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Research Article

Virtual Reality On Labour Pain

Effectiveness of Virtual Reality On Level of Labour Pain Among Primigravida Women – A Randomized Prospective, Passive Control, Interventional Trial

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Abstract: Childbirth is a natural process, and its pain is perceived as normal. Labor pain is a universal experience for women; it is a highly unpleasant sensation that cannot be shared with others. Virtual reality (VR) learning is a technology that allows the user to explore and manipulate computer-generated real or artificial three-dimensional (3D) multimedia sensory environments in real-time. It allows for a first-person active learning experience through different levels of immersion, that is, a perception of the digital world as real and the ability to interact with objects. The objectives were 1. To assess the level of labor pain among primigravid women admitted in the labor ward. 2.To evaluate the effectiveness of virtual reality on the level of labor pain among the primigravid women admitted to the labor ward. 3. To find out the association between the level of labor pain among the primigravid women with selected True experimental research design was adopted for the study. The population of the study was Primigravid women with labor pain. Totally 60 samples were selected by Random sampling technique (lottery method), 30 in each group. Group I (experimental) received the virtual reality technique, and group II (control) received routine care. Pre-test was done using a structured questionnaire and assessment of the level of pain perception by numerical pain rating scale. In the post-test, after giving the Virtual reality technique to group I level of labor pain was assessed with a numerical pain rating scale. The results revealed that in the pre-test, the majority of samples, 24(80%), had severe pain,5(16.7%) had moderate pain, and 1(3.3%) had the worst pain in both the experimental and control group. In posttest, the majority of sample in group I 24(80%) had moderate pain, 2(6.7%) had mild pain, 4(13.3%) had severe pain and in group II 3(10%) had moderate pain, 25(83.3%) had severe pain, 2(6.7%) had worst pain. In the pre-test, the experimental and control group's mean and standard deviation values were 7.4, 1.04, and 7.57, 1.22 respectively. In the post-test, the experimental and control group's mean and standard deviation values are 5.23,1.25 and 8.07,1.01, respectively. The obtained Wilcoxon signed ranks test value for experimental group 4.867 and p-value < 0.0001. The Study findings reveal that the virtual reality technique effectively reduced labor pain among primigravid women using a numerical pain scale score.

Keywords: Virtual Reality, Labor Pain & Primigravid Women

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1. INTRODUCTION

Childbirth is a natural process, and the pain associated with it is also perceived as normal. Labor pain is a universal experience for women1; it is a highly unpleasant sensation that cannot be shared with others. The labor process is a physiological and psychological challenge for every woman. The contracting uterus causes pain during labor and pressure by the descending fetus on the cervix. It manifests as cramping in the abdomen, groin, thigh, and back, and the mother experiences a tired, achy feeling all over the body. Pain experienced by women varies in intensity and severity and differs from time to time, and the birth order is based on their physical and emotional changes. The sequence of labor pain varies between nulliparous (primigravida)and multiparous (multigravida) women. It is substantiated that pain scores are significantly high in the nulliparous, especially in contrast to the multiparous, particularly if no antenatal training has been provided. The research results also show nulliparous women experience more pain during early labor than multiparous women, who appear to experience more intense pain during the second pelvic phase of labor. This is supposed to be due to the sudden activation of nociceptors enclosing the vaginal vault and vulva and the rapid descent of the unborn. There are many non-pharmacological methods in pain control; among those, Homeopathy, Music therapy, Transcutaneous electrical nerve stimulation, Acupressure, and Virtual reality are the most common and widely applied techniques. The scientific specialty describes epidural analgesia as the most wanted and productive, but with side effects. Other comfort measures, such as effleurage and Hydrotherapy, help minimize anesthesia or analgesia and prevent the transmission of pain impulses to the brain[2-4]. Among those methods, techniques such as Virtual reality have been proposed to help women cope with pain during labor.10 Virtual reality (VR) learning is a technology that allows the user to explore and manipulate computer-generated real or artificial three-dimensional(3D) multimedia sensory environments in real-time.[5] The definition of "virtual" is near, and" Reality" is what we experience as human beings. It allows for a first-person active learning experience through different levels of immersion, that is, a perception of the digital world as real and the ability to interact with objects.[6] An individual utilizing virtual reality equipment can look around the virtual world, move around, and connect with virtual features or items. VR headsets with such a head-mounted display and a small screen in front of the eyes are frequently used to achieve the effect, but they can also be achieved through uniquely engineered rooms with numerous big screens. Virtual reality normally includes auditory and video feedback, but haptic technology may also enable other kinds of sensory and force feedback. Virtual Reality can be displayed with various tools, including computer or mobile device screens, Virtual Reality rooms of head-mounted Displays, and multi-project environments to generate realistic images, sounds, and sensations.[7]

