Application of Virtual Reality Technologies in the Nursing Profession

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Introduction

Nursing, which has the responsibility of determining the needs in the health and disease situations from the birth of the human to the death process and solving problems by planning the appropriate initiatives, is an applied health discipline and a scientific art that renews itself with scientific, technological, sociocultural changes from past to present and deals with the health of the individual/family and society (Yildiz, 2019:1).

In twenty-first-century education, technology is constantly coming across as an evolving and regenerating factor. As new teaching technologies are developed, different learning methods and processes are forming other than traditional learning methods. One of these emerging methods is virtual reality (VR) technology. Virtual reality is the projection of three-dimensional images animated on a computer to people like a "real world" with the help of some devices. These virtual reality-enabling devices are hardware formed by a combination of computers, glasses, headphones, and motion sensors (Dayan & Ince, 2021).

The definition of virtual reality naturally comes from both definitions of "virtual" and "reality." The definition of the word "virtual" means physically non-existent, while "reality" is what we experience as humans. Hence, the term "virtual reality" basically means "close to reality" (Turgut, 2021:19) and is basically an illusion that relies on allowing them to be in a computer-generated environment, so people feel like they're there even though they're not actually in it. VR applications aim to distract users by interacting with different senses (vision, hearing, touch, etc.) and blocking external stimuli (Sarman et al., 2021). As a result of this, any sensory and cognitive activity is possible for a person (or persons) in a digitally created artificial world that can be an imaginary, symbolic, or simulation of certain aspects of the real world (Turgut, 2021:19).

Today, VR systems can be used in different ways, such as head-mounted screens, fixed screens, and hand-held screens (Turgut, 2021:20). Virtual reality technologies offer the ability to create therapeutic environments in healthcare, surgery, assessment, diagnosis, and treatment of health problems, and are used in many areas, such as rehabilitation of patients to remove symptoms, exercise applications, and training of professional groups in medicine and healthcare.

Virtual reality is a computer simulation technique that allows individuals to hear and feel the sounds and corresponding stimuli that accompany the visual landscape through the headset, allowing them to become part of a world built in a computer environment; It is an advanced form of human-computer interaction that gives users a sense of reality and allows mutual communication between this computer-generated environment and the user (Burkay, 2021: 14-15; Sen., 2020:13).

In a study examining graduate theses conducted using virtual reality in the field of nursing between 2016-2020 in Turkey, it was stated that 54.5% of the theses were made with pediatric patients and 36.4% with adult female and male patients. The same study stated that virtual reality applications are most commonly tried for pain management and anxiety as a distraction method in our country, and virtual reality glasses are preferred by 90.9% as a virtual reality application (Sarman et al., 2021).

We see that virtual reality studies in the field of nursing are mostly aimed at the training of student nurses, and they are used for diagnosis/treatment/rehabilitation in different patient/disease groups in nursing applications, also, nurses apply virtual reality applications for themselves. In this context, the use of virtual reality applications in nursing will be scrutinized under three different headings.

Use of Virtual Reality in Nursing Training

Nursing education is an educational system where structured, theoretical, and practical training is offered as a whole with the aim of giving the student the identity of professional nursing and preparing the student for professional life. In this system, nursing students are expected to gain a good level of cognitive, affective, and psychomotor skills (Dayan & Ince, 2021; Yildiz, 2019:14).

In the nursing profession, where mock-ups and mannequins have mostly been used to create virtual reality in education, the studies in which virtual environments are created and their activities are evaluated are becoming widespread day by day with the advancement of technology and the facilitation of access to these technologies (Turgut, 2021:22). The fact that nursing is a health discipline that includes a practice-based education process, as well as, its complexity and difficulty related to patient care require many different psychomotor skills (Yildiz, 2019:14). It has become popular for instructors to overcome the difficulties experienced in transferring the theoretical knowledge to the practice by giving instructors the opportunity to reach many students in a shorter time with virtual reality applications in the training of health workers (Sarikoc, 2016).

