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Fall Prevention Strategies in Geriatric Medical Welfare Facilities

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Abstract

Purpose: This study aimed to analyze the current status of elderly medical welfare facilities in Korea, examine the correlation between elderly population and facility distribution, and propose safety management strategies with a focus on fall prevention.

Research design, data and methodology: Data on elderly population and facility distribution across 17 regions in Korea (as of 2025) were collected. Pearson's correlation analysis was conducted to examine the relationship between population size and facility numbers. Regional disparities were identified through comparative analysis, and previous studies were reviewed to assess fall incidence patterns in long-term care institutions. **Results:** A moderately strong positive correlation ($r=0.78$) was found between elderly population and facility numbers. However, regions with a high elderly ratio, such as Jeonnam, Gyeongbuk, and Jeonbuk, lacked sufficient facilities, revealing significant disparities. Falls were the most frequent incidents in long-term care institutions, occurring mainly in beds, bathrooms, and shared spaces. **Conclusions:** Although elderly medical welfare facilities have expanded with population aging, regional imbalances remain. Policy efforts should focus on (a) region-specific infrastructure expansion, (b) qualitative improvements in facilities, (c) ICT-based preventive management, and (d) integration with community care. This study provides baseline evidence for elderly care policy and fall prevention strategies in the context of a super-aged Korean society.

Keywords : Elderly Medical Welfare Facilities, Super-Aged Society, Fall Prevention, Safety Management, Regional Disparities

JEL Classification Code: I18, I38, J14, H75, C93

1. Introduction¹

1.1. Research Background and Necessity

The projected population of Korea in 2025 is approximately 51.68 million, with 10.24 million individuals aged 65 years or older, accounting for 20.34% of the total population (Statistics Korea, 2025). This

milestone confirms that Korea is now categorized as a super-aged society, a stage reached when older adults comprise over one-fifth of the total population.

By 2035, this proportion is expected to rise further to 26.5% (CISS, 2025.8). This milestone confirms that Korea is now categorized as a super-aged society, a stage reached when older adults comprise over one-fifth of the total population.

The rapid growth of the elderly population is

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accompanied by a significant increase in dementia cases. According to the World Health Organization (WHO, 2023), an estimated 55 million people worldwide were living with dementia in 2023, a figure projected to reach 139 million by 2050. In Korea, the prevalence of dementia among individuals aged 65 and older was 10.3% in 2022, corresponding to approximately 970,000 patients, and is expected to reach 3 million by 2050. Particularly concerning is the prevalence among the “oldest-old” aged 85 and above, reported to range from 30% to 40% (WHO, 2025).

Falls constitute another major safety concern among older adults. Globally, 28%–35% of those aged 65 or older experience at least one fall annually, with the rate rising to 42% among those aged 80 and older (WHO, 2025). According to the World Health Organization (WHO, 2023), an estimated 55 million people worldwide were living with dementia in 2023, a figure projected to reach 139 million by 2050. In Korea, the prevalence of dementia among individuals aged 65 and older was 10.3% in 2022, corresponding to approximately 970,000 patients, and projections suggest that the number will approach three million by 2050.

Particularly concerning is the prevalence among the “oldest-old” aged 85 and above, reported to range from 30% to 40% (WHO, 2025). By 2035, it is anticipated that over one-fifth of the population will be 65 years or older.

These demographic and epidemiological transitions, compounded by global warming and environmental challenges, are expected to further intensify the burden on healthcare and long-term care services. Ensuring resident safety in elderly care facilities has thus become an urgent policy priority, with fall prevention recognized as a particularly critical issue. Recently, smart safety management has gained importance through the incorporation of advanced tools, including AI, IoT-based monitoring, and robotic care systems.

1.2. Research Objectives and Methods

As Korea moves into a super-aged society and social welfare institutions continue to expand, the necessity of systematic safety management has become more apparent.

Anticipating future care needs and ensuring the provision of higher-quality services requires a systematic approach to facility safety.

The primary objective of this study is to examine the current management practices of long-term care institutions, identify issues related to frequent fall incidents in social welfare facilities, and propose strategies for improving safety management.

For this purpose, the study collected and analyzed data on relevant legislation, institutional operation systems, and

fall-related statistics. Sources included publicly available data from the National Statistics Portal, the Long-Term Care Insurance system, and the National Health Insurance Service. Based on this analysis, the research aims to highlight key problems in safety management and to suggest practical measures for improvement.

