disease, elderly patients with multiple chronic diseases have limited physical function, increased the number of visits and hospitalizations, increased utilization rate of health services, higher disease burden, and increased risk of death, which seriously affects the health status and quality of life of the elderly, and brings many challenges to family care, medical resources, and health management^[2, 4-9]. The overall health of the elderly is not optimistic, and the "Healthy China Action (2019-2030)" pointed out that the total number of elderly people with chronic diseases in China has reached 180 million, of which the proportion of at least one chronic disease is as high as 75%^[1]. Due to the large number of multiple chronic diseases in the elderly, maintaining the health of elderly patients with multiple chronic diseases and helping the elderly to live out their old age is a problem faced by the health management of the elderly^[2, 10]. Therefore, to

solve the problem of the elderly with multiple chronic diseases, modern medical and health care needs to pay attention to, in order to protect people's health, promote the development of healthy aging, and ensure the implementation of health management of the elderly, it is necessary to pay timely attention to the prevalence of multiple chronic diseases of the elderly.

1.2 Multiple chronic diseases management of Aged care

Multiple chronic diseases have become the main concern of the elderly, foreign studies for multiple chronic diseases have been made, a study in the United States shows that the prevalence of chronic diseases in the elderly is about 80%, and more than half of the elderly with chronic diseases are elderly people with multiple chronic diseases [2, 5]. In the European survey, the prevalence of chronic diseases was 37.0 percent in people over 50 years of age and 52.8 percent in people aged 70 years and older [8, 11]. In a survey in Italy, the prevalence of multiple chronic diseases in people over 65 years of age was 39.9 percent [5]. Data from Scotland report a prevalence of multiple chronic diseases of 30.4 percent in people aged 45 to 64 years, 64.9 percent in people aged 65 to 84 years, and 81.5 percent in people over 85 years of age [9]. Van Oostrom SH et al. found that 13 percent had multiple chronic diseases, mostly those over 55 years of age [8]. Fortin M et al. referred to literature from 1990 to the end of 2002 and concluded that the prevalence of multiple chronic diseases in people aged 55 to 74 years old was 60%, much higher than asthma (6.5%), hypertension (29.6%), and diabetes (8.7%) [9]. Pmdos-Torres et al. finally identified three common disease patterns through 97 patterns consisting of two or more diseases and 63 patterns consisting of three or more diseases, namely cardiovascular and metabolic diseases, mental health-related problems, and musculoskeletal diseases [7]. In 1992, Elixhauser A et al. found that the prevalence of multiple chronic diseases in the hospital was about 60% by all hospitalized patients hospitalized in California, USA, and the most common comorbidities were: hypertension, fluid and electrolyte imbalances, chronic lung disease, diabetes, deficiency anemia and arrhythmias [11]. An exploratory study from Indonesia found that hypertension with heart disease, hypercholesterolemia, arthritis, and uric acid/gout were the most common disease combination patterns [6]. Garin et al. found three common patterns of multiple chronic diseases through research on multiple chronic diseases in many countries around the world, including cardiolarly-respiratory (angina, asthma, and chronic obstructive pulmonary disease), metabolic (diabetes, obesity, and hypertension), and mental-joint (arthritis and depression) patterns [5].

By exploring the prevalence mode of multiple chronic diseases in the elderly in elder care institutions, this study proposes to optimize the prevention and control strategies of multiple chronic diseases and improve the quality of life of elderly patients with chronic diseases, so as to understand the prevalence of multiple chronic diseases in the elderly and provide reference opinions for relevant institutions to formulate management strategies. Through the prevalence mode of chronic diseases in the elderly and some of its influencing factors, it is helpful for elder care institutions to screen and monitor the elderly in a timely manner in the combination

mode of common chronic diseases, combined with the risk of chronic diseases in the elderly, put forward multiple disease prevention and control strategies, formulate health management programs that are relatively in line with elder care institutions, prevent the occurrence of related chronic diseases, and improve the health status and quality of life of the elderly. Under the premise of mastering the existing chronic disease mode, it provides a basis for daily care and health management for elder care institutions, reduces the mortality rate of chronic diseases, and improves the satisfaction of the elderly with elder care institutions.

2 Methods

We followed a three-step process to extract and analyze data from these reports: (1) data sourcing and processing, (2) data extraction, (3) data labeling, and data analysis.

