

Geriatric care: Integrating technology and innovation for better elderly support



**Kshitija Satalkar, Yash Suryavanshi, Divya Kulkarni*,
Suvarna Ingale**

Department of Pharmacy Practice, Shree Chanakya Education Society's Indira
College of Pharmacy, Pune-411033
Email: kulkarni.divya13@gmail.com

Abstract

The importance of integrating technology and innovation in geriatric care to improve support for the elderly, addressing their unique challenges such as medical, social, psychological, and economic issues. Geriatric nursing is crucial in providing comprehensive care considering physiological, psychological, and social needs. Challenges include age-related diseases, mental health issues, and the COVID-19 pandemic. Advancements in geriatric care include AI-powered apps, gerontechnology, and robots for daily tasks and healthcare monitoring. Telemedicine and wearable health technology are transforming healthcare delivery, while medical advancements like precision medicine and minimally invasive surgeries improve the quality of life for older adults. Preventive care strategies, such as regular screenings and lifestyle changes, are crucial for maintaining the health of the elderly population. A multidisciplinary approach is essential for geriatric care, promoting respect and inclusivity for all ages.

Keywords: Gerontechnology, Telemedicine

1. Introduction

People over 60 years old are considered elderly. Geriatrics is a branch of medicine that deals with the medical care of elderly patients (1). An unparalleled transformation in the worldwide population's demographics is taking place, as the percentage of elderly people is continuously rising (2). The geriatric population is frequently overlooked which brings with it a large number of medical, social, psychological, and economic issues (1). Geriatric nursing is a specialty that provides all-encompassing care to the elderly, considering their unique physiological, psychological, and social needs, thereby enhancing their overall well-being(2).

2. Classification of the elderly according to functional and cognitive status

2.1. Group I elderly (functionally and cognitively fit elderly)

The elderly population aged 60-70, who are physically and mentally fit are categorized under this category, they require health-promoting activities like nutrition, physical activity, social interaction, psychological support, and brain-related activities. The goal is to keep them active, screen for common diseases (diabetes, hypertension), promote bone health, and provide vaccinations, while also ensuring their overall health (3).

2.2. Group II elderly (mild functional limitations or mild cognitive impairment)

The majority of individuals aged 70-80 require social support, including Meals on Wheels, special transportation, and assistance from social workers or children for hospital visits or physical rehabilitation. Comprehensive assessment and rehabilitation can help them become active and independent, requiring physiotherapy, psychological support, and ongoing medical treatment (3).

2.3. Group III elderly (severe functional limitations or cognitive limitations)

The group requires home care or hospice care, requiring a range of services including doctors, nurses, physiotherapists, laboratory services, and pharmacy services delivered to their homes, with the aim of maintaining their comfort (3). Healthcare systems should focus on developing training and education programs for nursing practitioners to meet the evolving needs of geriatric care, integrating geriatric-focused courses with ongoing professional development to equip nurses with the necessary knowledge and skills (4).

3. Challenges faced by elderly

Old age is characterized by irreversible physiological, temporal, mental, and social changes, role losses, and a deterioration in the system's responsiveness to the environment. Aging is not a sickness; rather, it is a stage of life marked by a progressive biological growth and development process resulting in a reduced ability to live and adapt (5).

3.1. Age-related diseases and conditions

Diabetes is a prevalent disease among the elderly that, if left untreated, can result in consequences such as renal disease and visual loss (6). The statistical probability of cancer rises with age, increasing the risk for multiple types of cancer, while it is not solely age-related (7). Degenerative conditions that impair mobility, cause chronic pain and frequently lead to a decline in independence and quality of life, such as osteoporosis and arthritis, present serious health risks (8). Cognitive capacities and day-to-day functioning are significantly impacted by dementia and other neurodegenerative disorders (9).

3.2. Mental health issues

The COVID-19 pandemic has exacerbated the prevalence of mental health issues in the elderly, including depression and anxiety, often misdiagnosed as normal aging symptoms. This is due to misconceptions about mental health in older adults and the stigma associated with mental health issues (10).

4. Advancements

4.1. Geriatric nursing

Geriatric nursing improves the health and well-being of the elderly. Nurses in this sector possess the necessary knowledge and skills to manage age-related health issues such as chronic illnesses, polypharmacy, cognitive impairments, frailty, and falls. Their approach goes beyond disease management, emphasizing person-centred care and improving the quality of life for older persons. Caring for the elderly has various challenges. Geriatric nurses face difficult health challenges, including managing numerous chronic illnesses simultaneously (2). One of the most important talents that geriatric nurses possess is the ability to interact effectively with elderly patients. Many elderly persons have hearing or vision impairments, cognitive challenges, or linguistic barriers, making communication difficult. Geriatric nurses are trained to employ effective communication tactics to ensure patients understand their treatment plans and feel at ease addressing their health concerns. Another essential component of geriatric nursing is the emphasis on preventing and controlling chronic illnesses that are frequent among older persons including diabetes, hypertension, and heart diseases. Geriatric nurses collaborate with patients to create personalized care plans aimed at reducing problems and enhancing overall health (11).

4.2. Social isolation and Alzheimer's disease

Amicus Brain, an AI-powered caregiver app, is revolutionizing the way seniors cope with social isolation. By utilizing AI, chatbots and virtual assistants can provide companionship, reduce loneliness, and offer tailored advice. These AI-powered companions can converse, play games, and provide information, enhancing the quality of life for seniors dealing with challenging diseases like Alzheimer's disease (12).

4.3. Gerontechnology

Combating senior individuals' needs and the term "gerontechnology" refers to the study, creation, and introduction of particular technologies for the benefit of the senior population as a whole or of their chosen groupings (13).

