Scientific Research Publishing

Open Journal of Social Sciences, 2026, 14(1), 154-167
https://www.scirp.org/journal/jss
ISSN Online: 2327-5960
ISSN Print: 2327-5952

Exploring the Development Path of Smart Elderly Care in Qinghai Pastoral Areas: A Case Study of the Senior Home in Henan County

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How to cite this paper: Yu, Y. (2026). Exploring the Development Path of Smart Elderly Care in Qinghai Pastoral Areas: A Case Study of the Senior Home in Henan County. *Open Journal of Social Sciences, 14,* 154-167.
https://doi.org/10.4236/jss.2026.141012

Received: December 4, 2025
Accepted: January 9, 2026
Published: January 12, 2026

Abstract

Against the backdrop of accelerating population aging in China, conventional elder-care paradigms are increasingly unable to satisfy the nation's expanding geriatric needs. Smart elder-care, as an innovative modality, has already demonstrated marked advantages in major metropolitan areas. Yet, in ecologically distinctive regions such as pastoral zones—characterized by geographic remoteness, under-developed infrastructure, a dearth of qualified professionals, and low levels of informatization—the diffusion and implementation of smart elder-care confront formidable obstacles. Focusing on the Henan County Nursing Home in Huangnan Tibetan Autonomous Prefecture, Qinghai Province, this study employs field investigations and case analyses to interrogate the challenges impelling the promotion of smart elder-care models in pastoral-area nursing institutions within a digital context, and to delineate corresponding developmental pathways.

Keywords

Smart Elder-Care, Pastoral Areas, Nursing Homes, Digital Transformation, Developmental Pathways

1. Introduction

In the 21st century, the demographic transition in China has rendered population aging an increasingly critical issue in social development. According to the latest statistics from 2023, the population aged 60 and above in China has exceeded 297 million, accounting for 21.1% of the total population, while the population aged 65 and above has surpassed 217 million, representing 15.4% of the national population (National Bureau of Statistics, 2024). This trend is equally pronounced in

Qinghai Province. In 2023, the permanent resident population of Qinghai stood at 5.94 million, of which the elderly population aged 60 and above reached 880,000, constituting 14.82% of the total, while the population aged 65 and above numbered 620,000, accounting for 10.44% of the provincial population (Office of the Aging Committee of Qinghai Province, 2024). As a representative pastoral area in Qinghai, Huangnan Tibetan Autonomous Prefecture exhibits particularly noteworthy aging characteristics. Data from the Seventh National Population Census reveal that its population aged 60 and above accounts for 8.34%, and the proportion aged 65 and above is 6.54%. Notably, the majority of the elderly in pastoral areas reside in rural regions, with the rural population aged 65 and above representing as high as 59.84% of the total elderly in these areas (Statistics Bureau of Huangnan Tibetan Autonomous Prefecture, 2021). Furthermore, the proportion of the oldest-old population continues to rise. The increasing share of the elderly not only reflects an accelerating trend of population aging but also underscores the unique urgency and specificity of elderly care service provision in Qinghai's pastoral regions, while simultaneously imposing higher demands on the social elderly care service system. Against this backdrop, traditional elderly care models have become inadequate in addressing the increasingly diverse and complex needs of the aging population. Consequently, there is a pressing need to explore innovative elderly care models to adapt to the requirements of the times. As an innovative strategy to address the challenges of aging, smart elderly care is gradually emerging as a focus of academic attention.

2. Literature Review

The notion of smart elder-care was initially articulated by the UK-based Life Trust Foundation under the designation "Fully Intelligent Elderly System." Its foundational premise is to harness advanced information and communication technologies so that older adults can receive high-quality, temporally and spatially unconstrained support within their own domiciles (Bai & Zhu, 2016). Only through subsequent conceptual refinement was the term "smart elder-care" (zhìhuì yǎnglǎo) formally crystallized. In recent years, the construction has been further elaborated within domestic scholarship. Notably, Zuo Meiyun posits that smart elder-care must transcend the mere provisioning of material support and simultaneously address the psychosocial dimensions of aging. By leveraging networked technologies and social-media platforms, older adults' accumulated experiential knowledge and wisdom can be re-activated, thereby imbuing their later life with heightened meaning and value (Zuo, 2014). The expanded connotation of smart elder-care is manifest on two interrelated planes: technological innovation and the individualized satisfaction of older adults' heterogeneous needs. By mobilizing state-of-the-art information technologies—namely, the Internet of Things, cloud computing, and big-data analytics—intelligent devices deliver comprehensive support across the full spectrum of daily living, encompassing domiciliary routines, safety assurance, medical treatment, health rehabilitation, recreational engagement, and life-