In professional skills laboratories, students learn to turn their theoretical knowledge into skills under the supervision of instructors and then make clinical practice. These laboratory practices help to reduce students' clinical anxiety, improve communication skills, and combine theory and practice. In addition, they are safe environments for students

because they have repeat opportunities, feedback can be given by the instructor, and there is no risk of harming the patient (Ismailoglu, 2015:1).

There is a need to develop and use new tools in the training of health personnel in order not to harm the patient, but minimize errors, prevent ethical violations, adapt to the developing technology in the field of health, meet the increasing expectations of patients, and provide quality care. Therefore, virtual reality applications enable the unlimited application of clinical scenarios in a risk-free environment to reduce the student's anxiety and increase self-confidence, improve clinical decision-making skills, provide effective learning by giving feedback to the student at the end of the application, and are included as a rising value in nursing education (Gundogdu & Dikmen, 2017).

It is emphasized that virtual reality methods used in nursing basic skill training have a positive effect on increasing students' academic success and professional skill performance (Dayan & Ince, 2021).

Virtual reality applications have many benefits, for example, they create an environment as if they were real with three-dimensional audiovisual animations, however, they enable the student to take an active part in the applications by directing them to learn by experimenting, making them think to make decisions in a complicated situation, creating an educational environment very close to reality, developing the student's pre-clinical skills, integrating theory and practice, allowing the students to evaluate themselves objectively by giving feedback, increasing the motivation of the students by allowing them to avoid negative experiences, allowing them to make mistakes without harming anyone before the applications to be made to real patients (Dayan & Ince, 2021:89; Gundogdu & Dikmen, 2017; Jamison, 2006, Okutan, 2021:29; Turgut, 2021:22).

Many skills training are provided in schools that train health workers with applications from washing hands and taking a medical history, to establishing vascular access and providing basic life support. Virtual reality applications support students by giving them the opportunity to experience many skills over and over again, such as establishing vascular access properly without harming patients, providing basic life support, administering intravenous injections, interviewing patients, etc. It gives the opportunity to apply skills that students cannot concretely observe in the actual patient, such as evaluating in-body organs in the virtual environment for converting the theoretical training they receive into practice (Sarikoc, 2016).

Jung et al. (2012) examined the effect of a virtual reality simulation system on students' intravenous catheterization skill performance in first-grade nursing students, and used virtual reality, a plastic arm model, and two methods together as skill training methods; their experimental study was about intravenous skill training in a three-group model, as a result, it was stated that the rate of successful completion of the skill application of the

students using the virtual simulation method was high. As a result of this study, researchers emphasized that simulation is a useful method that can be used in nursing education together with the traditional education methods. In a different study which examined the effectiveness of the use of "SIV simulator" and "plastic arm model" in providing nursing students with the ability to apply intravenous catheters, it was found that teaching with "SIV simulator" had a positive effect on the skill level of the students and the level of satisfaction with the method used in gaining the ability to apply intravenous catheters (İsmailoglu, 2015:65). Virtual reality applications similarly make positive contributions to the ability of students to apply port catheters (Tsai et al., 2008). It is emphasized that virtual reality simulation group students learn the skill steps of urinary catheter application more easily (Smith & Hamilton, 2015) and students find the application interesting. They spend more time making more applications in urinary catheterization application (Butt, 2018). The knowledge and skill levels of the students increase in the tracheostomy care with the game-based virtual reality application, and the game-based virtual reality application can be used to teach the applications that require surgical asepsis principles such as aspiration where the order of skill application is complex and requires attention (Bayram, 2017:66). In nursing education, pelvic examination, nasotracheal aspiration, urinary catheterization, IV catheterization applications can be performed with virtual reality model simulations that provide the student with the highest level of the learning environment (Yildiz, 2019:16). It was concluded that the computer-based simulation system designed to provide subcutaneous drug administration skills in nursing education has a positive effect on the subcutaneous injection application skill performance of students and the anxiety levels that occur during subcutaneous injection administration in a real patient (Gundogdu & Dikmen, 2017: xii).