2.1 Data sourcing and processing

This paper selects the physical examination data of 103 elderly patients with two or more chronic diseases who were hospitalized in a elder care institution in Guilin from July 1, 2022 to March 1, 2023, aged ≥ 60 years old. The average age of the elderly patients enrolled was 78.03 ± 8.24 years, the oldest age was 93 years, and the youngest age was 62 years, including 52 males, with an average age of 75.59 ± 9.11 and 51 females, with an average age of 80.41 ± 6.52 .

2.2 Data extraction

Inclusion criteria: Inpatients in elder care institutions, aged ≥ 60 years old, suffering from 2 or more chronic diseases, and have undergone relevant physical examinations during hospitalization. Exclusion criteria: age < 60 years, no disease or only 1 chronic disease, incomplete physical examination data, no relevant physical examination. General information: gender, age, marital status, BMI. Laboratory indicators: hemoglobin (Hb), alanine aminotransferase (Alt), low-density lipoprotein (LDL-C), creatinine (Cre).

2.3 Data labeling and data analysis

A database was established by applying Microsoft Excel 2016 data entry. SPSS22.0 was applied for statistical data analysis. Descriptive analysis was used to analyze the characteristics of the general situation, and the Chi-square test was used to compare the prevalence of multiple chronic diseases in the elderly with gender, age and other data, expressed as percentages. The laboratory indicators are measurement data, which determine whether it meets the normal distribution, and the mean \pm standard deviation is expressed in line with the normal distribution, and independent samples t-test are used between different groups. The difference of $p < 0.05$ was used to determine whether it was statistically significant.

3 Result

3.1 Chronic diseases in the elder care institution

Among the 103 elderly with multiple chronic diseases in the elder care institution, 45 cases (43.6%) had multiple chronic diseases, 23 cases were men, 22 cases were women, 42 cases were 3 chronic diseases, 24 cases were men, 18 cases were women, 16 cases (15.8%) were more than 4 kinds of chronic diseases, 5 were men and 11 were women. The selected elderly were mainly over 60 years old, the oldest age was 93 years old, the youngest age was 60 years old, and they were divided into 3 groups according to age, 19 people aged 60 to 69, 34 people aged 70 to 79 years, and 50 people over 80 years old. Marital status was divided by the presence or absence of a spouse, with or without a spouse 41 and 62 without a spouse. Through the division of BMI, due to the small number of obese elderly people, BMI is divided into three groups, 18 are thin, 61 are normal, and 24 are overweight and obese. The test results showed no significant significance between sex, age, marital status and BMI.

In the summary of the elderly with multiple diseases in the group, the results showed that the prevalence of hypertension was the highest among the elderly in the elder care institution, reaching 77.67%, followed by cerebrovascular disease 72.82%, diabetes 38.83%, heart disease 18.45%, osteoarthropathy 17.48%. According to the data, there are 5 cases of prostatic hyperplasia or hypertrophy in men, and the incidence is 4.85%.

3.2 Multiple chronic diseases

There were only 45 cases of two chronic diseases, the prevalence of multiple chronic diseases reached 43.6%, only 42 cases of 3 diseases, the prevalence of multiple chronic diseases was 40.7%, 11 cases of 4 chronic diseases, the prevalence of multiple chronic diseases was 10.6%, and the prevalence of 5 kinds of chronic diseases reached 4.8%. Through sorting, it was found that the combination of 2 chronic diseases and 3 chronic diseases common in the elder care institution was the most common, among which the top five combinations of 2 chronic diseases were: hypertension + cerebrovascular disease 20.3%, hypertension + diabetes 3.8%, hypertension + osteoarthropathy 2.9%, osteoarthropathy + cerebrovascular disease %, cerebrovascular disease + diabetes 1.9% (Table 1). The top five combinations of the three chronic diseases were: hypertension + diabetes + cerebrovascular disease 9.7%, hypertension + osteoarthropathy + cerebrovascular disease 2.9%, hypertension + cerebrovascular disease + heart disease 2.9%, hypertension + cerebrovascular disease + memory-related diseases 2.9%, hypertension + dyslipidemia + memory-related diseases 2.9% (Table 2).

Table 1. The top five common 2 chronic disease combinations.

Combinations	Number of people	Percentage (%)
hypertension +cerebrovascular disease	21	20.3

hypertension + diabetes	4	3.8
hypertension + osteoarthropathy	3	2.9
Osteoarthropathy + cerebrovascular disease	3	2.9
cerebrovascular disease + diabetes	2	1.9

Table 2. The top five common 3 chronic disease combinations.

