

Understanding the Effect of Virtual Reality on Anxiety and Pain Due to Intrauterine Device Insertion

Abstract

Background: Virtual Reality (VR) can provide more interruption as it inundates the patient in a different universe and connects with numerous faculties. VR has been utilized to deal with the pain and stress associated with various painful medical procedures. **Materials and Methods:** This multi-method study was conducted on 60 women in an Intrauterine Device (IUD) acceptor. This research occurred in the independent practice of midwifery in the great region of Yogyakarta, Indonesia, in 2020. **Results:** The study found that the things that make respondents anxious in the face of this IUD insertion are experience, information, knowledge, and family support. The quantitative analysis found different pain levels in the VR and non-VR groups ($t_{118} = 1,65, p < 0,001$). **Conclusions:** VR can be used as a method to distract clients during IUD insertion.

Keywords: Anxiety, intra uterine device, pain, virtual reality

Introduction

Women worldwide have used the Intrauterine Device (IUD) as a method of contraception for more than 30 years. IUD insertion is related to high nervousness in the vast majority, and uneasiness and dread can cause inconvenience during IUD insertion.^[1]

Virtual Reality (VR) is a modern innovation that permits an individual to be brought into the virtual world. The discoveries of the meta-analysis propose that virtual reality distraction is a potent pain intervention. Previous research on VR interventions for managing procedural pain and anxiety in IUD acceptors has been limited. Cost savings, the availability of high-quality standard technology, and numerous VR environments have made it increasingly possible to integrate VR systems into clinical practice, but staff training and supervision are needed to operate VR devices. Strict and vigilant hygiene procedures based on hospital standards for infectious diseases, powering equipment, and regular updates of operating systems and software. Misuse or improper management of VR equipment can lead to ineffective and problematic use. Positive results have been reported for VR interventions for treating acute procedural pain over the last two

decades due to cost, hardware and software availability, and a lack of resources to perform these interventions.^[2]

Combining innovation with scientific rigor, it is difficult to systematically assess the use of VR interventions and solve difficult health problems. However, the successful integration of these two areas is painful, and procedural interventions may significantly improve non-pharmacological interventions for anxiety and stress. Many academic and private organizations focus on developing hardware and software for VR and other digital therapies for implementation in medical facilities.^[3,4] This study aims to understand the effect of VR on anxiety and pain due to IUD insertion.

Materials and Methods

This multi-method study was conducted on 60 women in IUD acceptor. This research took place in the midwifery office in the extraordinary region of Yogyakarta, Indonesia, from September 2020 to December 2020. Our research steps were: the client came to the Independent Practice Midwife; we gave the serial number; and we asked for the client's consent to be the research subject.

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We used a simple random sampling technique by drawing many respondents based on serial numbers. We assessed the degree of pain during IUD insertion. We considered anxiety just before and shortly after IUD insertion. We conducted semi-structured and in-depth interviews to get to know the client’s feelings in more detail. Our interviews were conducted in a closed room before the intervention. Interviews were recorded on a smartphone with patient consent and fully transcribed. For respondents who said they were anxious about the IUD insertion, we included them in the study sample. One respondent said she had high anxiety about the IUD insertion, so she did not use the IUD. The researcher asked what caused the respondents to feel anxious when facing the IUD insertion for 10–15 minutes. Our respondents’ answers were anonymous, and we kept them confidential.

Before going to the gynecology table, our clients in the intervention group put on glasses and a VR headset that provided underwater scenery, roller coaster rides, museums, and overseas trips, while in the control group, there was no VR. After the patient was immersed in the virtual world, we inserted the IUD. At the installation time, we assessed the patient’s facial expressions and response using VR. The instrument used to assess pain was a visual analog scale (range 0–10). The visual analog scale (VAS) was self-finished by the respondent (mm). The respondent was approached to put a line opposite the VAS line at the point that addressed their pain intensity scoring. Utilizing a ruler, the score was controlled by estimating the distance (mm) on the 10-cm line between the “no pain” anchor and the patient’s imprint, giving a range of scores from 0 to 100. A higher score showed greater pain intensity.

Based on the distribution of pain VAS scores in postsurgical patients (knee replacement, hysterectomy, or laparoscopic myomectomy) who depicted their postoperative pain intensity as none, gentle, moderate, or severe, the following cut points on the pain VAS were recommended: no pain (0–4 mm), mild pain (5–44 mm), moderate pain (45–74 mm), and severe pain (75–100 mm). Measurements using VAS were done after the patient climbed the gynecology table and used VR glasses.

We used VR treatment for respondents in the intervention group and standard care in the control group. After the patient was immersed in the virtual world, we inserted the IUD. At the installation time, we assessed the patient’s facial expressions and response using VR. We conducted semi-structured and in-depth interviews to get to know the client’s feelings in more detail. Our interviews were conducted in a closed room after the intervention. Interviews were recorded on a smartphone with patient consent and fully transcribed.

