Virtual Reality and Pain Management

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ABSTRACT

Invasive procedures, which are commonly used in diagnosis and treatment of diseases, are known as painful procedures. Cognitive behavioral implementations in pain management are used as nonpharmacological method. In the recent years, developed virtual reality, thanks to the advancement of computer technology, falls into many different methods which are used in these implementations. Virtual reality makes people to feel that they are in a different environment by using human machine interfaces. Patients give their attentions to the environment that they see and process of pain signal operations slows down and pain perceived less. In this essay, activity of virtual reality on pain in invasive procedures will be examined.

Keywords: Invasive Procedure, Pain, Virtual Reality, 3D.

INTRODUCTION

In every term of the history, confronted pain by humanity, is a subjective and complicated subject that develops with individual-specific experiences. Pain which is felt by everyone without looking age, gender or economical status, can be defined as unwanted experience that leaves inadequacy effect and persistent feelings on individuals. [1-3]

Another definition, which is accepted universally, was done by Taxonomy Committee of International Association for the Study of Pain which was founded in 1974 and still continues its studies. According to the committee, “Pain; is a sensory and emotional experience that resulted from a specific part of a body or related with potential tissue damage or not and also related with past experiences of individual.” [4]

In order to emphasize the clinic importance of the evaluation of pain, American Pain Society (APS) was published “pain as 5. Vital finding” statement, in 1996. Purpose was the draw attention to the evaluation of pain by giving importance likewise other four vital findings. [5-7]

Pain, has been seen since the start of the history of mankind, despite the significant improvements in the contemporary health sciences, can still be seen and is still one of the major reasons that patients require medical assistance. Millions of patients from all around the globe, appeals to the medical facilities with a pain issue. Unfortunately, necessary precautions are ineffective and pain of the most of the patients cannot be dealt with. It is also known that, life quality of these patients decline due to the pain, hospitalization period extends and death ratios increase. [8]

In the literature, it is stated that invasive procedures that implemented by health professionals cause pain. [9-14] Efficient pain management is a human right and priority of the care. [15] Nurses who are member of occupation that plan and manage
the care, take efficient role in the diagnosis of pain, control of pain by using pharmacological and nonpharmacological methods and evaluation of results, because they are with the patient more than any other health professionals. [16]

In the invasive procedures which are implemented in health care environments, from past to today, many various non pharmacological methods and techniques that oriented at pain management, were tried. [13,17-19] In the recent years, virtual reality that developed as a result of advancement in computer technology, is used for cognitive-behavioral method in pain management.

**Purpose**

In this review paper, purpose; is examine the activity of virtual reality application on pain in invasive procedures.

**MATERIALS AND METHODS**

The studies in English published until September 2016 in Medline database were found with “virtual reality”, “pain”, “invasive procedure”, “3D” and “nonpharmacological methods” keywords and reviewed.

**Virtual Reality (VR) Application**

Virtual reality (VR) application, is a concept that formed by oxymoronic virtual and reality words. According to Turkish Language Institution, virtual means imaginary, not real meaning, takes its origin from Latin word “virtualis”. On the other hand, reality is defined as the real one, all of the existed things, truth. [20]

Virtual reality that appeared as a concept in 1950s, is started to use in application areas in 1900s. [20] As term, it was first used by Jaron Lamier in 1989. In those times, these systems generally were carried out with computer systems that have ability of real time animation and controlled with chief fixed device and position follower. [21]

Virtual Reality was used for space and military researches as computer-based, high-cost technology for many years, and in the recent era, with the different applications which are developed for mobile devices, its usage in medicine, education, entertainment, librarianship, museology, architecture and industrial designs areas became widespread. [20,22]

Today, three dimensional VR has been make android based smart devices which easy to reach and common. In the system, display is obtained by using a simple combination of framed optic lenses which holds patient's point of view perpendicular to the direction as holding a phone at a fixed distance. [23] Three dimensional animation devices system of work based on stereographic view features. After the installation of related applications to smart phone, device divides the screen into two. With the help of acquisition of different images for right and left eye, reflection of the spatial existence of a three-dimensional animated object is obtained. [24]

VR is a simulation model that gives reality feeling to its participants, computer based created, and gives opportunity to mutual communication. The most main feature of the VR which separates it from other similar applications, it gives individuals a reality feeling. [25]

**Virtual Reality Application in the Pain Management of Invasive Procedures**

VR which is a type of computer system that uses human-machine interface, is used in many different application which...
known as medical procedure, for pain management in the recent years.

According to the hypothesizes of researchers, VR works as a nonpharmacological method on complicated pain modulation system of body by using cognitive and attention processes. Despite of lack of explanation about neurobiological mechanisms, researches interestingly state that positive results are obtained in the management of pain. [26]

When the patients feel that they are in the visual, they get away from the pain efficiently. Therefore, pain attention lowers. [27]

In the recent years, as a distraction application for pain, VR is commonly used in medical care for dulling the pain. In the applications such as burn debridement, injection applications, wound care, dental pain, endoscopic treatment, and chronic phantom pain, chemotherapy applications, studies that show the activity of VR in pain management are existed. [26-29]

Biermeir et al (2007) were stated low pain point in the group which was image watched during venous access. [30] In the study of Oyama et al (1999), they stated that VR application in chemotherapy infusion lowered the pain significantly. [31]

In the randomized controlled study which was conducted by Wint et al (2002), they explained that during the lumbar puncture process in cancer diagnosed patients, patients who used virtual reality glasses, stated low pain point but there were no statistically meaning. [32]

Gold et al. (2005) examined 100 children (age 8-12 years) receiving routine outpatient blood draw and reported a lower frequency of moderate to severe levels of pain intensity compared with children in the other three conditions. [33]

CONCLUSION

Today, VR is used in painful medical procedures because it’s easy to reach smart phone technology, low cost and movable features. In the conducted studies, virtual reality activity in the pain management which occurs in invasive procedures, was proved. However, in the literature there are limited number of studies exist, therefore more studies are needed.

REFERENCES


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