long learning. As information technologies evolve, the proliferation of wearable apparatuses and smart-home artifacts has rendered real-time monitoring of older adults' health status technically feasible, while tele-medical services furnish an expanded repertoire of convenient and accessible care options (Liu, Wu, & Ren, 2024). The diffusion of smart elder-care paradigms is poised to substantially elevate older adults' quality of life, rendering their later years healthier, more convenient, enjoyable, and dignified. To accommodate the heterogeneous and escalating demands of this cohort, scholars have articulated a spectrum of smart elder-care service models—among them community-based smart elder-care, online integration of smart medical and nursing services, and big-data-driven health-oriented elder-care. These modalities "leverage the Internet of Things, cloud computing, big-data analytics, and artificial intelligence to deliver highly personalized services tailored to the individual biopsychosocial profiles of older persons." (Liu, Wu, & Ren, 2024). Concurrently, robust policy endorsement from the state has furnished a pivotal institutional scaffold, guaranteeing sustained impetus for the evolution of the smart elder-care industry.

Relative to conventional elder-care paradigms, the primary superiority of smart elder-care is instantiated at the level of service delivery. Its inherently personalized and customizable architecture accommodates the heterogeneous demands of older adults. By synthesizing data analytics with iterative user feedback, service providers can elicit granular insights into each elder's idiosyncratic needs, thereby formulating care plans that closely align with individual biopsychosocial profiles and, in turn, enhancing both the efficacy and perceived satisfaction of the services delivered (He & Xing, 2020). Beyond reconfiguring the modality of service provision, smart elder-care enables the high-efficiency allocation of scarce resources, thereby offering a pragmatic solution to the challenges posed by population aging. Through integrated information-technology platforms, elder-care assets can be subjected to precise, real-time governance, augmenting both the velocity of service response and their spatial coverage. As exemplified by tele-medical systems, professional health services can be delivered directly within older adults' domiciles, significantly attenuating their reliance upon—and concomitant consumption of—concentrated medical resources (Macduff, West, & Harvey, 2001). At the individual level, the deployment of intelligent devices and mobile applications grants older adults frictionless access to domiciliary support, health governance, and emergency assistance. The immediacy and temporal exactitude of these services markedly surpass the logistical capacities inherent in traditional elder-care modalities (Sui & Peng, 2018).

3. Problem Formulation

Smart elderly care is a novel care model that integrates modern technology. The application of this model in major cities has demonstrated its significant advantages, particularly in community-based home care and institutional care settings. However, in the unique context of pastoral areas such as Qinghai, questions

remain unanswered regarding whether local culture can adapt to smart elderly care, whether elderly residents in nursing homes are receptive to this model, whether the existing infrastructure in pastoral nursing homes can support the widespread adoption of smart elderly care, and in which specific areas such technologies should be prioritized.

Existing research indicates that over 40% of surveyed elderly individuals do not use smartphones, with the proportion among rural elderly reaching as high as 63.92%. Moreover, rural elderly face significant gaps in digital access, usage, and literacy (Wei, Yang, & Guo, 2024). These challenges are underpinned by multiple barriers, including individual digital literacy, psychological factors, family support, and technological accessibility (Li, Ma, Zhang et al., 2025). Therefore, promoting smart elderly care in pastoral areas must address these structural challenges head-on.

Furthermore, with the wide variety of digital technologies available, determining which ones can tangibly improve the quality of life for the elderly and meet the operational needs of caregivers remains an open question. There should be a precise alignment between demand and technology to avoid the adoption of smart elderly care as merely a "trendy" endeavor. Through this study, we aim to propose a practical and feasible development pathway for the implementation of smart elderly care in pastoral nursing homes in Qinghai, with the goal of enhancing the quality of life for elderly residents and improving the operational efficiency of these institutions.

