

WEARABLE DEVICES

Firas Sarhan, Director of Centre of Excellence for Technology Enhanced Care, explores the benefits of wearable assistive technology

There are key major challenges facing the health and social care sector in the coming years closely linked to the increasing number of elderly individuals with multiple long-term conditions. Furthermore, the cost of care is on the increase at a time when the country is facing austerity measures to become more efficient in funding allocation and service redesign of care pathways for individuals. In addition to this the health and social care sectors are facing major challenges in recruiting health and social care professionals that will be able to deliver care. The need for assistive technology is increasingly becoming more important as it is being used as a tool to identify problems and prevent its development by allowing early intervention based on the data being collected regarding the individual's wellbeing.

The evolving use of assistive technology such as wearable devices and sensors for those with long-term chronic conditions gives

professional access to address and review their activities of daily living, wellbeing and quality of life based on already established valid and reliable electronic assessment tools linked specifically to their medical condition. Wearable assistive

technology has started playing a major role in individuals' lives as the number of people using such technology is on the increase. In 2017 19% of UK residents owned at least one of these devices; either Fitbits or Apple Watches. These assistive technology devices can collect data independently and freely without any bias or manipulation. Wireless, implantable sensors can continuously measure key vital signs such as temperature, pulse, respiratory rate, oxygen saturation, motion, and blood pressure. The continuous measurement can inform professionals of the wellbeing status of the individual which allows early intervention to address any health or social care related problem, as well as allowing individuals to be engaged within their own care, ensuring they are better informed and empowered to manage their own condition.

Further benefits of these wearable assistive technology devices is

DID YOU KNOW?

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that they allow people to maintain wellbeing through increasing activity and mobilising within their own homes. Furthermore, wearable devices can identify and recognise signs of stress and anxiety among individuals with long-term conditions which could be used effectively by professionals to implement early intervention to address any mental health condition that develops because of a long-term condition.

DAILY INFORMATION

Advanced assistive wearable technology can be used to accurately track the daily living activities of individuals. This information could be used to engage and develop a remote rehabilitation programme for individuals to allow better recovery post-discharge from hospital or to develop a remote programme to maintain wellbeing and prevent medical problems developing, such as limited mobility, poor nutrition, muscle wastage and development of pressure ulcers. The application of such programmes using wearable assistive technology would allow and facilitate engagement and motivation of individuals with long-term conditions to maintain an active and healthy lifestyle through adherence to remote rehabilitation programmes.

DOMESTIC MONITORING

The evolution of advanced wearable technology allows for domestic environment monitoring for safety and enables professionals to recognise any changes in an individuals' daily routine. It can also assist in maintaining a comfortable living environment through sensors that can monitor home temperature, humidity and alert appropriate services if there is any fire or floods within the home. The wearable technology could also have an added

value for the individual's personal safety by limiting entry into the property or by locating individuals who have wandered out of their own home alone without a carer or family member. The application of such technology will allow a focused and structured approach to assess signs of any deterioration of the individuals medical condition and allows early intervention.

Further examples of how wearable assistive technology can help are:

- 1 MONITORING OF PERSON-CENTRED PHYSICAL ACTIVITY BY USING A WRISTWATCH OR STEP ACTIVITY MONITOR**
This offers the ability to accurately measure physical activities and assess the physical performance of individuals, linking it to their medical condition and establishing the appropriate decision-making process for early intervention to maintain safety and wellbeing.
- 2 PARTICIPATION AND EMPOWERMENT OF INDIVIDUALS**
The use of wearable technology allows the individuals to be more engaged with their own life and situation. Being empowered in your own care and life situation reduces the risk of social isolation.
- 3 REST AND SLEEP QUALITY**
The use of advanced technology can assess the duration, pattern and quality of sleep linking this to the individuals' health and wellbeing, such as low moods, fatigue and cognitive function decline.
- 4 AUTONOMIC BODILY FUNCTIONS**
It allows the measuring of vital signs which could be used as a reference point for any future changes with the individuals medical condition and allows proactive management to prevent complication development. Bodily systems that could be monitored using wearable assistive technology include, cardiovascular, gastrointestinal and sexual dysfunction, and problems with thermoregulation.



The key issues that need to be considered when using wearable devices are: who owns and has access to the data that's being collected? And who is responsible for the protection of such data from being misused or mishandled? Furthermore, the implementing organisation should have the legal and ethical framework well established parallel to the professional guidelines on using assistive technology to protect individuals using it and professionals who are prescribing such a new method of care.