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Birth in Nature

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Abstract**:** *The physical environment is one of the factors that affect women's experience of labor. The basics of the childbirth process have not changed since the beginning of human existence; however, the environment in which women today give birth has changed significantly (Butani & Hodnett, 1980). One study found that 94% of women thought that the physical environment affected how easy or difficult giving birth was. However, the literature on the impact of interior/architectural design on women's birth experience is limited (Newburn& Singh, 2003). Incorporating design elements and strategies that calm and reduce negative emotions may create positive experiences for women in labor. The purpose of this study was to examine the impact of one such strategy, namely the presentation of images of nature, on the labor and delivery experience. The sample consisted of 50 women in labor. The participants were recruited during prenatal classes offered at a birth center in a medium-sized city in Texas, and from Health Point clinic in the same city. The sample were divided randomly into two groups, A and B. Group A was the control group with no exposure to images of nature. Group B had the opportunity to view images of nature displayed on the labor and delivery room TV. After delivery, all participants were given two questionnaires. The first questionnaire was a demographic one, and the second was a sub-scale adapted from the questionnaire of Quality from Patients' Perspective (QPP). In addition, vital signs (including blood pressure and heart rate), use of epidural and pain relief medications, and Apgar score were examined from the subjects' medical records. The study findings showed that the experimental condition has a higher score on the QPP sub-scale, Group A m= 4.46, Group B m=4.63. In addition, there was a positive correlation between hours of viewing Nature video and QPP mean scores. The analysis showed an increase of the QPP scores associated with the increase of Nature TV watching time, QPP mean of watching time (less than an hour) Group m=4.5, QPP mean of watching time (more than 3 hours) m=4.8. Pearson's correlation showed a significant negative relationship between QPP means scores and pain medications r= -.341, p=. 039. The mean score for the heart rate was lower in the experimental condition m= 84.60, than in the control condition m= 90.49. For Apgar, the mean score was higher for the experimental Group A m= 8.65, Group B m=8.92. These findings support the study hypothesis which states that the nature images would influence the labor experience positively. In addition, the findings emphasize the importance of incorporating non-pharmacological techniques in LDR units to sooth the pain. Adding Nature imagery to the LDR environment can be one of these techniques.*

Keywords: *childbirth environment, nature stimuli, labor experience, pain management.*

1. Introduction

Evidence suggests that the physical environment is one of the factors affecting women's experience of labor. It was reported that women have clear preferences about the type of environment, facilities, and controls they want for maximum comfort and support during labor. However, a significant gap has been found between the facilities women would like and what is available [1]. For instance, having a window in the room, or adding a beautiful or interesting view was one of the factors that was emphasized by many women. However, an open window can be perceived as lack of privacy, and may be kept closed at all times. Also, different techniques and exercises have been proposed to achieve positive outcomes during labor and increase patient satisfaction. These techniques include educational or antenatal classes, relaxation techniques, breathing exercises, music, aromatherapy, and massage therapy. Literature shows that women's bodies perform better during labor when they feel more relaxed and comfortable [2]. The aforementioned techniques have been used to improve the

delivery experience, but no one has examined the potential use of biophilic imagery as a potential tool. Based on research in other areas such as acute care settings, there is a possibility that biophilic visual stimulus may help reduce stress and perceived pain during child birth, thereby improving the patient's experience. For example, exposure to nature sights and sounds before, during, and after bronchoscopy was found to be a safe, inexpensive way to enhance analgesia, with none of the risks or side effects caused by medications [3]. In another example, a study by Pati and Nanda [4] suggests that the use of positive distractions can affect the stress and anxiety associated with the waiting experience. Based on the positive impact of nature in previous studies, could incorporating positive distraction in the labor room help in reducing stress associating with waiting, especially with the increase of labor hours?

The specific aim of this study is to examine the impact of visual nature stimuli on women during labor and delivery.