4. Introduction to the Field Site

Henan County is situated in Huangnan Tibetan Autonomous Prefecture, Qinghai Province, on the northeastern edge of the Qinghai-Tibet Plateau. It borders Xiahe County of Gannan Tibetan Autonomous Prefecture, Gansu Province to the east; Maqu County of Gannan Tibetan Autonomous Prefecture, Gansu Province to the south; Maqên County of Golog Tibetan Autonomous Prefecture, Qinghai Province to the west; and Zêkog County to the north. Located at the junction of Qinghai, Gansu, and Sichuan provinces, it occupies a unique geographical position, serving as a vital corridor connecting the Qinghai-Tibet Plateau with inland China. Despite being a remote region in the northwestern interior where approximately 93% of the county town's population is ethnically Mongolian, long-term interaction and exchange with Tibetan communities have led most local Mongolians to lose their native language and cultural practices. Tibetan has consequently become the lingua franca in the area. Prior to their settlement in the Henan region, the Mongolian ancestors had already converted to Buddhism. After moving into Henan, they engaged in continuous political, economic, and cultural exchanges and integration with the local Tibetan population, who shared the same religious faith. This process further entrenched the position of Tibetan Buddhism in the region. Under the strong advocacy of successive Mongolian leaders, Buddhist monasteries flourished, and the monastic elderly care model gradually emerged within this

context, gaining acceptance among many devout elderly herders. However, due to the county's remote location, most elderly residents have received little or no formal education and psychologically lean towards traditional home-based care concepts. Only those without children nearby or without children at all opt for care in monasteries or nursing homes.

The Henan County Nursing Home, a key component of the local elderly care service system, is located on Lamulan Cuo Road, Jiangyuan District, Youganning Town. It enjoys an excellent geographical location with convenient transportation. The facility covers an area of 8 mu (approximately 0.53 hectares), with a building area of 853 square meters and a current capacity of 109 beds. It is equipped with a dining hall, activity rooms, and an integrated medical and elderly care service center, providing residents with comprehensive services encompassing accommodation, dining, healthcare, and recreation. The staff includes 6 administrative personnel and 6 nursing attendants, catering to 81 elders (the total number of residents) under the special hardship support system. Among them, 14 are moderately disabled and 4 are mildly disabled. Currently, the nursing home does not employ any digital tools in its management. On the one hand, the relatively small number of residents allows the traditional management model to maintain basic operations. On the other hand, most residents have limited or no formal education, resulting in low receptiveness to new technologies, and a minority also face mental health challenges, posing significant potential obstacles to the implementation of smart elderly care. Furthermore, Qinghai Province is located in a frontier region of China, with economic development lagging behind inland cities. Government funding for elderly care initiatives remains at a relatively low level, which also creates difficulties for piloting and popularizing smart elderly care. However, with the acceleration of digitalization, national support for this new elderly care model is expected to increase, thereby bringing more opportunities for the development of nursing homes in pastoral areas. Therefore, this study takes the Henan County Nursing Home as a case study to explore the application of smart elderly care in pastoral area nursing homes and the potential issues that may arise during the process. As a nursing home in an ethnic minority region, researching this case can provide valuable reference experience for other similar nursing homes in ethnic areas when adopting smart elderly care solutions.

5. Methodology

This study adopts a qualitative case study methodology, supported by field research conducted at a nursing home in Henan County, Qinghai Province, from July to August 2023. The fieldwork spanned 15 days and was designed to systematically investigate the practical conditions and feasible pathways for developing smart elderly care in pastoral areas through in-depth, on-site data collection and analysis. Primary data were obtained via semi-structured interviews and participant observation, supplemented by reviews of relevant policy documents and local statistical reports for contextual understanding.

Guided by the principle of purposive sampling, the research ensured comprehensive coverage of key stakeholder groups involved in both the supply and demand sides of elderly care services. Participants were categorized into three main groups: first, 20 older adults under the special support program, including 6 moderately disabled, 3 mildly disabled, and 11 fully self-reliant individuals, aged between 65 and 89; second, all 6 frontline caregiving staff; and third, 4 administrative personnel, namely the nursing home director, the logistics supervisor, and two heads of the integrated medical and elderly care service center. This sample structure accounts for variations in care needs among older adults with different physical conditions, incorporates the practical perspectives of caregivers, and includes the operational and decision-making viewpoints of management, thereby establishing a robust empirical foundation for subsequent case comparisons and model analysis.