1.1OBJECTIVES

- To assess the level of Labour pain among Primigravid women admitted to the Labour ward.
- To evaluate the effectiveness of Virtual Reality on the Level of Labor pain among the Primigravid women admitted to the Labour ward.
- To find the association between the level of labor pain among the Primigravid women with selected demographic variables.

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2. MATERIALS AND METHODS

2.1 Study primer

This study was done on patients attending the labor ward at Mahatma Gandhi Medical college and research institute, Puducherry, India. (IHEC No - KGNC/IHEC/2020/037.) The study had minimal intervention and was by the declaration of Helsinki.

2.2 Study design

We enrolled 60 women admitted during labor in this randomized, controlled, single-center clinical trial. Following their approval and written consent, we randomly assigned these women to immersive virtual reality (VR) or a control group.

2.3 Inclusion and exclusion criteria

Primigravida without any other comorbid illness with pain willing to undergo the trial were recruited. This study's participants were women in labor who were candidates for vaginal delivery and had no known risk factors. Women aged 18 to 42 with a singleton pregnancy, vertex presentation, no history of chronic medical conditions, absence of pregnancy complications, and admission with documented labor by cervical exam and normal uterine contractions met the inclusion criteria. Women with migraine, headaches, dizziness, motion sickness, epilepsy, psychiatric disorders, visual or auditory disabilities, or a history of cesarean section were barred from participating. In addition, any patient with false pain, multi gravida, systemic illness, or chronic drugs was excluded**.**

2.4 Randomization

Sixty samples were selected by Random sampling technique (Lottery method)—30 in each group. Group I (experimental) have interventions, and Group II (control) has routine care. We ensured that the names were kept from repeating to ensure the lottery method was foolproof for randomization.

2.5 Clinical measures and data

VR group: Virtual Reality (VR) is a computer-generated environment with realistic-looking scenes and objects that immerses the user in their surroundings. (figure 1)

Fig 1 shows the antenatal mother taking VR intervention.

Such VR surroundings were created after taking pain scores (0- 10-point score) and other basic demographic data. After the VR technique, the data were collected again for analysis.

2.6 *Control-group*

Group II or the control group did not receive any special interventions.

3. STATISTICS

To elicit a 10 % difference in the decrease in pain and for an alpha error of 0.05 with a beta error of 80 %, the sample size was 55 with sample software. We took 60 samples to overcome dropouts. Finally, the data were analyzed using descriptive statistics (Mean, Frequency, Percentage, and Standard Deviation) and Inferential Statistics (Chi-square test, Mann-Whitney Test, Wilcoxon signed ranks test). The data were analyzed with SPSS version 20 software – (USA). A p-value of less than 0.05 was considered significant.

3.1 Bias

There is possible randomization, but blinding is difficult as it involves direct treatment with VR shows.