A large number of students, the lack of the number of teaching staff, and the constant renewal and increase of the skills that should be acquired by students make it difficult to evaluate students objectively. Virtual reality allows a student to easily use each skill in the created virtual environment at any time and in any number of ways. The fact that these materials in the virtual environment can be stored as recorded makes it easy for a student to be evaluated by more than one instructor (Sarikoc, 2016). In addition to providing students with psychomotor skills, virtual reality applications are coming to the agenda as a unique and useful alternative teaching method in providing students with more advanced and abstract skills such as collaboration, problem-solving, critical thinking, or communication skills.

In the vast majority of the research results, it is stated that the virtual simulation method used in the nursing education process positively affects the skill performance and academic success of the students (Gundogdu & Dikmen, 2017; Sarikoc, 2016). At the same time, virtual reality applications prevent the patient from being harmed while trying or learning a new technique (Yildiz, 2019:16).

By offering experience-based learning, virtual reality applications can contribute to reducing the anxiety students experience in their first clinical practices, increasing their self-confidence and improving clinical decision-making skills, thus enhancing their success and motivation levels. With this application, students learn in a safe environment, without fear of doing wrong and harming the patient, and by having the opportunity to live this experience whenever they want.

The Use of Virtual Reality in Nursing Practices

Recently, virtual reality applications have been used among nursing initiatives used in clinical fields to alleviate pain, anxiety, and fear, and provide comfort and convenience by diverting patients' attention (Okutan, 2021:30). While VR applications applied as a method of diverting attention are widely used in clinical medical care, especially to relieve pain, there are also studies showing their effectiveness in the management of pain and anxiety during procedures such as burn wound debridement, injection applications, wound care, toothache, endoscopy procedure, phantom, and chronic pain, and chemotherapy applications (Guo et al., 2014; Hoffman et al., 2000; Hoffman et al., 2011; Toru, 2018:16). While there are many studies indicating that virtual reality is a useful interventional tool especially in pediatric patient groups (Aydin, 2018:37; Hoffman et al., 2008; Kaplan, 2020: 61; Piskorz & Czub, 2018), we see that nurses working with adult patients also often benefit from VR practices (Karaman, 2016:38; Schneider et al., 2003; Schneider & Hood, 2007; Schneider et al., 2011; Sahin & Basak, 2020).

Cancer

Anxiety, which is not diagnosed or intervened in the patient due to chemotherapy applied to slow down the development of cancer, prevent its spread, treat and alleviate the symptoms, may adversely affect the individual's adaptation to treatment, coping with the disease, and quality of life (Toru, 2018:1). The technique of diverting attention, a method that focuses on the individual's coping with the symptoms caused by chemotherapy, increases the individual's sense of control, activity level, and work capacity, reduces pain, anxiety level, feeling of weakness, and side effects of pharmacological methods (Toru, 2018:15).

The long-term side effects of cancer and cancer treatment can include many physical and psychological consequences, such as pain, fatigue, anxiety, depression, and cognitive dysfunction. Studies report that cancer-related fatigue and emotional state changes such as anxiety and depression significantly affect cognitive functions and reduce the quality of life in cancer patients. Some of the common causes of repeated pain and anxiety in cancer patients are intravenous interventions, invasive examinations such as bone marrow aspiration, medical procedures, and chemotherapy (Ozdag & Inkaya, 2021).

Studies assessing pain and anxiety with VR technology in cancer patients have been

conducted with patients undergone establishing vascular access, blood collection, port insertion, lumbar puncture, biopsy, chemotherapy treatment, or patients hospitalized during different procedures, in addition, a study was conducted to examine the effect of radiotherapy on anxiety level before radiotherapy (Nilsson et al., 2009; Ozdag & Inkaya, 2021; Schneider et al., 2003; Schneider et al., 2011; Toru, 2018:15).

Since the anxiety experienced by individuals during the chemotherapy process causes life changes, it requires effective coping methods. As a coping method, by using virtual reality glasses, it can be ensured that the individual moves away from the hospital setting where the patient feels himself/herself in another world. Because virtual reality glasses are a tool that has the potential to address multiple senses at the same time and block the senses from environmental warnings, it can also allow individuals to feel the long chemotherapy treatment period as short and cope with symptoms such as anxiety (Toru, 2018:3).