Throughout the investigation, this research strictly adhered to the ethical standards of social science research, with particular emphasis on protecting the rights and interests of older adults as a vulnerable group. All interviews were conducted with communication support in both Tibetan and Chinese to ensure participants fully understood the research and participated voluntarily. The data collection process implemented principles of anonymization and confidentiality; all case information presented in this paper uses pseudonyms, and interview records are solely for academic purposes. Furthermore, the research design emphasizes immersion in the local cultural context, striving to align problem formulation, language use, and interpretation of meanings with the daily practices and local knowledge within pastoral elderly care institutions, thereby enhancing the study's empirical validity and contextual relevance.

6. Opportunities for Smart Elderly Care in Pastoral Area Nursing Homes

When exploring the application and necessity of smart elderly care technologies, it is crucial to consider the specific cultural contexts of different regions and the actual conditions of elderly care institutions. Smart elderly care encompasses a wide range of technologies, not all of which are suitable for every care environment. Particularly in areas with distinct cultural characteristics, such as pastoral regions, and in specific types of institutions like nursing homes, certain technologies hold significant importance, while others may be less practical. In the field of smart elderly care, initial applications primarily focused on real-time monitoring of seniors' physiological parameters, such as heart rate, blood glucose, and blood pressure. Through remote monitoring technology, healthcare professionals can stay informed about the health status of the elderly and intervene promptly upon detecting anomalies to prevent potential health risks.

As technology advances, the smart elderly care field has introduced more diverse solutions. For instance, Japan's "virtual nursing home" model. "By establishing an online platform that integrates 'information services + in-home elderly

care services,' seniors can easily access the virtual nursing home's platform via phone calls or mobile apps. Through this platform, they can obtain services covering daily necessities, food, housing, and transportation. Staff will provide in-home services, and platform administrators will also track the service process in real-time." (Zuo & Yu, 2023). In China, the "15-minute health and elderly care service life circle" in Yuexiu District, Guangzhou, serves as a typical case of smart elderly care. The district employs a unified "Ping An Tong" platform, which features functions such as one-click emergency calls, fall detection alarms, daily heart rate and blood pressure monitoring, real-time positioning, and electronic geofencing. Through the "Ping An Bao" emergency call platform, automatic alerts can be triggered.

In China's remote regions, due to unique geographical conditions, the application of smart elderly care technologies remains stagnant. However, with the accelerating aging of the population in China, the elderly population in pastoral areas is also increasing, leading to growing pressure on nursing homes in these regions. Issues in pastoral area nursing homes are becoming increasingly prominent. The large number of elderly residents coupled with a relative shortage of nursing staff results in prolonged periods of solitude for the elderly, leading to problems such as residents leaving the nursing home without permission and inadequate supervision during activities like bathing. These challenges highlight the necessity and urgency of applying smart elderly care technologies in the unique environment of pastoral area nursing homes.

Guo Yi, Male, Mongolian, 74 years old:

> "I've been living here for quite some years, about eight years now, and I've grown accustomed to most things. However, one thing has always worried me—taking a bath. As you know, when you're old, your legs and feet aren't as steady, and the bathroom floor is slippery. I feel anxious every time I take a bath. I remember once I almost fell; luckily, I reacted quickly and grabbed the handrail nearby, so nothing serious happened. But that incident still scares me, and since then, I've been even more cautious when bathing. I wish there were safer measures, like non-slip mats in the bathroom, to give us elderly folks some peace of mind while bathing."

As age advances, the physiological functions of the elderly gradually decline, placing them at a higher risk of falls during daily activities such as bathing. Falls can have serious consequences for the elderly, including physical injuries and subsequent health complications. Additionally, during private activities like bathing, the elderly often prefer to maintain their privacy and avoid the presence of others.

The application of digital technology is particularly important in this context. By wearing smartwatches equipped with one-touch emergency alert functions, the elderly can quickly notify nursing home staff in the event of a fall. This emergency alert feature not only ensures timely assistance in critical situations but also allows the smartwatch to monitor the elderly's health in real time. If abnormalities are detected, the device can automatically alert staff, enabling a swift response and

on-site assistance to effectively prevent potential dangers.

Furthermore, at the Henan County Nursing Home, it is common for residents to leave the premises unnoticed by security guards, posing significant safety risks. This not only compromises the safety of the elderly but also creates unnecessary difficulties for the staff.