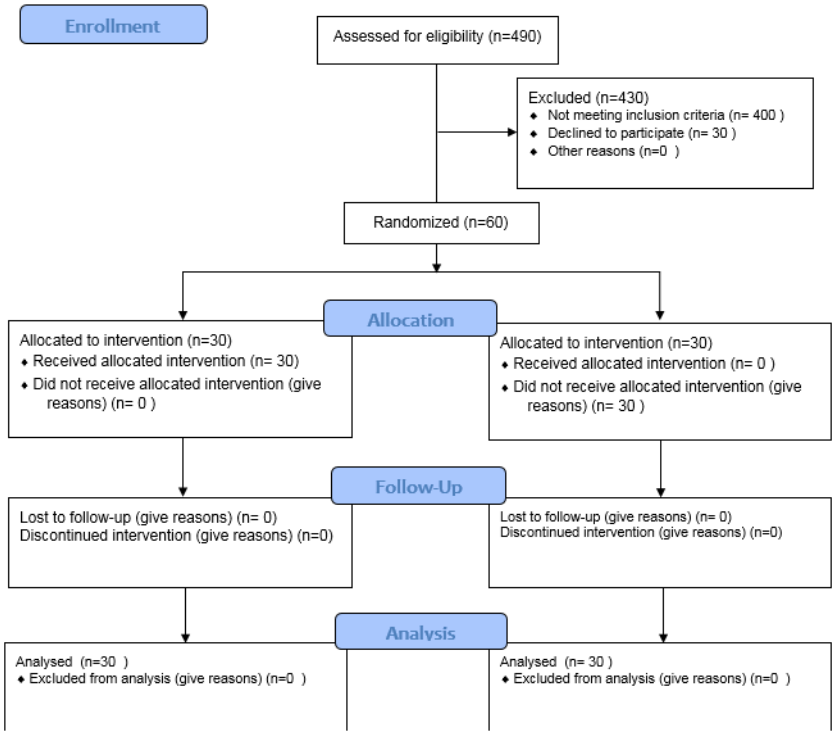

Fig 1:CONSORT 2010 Flow Diagram

4. RESULTS AND DISCUSSION

The frequency distribution of demographic variables regarding the percentage distribution of age of primigravid women with the highest number of samples 14(46.7%) in the experimental group and 13(43.3%) in the control group, belongs to 21-25 years. Regarding religion, the majority of samples, 28(93.8%) in both experimental and control groups, belonged to Hindus. Regarding education, most of the subjects (11(36.7%) in the experimental group belonged to the graduate, and 11(36.7%) in the control group belonged to the higher secondary study. Regarding occupation, the majority of the subjects, 20(66.7%) in the experimental group and 18(60.0%) in the control group, belonged to the homemaker. Regarding the family income of the primigravid women, most of the subjects, 11(36.7%) in the experimental group, were earning more than 20,000, and 19(63.3%) in the control group were earning between 10,000-15,000. Regarding the family type, the majority of subjects, 19(63.3%) in the experimental and control groups, belonged to the nuclear family. Regarding the diet majority of the subjects, 27(90.0%) in the experimental group were taking the non-vegetarian, and 29(96.7%) in the control group were taking the non-vegetarian. Regarding the residential area, 24(80.0%) were in the experimental group, and 16(53.3%) lived in the urban area. Regarding the gestational week, 's majority of the subject, 22(73.3%) in the experimental group and 19(63.3%) in the control group, belongs to the gestation of 38-39 weeks.

Table 1 shows various characteristics.

	Experimental group	Control group
The age group of 21 – 25 years	46.7%	43.3%
Religion(Hindu)	93.8	93.8
Occupation (homemaker)	66.6%	60%
Area(urban)	80%	53.3%

Regarding the majority of the fetal heart rate of the subjects, 26(86.7%) in the experimental group and 30(100.0%) in the control group belonged to a heart rate of 131-160 beats/minute. Furthermore, regarding the duration of hospitalization, most subjects 14(46.7%) in the experimental group belonged to the two days before labour.13(43.3%) in the control group belonged to one day before labor. Finally, regarding the sources of information, the majority of the subjects, 16(53.3%) in the experimental group, belonged to the mass media, and 9(30.0%) in the control group belonged to friends and family members, mass media, no any information.