Schneider et al. (2003) examined the effect of virtual reality glasses applied to breast cancer patients over the age of 50 who received chemotherapy treatment on symptom distress, fatigue, and anxiety levels; and during the first session of chemotherapy treatment (45-90 minutes), 16 breast cancer patients were shown undersea, museum visits and titanic videos with virtual reality glasses. After using virtual reality glasses, the patients experienced a significant reduction in symptoms, fatigue, anxiety, and perception of the time elapsed during chemotherapy (Schneider et al., 2003). Schneider et al. (2011) examined the effect of virtual reality glasses applied to patients with breast, lung, and colon cancer who received chemotherapy treatment on anxiety and fatigue levels, and a total of 137 patients of the experimental group and control group were shown videos with virtual reality glasses during chemotherapy treatment (45-90 minutes). As a result of the study, it was determined that the application of virtual reality glasses diverted attention and that the patients in the study group had a decrease in the level of anxiety and fatigue and that the time passed faster in the treatment process. In this context, virtual reality glasses can be used in the management of symptoms and reduction of anxiety in individuals undergoing chemotherapy.

Espinoza et al. (2012) made 33 metastatic cancer patients, aged 41-85 years old, who were hospitalized in the oncology service to receive chemotherapy treatment, watch the park, and nature walk with virtual reality glasses in half-hour sessions consisting of four sessions for a week. After the application of virtual reality glasses to reduce pain and distress due to medical procedures and chemotherapy, it was seen that anxiety and depression levels decreased and happiness levels increased in patients

According to Schneider and Hood (2007), individuals who benefited from VR administration during the first chemotherapy treatment with the virtual reality glasses application had significantly fewer anxiety levels compared to the control group during the second

chemotherapy treatment. These findings showed that using the distraction intervention was more effective during initial chemotherapy treatment when patients were more anxious and had a lower ability to cope with a stressful situation (Schneider & Hood, 2007). Nilsson et al. (2009) stated that the use of virtual reality during invasive procedures in the pediatric oncology unit reduced pain in children and adolescents and had a positive effect on patient relaxation.

Reducing pain and anxiety

Nurses, who are members of the profession that plan and manage care, play an active role in identifying, controlling pain, using pharmacological and non-pharmacological methods, and evaluating the results because they are with the patient longer than other health professionals (Richards & Hubbert, 2007).

Virtual reality can be used as an effective distraction method that allows daydreaming by appealing to multiple senses of the patient. Especially in acute painful applications, virtual reality allows the individual to direct his attention from the painful stimulus to the computer-based created world (Orhan, 2020:46). Virtual reality is known to not only change the way the patient interprets incoming pain signals, but also reduce the brain activity associated with pain. The effect of the virtual environment in which people enter and the videos consisting of nature and landscapes that relax people are thought to have an anxiolytic effect on patients. With this anxiolytic effect, the activity of the amygdala and adrenergic activity decrease. As a result, since the number of stimulated receptors decreases, fewer pain signals are sent to the brain, which leads to a decrease in the level of pain (Okutan, 2021:59).

Informing children about the operating room and the process in the preoperative period is important in terms of reducing anxiety before and after surgery, relieving postoperative pain, and ensuring parental satisfaction. For this reason, it is useful to give information to children, who like to use technology, in accordance with this technology (Turgut, 2021:46). It was determined that preoperative preparation and postoperative video watched using virtual reality glasses in children to be operated are effective on anxiety and parental satisfaction and a useful method to reduce postoperative pain (Turgut, 2021:47). Similarly, Chad et al. (2018) reported that VR glasses used to distract attention in children during vaccination were effective in reducing the perception of pain and fear. It was determined in a different study that the application of virtual reality before total knee replacement surgery reduced pain and anxiety, and had a positive effect on vital signs (Gunes, 2021:vii).

Burn wound dressing

The management of pain and anxiety caused by burn care involves difficult and complex processes. Virtual reality has been a method often used in nursing care abroad in recent

years as an engaging, interactive, effective distraction technique for children and adults during painful health care procedures, including burn wound treatments (Kaya, 2020:4). Dressing renewal made during burn care increases the pain and anxiety levels of patients. It is reported that the VR glasses used in this process reduce the pain and anxiety levels of patients and that patients feel more comfortable (Guo et al., 2014; Kipping et al., 2012; Markus et al., 2009; Morris et al., 2010; Scapin et al., 2018).