2. Theoretical Background and Review of Previous Studies

2.1. Social Context and Changes

2.2.1. The Era of Super-Aging

Korea entered an aging society in 2000, when the proportion of the population aged 65 and older reached 7.2%. By 2018, this figure had increased to 14.3%, marking the transition to an aged society. In January 2025, the elderly population reached 20.3%, officially placing Korea in the stage of a super-aged society. The proportion of older adults has continued to grow steadily, rising from 12.2% in 2013 to 20.3% in 2025. Strategies for improving safety management. According to life tables published by Statistics Korea (2023), the average life expectancy in Korea is 83.5 years, with men living an average of 80.6 years and women 86.4 years. The increase in the elderly population has resulted in rising demand for medical and welfare services, including long-term care, nursing hospitals, and elder care programs. This demographic shift has also contributed to higher medical expenditures and placed additional pressure on the national health insurance system.

The rapid growth in the number of frail elderly and older adults living alone has highlighted the weakening of traditional family-based caregiving and the erosion of social networks among seniors, thereby necessitating the socialization of care. The Ministry of Health and Welfare (2025) projects that the number of elderly living alone will increase from 2.19 million in 2024 to 3.64 million in 2035. Similarly, the population aged 85 and older is expected to rise from 1.06 million in 2024 to 1.88 million in 2035 (MOHW, 2025).

2.1.2. Advances in Science and the Era of the Fourth Industrial Revolution (Industry 4.0)

The Fourth Industrial Revolution (Industry 4.0) has brought about profound structural transformations across society by maximizing efficiency through technological innovation. Its core technologies—including artificial intelligence (AI), the Internet of Things (IoT), and robotics—are increasingly being applied in diverse sectors.

Smart Safety Management refers to a system that utilizes IoT, AI, big data, cloud computing, and sensor

technologies to monitor the safety of residents and staff in long-term care institutions in real time and to prevent potential accidents. Compared with traditional approaches, this technology allows for faster and more precise responses to safety risks.

As the key technologies of Industry 4.0 become more widespread, the field of social welfare and elder care services is also expected to undergo significant transformation. Such advancements will play a vital role in enhancing safety and improving the quality of care within long-term care environments.

2.1.3. Climate Change and the Rising Incidence of Diseases

Accelerated global warming has had a profound impact on the health of the elderly population. Extreme heat events, in particular, weaken physical resilience and increase the prevalence of neurological conditions such as dementia, thereby intensifying the demand for social welfare and long-term care facilities.

Since the Industrial Revolution, fossil fuel extraction and combustion, along with large-scale deforestation, have contributed to air pollution and the release of greenhouse gases such as carbon dioxide (CO₂), methane (CH₄), ozone (O₃), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), and sulfur hexafluoride (SF₆). These gases are recognized as major drivers of global warming, leading to rising surface temperatures, more frequent heatwaves and cold spells, the melting of polar ice, rising sea levels, floods, and typhoons—all of which represent significant threats to ecosystems and human survival.

Epidemiological studies demonstrate that heatwaves are associated with an increased daily mortality rate among older adults compared to non-heatwave days. Furthermore, for every 1°C rise above threshold temperatures, the incidence of heat-related illnesses increased by 56% in the general population, but by 62% among older men and 74% among older women, indicating that the elderly are disproportionately affected (Jo, 2013).

The health consequences of heatwaves extend beyond mortality, encompassing exacerbations of cardiovascular, respiratory, neurological, and psychiatric disorders (Blum et al., 1991; Jo, 2013). Meteorological disasters have also been shown to induce psychological trauma, resulting in reduced cognitive capacity, depression, and heightened anxiety. Such impacts are observed before, during, and after extreme events, with studies reporting declines in memory and task performance among both middle-aged and elderly populations exposed to prolonged heat stress (Abderrezak & Knoche, 2002; Jo, 2013).

Temperature data from Seoul indicate that the average maximum temperature during summer was 28.6°C in 2012, rising by 1.3°C by 2018 and reaching 30.7°C in 2024, a

net increase of 2.1°C over the period. In 2024, there were 33 days with maximum temperatures above 33°C and 80 days exceeding 30°C, representing an increase of 31 extreme-heat days compared to 2014 (Abderrezak & Knoche, 2002; Jo, 2013).

