



Prifysgol Cymru
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BMHP6027_BIRM: Empowering the Older Person

Week 5- Technological Innovations in Elderly Care

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Lecture Content

- Introduction to Technological Innovations in Elderly Care
- Assistive Technologies: Overview, innovations, and impact
- Telemedicine and Remote Health Care: Benefits and barriers
- Digital Health Tools: Empowerment through apps and devices
- Challenges and Ethical Issues in Technological Adoption
- AI and Robotics in Elderly Care
- Assistive Technology in Dementia Care
- Discussion and Future Directions



Technology to Care for the Elderly



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Introduction to Technological Innovations

The Ageing Population:

As the elderly population increases, there is a growing need for innovative solutions to support independent living, health, and well-being.

Technology's Role:

- Technology is vital in reducing strain on healthcare services, promoting independence, and improving the quality of care for older adults and strengthening the long-term sustainability of the UK's healthcare system

Categories of Technology

Assistive Technologies:

- **Devices** aiding in mobility, safety, and daily living tasks.
- **Telemedicine:** Remote medical consultations, monitoring, and health advice through digital platforms.
- **Digital Health Tools:** Apps and wearables that track health metrics, support medication management, and foster active living.

(Woffindin, 2024)

Assistive Technologies Overview

Assistive technologies help individuals with disabilities or age-related limitations maintain their independence. Examples include...

- **Mobility Aids:** Devices like wheelchairs, walkers, and electric stairlifts that promote physical movement and independence.
- **Home Adaptations:** Smart home systems (e.g., fall detectors, motion sensors, voice-activated assistants) enhance safety and ease of living.
- **Wearable Devices:** Tools like fitness trackers, smartwatches, and health monitoring wearables help track physical activity, sleep, heart rate, and even detect falls.

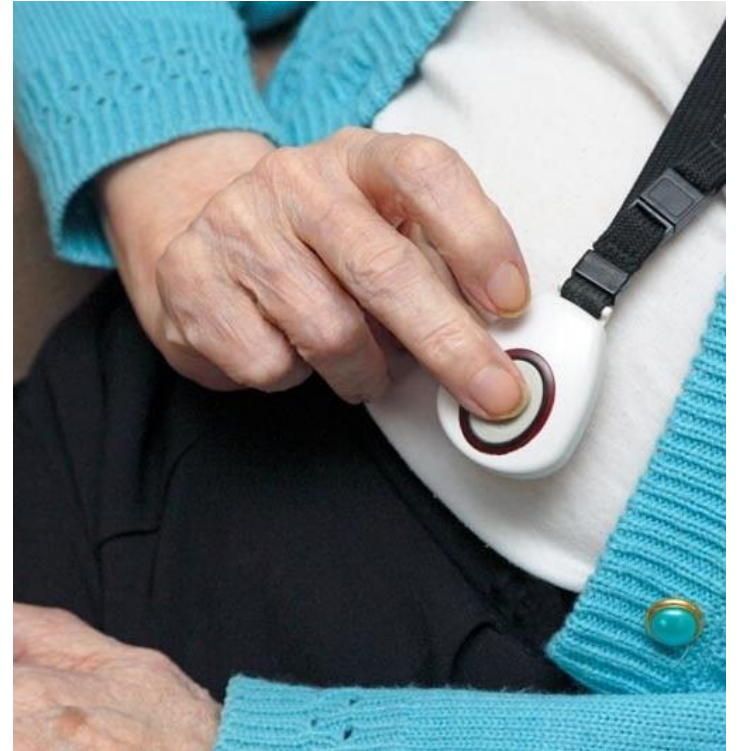
These technologies aim to **reduce caregiver burden** and promote **independence** for older adults in their daily lives



Innovations in Assistive Technology

- Some examples of these include...
- **Robotic Aids:** Robots that provide physical support and companionship.
 - Paro: A robotic seal used in dementia care to provide comfort.
 - Pepper: A humanoid robot used for social interaction and engagement.
 - Giraff: A telepresence robot enabling remote caregiving.
- **Personal Emergency Response Systems (PERS):** Wearables such as LifeAlert that allow older adults to call for help in emergencies.
- **Smart Home Technologies:** Devices like Amazon Alexa or Google Home help older adults control lights, appliances, and even request emergency assistance.

Advantages of these Innovations are...Enhanced safety and security in the home.
Improved communication with family and caregivers.