There are many studies in the literature that the use of VR glasses during burn wound care has a positive effect on acute pain (Hoffman et al., 2008; Kipping et al., 2012; Markus et al., 2009). Kaya (2020) determined that virtual reality is effective in reducing the level of pain, anxiety, and fear in children during burn dressing and suggested that the use of virtual reality during burn dressing should be widespread and included in the treatment process. Scapin et al. (2018) reviewed 34 studies of burn dressing renewal and reported that pain, anxiety, and stress were reduced during dressing renewal, physiotherapy, and physical rehabilitation in patients with burns, and the use of VR technologies would be beneficial.

Diagnostic procedures

Virtual reality applications, one of the methods of diverting attention, are widely used in clinical medical care to relieve symptoms by offering the possibility of creating therapeutic environments for the evaluation and treatment of medical conditions. VR glasses, which are not expensive to apply and use, do not cause side effects, can be used in the healing of the individual, and are frequently preferred in nursing practices due to these features (Toru, 2018:2).

Biopsy

The virtual reality application, which has developed with the advancement of technology, is an application that reduces the perception of pain and anxiety by using the cognitive and attention processes of people. The application, which includes music in the background with images obtained with special camera systems and multidimensionality thanks to binocular glasses, distracts people from thinking about the medical procedure. Pain and anxiety management through non-pharmacological methods such as virtual reality is among the main objectives of nursing practices (Karaman, 2016:iv). During the breast biopsy, which is one of the medical interventions, it was determined that virtual reality application was effective on pain and anxiety (Karaman, 2016:38). At the same time, it was concluded that virtual reality applied during knee arthroscopy operation reduced blood pressure and pulse rates after surgery (Sahin & Basak, 2020). Similarly, it was concluded that the application of SG glasses during the transrectal prostate biopsy procedure (TRUS-Bx) reduced the pain of the patients and positively affected their vital signs (Genc, 2021:vi).

Endoscopic procedures-colonoscopy

Colonoscopy, one of the screening tests, is considered the most reliable method with proven effectiveness in the prevention of colorectal cancers and the reduction of the death rate due to colorectal cancer and is considered the gold standard. Colonoscopy, which is an endoscopic intervention, can cause embarrassment, pain, and anxiety in patients. Procedure-related pain, also defined as procedural pain experienced during colonoscopy, develops if the procedure is invasive, the rotations in the colon that do not have a fixed shape are sharp, and the mesentery is stretched due to the delivery of air to expand the intestine during the procedure. The application of colonoscopy to a region perceived as private causes a sense of shame in patients; the fear of being embarrassed and feeling pain results in anxiety. Yilmaz (2021) determined that virtual reality glasses had positive effects on vital signs and anxiety in patients undergoing colonoscopy, and in line with these results, it was recommended to expand the use of virtual reality glasses by nurses during colonoscopy.

Childbirth

Childbirth, which is one of the important life experiences of a woman, is a natural process, but it is an important experience that affects the mother's health from a physical, emotional, and social point of view. It is extremely important that the birth experience should end positively for the woman and her family and that a satisfactory birth environment should be created. Watching relaxing images accompanied by relaxing music with VR glasses at the time of delivery allows the woman to go on a visual journey to a calmer environment, away from the work area surrounded by medical equipment. This relaxation technique (video with virtual reality glasses) increases the secretion of endorphins and oxytocin while helping to suppress adrenaline, thus causing more effective birth contractions for easy delivery. In other words, mental relaxation also provides physical relaxation that can help the birth process (Dutucu, 2019:22). Dutucu (2019) concluded that birth pain decreases with the use of VR glasses, which are applied during a normal birth experience, and does not affect delivery time, also pregnant women find glasses effective in pain control and are satisfied with watching videos.

Neuro-psychiatric problems

Virtual reality apps have been used as an effective method, especially in psychotherapy for treating many disorders (such as phobia, anxiety, post-traumatic stress disorder, and panic). Medication is not preferred by psychiatric patients for reasons such as the negative attitudes of people against psychiatric drugs and the prejudice of people in the community against those on psychiatric medication. Therefore, people with psychiatric disorders are referred by specialists to try interventions such as virtual reality.

