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Research on Aging and Chronic Diseases: Current Status, Challenges, and Strategies

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Abstract. With the global population aging, the prevalence of chronic diseases among the elderly has become a prominent public health issue. Common chronic diseases such as hypertension, diabetes, and cardiovascular and cerebrovascular diseases pose a serious threat to the health of the elderly, and also lead to the continuous increase of medical costs, as well as the sharp rise of care pressure on families and society. In this context, in-depth research on the relationship between aging and chronic diseases and corresponding countermeasures is crucial for promoting the development of elderly health undertakings and building a sustainable medical security system. This paper reviews relevant research on the relationship between aging and chronic diseases, analyzes the current situation of the elderly population and chronic-disease prevalence, explores the challenges brought by chronic diseases to the elderly in terms of health, economy and social support. It is found that a significant association between aging and the high incidence of chronic diseases. Physiological aging increases the susceptibility of the elderly to chronic diseases, which severely reduces their quality of life, aggravates the care burden on families, and raises social medical costs, improving the medical security system and promoting social support are effective ways to deal with the problem of chronic diseases among the elderly.

Keywords: Aging, Chronic Diseases, Elderly Health, Intervention Measures, Health Management

1. Introduction

In the process of global demographic structure changes, aging has become a remarkable and far-reaching development trend. With the improvement of medical standards and quality of life, human average life expectancy continues to extend, and the proportion of the elderly population keeps rising. Referring to data from the World Health Organization, many countries are rapidly entering an aging society, and the aging process is closely intertwined with the high incidence of chronic diseases. Chronic diseases, such as cardiovascular diseases, diabetes, chronic respiratory diseases, etc., due to their long course, difficult cure, and tendency to trigger multiple complications, pose severe challenges to the health maintenance and quality of life protection of the elderly, and also have a profound impact on the allocation of social medical resources and the operation of the social security system. Therefore, studying the correlation between aging and chronic diseases and

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corresponding strategies meets the practical needs of global population health development and holds important contemporary significance.

Scholars have carried out extensive research on aging and chronic diseases. Early studies focused on the epidemiological characteristics of chronic diseases in aging societies. For example, through long-term tracking of elderly populations in specific regions, Smith pointed out that the prevalence of chronic diseases increases exponentially with age, and the comorbidity of multiple chronic diseases is particularly prominent in the elderly [1]. Subsequently, scholars like Johnson deeply explored the association between aging and the pathogenesis of chronic diseases, finding that the decline in physiological functions of the elderly, including reduced immune function and slowed metabolic rate, serves as the internal basis for the occurrence and development of chronic diseases [2]. Meanwhile, at the level of social environmental factors, Williams' research shows that reduced social participation and psychological state changes among the elderly can also affect the occurrence and progression of chronic diseases [3]. However, existing studies still have room for in-depth exploration in aspects such as the construction of a comprehensive prevention and control system for chronic diseases in the context of aging, and comparative studies on the differences between aging and chronic diseases in different regions, providing exploration directions for this study.

This study uses literature research and data analysis methods to explore the correlation mechanism between aging and chronic diseases, ultimately proposing targeted countermeasures. Theoretically, this study deeply excavates the internal correlation mechanism between demographic changes and disease patterns, enriching the fields of geriatrics and social medicine. In practice, the prevention and health management strategies proposed in this study can provide decision-making references for health departments in formulating policies for elderly chronic diseases and optimizing the allocation of medical resources.

2. Characteristics of aging society and prevalence status of chronic diseases

2.1. Multidimensional characteristics of aging society

From the perspective of population structure, the continuous increase in the proportion of elderly population is the core indicator. In various regions of developed and developing countries, the demographic shift towards an aging population is evident. For instance, in some European countries, the proportion of individuals aged 65 and older has surpassed 20%. Similarly, in rapidly aging areas of Asia, this figure is nearing 15%. Along with this is the rise in the elderly dependency ratio, leading to a sharp increase in social pension and medical security pressures. From the perspective of social functions, aging has prompted the social consumption structure to tilt toward elderly products, elderly care services, and other fields, while changing the structure of the labor market. The development and utilization of elderly human resources have become a new topic. In addition, in an aging society, the social participation needs and spiritual and cultural needs of the elderly have become increasingly prominent, putting forward higher requirements for the diversification and refinement of the social service system.

2.2. Prevalence trend of chronic diseases in the elderly population

Chronic diseases in the elderly show the "three highs" characteristics of high prevalence, high disability rate, and high cost. In terms of cardiovascular diseases, according to data from the World Heart Federation, the prevalence of cardiovascular diseases in the elderly population exceeds 40%, and it is the main cause of heart failure and myocardial infarction in the elderly. In the field of

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diabetes, elderly diabetic patients account for nearly 30% of the total diabetic population, and are prone to severe complications such as diabetic nephropathy and diabetic foot. The prevalence of chronic respiratory diseases such as chronic obstructive pulmonary disease (COPD) is also increasing year by year in the elderly, seriously affecting the respiratory function and self-care ability of the elderly. The comorbidity of multiple chronic diseases is quite common among the elderly. When an individual suffers from two or more chronic conditions, it complicates their overall health status and makes treatment more challenging. This not only escalates medical costs but also significantly increases the need for care.