Pros and Cons of Assistive Technologies

- **Pros:**

- Increased Independence: Helps older adults live more autonomously.
- Improved Safety: Fall detection, emergency alerts, and health monitoring reduce the risk of accidents and undetected health issues.
- Reduced Caregiver Burden: Technologies assist with daily activities, lessening the need for constant caregiver presence.

(WHO, 2024)

Pros and Cons of Assistive Technologies

- **Cons**

- **Cost:** Many advanced assistive technologies are expensive, limiting accessibility.
- **Digital Literacy:** Older adults may struggle to use or adapt to modern technology.
- **Emotional Resistance:** Some may feel a loss of dignity or human interaction with over-reliance on technology.



(Woffindin, 2024)

Activity 1- Assistive Technologies

Group Task

- Get into small groups and follow the instructions for **Activity 1**
- You will find this in this week's Moodle tile

Telemedicine in Elderly Care

Telemedicine refers to remote health services which enable older adults to access medical care without leaving their homes such as...

- Virtual GP Consultations: Patients can consult with doctors via video calls or phone calls.
- Remote Health Monitoring: Devices that monitor vital signs (e.g., blood pressure, heart rate) and transmit data to healthcare providers.
- AI-Based Health Assistants: Tools like Babylon Health provide virtual consultations using symptom-based algorithms.



Benefits of Telemedicine

- Key Benefits:
- **Reduced Hospital Visits:** Elderly patients, particularly those with mobility issues, can receive healthcare from home.
- **Continuous Monitoring:** Chronic diseases such as diabetes or hypertension can be monitored remotely, leading to better preventive care.
- **Convenience:** Telemedicine offers flexible scheduling and instant access to medical professionals.
- Telemedicine also decreases the need for resources (see following slide)



Benefits of Telemedicine

Key Cost Savings Through Telemedicine

- **Reduced Travel and Time:**
- **For Patients:** Older adults, particularly those with limited mobility or in remote areas, no longer need to organise transportation or deal with physical barriers to attending appointments.
- **For Providers:** Healthcare workers save travel time when conducting home visits or rural care. This also reduces costs for community healthcare providers who no longer need to fund transportation for staff.

Benefits of Telemedicine

Key Cost Savings Through Telemedicine

- **Optimised Staffing:**
- Telemedicine allows healthcare providers to make better use of their staff, reducing the need for large teams of receptionists, nurses, and administrative staff to manage patient flow in clinics.
- Remote consultations mean fewer on-site staff are required to manage waiting rooms, check-in processes, and physical patient handling.



Benefits of Telemedicine

Key Cost Savings Through Telemedicine

- **Shorter Consultation Times**
- Virtual consultations are often shorter than in-person visits, as many logistical aspects (e.g., patient travel time, waiting room delays) are eliminated.
- This increases the number of patients a doctor can see in a given day, improving efficiency without increasing staffing levels.
- Follow-up appointments for chronic conditions can be quick and streamlined via telemedicine, freeing up time for more complex cases to be addressed in-person.

Challenges of Telemedicine

- 1. Digital Literacy and Access to Technology:
- **The Digital Divide:** Many older adults do not have the necessary skills or are not comfortable using digital platforms or may not have access to the necessary technology.
- **Access to Devices and Internet:** Reliable internet access and proper digital devices (e.g., smartphones, tablets) are required for telemedicine, which might not be readily available to all elderly individuals, particularly those in low-income or rural areas.

Challenges of Telemedicine

2. Privacy and Security Concerns:

- **Data Protection:** Handling sensitive health information over digital platforms raises concerns about data privacy and security breaches, especially for older patients who may be unfamiliar with data-sharing practices.
- **Consent and Understanding:** Older adults with cognitive impairments (such as dementia) may struggle to understand and give proper consent for telemedicine consultations, complicating the process.

Challenges of Telemedicine

3. Limited Physical Examination Capabilities:

- **Inability to Perform In-Depth Physical Assessments:** Telemedicine is limited in its ability to provide a comprehensive physical examination. Certain diagnostic processes (e.g., checking vital signs, performing physical tests) still require in-person visits.
- **Missed Symptoms:** Some symptoms may go unnoticed in virtual consultations, particularly those related to physical touch or inspection, like swelling or changes in skin tone.