Sonamji, Female, Caregiver:

> "At our nursing home, two residents particularly trouble us. One is an elderly man who particularly enjoys drinking. He often sneaks out unnoticed to find a place to drink, buying cheap Erguotou liquor for about ten yuan a bottle. He has a low tolerance for alcohol and gets drunk easily. When drunk, he tends to forget things and loses his sense of direction. Almost every time he goes out, he loses his way back. On many occasions, around eight or nine in the evening, I've had to take the institution's vehicle to search for him along the streets, pick him up, and bring him back. We are genuinely worried that something might happen to him when he's out alone.
>
> The other resident has mental health issues. Sometimes, he suddenly exhibits erratic behavior. If we don't notice his condition in time, he might run out on his own. However, this resident usually stays near the nursing home and doesn't wander far, so we can find him quickly. But honestly, there's little more we can do. Our staff is limited, and we have many residents to care for. Sometimes, it's really hard to keep an eye on everyone."

Based on the empirical materials collected through the aforementioned field survey, it can be clearly concluded that at the nursing home in Henan County, the core demands of elderly residents and staff are highly focused on the domain of safety and security. Moreover, their preferences for smart elderly care technologies exhibit characteristics of being "practical, simplified, and targeted", providing direct empirical support for the adaptive selection of smart elderly care technologies in pastoral area nursing homes.

From the perspective of elderly residents' demands, the risk of accidents during daily activities is their primary safety concern. Represented by Mr. Guo Yi, a 74-year-old Mongolian elderly resident, physiological decline places seniors at high risk of falls during private daily activities such as bathing. As elderly individuals generally value privacy in such activities and are reluctant to accept real-time external assistance, there is a clear demand for safety tools that "do not intrude on privacy but can respond quickly to emergencies." They tend to prefer simple, easy-to-use protective technologies (such as devices with emergency alarm functions) over complex smart systems that require extensive learning.

From the feedback provided by staff, the safety hazards posed by residents leaving the facility without authorization and the contradiction of manpower shortages are the most prominent operational challenges. The account of caregiver Sonam Ji reflects the common situation in pastoral area nursing homes of "few caregivers and many care recipients". Staff find it difficult to monitor all residents in real time, particularly those with specific behavioral habits (such as going out for

alcohol consumption) or mental health issues. Unauthorized departures not only pose significant safety threats to the residents themselves but also substantially increase the burden and stress on staff in terms of search efforts. Therefore, staff most prefer intelligent management technologies capable of "real-time positioning and anomaly alerts". Their core demand is to use technological means to compensate for manpower shortages, thereby improving the efficiency and responsiveness of monitoring residents' safety.

The empirical feedback from both elderly residents and staff clearly reveals the core demand scenarios for smart elderly care in pastoral area nursing homes—focusing on two high-frequency safety risks: "fall prevention" and "unauthorized departure monitoring". Moreover, the application of technology must meet the prerequisites of being "easy to operate, privacy-preserving, and adaptable to current manpower conditions". This empirical conclusion not only validates the necessity and urgency of applying smart elderly care technologies in pastoral area nursing homes as discussed earlier but also clarifies the core direction for technology selection, providing a solid practical foundation for subsequently proposing development pathways that align "supply with demand".

Therefore, integrating smart products, such as smart sensor cards and GPS tracking devices, into the daily management of nursing homes is particularly important. These smart devices can be integrated into the nursing home's security management system. When a resident leaves the nursing home area without authorization, the smart sensor card they carry can automatically trigger an alarm mechanism. Upon receiving the alert, staff can respond promptly and take appropriate action, effectively preventing potential dangers. Even if the smart sensor card fails to detect a resident's departure, staff can still track the resident's real-time location using GPS devices. The introduction of these smart functionalities positively contributes to improving the management efficiency of nursing homes, enhancing the quality of life and safety of the elderly, and alleviating the workload of staff.

During the author's fieldwork at the nursing home, in addition to focusing on the safety of the elderly and the daily management of the institution, it was observed that the spiritual lives of the residents were generally impoverished. Aside from the routine activities arranged by the institution, most elderly residents lacked other forms of entertainment and cultural engagement.

Taking the Community Elderly Day Care Service Center in Nankai District, Tianjin as an example, this center adopts a "4 + X" service model. While ensuring four basic service functions—emergency call services, meal delivery, housekeeping, and daily necessities convenience store—it continuously expands its service offerings. This model has successfully integrated multiple services, including medical appointment registration, housekeeping services, online shopping, and cultural and recreational activities, achieving comprehensive elderly care services within the community. With a simple combination of equipment—a television, a remote control, and a set-top box—up to 28 service functions can be provided to

the elderly, forming an internet-based elderly care service model that is highly welcomed by the elderly population (Zhang, 2016).