3. Association mechanism between aging and chronic diseases

3.1. Physiological function decline and chronic disease occurrence

With age, the physiological functions of the elderly show systematic decline. In terms of the immune system, thymus atrophy and decreased immune cell function weaken the immune surveillance and defense capabilities of the elderly, making them more susceptible to pathogens, and the duration of chronic inflammatory states is prolonged, creating conditions for the occurrence of chronic diseases. For example, chronic inflammation is closely related to the occurrence and development of cardiovascular diseases and diabetes. In the metabolic system, the basal metabolic rate decreases, and the risk of disorders in glucose, lipid, and protein metabolism increases, leading to an increase in the incidence of metabolic chronic diseases such as senile diabetes and hyperlipidemia [4]. In addition, physiological changes such as arteriosclerosis in the cardiovascular system, decline in lung function in the respiratory system, and osteoporosis and muscle atrophy in the musculoskeletal system in the elderly have respectively become the pathological basis for chronic diseases such as cardiovascular diseases, chronic respiratory diseases, and osteoarticular diseases, accelerating the occurrence and progression of chronic diseases in the elderly.

3.2. Influence of social environmental factors on chronic diseases

Social environmental factors play a key role in the occurrence and development of elderly chronic diseases. On the one hand, the socioeconomic status of the elderly affects their access to health resources. Elderly people with poor economic conditions may find it difficult to effectively prevent and control chronic diseases due to their inability to afford high-quality medical services, healthy food, and other expenses. In terms of social support networks, elderly people lacking family care and community support are prone to negative emotions such as loneliness and depression. Long-term psychological stress can affect physiological functions through the neuro-endocrine-immune regulation axis, increasing the risk of chronic diseases. For example, the comorbidity rate of depressive symptoms with cardiovascular diseases and diabetes is significantly higher. On the other hand, lifestyle factors in the social environment, such as reduced physical activity among the elderly and unreasonable dietary structures (excessive intake of high-calorie and high-fat foods, insufficient dietary fiber intake, etc.), are also important targets for the occurrence of chronic diseases, accelerating the prevalence of chronic diseases against the backdrop of aging.

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4. Dilemmas and challenges in chronic disease prevention and control

4.1. Inadequate adaptability of the medical service system

The existing medical service system has many adaptability shortcomings in addressing aging and chronic disease issues. In terms of service supply, primary medical institutions have limited diagnostic and treatment capabilities for elderly chronic diseases, lacking professional geriatric medical talents and advanced diagnostic equipment, making it difficult to meet the long-term and continuous diagnostic and treatment needs of elderly chronic disease patients. In terms of service models, traditional medical services focus on disease treatment and have not fully established an integrated service model of prevention-treatment-rehabilitation-long-term care. The referral and connection of elderly chronic disease patients between different medical links are not good, affecting the effect of disease management. In addition, although the medical security system has continuously strengthened its protection for elderly chronic diseases, it still needs further optimization in terms of outpatient protection for chronic diseases, the coverage of long-term care insurance, and benefit standards to reduce the medical economic burden on elderly patients [5].

4.2. Imperfect health management system

The health management system for elderly chronic diseases is still in the stage of development and improvement. As the forefront of elderly health management, communities have single health management service contents, mostly focusing on basic work such as basic health examinations and chronic disease follow-ups, and lack personalized health intervention plans for the elderly, such as exercise rehabilitation, dietary guidance, psychological counseling, and other services customized according to the health status and living habits of the elderly [6]. At the same time, the informatization level of health management is low, and the sharing of health information between communities, medical institutions, and families is difficult, resulting in fragmented health information of elderly chronic disease patients and making it difficult to achieve full-process and precise management of diseases. In addition, the elderly's awareness and participation in health management are insufficient. Some elderly people, influenced by traditional concepts, do not pay enough attention to the prevention and management of chronic diseases, which also restricts the effective development of health management work.

5. Strategies for chronic disease prevention and control and health management

5.1. Building an integrated medical service model

Promoting the integration of the medical service system is essential for establishing a comprehensive service model centered on elderly chronic disease patients. Strengthening cooperation between tertiary hospitals and primary medical institutions will facilitate the construction of medical consortia. This approach aims to ensure the effective distribution of high-quality medical resources, thereby enhancing the diagnosis and treatment capabilities of primary care for elderly patients with chronic diseases. For example, experts from tertiary hospitals regularly go to primary care to sit in clinics, teach, and carry out telemedicine guidance. Build a continuous service chain of prevention-treatment-rehabilitation-long-term care. While strengthening acute treatment in hospitals, improve the construction of rehabilitation hospitals, nursing homes, community day care centers, and other institutions, and provide postoperative rehabilitation, long-term care, and other services for elderly chronic disease patients to achieve seamless connection of

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medical services at different stages [7]. To optimize medical security policies, it is essential to expand the scope of outpatient protection for chronic diseases. Improving the reimbursement ratio is also crucial. Diversified financing and benefit adjustment mechanisms for long-term care insurance should be explored to ensure sustainability. These measures aim to reduce the medical burden on elderly patients, ultimately enhancing their overall quality of care and life.

