



(REVIEW ARTICLE)



Assistive technologies and home monitoring

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Abstract

Assistive technology is a wide-ranging technology.

Technology used to assist the people with the disabilities or aged citizens is the main intent of assistive technologies².

Disabled person struggles to perform day to day activities therefore, Assistive technologies will enhance the boldness among the person to conduct the activities in daily living severally. Home monitoring is one in all the rising practices to assist and monitor the patients outside the normal clinical settings, like within the home which can build up approach towards self-care.

The main objective of this review is to acknowledge numerous studies allotted by various authors to accumulate the information regarding developments, analysis works and upgrades within the assistive technologies and home monitoring.

Keywords: Assistive technology; Home monitoring; Self-care; Rehabilitative; Playacting

1. Introduction

1.1. Assistive technology

Assistive technologies introduce to devices or gadgets that supports an individual to take care of or boost their ability, safety, health and happiness.

This technology empowers people to measure healthy, effective, self-determined, and majestic lives and to participate in education, the labor and social life. It additionally decreases the requirement of traditional health services, abiding care and therefore the work of health care help.

1.1.1. Assistive technology are used

- To help those who have no skilled medical needs to manage their disabilities
- To make life easier for people with disabilities
- To uplifts the confidence and quality of a life
- To promote independence and determination
- For rehabilitative help

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- To help direct attainable risk in and around home
- To help with memory and recall
- To help the disabled person to feel less stressed
- To progress towards smart environment

1.2. Different types of assistive devices

1.2.1. Aids for Activities of Daily Living

These are the uniquely designed gadgets to help those who struggles in playacting activities in daily living.

Commonly used devices are as follows:

- Universal cuff, drug organizers, mug with 2 handles, adapted chopsticks for feeding.
- Shower chair, bath board, bathroom grabbers, grooming aids for private hygiene.

1.2.2. Augmentative and different communication devices:

These devices assist the people who have communication disorders to convey their thoughts.

Commonly used devices are as follows:

- Hearing loop
- Speech synthesizers
- Speech generating devices
- Modified typewriters

1.2.3. Computer access aids

These devices are used for people with disabilities.

Commonly used devices are as follows:

- Light pointers
- Alternate or modified keyboards
- Special software package
- Voice to text software package

1.2.4. Mobility Aids

These devices are specially designed to assist and correct the walking pattern, equilibrium and mobility.

Commonly used walking aids are as follows:

- Crutches
- Canes or walking aids
- Walkers
- Electric or manual wheelchairs

1.2.5. Prosthetics and Orthotics

Prosthetic devices are artificial replacements for those patients with missing limbs and orthotics devices are used to support and bracing of weak joints or muscles.

Commonly used devices are as follows:

- Prosthetics: artificial eyes, teeth artificial limbs
- Orthotics: wrist braces, arm braces, spinal orthotics, heel casts, etc.

1.2.6. Sensory aids for impaired hearing/vision

These devices are used to raise auditory signals, chiefly speech and to enhance vision.

Commonly used devices are as follows:

- Electronic travel aids
- Position locator devices
- Hearing loop
- Visual alerting systems
- Telecommunication devices
- Personal amplifiers

1.2.7. Seating and Positioning:

These are used to provide body support to help people perform daily work.

Commonly used devices are as follows:

- Standing tables
- Positioning belts
- Cushions and wedges

1.2.8. Wearable devices

These are easy handling devices.

Commonly used devices are as follows:

- Smart watches
- Bracelets with GPS
- Necklaces with medical monitoring of pulse respiration, oxygen levels, etc.

1.3. Home monitoring

Home monitoring is the utilization of technology to monitor the health of the patients within their homes .

Home monitoring system helps the patients monitors themselves to look at the data about their health and also helps the medical practitioners analyze the situation of the patients.

1.3.1. Benefits of home monitoring:

- Improves self-regulation and care plan of the patient
- Reduces expenses of the patient and enhance work productivity
- Improves patients experience and satisfaction
- Boost the connectivity of the caregiver and involvement in care
- Builds the patient's engagement

1.3.2. Types of home monitoring devices:

- Continuous Glucose Monitoring Device
- Affordable surgical Robots
- AI-backed Computer Vision
- Mixed Reality Surgical Devices
- Handheld Pulse oximeter
- Implantable loop recorder
- Infrared ear thermometer
- Surgical display monitor
- Cardiac output stimulator

1.4. Literature review

1.4.1. Effectiveness of task-specific training using assistive devices and task-specific usual care on upper limb performance after stroke¹

A systemic review and meta-analysis

- Author: Samantha G. Rozevink
- Study: Effectiveness of task-specific training using assistive arm devices (TST-AAD) compared with task-specific usual care (TSUC) on the upper limb performance of patients with a stroke.
- Result: Task-specific training using assistive devices is effective in improving the upper limb performance in the subacute stage of stroke although TST-AAD did not appear to be superior over TSUC in the chronic stage.

