Discussion on the Sports and Exercise Rehabilitation Majors in New Zealand Universities and their Relationships with Aging Society

Man Li[1], Xu Dai[2*]

[1]*The First Affiliated Hospital of Jinzhou Medical University, Jinzhou, 121001, China*
[2]*Jinzhou Medical University, Jinzhou, 121001, China*
[*]*Corresponding author: daixu@jzmu.edu.cn*

Abstract: *With the intensification of global population aging, the health issues of the elderly have gradually become a focal point of societal concern. Sports and exercise rehabilitation, due to their significant roles in enhancing the physical functions, improving the mental health, and elevating the quality of life of the elderly, have become important means to address the health demands of an aging society. As core institutions for knowledge innovation and talent cultivation, universities in New Zealand demonstrate unique advantages in their sports and exercise rehabilitation majors, particularly in curriculum design, research directions, and talent output. Starting from the theoretical foundation and the needs of the elderly population, this paper analyzes the current status and characteristics of sports and exercise rehabilitation majors in New Zealand universities, and explores their innovative practices and future development paths in an aging society. The research indicates that the sports and exercise rehabilitation major plays an irreplaceable role in addressing the challenges of an aging society; however, its development still relies on further promotion through curriculum reform, technological innovation, and multi-party collaboration. This paper provides theoretical references and practical suggestions for promoting the upgrading and adaptive development of related majors in New Zealand universities.*

Keywords: *Aging society; Sports and exercise rehabilitation; New Zealand universities; Innovative practices; Curriculum reform*

Introduction

The global aging process is accelerating, and New Zealand is no exception to this trend. According to statistics, the proportion of the population aged 65 and over in New Zealand continues to rise, which places higher demands on health resources and services. The elderly population generally faces multiple challenges such as chronic diseases, a high risk of falls, and mental health issues, and there is an urgent need for effective health intervention strategies. Against this backdrop, sports and exercise rehabilitation have garnered increasing attention by virtue of their unique advantages in improving physical function, preventing diseases, and enhancing the quality of life. The sports and exercise rehabilitation major in New Zealand universities, serving as an important cultivation channel for specialized health services, undertakes the critical responsibility of delivering high-quality talents to society and promoting health-related research. A systematic analysis of how this major functions in the context of an aging society will help clarify its development direction and positioning, while also providing practical references for the government, educational institutions, and various sectors of society.

1. The Role of Sports and Exercise Rehabilitation in an Aging Society

1.1 Theoretical Foundations and Practical Advantages

Sports and exercise rehabilitation play a significant role in an aging society. Their theoretical foundations and practical advantages determine their core position in the health management of the elderly. From a theoretical perspective, sports and exercise rehabilitation integrate multidisciplinary knowledge from exercise physiology, rehabilitation medicine, psychology, and sociology. Exercise physiology reveals the positive effects of moderate exercise on the cardiovascular, skeletal muscle, and

metabolic systems. Aerobic exercise can improve cardiorespiratory function, increase bone density, and slow down muscle loss, thereby delaying physiological aging. Meanwhile, rehabilitation medicine emphasizes the important role of exercise intervention in functional recovery, particularly demonstrating significant effectiveness in improving joint flexibility, enhancing muscle strength, and preventing falls and promoting postoperative rehabilitation. Furthermore, psychological research indicates that exercise can effectively alleviate depression and anxiety in the elderly, enhance their self-efficacy and social participation, and consequently have a positive impact on mental health.[1]

On a practical level, the multi-level and multi-target intervention effects of sports and exercise rehabilitation grant them significant advantages in promoting comprehensive health among the elderly. Firstly, exercise intervention can prevent and manage chronic diseases, such as reducing the risk of hypertension, diabetes, and cardiovascular disease, while simultaneously improving the quality of life for those with chronic conditions. Secondly, targeted rehabilitation training, including strength enhancement, balance exercises, and flexibility training, helps maintain the independent living capacity of the elderly and reduces the risk of falls. Furthermore, exercise rehabilitation programs provide social support for the elderly through group activities, alleviating feelings of loneliness and enhancing psychological well-being and social connections. Compared with traditional medical care, sports and exercise rehabilitation also offer economic efficiency, not only reducing the burden on the healthcare system but also providing sustainable health management solutions for the elderly. Therefore, sports and exercise rehabilitation have demonstrated excellent health promotion potential in an aging society, establishing themselves as vital tools for addressing the challenges of an aging population.

1.2 Analysis of the Demand for Sports and Rehabilitation Services among the Elderly Population

In an aging society, the demand of the elderly population for sports and rehabilitation services exhibits diversified and individualized characteristics. This demand is primarily driven by their physiological, psychological, and social needs. As people age, the complexity and variability of health conditions among the elderly become increasingly apparent, consequently leading to higher requirements for more specialized and customized services.

