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WEARABLE TECHNOLOGY IN NURSING

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Gulsun Ozdemir Aydin[1], Nuray Turan[2], Nurten Kaya[3]
[1]Istanbul University, Florence Nightingale Nursing Faculty, Department of Fundamentals of Nursing. gulsunoz@istanbul.edu.tr
[2]Istanbul University, Florence Nightingale Nursing Faculty, Department of Fundamentals of Nursing. nkaraman@istanbul.edu.tr
[3]Istanbul University, Health Sciences Faculty, Department of Midwifery. nurka@istanbul.edu.tr

ABSTRACT
Nursing care are changing and evolving every day. Wearable technology has gained the interest of nurses. Wearable technology devices are being developed to help people live healthier lives and to know their bodies better through a complex network of interrelated tools. These devices worn on the body that can capture data such as heart rate, gait abnormalities, heart rhythms, number of calories burned, and even hours slept. Many people already have cell phones, computers, tablets, or other devices that networked together with other devices, allowing caregivers, care providers, and even friends and family to monitor functioning and have historical records on a day-to-day or minuteby-minute basis. The system's software can use the data from these sensors to build a personalized profile of the user's physical performance and nervous system activation throughout the entire day—providing a truly personal medical record that can revolutionize healthcare. Wearable technology allows for data capture that is reliable and easy to retrieve and uses objective measures to enhance clinical decisions. Nurses are going to be increasingly responsible for patients who use wearable technologies. Nursing should capitalize on the wearable technology phenomenon by being visionary, vocal, and proactive. Because, wearable technology is part of the future of nursing.

Keywords: Wearable technology, quality of life, making decision, nursing care
JEL Codes: M30

1. INTRODUCTION

The needs for higher quality and better efficiency in health and medicine both at home and in the hospital are becoming more important as the population is growing increasingly older. An inseparable part of the solution to provide health care is provided by wearable technology (Axisa et al., 2005). Wearable technology has aroused the interest of researchers and clinicians over the past decade (Bonoto, 2003). The enormous benefits that could be related to long-term monitoring of individuals at home and community settings result in the motivation for the improvement of wearable sensors and systems (Bonato, 2010). When wearables are integrated with core medical systems, physicians, nurses and hospital staff can be allowed to become exactly mobile, using their hands to work while having access to the relevant, contextaware information, by wearables. Intelligent biomedical clothes and wearable ambulatory health-monitoring systems can function as a key facilitator for life-long continuous health monitoring in terms of all individuals.

2. WEARABLE TECHNOLOGY

2.1. Rehabilitation

By the effect of health care economy which is increasingly becoming difficult, the rehabilitation program of the patients is affected with the decrease in the length of hospital stay of stroke patients. This situation has revealed the need for finding new ways by the clinicians and scientists in order to increase the quality of life of the individuals, to make the physical movement safe, and to produce solutions for the individual (Gürşen, 2013). In this context, there are many wearable

technological care products in the planning of rehabilitation services. Therefore, to recognize the range of wearable products used will expand the application areas of nursing.

Wearable products to support individuals with neurological problems are mainly available in rehabilitation services. The activity level can be improved through the sensors installed in these patient groups and individual-specific motion algorithms can be produced. Patients in physical therapy and rehabilitation units wear pedometers and accelerometers. This wearable technology provides information about the physical activity level of these patients and indicates the state of achieving real objectives regarding the individual's level of exercise (Wilson, 2016). With these tools, the measurement allows for monitoring in the patient's own natural environment. In the past, the nurses were performing measurement in specific areas created for this patient group and relied on these results. However, nowadays, the accelerometer device with noninvasive sensor for patients after stroke is an important tool that records the development of the exercise program given to the patient and provides data entry (Salazar et al., 2014).

The use of wearable technology products in rehabilitation patients plays an important role both in following up the patients and in determining the level of movement of individuals. Another wearable technology used in neurological rehabilitation is the wrist-worn accelerometer, which is used to detect epileptic seizure. This device provides important data in producing an algorithm for an unexpected stroke situation by collecting tonic and clonic contractions (Wilson, 2016).

Another wearable technology product used in Parkinson's patients is eyeglasses and earphones that provide virtual reality. Virtual reality glasses are used to prevent falls (Espay et al. 2010). These glasses copy the surrounding area of the individual and make the patient feel that he/she is in the real world. The glasses perceive the movement of the patient with accelerometer and facilitate the walking of the patient by creating a dynamic checkerboard view over the actual floor covering. The floor covering that moves simultaneously with the patient prevents patients from freezing and ensures them to walk at a flowing speed. The sounds of the steps about how to take a step are accompanied by the earphone (Espay et al., 2010; Wilson, 2016).