The researcher asked whether VR could help respondents reduce anxiety and pain. What things about VR helped respondents deal with stress and pain? Rest assured that

all views expressed would be anonymous, and their participation would be kept confidential from practice. We gave these two questions for 10–15 minutes. We conducted semi-structured in-depth interviews in a closed room after the intervention, using interview guidelines and keeping the respondents’ identities anonymous. Qualitative data analysis was manually performed according to traditional content analysis using code development scheme in an organized and comprehensive framework, and categories were developed into topics.

Ethical considerations

This study was approved by the University of Respati Yogyakarta Ethics Committee, code no. 212.3/FIKES/PL/X/2020. The participants were aware of the research objectives, and informed consent was obtained from all of them. They were assured that their information would remain confidential.

Results

In this study, the characteristics of the respondents were presented in Table 1, which included the type of action in the IUD, the level of pain experienced by the respondent, and age. The quantitative analysis found different pain levels in the VR and non-VR groups ($t_{118} = 1,65, p < 0,001$) [Table 2]. Qualitative studies before intervention showed that the things that made respondents anxious in the face of this IUD insertion were unpleasant or harmful past experiences, untrue information and myths about the IUD, a lack of knowledge, and worrying about their husband’s response [Table 3]. A qualitative study after intervention showed three functions of VR to reduce anxiety. First, VR created an uncomfortable environment. Secondly, VR content had a distracting effect. Lastly, VR created an immersive function that brought people from the real world to the virtual world [Table 4].

Table 1: Respondent characteristics

Characteristics	Mean (SD)	Category	n (%)
Type of action in IUD*	1.67 (1.23)	Insertion	26 (43.33)
		Insertion and removal	20 (33.33)
		Removal	14 (23.33)
Level of pain of the respondent	1.57 (0.50)	No hurt	13 (21.66)
		Hurt a little bit	41 (68.33)
		Hurt a little more	6 (10.00)
Age	0.87 (0.76)	<35 years old	26 (43.33)
		>35 years old	34 (56.66)

*Intrauterine Device

Table 2: Different tests for the level of pain in the VR* and non VR groups

Level of pain	n (%)	Mean (SD)	p
VR Group	30 (50)	1.13 (1,08)	<0.001
Non-VR Group	30 (50)	2.40 (0.81)	

*Virtual Reality

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Table 3: Results of interview data analysis before intervention

Open codes	Categories	Theme
Unpleasant or bad past experiences	Past experience	The things that make the respondent anxious in the face of this IUD insertion
Untrue information and myths about the IUD	Information	
Lack of knowledge	Knowledge	
Worrying about husband's response	Family support	

Table 4: Results of interview data analysis after intervention

Open codes	Categories	Theme
Managing an uncomfortable environment	Functions of VR* glasses	VR effect of reducing anxiety
Functions of VR content	Distraction Function	
How VR works	Immersive Function	

*Virtual Reality

Discussion

Quantitative results showed significant differences between respondents who received VR and non-VR treatments. The results of this study provided evidence for using VR to reduce levels of apathy for older adults in residential care.^[5] First, we found that a lack of knowledge and negative perceptions about the IUD also affected pain and anxiety during insertion. This was in line with the research, which said that erroneous information about IUDs, having heard negative tales about IUDs, and legends and misperceptions associated with pain concerning IUDs might have influenced anticipated pain and actual perceived pain.^[6]

Secondly, we found that a lack of information and myths about IUDs could affect anxiety. Previous research has also revealed myths about IUDs, including that they can cause abortion.^[7] Thirdly, we found she was anxious about her husband's response if the IUD strings caused pain during intercourse. This finding aligned with previous research, which stated that spousal support was characterized as the husband's assistance with choosing an IUD regarding information, judgment, instrumentality, and feeling.^[8]

Fourth, using VR glasses also made respondents unable to see the tools that the midwife placed near them to reduce respondents' anxiety. Some clients were afraid to see the medical equipment and the appearance of the midwife. This finding was in line with previous research showing that the distracting effect of VR could be used to manage several painful experiences in children, including punctures, changing dressings, cleaning and draping burns, and the

management of chronic and acute pain.^[8] This study's limitation was that the anxiety level did not differ between patients who first inserted the IUD, removed the IUD, or removed the IUD.

Conclusion

The VR scenery can shift respondents' focus to the anxiety and pain they experience, so it can be concluded that virtual reality technology can reduce anxiety and pain during IUD insertion. The development of VR content that functions to structure cognition is also necessary, considering that VR content currently mainly functions as a diversion.

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Conflicts of interest

Nothing to declare.

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