From the perspective of physiological needs, the elderly population commonly faces issues such as decreased bone density, muscle loss, and joint degeneration. These changes can lead to limited mobility, increased pain, and a higher risk of falls. Exercise rehabilitation services targeting these problems, such as strength training and balance training, can effectively improve physical function. Furthermore, chronic diseases are relatively common among the elderly, including cardiovascular diseases, diabetes, and arthritis. Personalized exercise programs have demonstrated significant effectiveness in symptom management and the enhancement of quality of life.[2]

In terms of psychological needs, as the elderly retire and experience lifestyle changes, they often lack a clear social role and may simultaneously develop feelings of loneliness and anxiety due to health problems or the loss of close relationships. Physical activity and exercise rehabilitation can enhance the mental health of the elderly by improving their physical condition and promoting dopamine secretion. Furthermore, group exercise programs provide opportunities for emotional support, helping the elderly to rebuild social connections and alleviate feelings of isolation.

The elderly's need for a sense of social belonging and social participation has also driven the importance of sports and rehabilitation services. Participating in community sports programs can not only help the elderly alleviate loneliness but also expand their social networks. With the enhancement of health awareness, an increasing number of elderly people regard exercise as part of a healthy lifestyle and proactively seek rehabilitation services to extend their healthy lifespan and maintain vitality in life.

Depending on their health status, the needs of the elderly vary in characteristics. Elderly people in good health typically tend to delay aging and enhance their physical fitness through aerobic exercise and low-intensity strength training. Those in a sub-healthy state require more personalized services, such as physical fitness assessments and balance training. In contrast, disabled elderly individuals rely on comprehensive rehabilitation services to restore basic living abilities and improve their quality of life.

Although the demand for sports and rehabilitation services among the elderly is significant, the actual access rate to these services is constrained by multiple factors, including insufficient resources, imperfect community support systems, and economic burdens. In the future, collaboration between professional education in universities and social service organizations will be crucial. By cultivating

more professional talents and optimizing service provision, it will be possible to better meet the growing rehabilitation needs of the elderly population.

2. The Current Status and Characteristics of Sports and Exercise Rehabilitation Majors in New Zealand Universities

2.1 Program Structure and Educational Models

The sports and exercise rehabilitation majors in New Zealand universities are renowned for their diverse curriculum design and advanced educational models, which fully embody the characteristic of combining theory with practice. The program curriculum typically covers a wide range of disciplinary fields, including exercise physiology, rehabilitation medicine, anatomy, sports psychology, and public health policies. This interdisciplinary structure not only provides students with a solid scientific foundation but also enables them to gain a deep understanding of the multi-dimensional connotations of exercise rehabilitation.

In terms of educational models, New Zealand universities emphasize practice-oriented teaching methods, extensively adopting teaching strategies based on case analysis, laboratory practice, and community service. For example, students are required not only to complete theoretical classroom learning but also to participate in real-world exercise rehabilitation projects, such as community-based rehabilitation programs for the elderly or the design of rehabilitation training for patients with specific diseases. This model encourages students to integrate theoretical knowledge with practical application and cultivates their problem-solving abilities. Furthermore, to accommodate the developmental needs of diverse students, many universities offer flexible learning pathways, such as blended online and offline teaching and modular curriculum design, thereby attracting more international students and career changers.[3]

2.2 Research Directions and Social Impact

The research activities of New Zealand universities in the field of sports and exercise rehabilitation focus on innovation and social needs orientation, which has enhanced the international academic influence of this discipline. The research directions encompass elderly health interventions, exercise therapy for chronic diseases, neurological rehabilitation technologies, and the relationship between exercise and mental health. Among these, research on health interventions for the elderly has become a significant area, particularly concerning the design of exercise programs targeting sarcopenia, osteoporosis, and fall prevention.

These research outcomes have not only enriched the theoretical framework of exercise rehabilitation but have also provided a scientific basis for practical applications. For instance, low-impact exercise training developed specifically for the elderly has been widely implemented in community rehabilitation programs, effectively reducing the incidence of falls among the elderly population. Simultaneously, many universities collaborate with government agencies and non-profit organizations to jointly promote the formulation and implementation of health policies. Through these collaborations, exercise rehabilitation research in New Zealand has achieved a successful translation of outcomes from the laboratory to the community, which has not only improved the health level of the elderly but has also significantly alleviated the burden on the healthcare system, demonstrating the social value of scientific research in this field.