2. Material and methods

The study adopted a quantitative, experimental approach in a field setting, involving two comparison groups. It compared women's experiences of labor while in the presence of nature images with those who were not exposed to nature images

2.1. Subjects

The sample consists of 60 women in labor. The participants were recruited by members of the study team during prenatal classes offered at the Texas Tech University Medical Center (UMC) Birth Center in Lubbock and from Health Point Clinic in the same city. Approval of the research project was obtained from the Texas Tech University Health Sciences Center Protection of Human Subjects Committee.

2.2. Interventions

The study sample consisted of two groups of participants. Group A was the control group. Women in Group A were able to watch regular TV at their discretion, but there were no nature images displayed. The sample for Group A consisted of 26 women. For Group B (N=24), in addition to the regular TV, another TV displayed nature images. The size of both TVs was 32 inch wide. The images were chosen according to recommendations in the literature; namely, that the images represent trees, flowers, water and other nature content, that suggests positive subjects [5]. These images, which covered the whole screen, were downloaded on a USB flash drive as a looped video to be displayed during the entire period of labor. The images flipped automatically every 30 seconds. In total, there were 59 images. In order to record how many hours the patients watched TV images, a device to track the watching time was plugged into the experimental TV.

2.3. Instruments

Labor experience was measured through the following indicators:

Medical records were reviewed after birth for labor and delivery data. One of the pieces of recorded data is the Apgar score, which is the first test given to a newborn in the delivery or birthing room right after the baby's birth [6]. In addition, changes in the mothers' vital signs taken as part of standard care, including blood pressure and heart rate, were recorded. The study only recorded vital signs every hour, as the literature recommended to measure vital signs every 2 hours during late phases of labor and every hour during the active phase of the first stage of labor [7]. The usage of pain medication, such as Epidural Anesthesia, was recorded. Also a sub-scale questionnaire, adapted from the QPP-questionnaire [8], which was designed to measure quality of care from the patient's perspective. This sub-scale was administered to the mothers and collected before they were discharged from the hospital to measure satisfaction with the provided quality of care during their labor experience.

2.4. Data Analysis

The study used a T-test to examine the difference between the mean QPP scores for the control group and the experimental group. Also, an ANOVA was run to examine the impact of the time spent watching Nature TV on the QPP scores. In addition, Pearson's Correlation was conducted to examine the relationship between the study variables: QPP scores, Apgar scores, women's' vital signs, and pain medications. In addition, each item of the questionnaire was analyzed using a T-test to find out if there was a statistically significant difference

between the two group's scores. Based on the differences between group means on the variables of interest, the findings showed if the participants' birth experiences are improved or not.

3. Results

A total sample size of 60 was obtained at the conclusion of data collection. However, due to several factors, 10 participants were excluded from the study. The study variables were examined for (N=50) participants and used in the data analysis, n=26 in the control condition, and n=24 in the experimental one. The demographic questionnaire consisted of items asking participants about the mother's cultural background, participants' age, educational background, marital status, previous childbirth, and employment status. The highest percentage of the participants cultural backgrounds were the following: 52.2 % of the participants were Caucasian, 32.6 % Hispanic. The participants' age was divided into groups: 65.1% of the participants were in age 20 to 29, 23.3% age were between 30 to 39 years, 9.3 % under 20, and 2.3% of the participants were 40 to 49. For 47.8 % of the participants it was their first experience of childbirth, and for 52.2 % of participants it was not their first childbirth experience; 21.7 % of the participants had one previous childbirth, 17.4 % had two previous childbirths, 6.5 % of the participants had three previous childbirths, and 6.5 % had more than four previous childbirths. The QPP sub-scale questionnaire, a T-test was conducted to compare the QPP scores' mean for the control group and the experimental one. The result showed a slight increase of the experimental group QPP score mean (control group m= 4.46, experimental group m=4.63). The individual items analyses indicated items 1, 2, and 7 were significantly different between the two groups. In addition, the ANOVA analysis showed that an increase in the time spent watching Nature imagery is associated with an increase in the QPP scores. However, this correlation was not significantly different.

TABLE 1.QPP mean scores based on the nature images watching time.