Yilmaz et al. (2021) reviewed the studies of the last 10 years in which virtual reality and

augmented reality were used in psychiatric disorders. They determined that virtual reality and its applications improved social skills, cognition, and functioning in people with autism, an improvement was observed in attention-deficit status in people with attention deficit and hyperactivity disorder, virtual reality glasses were often preferred in case of a phobia, and there was a decrease in people's fear and anxiety situations depending on the applications. Considering all the articles covered in the study, virtual reality applications were more commonly tried on phobia as a state of psychiatric discomfort. In other cases of mental disorders, studies have highlighted the ability of people to do their daily activities more easily, improving their quality of life. But in nursing practices, we find that virtual reality applications are more limited in use in the psychiatric patient group. Related to this, such practices are proposed to be prepared and implemented under the supervision of psychiatric and psychological experts.

In relation to neuropsychiatric conditions, there are studies indicating that virtual reality can be an effective intervention for providing psycho-education to people with mood disorders, promoting relaxation and increasing positive emotions (Okutan, 2021:31), raising caregivers and nursing students of people with dementia (Hirt & Beer, 2019), and stress management in people with mood disorders (Shah et al., 2015).

Procedural pain

Many medical diagnoses and treatment processes cause acute pain, which is quite uncomfortable for the individual. Pain experienced during medical procedures is referred to as procedural pain and is among the factors playing a role in individuals' acceptance or rejection of these procedures. Procedural pain can also cause anxiety, leading to negative outcomes in the cardiovascular and respiratory systems when not controlled. It is important to control the pain that may be experienced in these procedures, which are important in the early diagnosis and treatment of diseases (Yilmaz & Dincer, 2022).

For hospitalized children, painful medical procedures such as establishing vascular access, injection process, blood collecting, vaccine administration, and dressing exchange are the biggest sources of fear. These procedures, which are also considered hospital procedures and obligatory to be performed, cause children to experience pain, anxiety, and fear (Burkay, 2021:2; Inal & Canbulat, 2015). One of the most common non-pharmacological methods used to reduce children's pain perceptions during medical processes is a distraction. Showing videos to children with VR glasses is considered among the distraction methods, and studies show that watching videos with VR glasses is effective in reducing children's perceptions of pain and anxiety (Gerceker et al., 2019; Gold & Mahrer, 2018; Jung et al., 2012; Okutan, 2021:30).

Blood collection

One of the major causes of pain for child patients is diagnosis and treatment processes

at the hospital, and children may think that these procedures, such as vaccination, injection, and bloodletting, will harm them (Goksu, 2017: 1-2). A previous study found that the majority of children in the experimental group utilizing VR glasses, which is one of the methods of diverting attention, had reduced pain after blood collection, also children thought this method worked, and children with VR glasses felt good during bloodletting, and not only children but also their parents were very happy with the practice (Goksu, 2017:50). The effectiveness of VR glasses in reducing the level of pain children feel during the bloodletting process has often been studied in the research, and the mean pain score of the children in the experimental group was lower than the children in the control group (Gold & Mahrer, 2018, Ozkan & Polat, 2020). The use of VR glasses in children was effective in reducing pain, fear, and anxiety during the bloodletting procedure (Aydin, 2018:37; Erdogan, 2018: 59; Gerceker et al., 2019; Goksu, 2017: 50; Orhan, 2020:xi; Piskorz & Czub, 2018).

Establishing vascular access

The experience of pain in diagnostic and therapeutic interventional processes during the disease process can be recorded in children's memory and reflected in the entire life process. In addition, this experience can cause fear in children. Since establishing vascular access, which is one of the interventional procedures, is a source of stress, the fear and anxiety experienced about the procedure may increase the perception of pain even more. Establishing vascular access is among the most frequent practices with high pain feedback from children in hospitals. As a distraction technique, it is recommended to be included in nursing practices and care because video viewing with VR glasses is effective in managing anxiety, fear, and pain in children (Kaplan, 2020:61; Ozdemir, 2019:60).