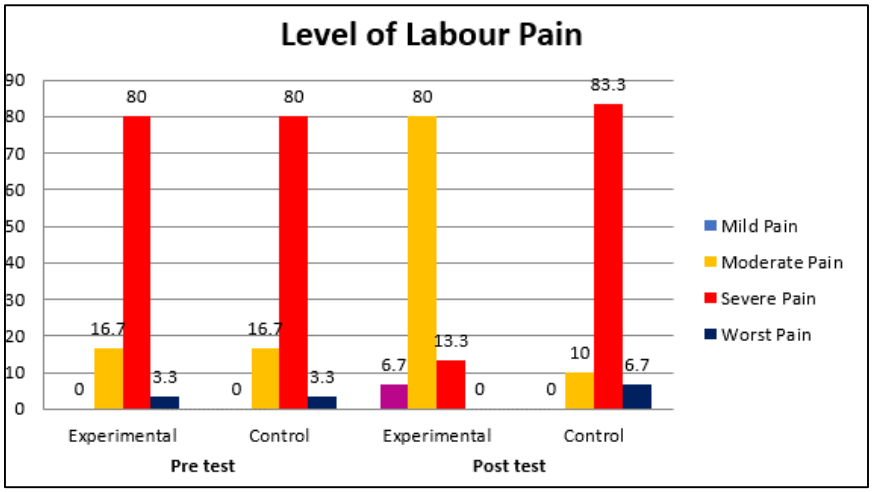

Fig 1 shows that In the pre-test, the majority of samples, 24(80%), had severe pain,5(16.7%) had moderate pain, and 1(3.3%) had the worst pain in both the experimental and control group. ***In post-test, the majority of sample in group I 24(80%) had moderate pain , 2(6.7%) had mild pain, 4(13.3%) had severe pain and In group II 3(10%) had moderate pain, 25(83.3%) had severe pain, 2(6.7%) had worst pain.***

Fig: 1 Percentage distribution of labor pain among Primigravid mothers during the pre-test and post-test.

Table: 2 Effectiveness of virtual reality in labor pain among primigravid women during pre-test and post-test.

Test	Experimental (n=30)		Control (n=30)		'Mann-Whitney test value	'p-value
	Mean	Standard Deviation (SD)	Mean	Standard Deviation (SD)		
Pre-test	7.4	1.04	7.57	1.22	380	0.278
Post-test	5.23	1.25	8.07	1.01	46.5	<0.0001
'Wilcoxon signed ranks' test value	4.867		2.982			
'p-value	<0.0001		0.003			

Table 2 shows virtual reality's effectiveness on the level of labor pain among Primigravid women between the experimental and control groups in pre and post-test.In the pre-test, the experimental and control group's mean and standard deviation values were 7.4, 1.04, and 7.57, 1.22, respectively.

In the post-test, the experimental and control group's mean and standard deviation values are 5.23,1.25 and 8.07,1.01, respectively. The obtained Wilcoxon signed ranks test value for experimental group 4.867 and p-value < 0.0001. The obtained Wilcoxon signed ranks test value for the control group was 2.982, and the p-value was 0.003. While comparing the experimental and control groups, pretest and post-test, In pre-test obtained mann whitney test value is 380, and the p-value is 0.278. The post-test mann whitney test value is 46.5, and the p-value is < 0.0001. Therefore, it is inferred that virtual reality effectively reduces labor pain among primigravida mothers and can be utilized as non-pharmacological management for reducing labor pain. In the association between the pre-test of the level of labor pain with the selected demographic variables among the primigravid women, the family type had a significant association with the level of labor pain at a p-value of 0.0143. There was no significant association between the level of labor pain and selected demographic variables like age, religion, education, occupation, residential area, gestational weeks, fetal heart rate, duration of hospitalization, sources of information, diet, and income. VR has been used to control the discomfort and pain associated with a wide range of known painful medical interventions. Participants immersed in VR[8] in clinical settings and experimental research report lower levels of pain, general distress/unpleasantness, and a desire to use VR again during painful medical procedures. VR reduced pain scores and opioid use in a randomized clinical trial compared to a control intervention. Virtual reality could be a useful postoperative pain management tool after head and neck surgery. Virtual reality (VR) is a nonpharmacologic option[10] for pain relief. However, it has received little research on pregnant or laboring women. In nulliparous women in labor, VR was associated with reduced pain. According to several other studies and findings, using immersive VR [11] during labor was associated with higher patient satisfaction. VR also reduced pain levels in early labor before epidural administration.

Immersive VR could be used as an adjunct in delivery room units to better women's long labor experiences. These findings go along with our results. Another Iranian study[12] has proved the usefulness of VR in episiotomy pain. Following epidural placement, patients experienced significant pain relief, as evidenced by significantly lower pain scores. It is critical to note that we did not test VR as a replacement for epidural analgesia. As part of our standard of care, laboring women in both the intervention and control groups received analgesia at their request. We investigated whether virtual reality (VR) could be used as an adjunct to improve women's labor and delivery experiences. They did not request in our study. Our understanding of the significance of a positive childbirth experience and its impact on women's physical, psychological, and social well-being has grown over time. However, the study has a few limitations.

- The study can be replicated with a large sample for better generalization.
- More studies can be conducted on reducing labor pain along with different complementary and alternative modalities to establish a rightful place in maternity care.
- Studies can also be done to evaluate the effectiveness of the labor process. The maternal and fetal outcome, the effect of movements and positions on pain and comfort. Still, this work is relatively new for our country as this VR may be prominent in managing pain in the coming years.