Challenges of Telemedicine

4. Lack of Human Contact:

- **Reduced Personal Interaction:** For many older adults, especially those who are socially isolated, in-person medical visits may serve as one of their few opportunities for direct human contact. Telemedicine removes this face-to-face interaction, which can negatively affect patients' emotional well-being.
- **Emotional Support:** The lack of physical presence can limit the ability of healthcare professionals to offer emotional reassurance, empathy, and comfort, which are crucial in elderly care. Building a strong therapeutic relationship might be more challenging in a virtual setting.
- **Trust and Communication:** Older adults might feel disconnected or less engaged during telemedicine consultations, making it harder for healthcare providers to establish trust, read body language, or assess non-verbal cues that can be important in diagnosis and care decisions.

Challenges of Telemedicine

5. Cognitive Impairment and Telemedicine Usability:

- **Confusion and Cognitive Barriers:** Elderly patients with dementia or cognitive decline may struggle to follow the instructions necessary to engage in telemedicine. They might forget how to use devices or become confused during the virtual consultation.
- **Family or Caregiver Support:** Often, telemedicine for patients with cognitive impairments relies heavily on caregivers or family members to facilitate the process, which can add to the caregiver burden.

Activity 2 – Case Study

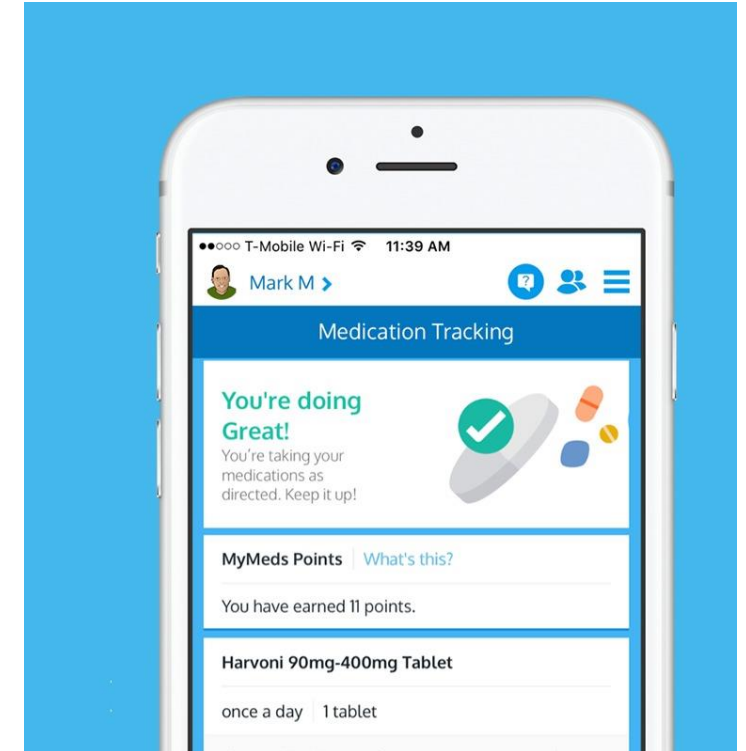
Group Activity

- Please read Alice's case study on Moodle
- Follow the instructions given
- Be prepared to feedback to the class!

Digital Health Tools Overview

These Include...

- **Health Apps:** Tools that promote physical and mental well-being (e.g., MyFitnessPal, Headspace).
- **Wearable Technology:** Devices like Fitbit, Apple Watch, and other smart devices that track fitness levels, sleep patterns, and heart rate.
- **Medication Management:** Apps like Medisafe send reminders to help older adults take their medication on time.





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Empowerment via Digital Health Tools

- **Self-Management:** Older adults can use apps and wearables to manage chronic conditions (e.g., tracking glucose levels for diabetes).
- **Cognitive Health:** Tools like brain training apps and virtual reality are being used to improve memory and cognition, especially for dementia patients.
- **Combatting Social Isolation:** Video calling platforms (e.g., Zoom, WhatsApp) help older adults stay connected with family and reduce loneliness.

Technological Challenges in Elderly Care

- **Digital Literacy:** Many older adults lack the skills to effectively use modern technologies, leading to frustration and exclusion.
- **Affordability:** High costs for devices and services may make them inaccessible to low-income older adults.
- **Resistance to Change:** Emotional and psychological barriers, such as fear of losing human connection, can make technology adoption difficult.