2.2. Current Status of Elderly Medical Welfare Facilities in Korea and Analysis of Fall Incidents

2.2.1. Legal Framework of Elderly Medical Welfare and Care Facilities

According to Article 48, Paragraph 2, Clause 13 of the *Long-Term Care Insurance Act*, the National Health Insurance Service (NHIS) is authorized to establish and operate long-term care institutions. These facilities provide benefits to older adults who have difficulty performing daily activities independently, thereby enhancing quality of life and contributing to the development of the long-term care system.

The Welfare of the Aged Act aims to prevent or detect geriatric diseases at an early stage, to provide appropriate medical care and nursing services, and ultimately to maintain the physical and mental health of older adults. In addition, the Act seeks to promote stability in later life and improve welfare by ensuring necessary support measures. Under this framework, elderly welfare facilities include nursing homes, group homes, welfare housing for the elderly, residential homes, day-care centers, senior welfare centers, community centers, and in-home welfare services. Specifically, Article 34 of the Act defines elderly medical welfare facilities as institutions that provide residential care, meals, nursing, and daily living assistance to older adults suffering from senile diseases such as stroke or dementia, which cause significant physical or cognitive impairment.

The Long-Term Care Insurance Act, implemented on July 1, 2008, covers individuals aged 65 and older, as well as those under 65 who suffer from geriatric conditions. It applies primarily to individuals with moderate to severe care needs (Grades 1–5). The purpose of the system is to promote health and stability in later life by providing long-term care benefits—such as support for physical activities and household tasks—while also alleviating the burden on families.

2.2.2. Types and Current Status of Elderly Medical Welfare Facilities

According to recent data from Statistics Korea and the Ministry of Health and Welfare, the number of elderly medical welfare facilities in Korea has steadily increased with the nation's entry into a super-aged society. As of 2024, there were approximately 9,000 long-term care institutions nationwide, including around 5,000 nursing

homes and about 1,600 long-term care hospitals. Most residents are aged 65 or older and are beneficiaries officially recognized under the long-term care grading system. The majority suffer from conditions such as severe dementia, stroke, or musculoskeletal disorders. Findings from the Long-Term Care Status Survey indicated that 77.5% of eligible beneficiaries were utilizing long-term care services at the time of the survey, while 22.5% were not. Among all beneficiaries, 27.7% were male and 72.3% were female. By age group, older adults aged 80 and above accounted for 70.4% of beneficiaries, whereas those under 65 represented only 2.8% (CISS, 2025).

Table 1: Elderly Population and Number of Elderly Medical Welfare Facilities by Region

Region	Elderly Population (Persons)	Total Facilities	Nursing Homes (Facilities)	Group Homes (Facilities)
Total	10,256,782	6,195	4,640	1,555
Seoul	1,813,648	475	237	238
Busan	780,576	123	103	20
Daegu	493,256	262	152	110
Incheon	533,369	512	428	84
Gwangju	246,980	102	88	14
Daejeon	259,245	155	110	45
Ulsan	188,702	68	49	19
Sejong	45,301	21	18	3
Gyeonggi	2,269,603	2,141	1,664	477
Gangwon	384,970	333	236	97
Chungbuk	349,187	321	239	82
Chungnam	47,5648	357	264	93
Jeonbuk	439,263	235	184	51
Jeonnam	486,492	322	253	69
Gyeongbuk	659,227	425	329	96
Gyeongnam	704,330	274	226	48
Jeju	126,985	69	60	9

Source: Ministry of Health and Welfare, Status of Elderly Welfare Facilities(Dec 31, 2024).

According to Table 1, as of December 2024, there were a total of 6,195 elderly medical welfare facilities nationwide, consisting of 4,640 nursing homes and 1,555 group homes. By region, Gyeonggi Province accounted for the largest share with 2,141 facilities (34.6% of the national total), followed by Seoul (475), Incheon (512), and Gyeongbuk (425). In contrast, Sejong had the smallest number with only 21 facilities. These findings suggest that the distribution of facilities is closely associated with regional demographics and the size of the elderly population.