2.3 The Alignment between Talent Cultivation and Industry Demands

The cultivation of talents in the field of sports and exercise rehabilitation at New Zealand universities is closely centered around industry demands, forming a highly adaptive educational system. Firstly, the curriculum design fully considers the specific needs of an aging society for rehabilitation professionals. For example, institutions focus on cultivating students' professional competencies in elderly health management, emphasizing the comprehensive enhancement of skills in exercise intervention design, personalized rehabilitation training, and patient psychological support. This educational objective directly corresponds to the demands of the elderly health service market.[4]

Secondly, universities enhance students' practical experience through internship programs and industry collaboration. For example, many institutions have established stable partnerships with rehabilitation medical facilities, nursing homes, and sports organizations. Students can directly

participate in work within these platforms, accumulating practical experience and gaining insights into industry operations. Additionally, some universities offer industry certification courses, helping students obtain both academic qualifications and professional certifications upon graduation, thereby improving their employment competitiveness.

Finally, the feedback mechanism between universities and the industry is also continuously being improved. By regularly communicating with industry leaders and employers, universities can promptly update curriculum content and teaching strategies to adapt to new trends in industry development. This dynamic adjustment enables the talents cultivated by New Zealand universities to quickly integrate into their roles and contribute to meeting the health service demands of an aging society, further strengthening the alignment between university education and industry needs.

3. Innovative Practices of the Sports and Exercise Rehabilitation Major in Responding to an Aging Society

3.1 Curriculum Reform Oriented towards the Needs of an Aging Society

To adapt to the increasingly diverse health demands of an aging society, the sports and exercise rehabilitation majors in New Zealand universities are undergoing demand-oriented curriculum reforms. These reforms focus on the actual needs within the elderly health service sector as their core principle. By updating curriculum content and innovating teaching methods, they provide students with a more comprehensive and practice-oriented education.[5]

Firstly, the updating of curriculum content focuses on the systematic resolution of common health problems among the elderly. For instance, bone degeneration, muscle loss (i.e., sarcopenia), cardiovascular diseases, and mental health issues are all highly prevalent health challenges within the elderly population. In response, universities are introducing more targeted course modules. By studying these modules, students can acquire the ability to design and implement scientific exercise programs suitable for the elderly. These programs not only focus on the recovery and maintenance of physical function but also emphasize the enhancement of the mental health and overall quality of life of the elderly.

Furthermore, the curriculum reform also emphasizes innovation in teaching methods to enhance students' practical skills and interdisciplinary thinking abilities. For example, many universities have introduced scenario simulation technology into their courses, enabling students to observe and address various potential issues encountered during the rehabilitation process of the elderly within a virtual environment. This technology not only visually presents the effects of different rehabilitation plans but also helps students foster a deeper understanding of multi-layered solutions to complex health problems.

At the same time, to adapt to the growing demand for specialized sports and rehabilitation services in an aging society, universities are strengthening their collaboration with the medical and rehabilitation industries to promote the alignment of curriculum content with industry needs. For example, some universities, through partnerships with hospitals, nursing homes, and community rehabilitation centers, regularly invite industry experts to participate in curriculum design and provide students with opportunities to learn in real-world settings.

3.2 The Application of Technological Innovation in Geriatric Rehabilitation

Technological innovation has opened up entirely new possibilities for the rehabilitation of the elderly and has become a significant research and practice direction for sports and exercise rehabilitation majors in New Zealand universities.

Firstly, the development and application of wearable devices have become a major breakthrough in rehabilitation services. These devices can monitor the health data of the elderly in real time, including step count, heart rate, blood oxygen levels, and sleep quality, providing reliable data support for formulating more scientific and dynamically adjustable exercise plans. By combining these devices with remote monitoring systems, the elderly can receive rehabilitation training at home while rehabilitation professionals monitor their physical status at any time, thereby significantly enhancing the efficiency and precision of rehabilitation services.

Artificial Intelligence (AI) technology has also played a key role in geriatric rehabilitation. AI

systems can provide scientific recommendations for the formulation and adjustment of rehabilitation plans by analyzing patients' health data and medical histories. For instance, during strength or balance training, AI can dynamically optimize training intensity and frequency based on real-time feedback from the elderly, thereby avoiding adverse effects caused by overtraining or undertraining.[6]

Secondly, Virtual Reality (VR) and Augmented Reality (AR) technologies have brought new experiences and possibilities to geriatric rehabilitation. VR technology can simulate realistic exercise environments, for example, through "virtual travel," which increases the enjoyment and engagement of the elderly during the rehabilitation process while simultaneously achieving goals such as enhancing balance or improving cardiorespiratory function. AR technology can provide real-time feedback during actual training, such as helping the elderly complete specific rehabilitation movements with virtual guidance, ensuring the correctness and safety of the exercises.

Finally, the rise of telerehabilitation platforms has provided technical support for the popularization of geriatric rehabilitation services. These platforms integrate wearable devices, AI technology, and online guidance functions, enabling the elderly to access professional rehabilitation services even in geographically remote locations or situations with inconvenient transportation.

