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VIRTUAL REALITY IN NON-PHARMACOLOGICAL PAIN MANAGEMENT IN THE PEDIATRIC INTENSIVE CARE UNIT

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Abstract: Pain is a subjective unpleasant experience, especially in children in the Pediatric Intensive Care Unit. Pain management is complex and in addition to pharmacological treatment, non-pharmacological technologies can be used. Virtual Reality is one of them, which, through an immersive and distracting experience, can interfere with the patient's sensation of pain, helping to control it. This study aims to evaluate the impact of using Virtual Reality (VR) as an auxiliary resource in non-pharmacological pain control in a pediatric ICU environment. therapy was instituted for children over 6 years of age, without hemodynamic instability. Validated pediatric scales were used to assess pain; the children were assessed prior to therapy in relation to pain and after undergoing therapy. Games and scenarios were introduced according to patients' preferences and could be immersive and active, not exceeding the maximum therapy limit of 15 minutes. 45 children were included, 29 (64%) had no associated pain and 16 (35%) had mild or moderate pain. Average age 8 years and median 8.6 years. After therapy, 12 children (75%) progressed to a pain-free condition, 4 (25%) still had some pain, 3 of which were mild and 1 was moderate. Among the children who still had pain, we found a severe level that, after applying Virtual Reality, improved to mild, which may be related to his diagnosis. As an initial result, we observed positive results in its use, however, for a more robust result., it is valid to continue the approach in relation to diagnoses, in terms of the duration of the post-therapy analgesic effect and the impact on the need for complementary analgesic medication. We conclude that virtual reality, in addition to being a playful tool that provides a calmer and lighter environment for the child, has an important impact on the management of assessed pain, and can be an ally to pharmacological therapies.

Keywords: Virtual reality; Pain; Physiotherapy; Pediatric Intensive Care Unit

INTRODUCTION

According to the IASP (International Association for the Study of Pain), from 1979, pain is an unpleasant emotional experience or sensation, which may be associated with a biological dysfunction, described according to personal experience. Because pain is subjective, the assessment needs to be individualized. Pain management is a very complex issue, in which many efforts have been made to develop new non-pharmacological technologies in order to minimize the anguish, suffering and pain experienced in the hospital environment, in a milder and non-invasive way. In pediatrics, the main causes of pain in children are due to certain procedures, whether invasive or non-invasive, such as venipuncture, exam collection, post-surgery and acute illnesses. Therefore, pain assessment is more complex and unique, due to the difficulty for children to express the location and intensity of pain. We evaluate, for example, changes in vital signs, facial expression, agitation and especially the information collected by family members. Therefore, in pediatrics it is possible to apply the face scale, visual analogue scale or numerical scale, varying according to the age group. Virtual Reality (VR) is an advanced technological tool that enables disconnection from the real world to the world of the metaverse, where the patient interacts through sensory, auditory, visual and tactile stimuli, which can be through immersive or active games. Within the hospital context, VR has become increasingly popular due to the benefits provided by therapy. One of the main objectives is to use it to improve pain and emotion, with the aim of reducing trauma caused during the hospitalization period. It is possible to apply VR to children over six

years of age and provide an individualized experience according to gaming preferences, making therapy with greater motivation and performance, enabling the multisensory capacity to induce nociception in the central nervous system, thus highlighting the decreased analgesic administration.

VR is a technological device that promotes interaction between individuals and the virtual environment, through hardware (glasses, headphones), connected to a cellular device, leading to an immersive experience, in which the scenario can be personalized and adapted. depending on the patient's emotions and expectations. This tool is a promising, low-cost instrument aimed at relieving pain or reducing the use of analgesics, through cognitive distraction in individuals undergoing hospital procedures.

The objective of this work was to evaluate the impact of VR on the non-pharmacological control of pediatric pain in the ICU, integrating standardized assessments and adapting them to the patient's clinical and physical conditions. In this interventional study, data from 45 patients, aged 6 to 13 years, who underwent Virtual Reality (VR) therapy were analyzed. Pain and Face scales were applied (figure 1) to assess the pain and the effect of VR, comparing data before and after the intervention. The sample included patients with different diagnoses, both respiratory and motor, restricted (due to surgeries, mobility limitations, and access with risk of loss) or not to bed, aged over 6 years. The games were introduced according to the preferences of the participants. patients, and they can be chosen in an immersive format, containing landscapes such as the bottom of the sea, nature and activities such as beat knowledge, and motor agility games, not exceeding the maximum therapy limit of 15 minutes. 45 children were included to perform virtual reality, of which 29 (64%) had no pain previously associated with the use of VR initially, 29 (64%) had no pain and 16 (36%) had mild or moderate pain. according to the assessment scale. After using VR, all children were reevaluated, those who did not present pain remained pain-free and of those who presented pain, 12 (75%) progressed to a pain-free condition, 4 (25%) still had some pain., 3 of which were mild and 1 was moderate (figure 2).

Pain is a subjective and complex experience, depending on each person's threshold and sensitivity, however, when it comes to the pediatric population this is even more limited. In pediatrics, the main causes of pain in children are due to certain procedures, whether invasive or non-invasive. Therefore, pain assessment is more complex and unique, due to the difficulty for children to express the location and intensity of pain.

Virtual reality has emerged as a new analgesic therapy that can replace or complement conventional pharmacological treatments and has been widely studied in the treatment of pain.

From the data found, we understand that virtual reality, in addition to being a playful tool that provides a calmer and lighter environment for hospitalized children, has an important role in non-pharmacological pain control in these patients. However, we observed that for more complete results, It is valid and necessary to continue the approach in relation to diagnoses and the duration of the analgesic effect after therapy, since the pain scale is applied immediately after the use of VR therapy.

Therefore, virtual reality provides a playful and peaceful environment for children hospitalized in pediatric intensive care units and also contributes to the reduction of associated pain.

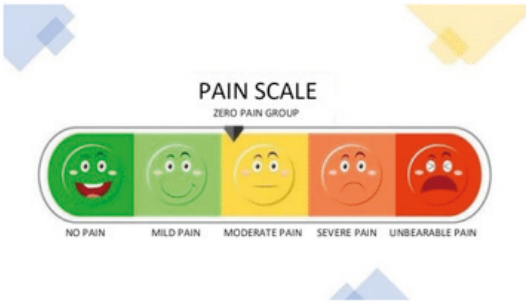

Figure 1: (Institutional pain assessment scale in Pediatric ICU)

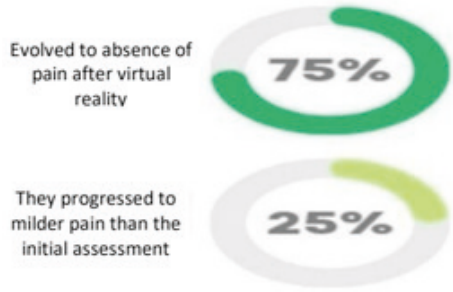

Figure 2 (Result of using Virtual Reality in pain perception)

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