Table 2: Status of Elderly Medical Welfare Facilities by Year (2014-2023)

Year	Nursing Homes (Facilities)	Group Homes for the Elderly (Facilities)
2014	2707	2134
2015	2933	2130
2016	3136	2027
2017	3261	1981
2018	3390	1897
2019	3595	1934
2020	3844	1881
2021	4057	1764
2022	4346	1723
2023	4525	1614

Source: Ministry of Health and Welfare, 2025.3

Table 2 provides an analysis of elderly medical welfare facilities, with a particular focus on nursing homes and group homes for the elderly. Based on statistical data from the Ministry of Health and Welfare spanning the years 2014 to 2023, year-by-year changes were systematically examined. Furthermore, Figure 1 presents a graphical representation of the data contained in Table 2, thereby facilitating a clearer understanding of temporal trends.

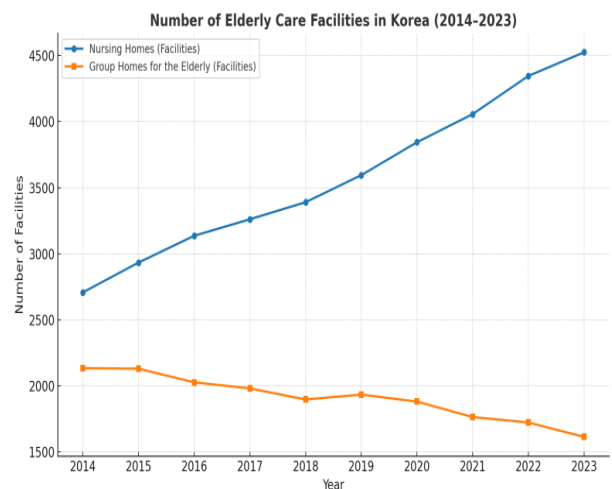


Figure 1: Status of Elderly Medical Welfare Facilities by Year (2014-2023) *Unit: Number of Facilities*

Source: Ministry of Health and Welfare, 2025.3

This chart illustrates the changes in the number of elderly care facilities and group homes for the elderly in Korea from 2014 to 2023. The data shows a steady increase in elderly care facilities, while the number of group homes has declined over the same period.

From 2014 to 2023, the number of elderly nursing facilities increased from 2,707 to 4,525, representing a

growth of 1,818 facilities, or approximately 67.2%. In contrast, group homes for the elderly decreased from 2,132 to 1,614 during the same period, a decline of about 24.3%. Consequently, the total number of facilities rose from 4,841 in 2014 to 6,139 in 2023, an overall increase of only 26.8%.

According to population projections by Statistics Korea, the elderly population aged 65 and over was about 6.48 million in 2014, accounting for 12.7% of the total population. By 2023, this figure had grown to approximately 9.5 million, reflecting a 68% increase compared to 2014.

In other words, while the elderly population increased by 68%, the number of elderly welfare facilities grew by only 26.8%, indicating a slower rate of expansion. The reduction in group homes for the elderly may partly explain this limited growth. Identifying the reasons behind this decline and implementing corrective measures are necessary. Moreover, as Korea continues to transition into a super-aged society, there will be a greater need for long-term planning, facility expansion, and improved safety management strategies.

Table 3: The ratio of senior citizens aged 65 or older to the total population by city and province

Region	Elderly Population (%)
Sejong	11.6
Incheon	17.7
Seoul	19.4
Gyeonggi	16.6
Gangwon	25.4
Chungbuk	25.3
Chungnam	22.2
Daejeon	18.0
Gyeongbuk	26.0
Daegu	20.9
Busan	17.2
Ulsan	17.2
Jeonbuk	25.4
Jeonnam	27.2
Gwangju	17.3
Gyeongnam	21.8
Jeju	18.9

Source: KOSIS, 2025.8

The data shows the proportion of elderly population (65 years and older) by region in Korea. Notably, Jeonnam (27.2%), Gyeongbuk (26.0%), and Gangwon (25.4%) record the highest ratios, indicating a more advanced aging society in these provinces. In contrast, Sejong (11.6%) shows the lowest proportion, reflecting its relatively younger demographic structure. Overall, rural and provincial regions exhibit higher aging rates compared to metropolitan cities.

The proportion of the elderly population varies

significantly across regions, with Jeonnam recording the highest at 27.2%, followed by Gyeongbuk (26.0%), Gangwon (25.4%), Jeonbuk (25.3%), and Busan (23.9%). The lowest proportion is found in Sejong (11.6%).

Based on the 2025 Statistics Korea (KOSIS) dataset, which provides regional, age, and gender-disaggregated population figures, the elderly population aged 65 and over was analyzed separately.