In light of this, this paper recommends introducing a similar service model to the Henan County Nursing Home. This would not only enrich the daily lives of the elderly by offering more diverse cultural and recreational activities but also enhance the service efficiency of the nursing home staff through smart solutions such as online call services. By incorporating intelligent services, the aim is to better address the spiritual and cultural needs of the elderly while optimizing the operational processes of the elderly care institution.

7. Challenges Faced by Smart Elderly Care in Henan County Nursing Home

The smart elderly care model has long been implemented and applied in inland cities of China, but its promotion and adoption in pastoral areas remain relatively delayed. This is primarily due to significant differences between pastoral regions and inland cities in terms of unique geographical locations, economic conditions, cultural backgrounds, and the living habits of the elderly. These differences lead to a series of distinctive challenges and issues in the implementation of the smart elderly care model in pastoral areas.

Language Barriers: In elderly care institutions in pastoral areas, the resident elderly population predominantly belongs to ethnic minorities, with most having engaged in pastoral work prior to entering care facilities and lacking formal education. Among these elderly individuals, only a very small number are proficient in Mandarin. Compared to inland cities, language barriers may pose a significant challenge in promoting the smart elderly care model in pastoral areas. On the one hand, this affects the elderly's understanding and acceptance of smart elderly care services; on the other hand, it imposes higher requirements on software development.

Influence of Traditional Mindsets: Due to the generally conservative outlook of elderly ethnic minorities in pastoral areas and their limited exposure to new information, the acceptance of novel concepts and technologies among local elderly populations is typically lower than in inland cities. Resistance to new technologies and approaches among elderly residents in pastoral areas may create additional difficulties in implementing the smart elderly care model.

Shortage of Human Resources: The remote geographical locations and limited economic conditions of pastoral areas make it challenging to attract and retain professionals with the technical expertise required for smart elderly care. Additionally, the lack of necessary educational resources in pastoral areas hinders the development of local talent to the required professional level. This situation restricts the implementation and promotion of smart elderly care technologies. To overcome this challenge, it is essential for the government and relevant departments to adopt corresponding incentive measures, such as providing additional financial subsidies, improving working conditions, and strengthening the cultiva-

tion and education of local talent. This would gradually establish a human resource foundation capable of supporting the effective operation of the smart elderly care model.

Insufficient Economic and Policy Support: Currently, the financial revenue of nursing homes in pastoral areas primarily relies on government funding. However, after covering the daily operational costs of these institutions, these funds often fall short of providing adequate support for the implementation of the smart elderly care model. Furthermore, the lack of proactive engagement by local governments in formulating and advancing policies related to smart elderly care has resulted in slow progress in its implementation in pastoral areas, leaving them in a comparatively backward state compared to inland cities.

8. Development Pathways for Smart Elderly Care in Pastoral Area Nursing Homes

Addressing Language Barriers: Provide professional translation services to assist the elderly in understanding smart elderly care technologies. Simultaneously, develop localized smart elderly care information to ensure content accessibility and cultural relevance. Optimize smart elderly care devices and corresponding software applications to better align with the usage habits of local elderly populations. Finally, relevant government departments and nursing homes should establish long-term plans to ensure the sustainability of language support and cultural adaptation measures.

Shifting Traditional Mindsets: Efforts should begin with respect for the traditional values of the elderly, incorporating culturally sensitive education on smart elderly care to guide them in recognizing its benefits and facilitate acceptance. "On the other hand, research indicates that elderly individuals are often introduced to new technologies and products through their children, grandchildren, and peer groups, with mutual support among friends particularly influencing their adoption". Therefore, within nursing homes, leveraging the influence of community leaders—through their recommendations and guidance—can enhance acceptance among the elderly. Adopt a gradual approach, starting with small-scale usage to allow the elderly to gradually acclimate and witness the practical benefits of the technology. Develop customized smart elderly care services that align with pastoral culture, enhancing interactivity and engagement through organized activities that encourage elderly participation in learning and usage. Finally, implement long-term tracking and evaluation of the impact of smart elderly care technologies on the quality of life of the elderly, making adjustments based on feedback. These strategies help gradually mitigate resistance among the elderly, improve their acceptance and willingness to use smart elderly care technologies, and promote the effective implementation of the smart elderly care model in pastoral areas.