2.2. Monitoring

Monitoring is very important in diabetes mellitus, neurology illness, cardiac disease and stroke. For example, one of the wearable technology products used in the identification and diagnosis of diseases in the cardiology clinic is the holter device. This device remains on the patient for 24-48 hours, and the patient's cardiac rhythm, pulse and blood pressure values can be recorded and monitored via electrodes. Another tool used in heart diseases is cardiac pacemaker. Cardiac pacemaker provides the function of the heart by creating an electromagnetic field to the heart and giving electrical activity to the heart (Wilson, 2016). The devices that are designed to be used in the control of diabetes and that give insulin according to the glucose ratio in blood by continuously measuring the blood sugar are widely used in today's diabetic patients. The hand hygiene monitoring monitor developed by Levchenko, Boscart, Fernie (2011) for the prevention of hospital infections entirely focuses on nurses' hand washing, is used in the prevention of hospital infections and seems to have successful results. Hand asepsis is provided by sending a reminder if the nurse did no wash her hands before or after the nurse enters the room through the sensor that can be mounted on the wall and the nurses have. It is seen that these products, which are included in the literature for monitoring purposes, have been solved by a portable sensor for the treatment of both healthcare professionals and patients.

Although nurses are not directly responsible in these treatment and care practices related to sick individuals, they impose responsibility for patient education about the use of the patient's wearable technology products and the points that the individual should pay attention to. Therefore, they make it compulsory for nurses to have knowledge about the use of the wearable products and the characteristics of the product.

2.4. Digital Medication Systems

Medication management is a complex and multifaceted operation that involves several people and numerous steps (Agrawan, 2009). In 1995, the first electronic medication management (eMAR) system was developed. This technology was improved to help reduce medication errors, organize the medication administration process and develop documentation (Moreland et al., 2012).

The eMAR makes it possible for nurses to confirm the five rights of medication administration, to control the doctor’s order and to document the medication administration and also provides links to such data as laboratory values, pain levels and vital signs (Moreland et al., 2012). The pharmacy dispensing systems, bar-coded medication administration, electronic medication reconciliation, and personal health records are included in these systems (Agrawal, 2009; Cheung et al., 2009).

2.3. Smiluation in Nursing Education

Simulation represents the closest form of reality although it is not the practice of wearable technology. In Turkey and all over the world, the interest in simulation applications to improve patient safety and patient care in the education of healthcare professionals has increased especially in recent years (Sarıkoç, 2016). The fact that learning is easier in simulators designed by creating a virtual environment and that to teach how to cope with unexpected situations provide a safe application environment for healthcare professionals about how to use a new technological product.

The purpose in simulation applications is to be able to see the effectiveness of the attempt on the simulator which has real anatomical structures and dynamic physiology and which imitates them. In this context, the fact that the nurses can perform their practices in these technological educational materials from the nursing basic education will improve the technology use and learning skills of nursing. In addition, its adaptation and integration to day care technologies will increase, and it will be better adapted to the working principles of wearable technology products applied on patients (Kurban, 2015).

3. EFFECTS OF WEARABLE TECHNOLOGY INDUSTRY ON NURSİNG

In the world population which is getting progressively older, it is aimed to improve the quality of life of patients by using wearable technology products in the treatment, care and follow-up of patients due to the increase in chronic diseases and the occurrence of permanent health problems. In this context, it will not be possible for nurse, who is the most important component of the health care team, to be insensitive to technology.

The needs of a man of the developing and changing world provide nurses with innovations, and research-development investments are increasing for nurses regarding the designing and finding new products for their own professional practices. Armed with knowledge on how to make inventions a reality, nurses now need to see their ideas evolve into new applications improving lives. In this regard, nurse educators and researchers need to lead both students and clinicians. When nurse entrepreneurs have new ideas on wearable technology, it is necessary to get support from the relevant authorities on how to develop this idea, how to apply it and how to concretize it. In this context, the relevant supports are available from universities and Turkish Patent Institute in Turkey.

4. CONCLUSION

Nurse inventors have a very essential role in nursing because of the fact that nurses are kept in a position to observe what is needed to help patients, improve and recover. The wearable technology will be pushed to become a strong force in nursing practice by the partnerships with developers, designers and the other members of healthcare teams. Since wearable technology is a part of the future of nursing, nursing should benefit from the wearable technology phenomenon by being visionary, vocal and proactive. It is essential for professional nursing to be involved in the process of improving and applying digital equipment which can have a big influence on health and well-being (Hansman, 2015).

Thus, it is necessary for nursing educators to allow nursing students to learn about research, development, production and marketing of the inventions in order to help patients. The fact that nurses have inventions that will make easier their professional practices or meet a necessity will make nursing stronger and will be the biggest indication that nursing produces and uses its own information.

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