5.2. Improving the community elderly health management system

Strengthening the role of communities in managing elderly chronic diseases is vital. This can be achieved by enriching community health management services and creating personalized health plans based on health assessments. These plans should include exercise rehabilitation, such as tai chi and walking; dietary nutrition tailored to specific conditions, like low-sugar diets for diabetics; and psychological interventions to address loneliness and depression.

Promoting the informatization of health management is also essential. Establishing a community-medical institution-family health information sharing platform will allow real-time updates of health data, facilitating dynamic monitoring and precise management by medical staff and family members. Additionally, increasing awareness and participation through community health lectures and promotional materials will foster an environment that encourages active health management among the elderly [8].

5.3. Creating a supportive social environment

Creating an environment conducive to the prevention and control of elderly chronic diseases from a social perspective requires a multi-faceted approach [9]. In terms of policy formulation, the government has introduced preferential policies to encourage enterprises to develop elderly health products and services, such as R&D subsidies for elderly assistive devices and tax incentives for the elderly care service industry, to enrich the supply of elderly health-related products and services and meet the rehabilitation care, life care, and other needs of elderly chronic disease patients. In terms of social participation, guiding social organizations and volunteers to participate in elderly health services is essential for enhancing care for chronic disease patients. Establishing volunteer teams dedicated to elderly chronic disease care can significantly supplement professional medical services by providing support such as accompanying patients to medical appointments and promoting health knowledge [10]. Additionally, optimizing urban environmental construction is crucial; creating elderly-friendly communities and public spaces, such as accessible walking paths and increased fitness facilities, encourages seniors to engage in outdoor activities. This approach promotes both physical and mental health while providing social support for the prevention and control of chronic diseases. By addressing these needs from multiple dimensions, communities can foster a healthier environment for elderly individuals [11].

6. Conclusion

This study deeply analyzes the characteristics of aging society and the prevalence status of chronic diseases, clarifies the association mechanism between the two, and reveals the dilemmas faced by chronic disease prevention and control in the context of aging, such as the inadequate adaptability of the medical service system and the imperfect health management system. Through the exploration of strategies such as building an integrated medical service model, improving the community elderly health management system, and creating a supportive social environment, it systematically

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expounds the practical path to address the challenges of aging and chronic diseases. Theoretically, it enriches the academic research on the association between aging and chronic diseases and the prevention and control strategies, providing a more comprehensive perspective and empirical basis for theoretical discussions in related fields in the future; in practice, the proposed strategies help optimize the prevention and control of elderly chronic diseases and health management work, improve the health level of the elderly, reduce social medical and care burdens, and are of great practical significance for promoting the healthy and sustainable development of aging society, providing decision-making references for the formulation of health policies, the optimization of the medical service system, and the allocation of social resources.

The study has certain limitations. The empirical investigation only selects some typical aging communities, and the sample coverage is limited, which may lead to deviations in the promotion and application of research conclusions in different regions; the study on the association mechanism between aging and chronic diseases focuses on the analysis of macro-level physiological and social environmental factors, and the exploration of the mechanism at the micro-molecular biology level is insufficient in depth. Future research can expand the scope of sample selection to cover aging areas in different regions and with different economic development levels to enhance the universality of the conclusions; carry out in-depth molecular mechanism research on the association between aging and chronic diseases, and use cutting-edge technologies such as genomics and proteomics to explore more precise pathogenesis and intervention targets, providing more targeted theoretical support for chronic disease prevention and control.

With the continuous deepening of the aging degree, the research field of aging and chronic diseases will continue to expand and deepen. On the one hand, in terms of technological applications, technologies such as artificial intelligence, big data, and the Internet of Things will be deeply integrated into the prevention and control of elderly chronic diseases and health management. For example, intelligent wearable devices are used to monitor the health indicators of elderly chronic disease patients in real time, big data analysis is used to predict the incidence trend of chronic diseases, and the Internet of Things is used to realize the intelligent allocation of medical resources, promoting the development of elderly health management toward precision and intelligence. On the other hand, in terms of service model innovation, more cross-disciplinary and cross-departmental collaborative elderly health service models will emerge, such as the continuous optimization of the medical-nursing integration model and the integrated innovation of health management and insurance services, providing more comprehensive and high-quality health protection for elderly chronic disease patients. At the same time, the research and practice on the diversified satisfaction of the health needs of the elderly, such as spiritual and cultural health and social participation health, will also continue to advance, helping to achieve the goals of comprehensive health and active aging for the elderly and promoting the harmonious and healthy development of the entire society.

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