Between 2019 and 2023, the elderly population increased by 1,189,216 persons, representing a 49.43% rise. In Seoul, the elderly population rose by 18,975 persons (40.21%), while in Busan it grew by 80,644 persons (47.47%). The most significant increase occurred in Sejong, where the elderly population expanded by 72.49%. Despite this rapid demographic shift, the number of elderly care facilities in Sejong remained unchanged, at 9 facilities in both 2014 and 2023.

Other regions also demonstrated sharp growth: Ulsan (+60.03%), Incheon (+57.11%), and Gwangju (+55.06%), all exceeding a 50% increase. Overall, most regions experienced growth rates close to 50%.

These findings highlight a pressing concern: while the elderly population has risen rapidly across the nation, the expansion of elderly care and medical welfare facilities has not kept pace. Therefore, systematic and region-specific planning is essential to ensure that the number and type of facilities adequately meet the growing needs of the aging population.

2.2.3. Status and Causes of Falls in Elderly Care Facilities

A. Characteristics of Safety Incidents and Elderly Falls

The World Health Organization (WHO) conceptualizes safety in two dimensions: the objective dimension, which refers to measurable behavioral and environmental risk factors, and the subjective dimension, which reflects an individual's perception and feeling of security (MOHW, 2025).

Within elderly care facilities, various safety incidents occur frequently, including fires, medication misuse, suffocation, and collisions. Among these, falls are of particular concern because they are closely associated with elevated mortality and morbidity among older adults. It is estimated that at least one-third of the elderly population worldwide experience one or more falls annually (Lee, 2020). According to WHO, approximately 28

B. Current Situation in Korea

A report released by Consumer24(2022) indicated that between 2018 and 2021, a total of 23,561 safety incidents involving older adults were submitted to the Consumer Injury Surveillance System (CISS). Of these, 62.7%—

equivalent to 14,778 cases—were associated with falls. Research has consistently shown that approximately 15–25% of community-dwelling seniors experience at least one fall each year, while in institutional care settings the incidence exceeds 50%.

A fall is commonly defined as an event in which an individual unintentionally comes into contact with the ground after losing balance during daily activities, without any external force being applied (Guidelines for Fall Prevention in Long-Term Care Facilities). Recent statistics from the Ministry of Health and Welfare, together with data from the Korea Patient Safety Reporting & Learning System (KOPS), reveal that in 2023 falls represented around 45% of all documented safety events in long-term care hospitals and facilities, with more than 60% occurring in or around patient bedsides.

C. Bed-Related Falls and Major Risk Factors

The majority of falls among older adults occur in relation to bedroom environments and furniture, particularly beds. An analysis by the Korea Consumer Agency (2016) of 1,250 elderly fall-related cases reported between 2013 and 2015 showed a consistent annual increase of more than 35%. Among these, 587 incidents (47%) were linked to bedroom furniture, with 581 cases (99%) specifically involving beds. Similarly, of the 100 cases associated with medical equipment, 60% occurred on medical beds.

Although fatalities were relatively rare, their significance was striking: two deaths (0.5%) were attributed to falls among seniors, a rate approximately ten times higher than the overall fatal accident rate (0.05%). These findings highlight the urgent need for systematic fall-prevention strategies, particularly in relation to bed safety and mobility management in long-term care settings.

D. Major Injury Sites Resulting from Falls

Analysis of fall-related injuries reported to the Consumer Injury Surveillance System (CISS) in 2016 revealed that head and brain injuries were the most frequent (3,014 cases, 20.4%), followed by injuries to the lower extremities above the knee (16.4%) and the hip/buttock region (11.3%). With increasing age, the proportion of hip fractures also tended to rise. Among serious outcomes, hip fractures (28.4%), head trauma (15.3%), and subsequent complications such as rehospitalization or increased mortality were frequently reported. Additionally, there were 2,579 cases of multiple-site injuries.

When examining injury types, fractures accounted for the largest proportion (179 cases, 50.3%), primarily due to age-related osteoporosis and reduced bone density. The most affected anatomical sites were the head and face (442 cases, 35.4%), followed by the hip, leg, and foot (379 cases, 30.3%), the torso (229 cases, 18.3%), and the arms

and hands (105 cases, 8.4%). Moreover, concussions and intracranial hemorrhages were reported in 71 cases (19.9%). Since the mortality risk associated with head trauma in older adults is estimated to be four times higher than in younger populations, these incidents require heightened vigilance. Falls among older adults can lead to severe consequences, including permanent disability or death (CISS, 2016).