Ethical Considerations

- **Data Privacy:** Ensuring that personal health data collected by devices and telemedicine platforms is secure and not at risk of breaches.
- **AI in Decision-Making:** Can AI-driven care solutions replace human judgment in caregiving?
- **Human Interaction:** Balancing the need for technology with the importance of human empathy in elderly care.

AI and Robotics in Elderly Care

- **AI Diagnostics:** Tools that predict health issues (e.g., risk of falls, cognitive decline) based on health data.
- **Companion Robots:** Social robots like Pepper provide companionship and emotional support to older adults.
- **Care Robots:** Devices that help with physical tasks such as lifting, mobility, and reminders for medications.



Assistive Technology (AT) in Dementia Care

- Dementia affects cognitive functions like memory, problem-solving, and decision-making, making it difficult for individuals to carry out everyday tasks.
- Assistive technologies (AT) have been developed to support independent living and to promote safety for individuals with dementia in their homes.

At the 2025 **Consumer Electronic Show**

New Tech for **Dementia Care**



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Types of AT in Dementia Care

Memory Aids:

- **Digital Reminders:** Devices like apps or smart home systems can remind individuals of daily activities (e.g., medication schedules, mealtimes).
- **Talking Clocks and Calendars:** Audio-enabled devices that remind users of the time, date, and tasks, reducing confusion.
- **Automatic Pill Dispensers:** Ensures proper medication management with alarms and dose scheduling.



Types of AT in Dementia Care

GPS Tracking Devices:

- Worn as watches or bracelets, these devices help locate individuals who may wander or become disoriented, providing peace of mind for caregivers.

Types of AT in Dementia Care

Smart Home Technology:

- **Voice-Activated Assistants** (e.g., Alexa, Google Home) can help control home environments, such as adjusting lights, providing reminders, or calling emergency contacts if needed.
- **Motion Sensors and Smart Lighting:** Automatically turn on lights in dark spaces or alert caregivers if unusual movements occur (e.g., wandering at night).



Types of AT in Dementia Care

Safety Systems:

- **Fall Detection Devices:** Wearable technology or floor sensors that alert family or caregivers in the event of a fall.
- **Home Monitoring Systems:** Video cameras and sensors can monitor home environments and send alerts if something unusual happens (e.g., leaving the stove on, not returning to bed).

Real Life Examples

- **Just Checking:** A system used in dementia care that tracks movement patterns in the home, helping families or caregivers monitor daily routines remotely to identify potential problems.
- **Lively:** A smart pillbox that alerts caregivers if medication is missed and includes built-in GPS for monitoring.

(Osborne, 2022)

Benefits of Assistive Technology in Dementia Care

1. Increased Independence:

- These technologies **empower** individuals with dementia to continue living **independently** in their homes, reducing the need for constant supervision.
- **Reduction in Caregiver Burden:** Monitoring devices, alerts, and memory aids allow caregivers to manage care remotely, providing reassurance while reducing stress.

Benefits of Assistive Technology in Dementia Care

2. Enhanced Safety:

- **GPS tracking** and **fall detection** systems reduce the risk of wandering and falls, which are common in people with dementia, especially in the later stages.
- **Remote Monitoring:** Enables family members or professionals to intervene if there are signs of confusion, agitation, or health emergencies.

Benefits of Assistive Technology in Dementia Care

3. Improved Quality of Life:

- **Familiar Environments:** Allowing individuals to stay in their own homes helps maintain a sense of normalcy and comfort, which can alleviate some symptoms of anxiety or confusion.
- **Cognitive Engagement:** Memory aids and voice-activated systems can help individuals maintain daily routines and cognitive activity, potentially slowing cognitive decline.



Challenges and Limitations of Assistive Technology in Dementia Care

1. Technology Acceptance:

- Some individuals with dementia may have **difficulties** using technology, or they may feel **uncomfortable** with certain devices, like cameras, due to concerns over privacy.
- **Digital Literacy:** Older adults, especially those with cognitive impairments, might struggle with learning how to use new technologies.

Challenges and Limitations of Assistive Technology in Dementia Care

2. Cost and Accessibility:

- **High costs** of purchasing and maintaining devices may prevent some individuals or families from accessing assistive technologies, particularly in low-income households.
- **Limited Customisation:** Not all technologies are adaptable to the specific stages of dementia or individual preferences, requiring more personalised approaches.