Actively Cultivating and Attracting Professional Talent: The government should collaborate with local educational institutions to offer specialized training, enhancing the professional skills of local talent and strengthening the talent pool.

Additionally, establish incentive mechanisms to attract and retain technical professionals. For nursing home staff, it is recommended to develop a periodic training curriculum to improve their skills in maintaining and repairing smart elderly care equipment, as well as handling emergency situations. Training content should include routine maintenance of smart elderly care devices, fault diagnosis, quick repair techniques, and emergency response protocols for unforeseen events.

Furthermore, organizing simulation drills and hands-on practice can enhance staff proficiency in operating smart elderly care equipment, ensuring they can accurately apply learned skills in practical work scenarios.

Diversified Fundraising and Policy Advocacy: To effectively promote the implementation of the smart elderly care model in pastoral areas, nursing homes should adopt a multi-faceted strategy to actively seek financial support from various sectors of society. This includes government funding, charitable donations, corporate sponsorships, and potential international aid. Through such diversified fundraising approaches, the necessary financial foundation can be established for the smooth development of smart elderly care projects. While actively seeking financial support, nursing homes must also engage in policy advocacy to secure governmental backing.

Aligning Supply with Demand: The introduction and application of smart elderly care facilities should not be viewed merely as a pursuit of trends or fashion. Instead, they should be grounded in a thorough analysis of the actual needs of the nursing home and implemented accordingly. In advancing smart elderly care, a pragmatic attitude must be adopted to ensure that every investment precisely addresses existing issues and meets the specific needs of the elderly, thereby maximizing cost-effectiveness.

9. Conclusion

Through a field survey conducted at the nursing home in Henan County, Huangnan Tibetan Autonomous Prefecture, Qinghai Province, this study explores the development pathways of smart elderly care models in pastoral nursing homes within the digital context. As China's population ages, traditional elderly care models are increasingly unable to meet the growing demands of elderly care. Smart elderly care, as an emerging model, has demonstrated significant advantages in major urban areas. However, in special regions such as pastoral areas, the promotion and implementation of smart elderly care face multiple challenges due to factors such as remote geographical locations, inadequate infrastructure, shortages of professional personnel, and low levels of informatization.

Through case analysis, this study argues that the application of smart elderly care technologies in pastoral nursing homes must consider the cultural backgrounds and practical needs of the local elderly population, as well as the operational conditions of the nursing homes. The introduction of smart elderly care technologies, such as remote health monitoring, smart wearable devices, and emergency alarm systems, holds significant importance for improving the quality of life of the el-

derly, ensuring their safety, and alleviating the workload of caregivers. Additionally, enriching the spiritual and cultural lives of the elderly through digital devices can further enhance their sense of well-being and satisfaction.

While the smart elderly care model offers considerable benefits in improving the quality of life for the elderly and enhancing operational efficiency, its promotion in pastoral areas also faces challenges such as language barriers, the influence of traditional beliefs, shortages of human resources, and insufficient economic and policy support. To effectively address these challenges, this study proposes a series of development strategies. The implementation of smart elderly care in pastoral areas is a long-term endeavor that requires collaborative efforts from multiple stakeholders, including the government, social organizations, and nursing homes. By adopting practical and feasible measures, existing obstacles can be gradually overcome, promoting the effective implementation of smart elderly care models in pastoral areas. This, in turn, will better meet the elderly care needs of the aging population, improve their quality of life, and provide new approaches to addressing the challenges of aging in pastoral regions.

It should be noted that this study is based on a single case of the Henan County nursing home. The generalizability of the findings is constrained by the specificity of the context and cannot be directly extended to all pastoral nursing homes without further comparative analysis across multiple cases or broader empirical validation. Furthermore, due to limitations in field research conditions within pastoral areas, the timeline of the study, and the complexities of the linguistic and cultural context, this research did not systematically employ qualitative data analysis techniques such as thematic analysis, coding procedures, or triangulation of data collected from different stakeholder groups. Future studies could expand the sample size to include diverse types of pastoral elderly care institutions for comparative analysis and could adopt more structured qualitative or mixed-method approaches to enhance the applicability, interpretative depth, and persuasiveness of the findings.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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