As gerontechnology was first developing, it was found that four categories of technologies had the biggest effects on addressing the requirements of the elderly including

- Technologies protecting against losses (e.g., control over nutrition quality or the quality of the physical and biological environment)
- Technologies compensating for the aging body (e.g., glasses, hearing aids, devices for stabilizing wheelchairs in means of transportation, electric wheelchairs)
- Technologies supporting elderly carers (e.g., video alarms, ergo-nomic toilets)
- Technologies expanding the field of choice for seniors (14).

4.4. Robots in care

- **The Kompaï robot** is an online social aid portal designed to assist senior citizens in daily tasks such as surveillance, mobility assistance, fall detection, shopping list management, social networking, cognitive stimulation, and health monitoring. It can detect dangerous situations, avoid obstacles, recognize speech, and navigate through uncertain settings. Controlled via voice commands and a touch screen, it also features a small hold for assistance (15).
- **Pearl** is an autonomous mobile robot that can react to everyday challenges for the elderly, like reminders and guidance in the surrounding area. This robot can recognize voice, navigate on its own, identify faces, and compress images to enhance online video streaming with senior family members (16).
- **RAMCIP:** The service robot aids elderly individuals, particularly those with memory impairments, to ensure their home safety. It performs tasks like medication reminders, food preparation, emergency detection, and communication with family and friends, ensuring a secure environment (17).
- **The Pepper robot:** Developed by SoftBank Robotics, is utilized in autism therapies, cognitive training, health monitoring, and companionship. It can identify speech, emotions, locate sounds, navigate safely, and interact with its environment using perception modules (18).

4.5. Technological advancements

4.5.1. Role of telemedicine

The use of telemedicine has been revolutionary in the delivery of healthcare, with particular benefits for elderly individuals who have mobility or accessibility issues. Healthcare professionals can diagnose, treat, and discuss with patients remotely via digital platforms, saving elderly patients from the taxing schedule of hospital visits (19). This technology intervention guarantees ongoing health monitoring, delivers medical care right away, and encourages regular communication with medical specialists (20).

4.5.2. Health technology wearable devices

The field of personal health monitoring has seen a significant transformation due to wearable health technology, which includes everything from heart rate monitors and fall warning systems to health-monitoring wristwatches (21). These wearables' real-time data offer priceless insights into a variety of health factors (22). This innovation represents a significant change that is

especially important for the elderly. These devices' instant warnings allow for timely responses to possible anomalies in health, and their ongoing surveillance facilitates better chronic condition treatment (23). As a result, wearable health technology improves treatment quality and makes aging more enjoyable for seniors. In light of the swift advancement of technology, it is imperative to utilize these developments to foster an environment in healthcare that is friendly to the needs of the elderly, improving their general well-being and quality of life.

4.5.3. New treatment methods

One notable development in contemporary medicine is the emergence of increasingly advanced, less invasive, and highly effective therapeutic techniques. Precision medicine is one revolutionary advancement that is bringing in a new era of targeted and personalized care by customizing treatment approaches based on each patient's genetic profile (24). With shorter recovery times, less discomfort, and fewer complications than with traditional invasive procedures, the advent of minimally invasive surgeries has improved patient experiences even more (25). These developments are especially beneficial to the elderly, who often face more obstacles in recuperating from invasive procedures because of age-related issues and maybe pre-existing medical disorders.

5. Strategies for preventive care

Preventive care is crucial in healthcare, involving regular screenings, vaccinations, and lifestyle changes to detect diseases early, prevent infectious diseases, and promote healthy behavior, making it a vital strategy in today's healthcare environment (26). Regular health checks are one of these pillars that is extremely important because it provides a vital means of early diagnosis and prompt intervention, particularly for older adults. Improved health outcomes and more tolerable treatments are frequently the result of early diagnosis. Immunizations are essential for protecting against a wide range of illnesses, some of which can be particularly serious in the elderly due to weakened immune systems. Encouraging healthy lifestyle behaviors like balanced diet, regular exercise, prioritizing mental health, and quitting smoking significantly contributes to disease prevention (27). These all-encompassing techniques are crucial for managing the health-related quality of life of the elderly population, as they successfully lower the incidence of disease, enhance general health, and eventually lengthen life expectancy.

6. Limitations on the successful adoption of innovations in senior environments:

Three crucial success elements may be identified for the successful introduction of innovations and new technologies into senior care:

- The principle of maximal simplicity must be applied in device design and automation, but a balance must be struck to ensure seniors' needs are met before focusing on easy handling and high automation (28).
- Utilizing appropriate language, formats, and channels for communication with seniors; in this context, personalizing the message and keeping in mind the social networks in which seniors operate should be crucial (28).
- Offering seniors psychological support, which includes enhancing their sense of agency and autonomy (28).

7. Conclusion

The advancement in geriatrics has been remarkable over all these years and has also helped to improve the quality of life in the elderly population. With the incorporation of innovative medical practices and a deeper understanding of the aging process, it has become easier to provide proper and precise geriatric care. To date, geriatric care plays an important role in managing complex health issues and also promotes the well-being of the elderly. Gerontechnology too has opened new horizons for older adults to live independently, and safely. These advancements highlight the value of a multidisciplinary approach to meeting the unique needs of an aging

population. As we move forward, ongoing investment in research, education, and technology will be critical to maintaining and expanding these achievements. By encouraging collaboration among healthcare providers, technologists, and policymakers, we can ensure that older adults receive all the necessary care and support they require. Finally, advances in geriatrics benefit not only the elderly, but society as a whole by fostering a culture of respect, dignity, and inclusivity for all ages.

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