1.4.2. Assistive technology to monitor activity, health and wellbeing in old age²

The wrist wearable unit in the USEFIL project

- Author: V. Ahanathapillai, J. D. Amor, and C.J. James
- Study: Assistive technology to monitor activities and the wrist wearable devices developed for the USEFIL project, the various health indicators extracted from its inbuilt sensors and how these are used to understand the health and wellbeing of the older person.
- Result: Assistive technology that combines both wearable sensors and environmental sensors to provide assistance in maintaining the independence of an older person. The wrist wearable device act as a stand-alone device to monitor the physical activity of a person.

1.4.3. Home based assistive technologies for elderly³

Attitudes and perceptions

- Author: George Demiris, PhD, Marilyn J. Rantz, PhD and Harry W. Tyrer, Jr, PhD
- Study: Assessment of the seniors' attitudes towards and perceptions of smart home technologies.
- Result: Technology can enhance home monitoring if designed according to person's needs rather than following technological developments.

Acceptance and use of innovative assistive technologies among people with cognitive impairment and their caregivers⁴

- Author: Bjorg Thordadottir, Guest Editor: Fernando H. Magalhaes
- Study: synthesize knowledge on facilitators and barriers related to acceptance of and use of IAT among people with CI and their caregivers.
- Result: IAT based interventions can be used by the people with CI and their caregivers. This finding also suggests that there is need for more individually designed IAT.

1.4.4. Assistive technology and adaptive equipment for children with cerebral palsy⁵

- Author: medically reviewed and edited by Gina Jansheski, M.D.
- Study: The use of assistive technology devices can provide a child of cerebral palsy with great numbers of benefits. Various techniques for assistance used are reviewed in this article.
- Result: Professionals often uses assistive technology in order to assist the children with cerebral palsy to improve their condition such as electronic communication boards, speech generating devices, eye tracking devices, hearing aids, etc.

1.4.5. Remote monitoring of covid-19 positive high-risk patients in domestic isolation: a feasibility study⁶

- Author: David Wurzer, Paul Spielhagen, Adonia Siegman, Ayca gercekcioglu, Judith Gorgrass, Simone Henze, Yuran Kolar, Felix Koneberg
- Study: To establish home monitoring system in the setting when a COVID-19 patient develops severe symptoms and needs to get him/her to the hospital as soon as possible which is not monitored at home.
- Result: There was successful organization of a remote monitoring system in a pandemic situation.

1.4.6. Essential devices for adapting the home after stroke⁷

- Author: Henry Hoffman
- Study: To rehabilitate and maintain the self-sufficiency of a stroke survivor by using assistive technology.
- Result: Living at home after a stroke is assisted by taking care of yourself, taking medications on time and by devices such as grab rails, slip resistant mats, shower chair, long handled shoe horn, Velcro fastenings, rolling walker, cane or quad cane, wheelchair, etc.

2. Conclusion

The above study herewith can be concluded as, Assistive devices used in Rehabilitative treatment of the old age patients or persons with any kind of disabilities are useful in treatment of the patient, but if these procedures are followed along the whole day with self-monitoring or Home monitoring throughout the day it would be an added benefit to the patient. Rehabilitation is a continued process; it is not a limited or concise process. This article will provide a further approach to the patient for gaining self- sufficiency and overcoming the disabilities.

Compliance with ethical standards

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Disclosure of conflict of interest

I have read and agree to abide by the Home monitoring Conflict of Interest policy. I acknowledge that I must disclose any conflict of interest, along with a description of any personal business interest, affiliation, or activity with any entity, whether or not active in the Home monitoring, which may give rise to a conflict of interest. I acknowledge that I understand that the Home monitoring of assistive devices, Conflict of Interest policy extends to my partner, a business or other entity with which I am associated and all members of my immediate household. I also understand that it is my obligation to promptly reveal any changes in my personal business interests, affiliations or activities which may give rise to a conflict of interest, by updating my disclosure statement.

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