Challenges and Limitations of Assistive Technology in Dementia Care

3. Ethical Considerations:

- **Privacy:** Continuous monitoring and tracking may raise concerns about personal privacy, especially in the use of GPS trackers and home cameras.
- **Autonomy vs. Safety:** While technology can protect individuals with dementia, over-reliance on monitoring systems might undermine their sense of autonomy.

The Future of AT in Elderly Care

- More **user-friendly** designs and affordable options are needed to ensure wider adoption of these technologies in dementia care.
- **Integration with healthcare systems:** More comprehensive integration of assistive technologies into routine healthcare can improve outcomes, allowing healthcare providers to monitor and adjust care plans in real-time.

Technology in Dementia Care for Hospital and Residential Settings

In hospitals and residential care facilities, technology plays a critical role in improving care quality for individuals with dementia. These technologies help manage behaviours, ensure safety, enhance communication, and improve overall well-being.

Technology in Dementia Care for Hospital and Residential Settings

1. Patient Monitoring Systems:

- Real-Time Monitoring: Hospitals and care homes use technologies like wearable sensors and bed occupancy monitors to track patient movement and detect potential falls or wandering.
- Pressure Mats: Placed near beds or doorways, pressure mats alert staff when a patient with dementia attempts to get up or leave their room unsupervised, preventing falls or elopement.

Technology in Dementia Care for Hospital and Residential Settings

2. Digital Care Plans and Electronic Health Records (EHR):

- **Integrated Care Plans:** Digital platforms allow healthcare providers to access comprehensive care plans and medical histories quickly, ensuring all staff are aligned on the patient's care needs.
- **Real-Time Updates:** Care staff can update health records in real-time, providing a coordinated and personalized approach to care.

Technology in Dementia Care for Hospital and Residential Settings

3. Cognitive Engagement Tools:

- **Therapeutic Robots:** Devices like Paro the seal provide emotional comfort and reduce agitation through interaction, helping to calm patients during stressful moments.
- **Interactive Screens and Apps:** Touchscreen technology and apps can provide cognitive stimulation through activities like memory games, music therapy, and visual storytelling.

Technology in Dementia Care for Hospital and Residential Settings

4. Communication Aids:

- **Voice-Assisted Devices:** Voice-activated systems (e.g., Alexa, Google Home) can assist care staff in providing reminders or answering basic questions, reducing patient confusion and improving communication.
- **Translation and Communication Apps:** For patients with dementia who struggle to communicate or who speak different languages, apps can translate speech or offer visual communication tools to bridge gaps.

Technology in Dementia Care for Hospital and Residential Settings

5. Wander Management Systems:

- **GPS Tracking:** Many residential care facilities and hospitals use wandering management systems with GPS tracking. These systems alert staff if a patient attempts to leave designated areas, helping to ensure their safety.
- **Geofencing:** Virtual boundaries can be set within the facility, and alerts are triggered when the person moves outside safe zones, allowing staff to respond quickly.

Benefits of Technology in Dementia Care Facilities

Improved Safety:

- Technologies such as fall detection sensors, pressure mats, and wander management systems reduce the risk of falls and elopement, protecting patients from harm.

Enhanced Personalisation:

- Digital care plans and cognitive engagement tools allow care providers to tailor activities and treatments to the individual needs of each person with dementia, improving the quality of care.

Benefits of Technology in Dementia Care Facilities

Reduced Staff Workload:

- Automated systems like real-time monitoring, voice-assisted devices, and electronic health records streamline administrative tasks, allowing staff to focus more on direct patient care.

Better Emotional Support:

- Therapeutic robots and cognitive engagement tools help reduce agitation, anxiety, and loneliness in people with dementia, particularly in unfamiliar environments like hospitals.

Challenges of Technology in Dementia Care Facilities

Cost of Implementation:

- High initial costs for installing advanced monitoring systems and purchasing therapeutic devices can be prohibitive for some facilities.

Training and Adoption:

- Staff may require significant training to effectively use new technology, and resistance to change can slow adoption.

Privacy Concerns:

- Monitoring technologies, especially those that involve cameras, raise ethical questions about privacy and consent in dementia care.

The Future of Technology in Dementia Care Facilities

Consider the following questions...

- How can hospitals and care homes overcome the barriers to adopting advanced technology in dementia care?
- What future innovations could enhance dementia care in institutional settings?
- How can technology be balanced with person-centred care in dementia treatment?

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