As labor pain is unique as it progresses with time till delivery, any reduction is significant. This study shows an increase in the control group.

5. CONCLUSION

The basic aim of the present study was to know the virtual reality technique's effectiveness in reducing labor pain among Primigravid women using a numerical pain scale score. The mean pre-test level of group I (experimental- VR) was 7.4(pain score), and the post-test mean was 5.23. In Group II (control), the pre-test mean level was 7.57, and the post-test mean was 8.07. The study concluded that the Virtual reality technique effectively reduced labor pain among the Primi gravida women. Furthermore, in the association between the pre-test, the level of labor pain with the selected demographic variables among the primigravid women's family type had a significant association with the level of labor pain.

6. AUTHOR CONTRIBUTION STATEMENT

Umamaheswari. R- write up and communication ; Annie Annal M- concept; Lavanya.S - Design and Data Poongodi.V; Data and Statistics

7. CONFLICT OF INTEREST

Conflict of interest declared none.

8. REFERENCES

1. Ravishankar M, Parthasarathy S, Saravanan P. Labour analgesia—a review. *J Anaesth Clin Pharmacol.* 1999;15(3):225–52.
2. Parthasarathy S, Ravishankar M, Hemanthkumar VR. Reported Pain During Labour - A Qualitative Study of Influencing Factors among Parturient During Confinement in Private or Government Hospital. J Clin Diagn Res. 2016 Mar;10(3): UC01-3. doi: 10.7860/JCDR/2016/16754.7343.
3. Rani, P., Surya, R., Sheeba, A.J., Parthasarathy, S., Vadlamudi Reddy, H.K. and Sivashanmugam, T., 2018. An equipotent dose of levobupivacaine reduces the incidence of instrumental vaginal delivery when compared to ropivacaine during epidural labor analgesia. Sri Lankan Journal of Anaesthesiology, 26(2), pp.105–110. DOI: http://doi.org/10.4038/slja.v26i2.8309.
4. Ravishankar M, Parthasarathy S. Acupuncture: Does it Need a Real Relook? J Basic Clin Appl Health Sci 2019;2(3):87–88. 10.5005/jp-journals-10082-02228.
5. Fox J, Arena D, Bailenson JN. Virtual reality: A survival guide for the social scientist. Journal of Media Psychology: Theories, Methods, and Applications. 2009;21(3):95.
6. Li A, Montaño Z, Chen VJ, Gold JI. Virtual reality and pain management: current trends and future directions. Pain Manag. 2011 Mar;1(2):147-157. doi: 10.2217/pmt.10.15.
7. Kourtesis P, Collina S, Doumas LAA, MacPherson SE. Technological Competence Is a Pre-condition for Effective Implementation of Virtual Reality Head Mounted Displays in Human Neuroscience: A Technological Review and Meta-Analysis. Front Hum Neurosci. 2019 Oct 2;13:342. doi: 10.3389/fnhum.2019.00342.
8. Li A, Montaño Z, Chen VJ, Gold JI. Virtual reality and pain management: current trends and future directions. Pain Manag. 2011 Mar;1(2):147-157. doi: 10.2217/pmt.10.15.
9. Pandrangi VC, Shah SN, Bruening JD, et al. Effect of Virtual Reality on Pain Management and Opioid Use Among Hospitalized Patients After Head and Neck Surgery: A Randomized Clinical Trial. JAMA Otolaryngol Head Neck Surg. 2022;148(8):724–730. doi:10.1001/jamaoto.2022.1121
10. Wong MS, Spiegel BMR, Gregory KD. Virtual Reality Reduces Pain in Laboring Women: A Randomized Controlled Trial. Am J Perinatol. 2021 Aug;38(S 01):e167-e172. doi: 10.1055/s-0040-1708851.
11. Carus, E.G., Albayrak, N., Bildirici, H.M. et al. Immersive virtual reality on childbirth experience for women: a randomized controlled trial. BMC Pregnancy Childbirth 22, 354 (2022). https://doi.org/10.1186/s12884-022-04598-y.
12. Shourab NJ, Zagami SE, Golmakhani N, Mazlom SR, Nahvi A, Pabarja F, Talebi M, Rizi SM. Virtual reality and anxiety in primiparous women during episiotomy repair. Iranian J Nursing Midwifery Res 2016;21:521-6