Lumbar puncture

Sander Wint et al. (2002) used VR glasses for 32 min during the procedure in a randomized controlled trial of 30 cancer adolescents who underwent lumbar puncture. The study found that adolescents using virtual reality glasses scored lower than those who did not use glasses, but the difference between them was not statistically significant.

Arteriovenosfistula (AVF) canulation process

It is suggested that virtual reality glasses can be used by nurses in the hemodialysis unit because they reduce the pain that occurs during the AVF cannulation process and increase patient satisfaction as an easy-to-apply and not an invasive method in patients trying to cope with pain (Sen, 2020: v).

Symptom management in chronic diseases

In a randomized controlled study of rheumatoid individuals, it was determined that dancing with a virtual reality gaming console had a positive effect on pain, depression, and

sleep quality (Unver, 2021:v). Cycling experience with virtual reality application has been reported to decrease depression levels and increase interpersonal relations in individuals with stroke. (Song & Park, 2015). A different study also reported that the virtual reality gaming app, which was also administered a total of ten times for 45 minutes in two weeks after a stroke, had a positive effect on patients' depression and anxiety levels (Adomavičienė et al., 2019). It is recommended to use virtual reality methods in the management of fear, anxiety, and pain during self-injection and testing of patients with diabetes (Aktura, 2021: vii).

Education

It is a well-known fact that pediatric epilepsy nursing is a private area, and combating seizure is the most important and serious step in combating disease, also nurse is in a key position in this step. The moment of secondary generalized tonic-clonic seizure, therefore, requires special training and attention. Using VR technology based on a secondary generalized tonic-clonic seizure scenario and correcting real-life potential errors before they are applied to the child are the main common goals of the entire team for "patient safety". Through this, families are expected to become experienced with a secondary tonic-clonic generalized seizure approach, eliminating malpractices. The method of stimulating the appropriate environment through VR technology in epilepsy training is expected to not only increase the knowledge and skill level of parents but contribute greatly to the standardization of the seizure approach, the establishment of the seizure protocol, and the use of common language. The epileptic seizure management training program, crafted with VR technology, was determined to be effective in enhancing the knowledge, skills, and motivations of parents to manage epileptic seizures (Turan, 2020:20).

Use of Virtual Reality in Nurses

We see that virtual reality applications can be used not only to eliminate the different symptoms of child/adult patient groups who are in the diagnosis/treatment process and to contribute to nursing education but also for different purposes in the health professions. A study to reveal the impact of the use of virtual reality glasses on burnout levels in intensive care nurses with a stressful occupation and a high risk of burnout has found that applying virtual reality glasses reduces the level of emotional exhaustion, increases the level of personal success, and does not have an effect on the level of desensitization subscale (Gungor, 2021: 12). In this context, it is conceivable that VR practices can be relaxing in groups of intensive working nurses.

Conclusions

It is important that nurses who are indispensable members of the health care system should be capable in terms of professional knowledge and skills in the nursing training process so that they can deliver the quality care expected of them. In this respect, it is important to use virtual simulation systems in nursing training due to the characteristics of virtual reality systems in nursing training such as integrating knowledge and skill, creating a learning environment by allowing the students to practice, giving them the opportunity to be able to repeat until they perform the right practice, reducing erroneous initiatives in clinical practice, and enhancing patient safety. It is seen that mostly virtual reality glasses among virtual reality applications are integrated into nursing initiatives, child patients are more preferred as a working group and studies are often carried out by nurses to eliminate pain, fear, and anxiety and to increase satisfaction, comfort, and adaptation to anesthesia.

Recommendations

Virtual reality applications, which are effective methods that are not expensive to apply and use, do not cause side effects, can be used in physical, psychological, social, emotional, and spiritual healing, development of education, and recovery of the individual, so may be preferred in nursing education and nursing practices. Since the variety of virtual reality applications used in nursing education is quite limited and generally considered in nursing principles, it will be useful to carry out applications for skills for different specialties such as surgical nursing, obstetrics and gynecology nursing, and internal medicine nursing. To enhance the quality of the training provided to health workers in Turkey and to adapt to the technological developments of the age, it may be suggested that virtual reality applications should be included and used in the education curricula.

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