E. Locations of Fall Incidents

The World Health Organization (WHO) identifies falls as a leading cause of injury, disability, and mortality among individuals aged 65 and older worldwide. In terms of location, residential settings accounted for 74.8% of fall incidents, while only about 4% occurred in nursing or welfare facilities. However, in hospitals and long-term care institutions, bed-related falls constituted more than 50% of all reported incidents, with a large proportion involving patients falling from beds. Reported outcomes included hip fractures (28.4%), head injuries (15.3%), and an increased risk of rehospitalization or death (MOHW, 2021).

Data from the CISS further indicate that 74.0% (11,055 cases) of falls occurred in homes, most commonly due to slipping in bathrooms or falling from beds. Falls in nursing care facilities, in particular, have shown an upward trend with advancing age, highlighting the urgent need for preventive interventions tailored to residential and institutional environments.

3. Conclusion and Recommendations

As of 2025, Korea has officially entered a super-aged society, with more than 10.24 million people aged 65 and older, representing 20.34% of the total population of approximately 51.68 million. The average life expectancy has risen to 83.5 years (80.6 years for men and 86.4 years for women), owing to advances in medical technology and improvements in living standards. However, the rapid progression of population aging has been accompanied by a rise in dementia, falls, and heat-related health concerns, which are emerging as pressing social issues.

In 2022, the number of dementia patients was estimated at 970,000 (a prevalence rate of 10.3%), and this figure is projected to reach 3 million by 2050. Falls continue to represent a critical safety concern, particularly among institutionalized elderly populations. Between 2014 and 2023, the number of long-term care facilities expanded from 4,841 to 6,139 (a 26.8% increase), while the total bed capacity increased from 151,200 to 242,974 (a 60.7% increase). Correlation analysis indicates a moderate to strong positive relationship ($r = 0.78$) between the elderly population and the number of facilities, suggesting that facility expansion has largely followed demographic

trends.

Given these demographic and epidemiological challenges, it is essential to strengthen safety management strategies in long-term care facilities, with a particular emphasis on fall prevention and dementia care. At the same time, broader public health initiatives must address the growing impact of climate change on vulnerable elderly populations. Policy measures should therefore integrate demographic trends, healthcare system capacity, and technological innovations—including AI, IoT-based monitoring, and smart care solutions—to establish a comprehensive framework for ensuring elderly safety and well-being in Korea's super-aged society.

These findings suggest that policy on elderly care facilities should not be limited to quantitative expansion. Instead, it is essential to ensure balanced regional distribution and strengthen qualitative management to meet the growing and diverse needs of the aging population.

Policy Recommendations

A. Region-Specific Infrastructure Expansion

- Prioritize the allocation of long-term care facilities in regions with higher proportions of elderly populations.
- Strengthen governmental support to reduce disparities in facility distribution between metropolitan and rural areas.

B. Improvement of Facility Quality

- Establish standardized safety design criteria for beds, side rails, and related equipment.
- Implement systematic and regular fall-risk reassessments and safety inspections.
- Deploy specialized personnel and provide structured training to enhance safety management.

C. Utilization of Advanced Technology and Preventive Care

- Introduce ICT-based fall detection and monitoring systems.
- Expand the adoption of low-height and smart beds with safety features.
- Incorporate exercise and physiotherapy programs to maintain strength and flexibility.

D. Diversification of Care Models

- Strengthen linkages between institutional care, community-based services, and home care.
- Establish integrated networks for the coordinated provision of medical and welfare services.

This study examined the correlation between regional elderly populations and the distribution of elderly care facilities in Korea, highlighting both the necessity of facility expansion and the persistent issue of regional

disparities in the context of a super-aged society. While the results confirmed that facility growth generally accompanied the rise in the elderly population, significant gaps remained in areas with higher proportions of older adults. Future policies should therefore move beyond mere quantitative expansion to emphasize balanced regional distribution, quality enhancement, technological integration, and community-based care models. Such a multidimensional approach will be crucial for establishing a sustainable care system in an aging society and for substantially improving the quality of life of older adults.

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Appendix 1: