## Effect of virtual reality and chewing mint gum on labor pain intensity and anxiety level: A Comparative Study

Hanaa kamal Helmy 1, Zeinab A. Baraia2 ,Hagar kamal Masoud 3, Safaa SolimanAhmed4
1&4Assistant Professor of Maternal & Newborn Health Nursing, Faculty of Nursing, Beni-Suef University, Egypt
2 Lecturer of Maternity, Obstetrics and Gynecological Nursing, Faculty of Nursing, Suez Canal University, Egypt
3 Lecturer of Maternal & Newborn Health Nursing. Beni-sueif University, Egypt

#### Abstract

Background: Due to the debilitating effects of severe labor pains, its management continues to be an essential subject that needs much attention. Application of a nonpharmacologic solution could have a significant impact on nursing practice to reduce labor pain and anxiety. Aims: To compare the effect of virtual reality and chewing mint gum on labor pain intensity and anxiety level. Methods: This is a single-blind, three-group clinical trial study on 300 mothers affiliated to Beni Suef University Hospitals and Elnada maternity and Plastic surgery hospital for natural childbirth during the year 2021 -2022. Subjects: were randomly divided into three groups of chewing gum, virtual reality, and control using six blocks. Group one (Chewing gum interventions), group two (virtual reality) where dilatation for 20 min were performed twice in 4-5 cm and 7-8 cm. Group three is the control group, where nurses performed the routine hospital care only. Tools: included A structured interviewing Questionnaire, Numerical rating scale, Visual anxiety scale or Observational scale of behavioral distress and mothers' satisfaction Questionnaire. Results: There was differences in pain intensity and anxiety level before and after the intervention. There was significant difference between pre-intervention pain intensity and anxiety level scores among the three studied groups, but there was a significant difference between pain intensity and anxiety level scores immediately and after 30 min post the intervention implementation. Conclusion: The results of this study displayed that virtual reality and chewing mint gum as an intervention decrease pain intensity and anxiety level during the first stage of labor. Recommendations: for further research include a larger sample, long-term retention, and opinions pregnant women.

Key words: L	abor pain, 1	Anxiety, '	Virtual	reality,	Chewing	gum
--------------	--------------	------------	---------	----------	---------	-----

#### **Introduction**

Labor is term used for 'physiological birth' or 'normal birth', it has been described as a painful physiological phenomenon throughout women's lives. Pain is an unpleasant status that the endeavor of medical science has always sought to eliminate or reduce its intensity and it has not been managed by medical

intervention (Osman, Elsyed and Abd

Elgawad, 2022: Ebrahimian et al., 2022). Fear of labor is a major women's resistance to natural child birth and therefore women prefer Cesare section delivery (Dargahi et al., 2018 : Ebrahimian et al., 2022). Several studies show that about 60% of nulliparous women and 40% of multiparous women describe severe labor pain and woman's pain perception could be influenced by past experiences with pain, fatigue, pain anticipation, positive or negative support system, labor and birth surroundings, cultural expectations, and

level of emotional stress and anxiety (Sosan et al., 2012 :Zhang et al., 2018).

As well, during labor, conflicting emotions such as fear, and anxiety are present. As well factors such as stress, lack of education, unawareness and lower socioeconomic status among mothers could cause severe pain. which are commonly coupled with anticipation and gladness. This conflicts or factors contribute to pregnant women's perception of pain and affects their labor and birth experience (Aziato, et al., 2017: Feveah &. Yakout, 2022). Anxiety and increased epinephrine fear and norepinephrine secretion which lead to Vaso constriction, increased muscle tone, decreased uterine contractility, and abnormalities during labor (Ebrahimian et al., 2022). Anxiety and pain are two essential factors that contribute to the process of labor. Anxiety during labor could lead to increased bleeding during childbirth, exacerbation of labor pain, negative experiences of childbirth, mental problems, postpartum depression, and delayed onset of first breast feeding. New evidence suggests that adequate relief of labor pain may be associated with a decreased risk of Postpartum depression (Zhang et al., 2018: Ebrahimian et al., 2022).

The severity of pain and anxiety during labor could be reduced by using nonpharmacological methods such as aromatherapy, distraction, acupuncture, acupressure, reflexology, respiratory techniques, massage therapy, and music therapy, etc.(Bolbol et al 2017:Moghimi et al., 2018). Virtual reality (distraction technique), it is one of the nonpharmacological approaches to reduce pain intensity and anxiety level, which presented by utilizing a variety of distraction techniques during painful medical processes. The negative process, such as pain, is on the margin of attention, which lessens the feeling and perception of pain intensity. Distraction is more in accordance with the painful inclination. Chewing gum and watching virtual reality

movies are two forms of distraction. By placing customized glasses carrying 360degree relaxation films in front of one's eyes, virtual reality diminishes attention to real stimuli. Recently, it has been employed as a technique to manage anxiety level and pain intensity during medical procedures (Aliakbari et al., 2017). According to one study, virtual reality could be a helpful in diverting the attention for those who are in pain due to a range of physical and mental diseases. By providing a distraction, chewing gum which can help in decreasing stress level and environmental anxiety. Chewing gum is useful in lowering both acute and chronic stress, according to a study, its impact is on stress, consciousness, and cognition levels. Some studies indicate that the CONSORT 2010 check list provides the foundation for this clinical trial (Wiederhold et al., 2014:Ebrahimian et al., 2022).

Nurses have a critical and vital role in assessing the pregnant women's perception of pain and anxiety by documenting and evaluating pain intensity or anxiety level by providing pain or anxiety control or by reducing their effect through giving information about the relief measures used by the hospital. In addition to, evaluating the maternal response to the relief measures as side effects, pregnant women's satisfaction regarding the relief measures and modifying the plan of care when required. Efficacious and competent nurses must be knowledgeable and understand maternal physiology, implications of treatment and usually try to diminish distress or anxiety related to pain and respond quickly to reports of pain and will believe patients' reports of pain (Murray & Huelsmann, 2020).

## Significant of the study

For women, labor is a protracted and painful procedure. The current gold standard for pain management during women birth is neuraxial blocking, which encompasses epidural, spinal, and combined spinalepidural analgesia with its adverse effects. But enhancing the entire labor and delivery process for women is difficult and necessitates offering tailored care, such as alternative treatment. Todays, there are increase interest in using the non pharmacologic techniques as it is noninvasive with non harmful side effects. The taste of mint gum was employed as a non-invasive, analgesic treatment in clinics that used VR or gum chewing with few adverse effects and no drug addiction. According to the results, the preferred methods for reducing pain and anxiety are the available, easy used methods, which do not require expertise and under the control of the individual. So, the need for this study is crucial to determine the effective methods for reducing pain and anxiety. Studies have shown that both methods of distraction (virtual reality and chewing gum) are somewhat effective in reducing pain and anxiety in medical practice. But it is not possible to say which the women is preferred (Carus et al.,2021). This study aims to compare the impact of virtual reality and chewing mint gum on labor pain intensity and anxiety level.

#### Aim of the study

The aim of this study was to compare the effect of virtual reality and chewing mint gum on labor pain intensity and anxiety level.

#### **Research Hypothesis**

There is difference between the chew gum, virtual reality in controlling pain and anxiety during the first stage of labor

## Study design

A randomized controlled trial. Quasiexperimental research design used to achieve the aim of this study. This design used to compare matched groups (gum chewing, virtual reality and control group) of mothers and measure the grade of change happen due to the effect of the intervention

## Study setting

This study was carried out in Obstetric department, affiliated to university hospital at Beni-Suef University; and also from Elnada maternity and Plastic surgery hospital (the protocol of labor in the two hospital was similar) it was carried out during the period from July 2021 to June 2022.

#### Subject:

Purposive sample of pregnant women who attend at the obstetric department affiliated to university hospital at Beni-Suef University were recruited. This randomized clinical trial with three parallel groups was performed on 300 mothers who attend at the obstetric department affiliated to university hospital at Beni-Suef University were recruited and also from Elnada maternity and Plastic surgery hospital (the protocol of labor in the two center was similar). Sampling was done from July 2021 to June 2022

#### Selection of the pregnant women Inclusion criteria included:

Singleton pregnancy with live embryo.

Entry into active phase of labor.

Pregnancy stage 37-41 weeks.

No history of medical and mental illness.

Women with no blindness.

Exclusion criteria:

Maternal age<18 and >35 years.

Use of Entonox and spinal and epidural anesthesia.

Chewing gum less than20min.

Watching virtual reality film lessthan20min.

Surgical complications, medical disorders such as DM and hypertension.

#### Sample size:

Sample size was detected based on the last numbers of previous setting

Sample size was calculated utilizing the following formula.

Ν

n=

1+N (e) 2 Where:

n= sample size

N =student (1200)

e = margin error (0.05)

Out of 300pregnant women who underwent cesarean section under spinal anesthesia and matched the inclusion criteria, 2 pregnant women were unwillingness to cooperate in the study, 2pregnant women were excluded because they had medical disorders like DM and hypertension, 2 was excluded because she is chewing gum less than 20 min. The researchers were excluded 34pregnant women of pilot study from sample So, this study included 300pregnant women, they were randomly assigned into three groups: Group1(Virtual Reality group) "100pregnant women": these pregnant women watched 360-degree video with nature landscapes (Samsung Gear VR Virtual Reality Headset with Samsung MobileS7) were performed twice with routine care. Group2 (chewing gum group "100 women": These pregnant women received gum chewing in the first at the beginning of the active phase, the intervention were performed twice with routine care, and Group3 (control group)"100pregnant women": These pregnant women did not receive any intervention and received hospital routine care only.

## Tools of data collection:

**Tool (1)** Structured interview questionnaire and personal data

• It includes Pregnant Women's history: as Job, Educational level, Socioeconomic Status, Pregnancy condition, Gravida, Parturition and BMI.

Tool (2) Numerical rating scale (NRS); means (verbal rating scale (VRS); visual analogue scale. (VAS)): (for studied groups). Adopted from Hockenberry & Wilson, (2015) and Song et al., (2016) it was used to measure mothers. Pain severity It consisted of a line divided by numbered points ranged from (0-10) consisting of six cartoon faces that range from a neutral expression (0 no pain) to a screaming face (10 hurts more than. Women's answers were sorted as follows: No pain (zero), mild pain (1-4), moderate pain (4-<7) and severe pain (7 -10). Alpha Cronbach test = 0.86 was used to test its reliability.

**Tool III:** Visual Anxiety Scale or Observational Scale of Behavioral Distress: The Spielberger's Anxiety Inventory is a standard questionnaire that consists of 20 items of explicit anxiety section. In the range of 4 Likert options, scores range from 0 to 4 (0 = Not present,

1 = Mild, 2 = Moderate, 3 = Severe, 4 =Very severe) and on a general scale, 0 to 100 are measured. A score of 20 indicates the lowest level of anxiety and a score of 100 indicates the highest level of anxiety. Each of the test terms is assigned a score of 0 to 4 based on the answer. Scoring is inverted for expressions that indicate anxiety. Depending on the item, the response scores will be assigned to 4-3-2-1-0 instead of 0 - 1-2-3-4. Phrases that indicate the absence of anxiety are reversed when scoring [19]. The reliability of the questionnaire was calculated by Cronbach anxiety 's alpha method of 0.889

**Scoring system:** This scale formed of 11 variables. Each item is scored on a scale of 0 (not present) to 4 (severe): 0 = Not present, 1 = Mild, 2 = Moderate, 3 = Severe, 4 = Very severe. With a total score range of 0–100, where <20 indicates mild severity,21–40moderate severity,41–60 severe and 61-100 very sever.

Tool IV; Pregnant Women' s satisfaction level (Likert - Scale Rating): Adapted from Friedel et al. (2014) it was used to assess women`s satisfaction level Pregnant regarding this scale formed of 5variables:1,Pregnant women were comforted by the use of the intervention; 2, it was a positive experience; 3, i intervention is not easy to use; 4, i would not like to use the intervention in the future. Likert scale consists of 4 statements and was based on a five points 1= Completely satisfied, 2= Satisfied, 3= Fair, 4= Dissatisfied, 5= Completely dissatisfied.

Validity and reliability of study tools: Content validity was ascertained by a group of experts (3) from Obstetrics and Gynecology Nursing speciality, and medical Obstetrics specialties. Their thoughts on the tool's format, layout, consistency, and scoring method were solicited. Changes to the tools were made in accordance with the experts' assessments of the instruments' sentence structure, suitability of content, and item sequencing. Although all agreed on the intervention, the experts suggested making a few modest tweaks to the language used to convey the information. The reliability of all the tools' components was tested. to evaluate internal consistency, use Cronbach's alpha. The reliability test of the tool 4 was established by the Cronbach alpha to assess internal consistency construct validity. Cronbach alpha r= 0.86.

## Ethical Considerations:

To gain mothers consent to participate in the study, were informed about the study's purpose and advantages. Also, mothers included in the stud were informed by the researchers that participation in the study was entirely optional, and they had the right to discontinue/withdraw at any time and without explanation, and that the researchers would maintain the confidentiality of their answers and/or data collected. All information will be kept private and secret. Those who are invited to participate in the study must give their express written or verbal agreement.

## A pilot Study:

A pilot study was authorized on 10% of the total sample (300) pregnant woman's to test tools clearness and applicability of the study tools as well as approximation of the time needed to completion of each study tool. Those who contributed to the pilot study were later excluded in the study as there were no modifications on to the tools.

## **Procedure:**

After gaining official approval from the director of Beni- suef university hospital and agreement of the chairman of Obstetrics department, data collection start to be collected through a period of nearly 12 months from the beginning of July 2021 to June 2022.

-The aim of the study at first was simply explained to pregnant women under study. -The researchers started to collect data from the pregnant women at the selected setting.

-The researcher started the study by visiting the sitting of the study 2 days/week (Mondays & Tuesdays) during the morning period in the previously mentioned setting from 9.00 a.m. to 2.00 p.m.

- All involved women were informed that participation is voluntary and have the right of accepting or refusing participation in the study. Each women were randomly allocated to the line of application and surrounding conditions should be similar in all patients.

-The first method of data gathered from through involved women interviewing questionnaire. The researchers introduced themself to the participant women and obtained her approval to participate in the study. The researchers collected sociodemographic data related to job, education level, socioeconomic status, pregnancy condition, gravida, parturition, and BMI: It included number of pregnancy condition (wanted or unwanted), gravida number (1 or 2), parturition (0 or 1), BMI (underweight or overweight or obesity). Assessment of pain scale done 10 time within 10 minutes each, also, Assessment of anxiety scale done 10 time within 5 minutes each. Regarding pregnant women's satisfaction assessment. the researcher inquired questions in a simple Arabic language and documented the answers in the structure interview tool. Interview consumed about 10 -15 minutes for each woman.

## Ethical and legal aspects:

1. Patient information and informed consent: A written informed consent in the Arabic language was autographed by each woman informing the nature, scope, and possible consequences of the clinical study. The pregnant woman's consent was confirmed by the personally dated signature of the pregnant woman and personally dated signature of the person conducting the informed consent. Before the intervention, the researchers trained the woman in the three groups how to use the pain visual Spielberger analogue and Anxiety Questionnaire both were completed by all research units before interventions and outcomes .At the beginning of the study, after obtaining the informed consent from the three search units, The demographic characteristics and fertility question was almost completed by questioning mother and looking at her hospital file. The chewing gum group was given a 1 g mint gum without sugar with routine care in two stages, first at the beginning of the active phase (4to 5 cm dilatation) and the second time at 7–8 cm dilatation to chew at their normal speed for at least 20 min.

The virtual reality group, given virtual reality glasses containing 360-degree video with nature landscapes (Samsung Gear VR Virtual Reality Headset with Samsung MobileS7), the previse action were performed twice with routine care. The first intervention was performed at the beginning of the active phase (4-5 cm dilatation) and the second intervention at 7-8 cm dilatation. Each intervention lasted for20 mins. The intervention groups (virtual reality and chewing gum) completed the pain visual analogue and the Spielberger Anxiety Inventory immediately after each intervention as well as at the first 30 min after each intervention. In the control group, only routine maternity unit care was received according to the national protocol of midwifery care like the intervention groups. Routine delivery unit care Such as receive analgesia, as oxytocin in the first and second stages of labor, as well control fetal heart rate, perform vaginal exams, assess and recording the vital signs and more etc. Like the other two groups, pain visual analogue and anxiety questionnaire were measured simultaneously with the intervention group. All interventions in the hospitals, two including implementation of the virtual reality, chewing gum, and recording the relevant questionnaires were performed by a post graduate nurse who had received the necessary training in the three shifts. Likert - scale rating satisfaction A questionnaire about pregnant women' s satisfaction: it is one of the secondary outcomes to be reported. So, before the pregnant woman discharge from the hospital, she asked about her psychological satisfaction regarding the

timing of the three-intervention initiation according to the group she was enrolled in, and if she was planning to repeat the same intervention schedule her in the next deliveries.

## Statistical analysis

The data were collected and entered onto Microsoft access database to be analyzed using the Statistical Package for Social Science (SPSS Inc., Chicago, version 21). Quantitative continuous data were

1. Student t-test was used in case of comparisons between groups.

2.Paired t-test was used for pre-post comparisons of the same sample.

3.Pearson correlation analysis was used for assessment of the inter-relationships among quantitative variables.

4. Colum and Bar chart diagrams were used to express the graphical presentation of the data. Statistical significance was considered at P -value < 0.05.

## **Results:**

Table 1showedthedemographiccharacteristics of studied groups; there was nostatistically significant differences among thethree groups.

**Table2** showed that, there was highly statistically significant difference between all groups regarding anxieties during the active and transition phase of labor.

**Fig. (1):** indicated significant improvement regarding studied women's pain levels in both groups when compared with control group. In virtual reality and chewing gum groups were (20% &12% no pain and severe pain sensation in the virtual reality group respectively) and (22% &13% no pain and severe pain sensation in the chewing gum group respectively) compared by the control group (0% & 20% no pain and severe pain sensation respectively).

**Table 3**: showed that, there was highly statistically significant difference between all groups of anxieties during the active and transition phase of labor but significantly lower than in the control group before intervention.

Fig. (2): Revealed that studied women's anxiety levels in all groups showed significant improvement regarding the anxiety level,

among the virtual reality, and chewing gum groups when compared with control group as the following (20% &5% no present and very severe anxiety sensation in virtual reality group while in chewing gum group showed (23% &8% no present and very severe anxiety sensation respectively) compared by the control group (0% & 20% no present and very severe anxiety sensation respectively).

**Table 4** showed that there was astatistically significant difference between allgroups with (p-value <0.001).</td>

Variable		Virtualreality group		Chewinggum group		Control group		P value
		N	%	N	%	N	%	
Job	Employed	25	25.0	35	35.0	33	33.0	>0.05
	Not employed	75	75.0	65	65.0	67	67.0	
Education level	Illiterate	10	10.0	15	15.0	12	12.0	>0.05
	Primary and secondary	30	30.0	35	35.0	40	40.0	
	High	60	60.0	50	50.0	48	48.0	
Socioeconomic Status	Poor	25	25.0	30	30.0	28	28.0	>0.05
	Moderate	55	55.0	60	60.0	65	65.0	
	High	20	20.0	10	10.0	7	7.0	
Pregnancy condition	Wanted	92	92.0	95	95.0	90	90.0	>0.05
	Unwanted	8	8.0	5	5.0	10	10.0	
Gravida	1	80	80.0	65	65.0	75	75.0	>0.05
	2	20	20.0	35	35.0	25	25.0	
Parturition	0	82	82.0	70	70.0	74	74.0	>0.05
	1	18	18.0	30	30.0	26	26.0	
BMI	Normal weight	12	12.0	9	9.0	20	20.0	>0.05
	Overweight	80	80.0	88	88.0	60	60.0	
	Obesity	8	8.0	3	3.0	20	20.0	
		1		1				

#### Table (1) Comparison between pregnant women data in the three groups of the study

Statistically insignificant at p-value>0.05

Statistically significant at p-value<0.05

Highly statistically significant at p-value<0.001

## Table (2) Comparison between the mean scores of womens pain severity among the three groups (virtual reality, chewing gum and control) during Cervical dilatation

Cervical dilatation	Time	Virtual reality Mean±SD	Chewing gum Mean±SD	Control Mean±SD	P value
Active phase (4-6)cm	Pain pre intervention	6.27±1.08	6.19±1.12	6.16±1.43	< 0.001
	Pain immediately post intervention	6.71±1.20	7.66±122	6.34±1.08	< 0.001
	Pain 30 min post intervention	7.02±1.08	7.16±1.10	7.92±1.25	< 0.001
Transition phase (7-10)cm	Pain pre intervention	8.27±0.86	8.22±0.82	10.58±0.68	< 0.001
	Pain immediately post intervention	9.03±0.66	8.77±0.42	9.93±0.71	< 0.001
	Pain30minpostinterve ntion	9.56±0.64	9.46±0.72	9.95±0.19	< 0.001



Fig. (1): illustrated Pain Levels among the Studied groups' Women among Virtual Reality, Chewing Gum and Control (n=300)

Table3: Comparison between mean scores of women's anxiety among the three groups (virtual reality, chewing gum and control)

Cervical dilatation	Time	Virtual reality	Control	Chewing gum	P value	
		Mean±SD	Mean±SD	Mean±SD		
Active phase (4-6)cm	Anxiety before intervention	40.41±6.32	42.45±4.97	39.77±6.38	< 0.05	
	Anxiety immediately after the intervention	38.32±6.44	44.03±4.90	37.48±6.65	< 0.001	
	Anxiety 30min after intervention	38.90±6.12	48.48±5.34	38.09±5.84	< 0.001	
Transition phase (7-10)cm	Anxiety before intervention	43.70±5.67	52.19±5.38	42.16±4.84	< 0.001	
	Anxiety immediately after the intervention	40.77±6.74	54.25±5.88	38.90±5.25	< 0.001	
	Anxiety 30 min after intervention	46.12±6.49	56.74±5.33	43.87±5.10	< 0.001	



Egyptian Journal of Health Care, 2022 EJHC Vol.13 No.2



# Fig. (2): Presented Anxiety Levels among the Studied groups Virtual Reality, Chewing Gum and Control (n=300)

Table 4: Frequent distribution of the studied groups satisfaction (chew gum, virtual reality and contro	I)
groups regarding pain intensity and anxiety level in the first stage of labor (n=300)	

Variables	Virtual reality (n=60)		Gum Chewing group (n=100)		Control group (n=100)		P value
	Ν	%	Ν	%	Ν	%	
Patients' satisfaction							< 0.001
Completely satisfied	32	32.0	40	40.0	5	5.0	
Satisfied	25	25.0	22	22.0	10	10.0	
Fair	33	33.0	20	20.0	40	40.0	
Dissatisfied	10	10.0	13	13.0	30	30.0	
Completely dissatisfied	0	0.0	5	5.0	15	15.0	

Statistically insignificant at p-value>0.05

Statistically significant at p-value<0.05

Highly statistically significant at p-value<0.001

#### Discussion

Labor is a natural physiological process, but it is also considered as one of the most painful experiences during woman's life. Caring of labor pain is one of the vital goals in intrapartum care. Experiences of labor pain could be varying among women. They are determined by emotional, motivational, cognitive, social, and cultural circumstances, as well as previous labor experience. The expectation and desire for pain relief vary widely between women during labor and during delivery (Oladapo et al., 2018;Osman, Elsyed and Abd Elgawad, (2022). In the present study, the severity of pain and anxiety during the first stage of labor was reduced following the use of the distraction technique (virtual reality) and chewing gum and there was a significant difference between pain and anxiety scores immediately and 30min after the intervention with p= <0.000). According to Ebrahimian et al., (2022) who reported in study title "Comparison of the effectiveness of virtual reality and chewing mint gum on labor pain and anxiety: a randomized controlled trial" as the finding reveal that there was a significant difference between pain and anxietv scores immediately and 30min after the intervention with (p < 0.05). In a study done by Pratiw and Husin et al., (2017) they found that there was a significant difference between pain scores in the VR user group and the non -VR control group (p<0.05) in his study about "The effect of virtual reality on pain in Primiparity women". But, the results of a study done by William, Victoria and John (2016)under the title "Traditional Instruction Versus Virtual Reality Simulation: A Comparative Study of Phlebotomy Training among Nursing Students in Kuwait" the study finding reveled no significance different between the 2 groups . Various studies have been conducted on the effect of virtual reality on pain intensity at the first stage of labor, all indicate the positive effect of virtual reality on pain intensity. In a Study aims to investigate the effect of virtual reality on pain threshold and tolerance. The results showed that using virtual reality increased pain threshold, tolerated pain self - efficacy and reduced pain intensity Akin et al., (2021). The researchers believe that this improvement may be due to that the VR is inexpensive method, easy used and almost all nurses and women in the sample had passion to know about VR application. The developed learning package included the needed information about VR application in simple, concise, clear language, videos and practical session as well as in written booklet which considered as a reference at any time from the participants.

The results of the current study is in line with the results of **Ebrahimian et al., (2022)** who found that virtual reality and chewing mint gum intervention reduce pain and anxiety women in labor during the first stage of childbirth and chewing gum is a relaxing technique so improves memory and reduces work stress. Additionally, Hirano and Onozuka (2015) reported in their study about chewing gum and its effect on attention indicated that chewing gum increased attention, increased consciousness. and improved cognitive performance .On the same line (Ireland et al , 2016) suggested that sugarfree chewing gum may help orthodontic patients to consume less ibuprofen, and chewing gum is effective in reducing pain among orthodontic patients and could be recommended as a suitable alternative to ibuprofen in a comparative study evaluating the effect of chewing gum versos the ibuprofen in orthodontic pain treatment. There was a statistically significant highly difference between all groups regarding pregnant women's satisfaction with the p-value = < 0.001. The present study demonstrated that, virtual reality and the gum chewing group showed more satisfied than the control group, while, in the virtual reality group more than half of the women reported that they were completely satisfied when compared with other groups. The researchers explained these results as the virtual reality is save, inexpensive, easy, reduces pain and anxiety in a safe way resulting in early passage of flatus, less hospital stay, and minimal pain score and complications, as well less hospitals cost Osman, Elsyed and Abd Elgawad, (2022). Additionally, Carus et (2021) said that an immersive VR al. application during labor was practical and improved patient satisfaction level. In the early stages of labor before an epidural was used, VR also reduced pain scores. To make the long laboring process comfortable for women more, immersive VR may find a role as an adjunct in labor and delivery units to improve the lengthy labor experience for women .the best one following the VR is chew gum when compared with control group that finding support the research hypothesis. The main result of the current study was the difference between pain and anxiety before and after the intervention.

There was no intensity statistically significant difference between preintervention pain and anxiety scores among the virtual reality, chewing mint gum and control groups, but there was a statistically significant difference between pain and anxiety scores immediately and 30min after the intervention. The researchers suggest that these results due to reduces the margin of attention, feeling and perception of pain. These finding also support the research hypothesis that related to improvement of the pregnant women's satisfaction level after virtual reality and chewing mint gum application Akin et al .,(2021) and Ebrahimian et al., (2022) .

#### Conclusion

This study displayed that chewing mint gum alone can reduce pain and anxiety at the first stage of labor. Also, using virtual reality could reduce pain and anxiety during childbirth without causing complications. Hence, we can say that using distraction method as (chewing gum and virtual reality) are easy and effective and could reduce pain and anxiety during childbirth.

#### Recommendations

In the light of the existing study findings, the following were recommended that:

Virtual reality is recommended as an alternative non- pharmacological therapy, which can be applied in maternity hospitals for effectual effect in labor pain management.

Replicability of the research study with a large sample because the generalizing of results makes confirm the benefit of virtual reality and analyze how to better to applying.

## Abbreviations

VR:Virtual Reality;RCT:RandomizedControlledTrial;V

#### AS:VisualAnalogue

Scale;IRCT:IranianRegistryofControlledTria l.

## **References:**

Akin, B., Yilmaz Kocak, M., Küçükaydın, Z., & Güzel, K. (2021): The Effect of Showing Images of the Foetus with the Virtual Reality Glass During Labour Process on Labour Pain, Birth Perception and Anxiety. Journal of Clinical Nursing

Aliakbari.M, Alipor. A, Ebrahimimoghadam. H, Fekraty.M., (2017). The efect of virtual reality (VR) on psychological disorders in Cancer Caseses. Military Caring Sci. 2017;4(1):49–57.

Aziato, L., Acheampong, A., & Umoar, K. (2017): Labour pain experiences and perceptions: a qualitative study among post-partum women in Ghana. BMC Pregnancy and Childbirth, 17(1), 1-9.

**Bolbol Haghighi N, ShayanA,Kazemi F, MasumiZ.,(2017).** The efect of using birth ball on maternal and neonatal outcomes: A randomized clinical trial. Avicenna J Nurs Midwifery Care. 2017;25(1):18–23.

Carus E G., Albayrak N., Bildirici HM., and Ozmen SG., (2021). Immersive Virtual Reality Improves Labor and Delivery Experience for Women: A Randomized Controlled Trial. October 13th, 2021 DOI: https://doi.org/10.21203/rs.3.rs-898920/v1

**Dargahi R,Ghazi A,Hashemi Pazikoueii F, Amani F., (2018).** A comparative study about the efcacy of Entonox gas analegesia alone and in combination with dexamethasone in painless labor. Anesthesiol Pain. 2018;8(4):61–71.

**Ebrahimian A, Bilandi RR , Bilandī MRR** and Sabzeh Z., (2022). Comparison of the effectiveness of virtual reality and chewing mint gum on labor pain and anxiety: a randomized controlled trial. BMC Pregnancy and Childbirth (2022) 22:49 . https://doi.org/10.1186/s12884-021-04359-3

**FeyeahT A &. Yakout SM., (2022).** The Influence of Three Delivery Positions on Pain Intensity and Feto-Maternal Outcomes During The First Stage of Labor among primi-gravidae Mothers, Comparative Study. Assiut Scientific Nursing Journal, DOI: 10.21608/ASNJ.2022.126566.1340 Friedel M, Whitman J, Magnani L.(2014) Boosting pain awareness through Buzzy Bee. Poster presentation at the 2nd European Congress on Pediatric Palliative Care, Fondazione Maruzza, Rome, 19-21th November 2014.

Hirano Y, Onozuka M.(2015). Chewing and attention: a positive efect on sustained attention. Biomed Res Int. 2015;2015:367026. https://doi.org/10. 1155/2015/367026. Epub 2015 May 17.

Hockenberry, Marilyn J.; Wilson, David, eds. (2015). "Chapter 5: Pain Assessment and Management". Wong's nursing care of infants and children (10th ed.). Mosby. ISBN 9780323222419 http://asnj.journals.ekb.eg ,http://www.arabi mpactfactor.com , http://olddrji.lbp.world/indexedJournals.aspx

**Ireland AJ, Ellis P, Jordan A, Bradley R, Ewings P, Atack NE, et al.(2016)** Comparative assessment of chewing gum and ibuprofen in the management of orthodontic pain with fxed appliances: A pragmatic multicenter randomized controlled trial. Am J Orthod Dentofac Orthop. 2016;150(2):220–7.

Moghimi Hanjani S, Mehdizadeh Tourzani Z, Tajvidi M, Baheri B, Asl L, Pouya M.,(2018). Efect of localized cold treatment modality on pain intensity during labor in primiparous women. Iran J Obstet Gynecol Infertility. 2018;21(5):14–21

Murray, M.L. & Huelsmann, G. M. (2020): Labor and Delivery, 2nd, Springer, USA, p; 88

Oladapo, O. T., Tunçalp, Ö., Bonet, M., Lawrie, T. A., Portela, A., Downe, S., & Gülmezoglu, A. M. (2018): WHO model of intrapartum care for a positive childbirth experience: transforming care of women and babies for improved health and wellbeing. Bjog, 125(8), 918

OsmanS A , Elsyed H F., Abd ElgawadNA.,( 2022).The Effect of Applying Virtual Reality in the Labor Unit: A Comparative Study. International Journal of Novel Research in Healthcare and Nursing. Vol. 9, Issue 2, pp: (94-104), Available at: www.noveltyjournals.com

Pratiw IG, Husin F, Ganiem AR, Susiarno H, Arifn A, Wirahkusuma F., (2017). The effect of virtual reality on pain in Primiparity women. Int J Nurs Health Sci. 2017;4(4):46–50.

**Song S, Choi DH, Oh TS (2016):** The Use of Locally Applied Vibration to Minimize Pain during Fractional CO 2 Laser Therapy in Living Liver-Donor Scar Management. pISSN: 2234-6163 • eISSN: 2234-6171 • https://doi.org/10.5999/aps.2016.43.6.570 • Arch Plast Surg 2016;43:570-574

**Sosan H, Mahrokh D, Mahin K, Mortaza G.,** (2012). Comparison of labor pain and factors afecting the pain perception among Primiparous and multipa- rous women referring to Women's private and state hospitals in Tabriz in 2010. Med J Tabriz Univ Med Sci Health Serv. 2012;34(3):117.

Wiederhold BK, Soomro A, Riva G, Wiederhold MD., (2014) Future directions: advances and implications of virtual environments designed for pain management. Mary Ann Liebert, Inc. 140 Huguenot Street, 3rd Floor New Rochelle, NY 10801 USA; 2014.

William A, Victoria L. John VP., (2016). Traditional Instruction Versus Virtual Reality Simulation: A Comparative Study of Phlebotomy Training among Nursing Students in Kuwait. Journal of Education and Practice ISSN 2222-1735 (Paper) ISSN 2222-288X (Online) Vol.7, No.9, 2016

Zhang,M.(2018):ForwardElectrophysiologicalModeling andInverseProblemforUterineContractionsduringPregnancy.WashingtonUniversity in St.Louis.