Combinations	Number of people	Percentage (%)
hypertension + diabetes + cerebrovascular disease	10	9.7
hypertension + osteoarthropathy + cerebrovascular disease	3	2.9
hypertension + cerebrovascular disease + heart disease	3	2.9
hypertension + cerebrovascular disease + memory-related disorders	3	2.9
hypertension + dyslipidemia + cerebrovascular disease	3	2.9

A total of 103 elderly people with multiple chronic diseases were grouped according to the number of chronic diseases, and the relationship between different basic physiological indicators and the number of multiple chronic diseases was observed. Table 3 showed that the values of LDL-C were statistically significant, the mean value of LDL-C in the elderly control group with more than 4 chronic diseases was relatively low (Table 3).

Table 3. The relationship between the basic physiological indexes of different chronic disease species.

basic physiological indexes	Chronic disease types =2	Chronic disease types =3	Chronic disease types ≥=4
Hb	113.22±19.91	117.69±11.89	112.87±11.91
Alt	27.24±46.30	19.64±13.41	22.56±21.47
LDL-C	2.18±1.03	2.28±0.81	1.62±0.75*#
Cre	106.61±54.35	104.76±38.86	84.19±41.04

*P<0.05 compared with 2 chronic diseases, # P<0.05 compared with 3 chronic diseases.

4 Discussion

In this study, we analyzed the grouping according to the number of multiple chronic diseases, and compared the relationship between different basic physiological indexes between groups. The results showed that the number of hemoglobin and chronic diseases was not statistically significant, and the significance was different from Qi Xinyang^[10], which may be caused by different sources of data and different criteria for study classification. This will require further research in the future. The value of LDL-C was statistically significant due to the increase in multiple chronic diseases and the number of chronic diseases. One of the risk factors for coronary heart disease,

cardiovascular and cerebrovascular diseases is low-density lipoprotein, which is a protein related to atherosclerosis. The LDL-C of elderly individuals is higher than that of young and middle-aged individuals. As the number of chronic diseases increases, the likelihood of coronary heart disease, cerebrovascular disease and other diseases increases. Lower LDL-C may be related to less daily exercise and poor diet in the elderly in this elder care institution. As far as observation is concerned, most of the elderly living in the elder care institution are mobility problems or wheelchairs, and the daily activities of the elder care institution are less, and the elderly cannot go out independently, and there is a risk of obesity.

Elderly care institutions need to strengthen the lifestyle management of the elderly, pay attention to the lifestyle and behavioral habits of the elderly during daily care, timely discover the bad lifestyles and habits of the elderly, use scientific methods to help them change bad lifestyles and habits, cultivate normal determined lifestyles, and reduce the occurrence of health risk factors. For the elderly with different multiple chronic disease combination models, some behavioral norms can be formulated for them, and personalized management can be carried out according to different groups of people, so as to develop good habits. In addition, it is necessary to focus on the physical exercise and nutrition of the elderly, at present, some elderly people do not like to carry out physical exercise because of mobility difficulties, exercise enthusiasm is not high, often stay indoors, serious lack of exercise, resulting in obesity and other problems, increase the risk factors of chronic diseases, pension institutions need to find suitable for the elderly exercise, organize physical exercise, encourage participation in physical exercise, mobilize the elderly exercise enthusiasm, to ensure that the elderly get appropriate physical exercise.

Current health policies advocate disease self-management for patients with chronic diseases, which can enable patients to actively participate in disease work and enhance disease management responsibility^[11], so it is necessary to improve self-management of the elderly. Due to the limited knowledge of the elderly, the limited understanding of their own diseases, unclear how to self-manage, and the limited personnel of the elder care institution, cannot carry out targeted management for each elderly person, which also causes the elderly with multiple chronic diseases cannot be effectively managed. Elder care institutions need to combine the current combination model of multiple chronic diseases, pay attention to the risk factors of diseases and the association between diseases, discover the connection between diseases, discover risk factors, diseases related to the elderly's own diseases and complications of their own diseases, formulate health management programs that conform to the elderly, provide programs for the elderly, and the elderly self-manage according to the program.

5 Limitations

The data of this study is limited to a pension institution in Guilin, and the data sample size is small, which has certain limitations and a certain range of bias, which needs to be further expanded. Due to research limitations, it is difficult to confirm chronic

diseases by conducting detailed medical examinations or examinations for each elderly person, and it is only possible to obtain accurate data by confirming the relevant information through the history and diagnosis at the time of physical examination. In addition, affected by the willingness of the elderly, the physical examination data at the same time cannot be obtained, some elderly people do not have physical examination within the time frame, and some elderly people do not carry out relevant physical examination. In this study, only blood biochemical tests were collected, and there were no relevant physical examinations, and the study data were still lacking. No further intervention observations were made and further follow-up records were required.

6 Conclusion

This study analyzed the physical examination data of elderly people with multiple chronic diseases in a elder care institution in Guilin and came to the following conclusions: Among the elderly with multiple chronic diseases hospitalized in the elder care institution, the proportion of elderly people suffering from 2 and 3 chronic diseases is the highest. The top three diseases with the highest chronic disease rate are hypertension, cerebrovascular disease and diabetes, which are the the highest chronic disease rate in the world. The first three most common combinations of multiple chronic diseases are hypertension + cerebrovascular disease, hypertension + diabetes + cerebrovascular disease, hypertension + diabetes. Among the hospitalized elderly patients with multiple chronic diseases, there were no significant significance in age, gender, marital status and BMI among different chronic disease groups. Among the elderly with multiple chronic diseases hospitalized in the elder care institution, the results of LDL-C were statistically significant between the different chronic disease control groups, and the mean value of LDL-C in the elderly control group with more than 4 chronic diseases was relatively low.

Acknowledgment

Fund Project: School of Nursing and Health Management SUMHS (hlyjkg1-2019-03); Guangxi Youth Science and Technology Innovation Talents Training Project(2021AC19421); Guangxi Bagui Scholars; Project for Enhancing Young and Middle-aged Teacher's Research Basis Ability in Colleges of Guangxi: Research on Equity and Prediction of Health Human Resources Allocation in Guangxi (NO. 2023KY0495). Tao Jiang is the corresponding author. Shangyuhui Huang and Meiting Wu are co first authors.

References

1. X. Tan, Y. Zhang, and H. Shao, "Healthy China 2030, a breakthrough for improving health," (in eng), *Glob Health Promot*, vol. 26, no. 4, pp. 96-99, Dec 2019.

2. C. Bähler, C. A. Huber, B. Brüngger, and O. Reich, "Multimorbidity, health care utilization and costs in an elderly community-dwelling population: a claims data based observational study," (in eng), *BMC Health Serv Res*, vol. 15, p. 23, Jan 22 2015.
3. R. Palladino, J. Tayu Lee, M. Ashworth, M. Triassi, and C. Millett, "Associations between multimorbidity, healthcare utilisation and health status: evidence from 16 European countries," (in eng), *Age Ageing*, vol. 45, no. 3, pp. 431-5, May 2016.
4. D. T. Zemedikun, L. J. Gray, K. Khunti, M. J. Davies, and N. N. Dhalwani, "Patterns of Multimorbidity in Middle-Aged and Older Adults: An Analysis of the UK Biobank Data," (in eng), *Mayo Clin Proc*, vol. 93, no. 7, pp. 857-866, Jul 2018.
5. N. Garin et al., "Global Multimorbidity Patterns: A Cross-Sectional, Population-Based, Multi-Country Study," (in eng), *J Gerontol A Biol Sci Med Sci*, vol. 71, no. 2, pp. 205-14, Feb 2016.
6. M. A. Hussain, R. R. Huxley, and A. Al Mamun, "Multimorbidity prevalence and pattern in Indonesian adults: an exploratory study using national survey data," (in eng), *BMJ Open*, vol. 5, no. 12, p. e009810, Dec 9 2015.
7. A. Prados-Torres, A. Calderón-Larrañaga, J. Hanco-Saavedra, B. Poblador-Plou, and M. van den Akker, "Multimorbidity patterns: a systematic review," (in eng), *J Clin Epidemiol*, vol. 67, no. 3, pp. 254-66, Mar 2014.
8. S. H. van Oostrom et al., "Multimorbidity and comorbidity in the Dutch population - data from general practices," (in eng), *BMC Public Health*, vol. 12, p. 715, Aug 30 2012.
9. M. Fortin, L. Lapointe, C. Hudon, and A. Vanasse, "Multimorbidity is common to family practice: is it commonly researched?," (in eng), *Can Fam Physician*, vol. 51, no. 2, pp. 244-5, Feb 2005.
10. K. Barnett, S. W. Mercer, M. Norbury, G. Watt, S. Wyke, and B. Guthrie, "Epidemiology of multimorbidity and implications for health care, research, and medical education: a cross-sectional study," (in eng), *Lancet*, vol. 380, no. 9836, pp. 37-43, Jul 7 2012.
11. A. Elixhauser, C. Steiner, D. R. Harris, and R. M. Coffey, "Comorbidity measures for use with administrative data," (in eng), *Med Care*, vol. 36, no. 1, pp. 8-27, Jan 1998.

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