3.3 Multi-Party Cooperation Promoting Professional Development

In the process of promoting the development of the sports and exercise rehabilitation major, New Zealand universities place a high priority on multi-party cooperation, constructing a collaborative network that encompasses academia, government, industry, and non-profit organizations.

The collaboration between universities and medical institutions is a core component of this multi-party cooperation. By establishing internship and research platforms, students are able to deeply participate in practical rehabilitation projects, such as community-based health promotion programs for the elderly or post-operative rehabilitation care in hospitals. These practical experiences provide students with skill accumulation that cannot be fully replicated by classroom learning, enabling them to face future professional challenges with greater confidence.

Collaboration with government departments further enhances the social value of university research. New Zealand universities promote the formulation of national health policies by providing policy recommendations based on empirical research. For example, certain exercise intervention and health management programs for the elderly developed by some universities have been incorporated into New Zealand's public health plans, offering a reliable foundation for the government to address health issues in an aging society.

In cooperation with enterprises, universities promote the rapid development of rehabilitation technology by participating in technological research and development and the industrialization process. For example, wearable devices and telerehabilitation platforms developed jointly with technology companies not only expand the boundaries of technological applications in the industry but also enable the widespread application of universities' scientific research achievements in the market.

Furthermore, non-profit organizations also play a key role in the collaborative network, particularly in community health promotion and the implementation of public welfare projects. Through cooperation with these organizations, universities can better align with the actual needs of the elderly population, designing and promoting more targeted rehabilitation programs. This not only increases the penetration rate of rehabilitation services but also further highlights the social service function of universities.

3.4 The Need for Policy and Financial Support

Although universities have made significant progress in the field of sports and exercise rehabilitation majors, further development remains inseparable from policy and financial support. Governments need to formulate and implement effective policies in the context of an aging society to promote the optimized allocation of educational resources and the sustainability of professional development. Specifically, policies should focus on increasing enrollment quotas for sports and exercise rehabilitation majors to meet the growing demand for talent; encouraging interdisciplinary research projects that integrate fields such as sports medicine, psychology, and social work to promote more comprehensive health management solutions; and establishing dedicated scholarships to attract and cultivate more outstanding professionals, ensuring the field can continuously attract innovative thinking and professional skills.

At the same time, adequate financial support is crucial for universities to advance technological innovation and practical projects. Investment in research funding can support the development of new rehabilitation technologies, such as artificial intelligence-based assistive rehabilitation systems and personalized exercise plan design tools. The application of these technologies can significantly enhance rehabilitation efficiency and the level of personalized services.

Furthermore, policy formulation should also encourage collaboration between universities and private enterprises to promote the translation of achievements and technological application, allowing educational and research outcomes to quickly respond to actual societal needs. Through this multi-faceted policy and financial support, the university sports and exercise rehabilitation major can better address the challenges of an aging society, meet the health management needs of the elderly, and provide more comprehensive and innovative solutions.

Conclusion

Through a systematic analysis of the relationship between sports and exercise rehabilitation majors in New Zealand universities and an aging society, this paper concludes that the sports and exercise rehabilitation major plays a significant role in an aging society. It not only enhances the health level of the elderly but also alleviates the pressure on the healthcare system. New Zealand universities, with their educational resources and research advantages, provide crucial support for advancing the development of this field. For the future, it is recommended that universities strengthen curriculum design oriented towards the needs of an aging population, emphasize the integration of theory and practice, and promote the application of advanced technologies such as wearable devices and virtual reality in exercise rehabilitation, thereby improving the precision and effectiveness of interventions.

Fund Projects

This research was supported by the Innovation Sub-project of the Local Cooperation Project jointly organized by the China Scholarship Council and the Department of Education of Liaoning Province.

References

[1] Li Jinlong, Chen Jin'ao, Liu Yunqing. Research on the Innovative Training Model and Enhancement Paths for Sports Rehabilitation Talents in the Context of an Aging Population. Sports Science and Technology, 2024, 45(04): 33-35.

[2] Zhang Cheng, Cui Qiang. On Healthy Aging and Physical Activities and Geriatric Disease Rehabilitation for the Elderly. Journal of Medical Frontiers, 2023, 13(11): 131-133.

[3] Gan Beibei. Integrating Sports and Medicine to Promote Healthy Aging. Health News, 2022-08-30 (008).

[4] Bai Feiran. Research on the Intelligent Fitness and Health Rehabilitation Service System and Products for the Elderly in Community Scenarios. Beijing University of Technology, 2020.

[5] Tang Chuande. A Study on the Feasible Strategies for Introducing Exercise Rehabilitation Education into University Physical Education Teaching. Journal of Anyang Normal University, 2022, (02): 124-128.

[6] Lyu Hao. Current Teaching Status and Future of Sports Health Care and Exercise Rehabilitation Education in Colleges and Universities. Food Research and Development, 2021, 42(18): 239.