Group	NO TV	Less 1 than hour	1 hour -3 hours	More than 3 hours
QPP mean scores	4.46	4.54	4.65	4.73

Moreover, the effect-size of the QPP was calculated by using the means and standard deviations of the control group and the participants who watched the Nature imagery TV more than 3 hours. The findings showed Cohen's d = - .61, and effect- size r = -.30, which indicated a small effect.

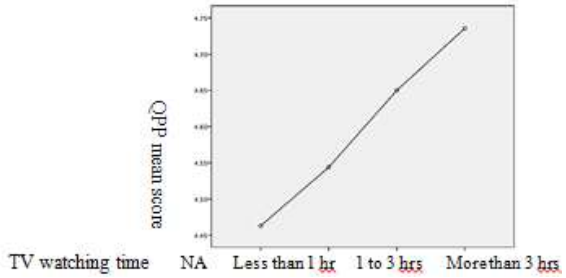

Fig. 1: QPP mean scores and the watching time hours.

The mean score for heart rate in the control group was 90.49 (n=26), and in the experimental group was 84.60 (n= 24) (Figure 2). The average heart rate for women during labor is 80 to 100. However, mothers can experience slow heart rate with the usage of Epidural [9].

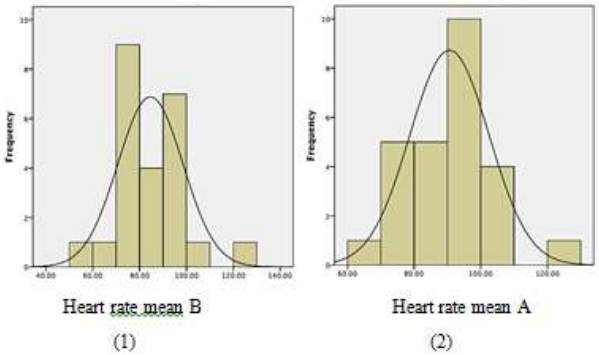

Fig. 2: Heart rate mean: (1) experimental group, (2) control group

The systolic mean of the blood pressure was 123.6 for the control group (n=26), and 122.8 for the experimental group, (n=24). For the diastolic blood pressure mean, the control group's score was 72.3, and the experimental group's score was 72.7. Normal blood pressure during the first stage of labor is 100/60 mm Hg or above, but less than 140/90 mm Hg [7]. However, taking an Epidural will drop a mothers' blood pressure significantly [9].

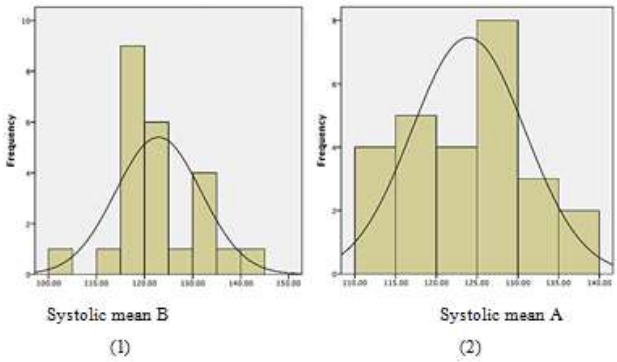

Fig. 3: Systolic blood pressure: mean (1) experimental group, (2) control group

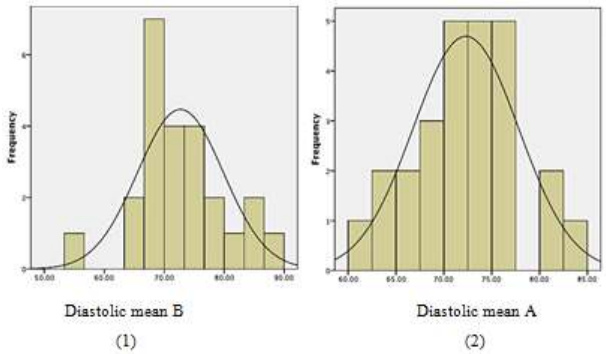

Fig. 4: Diastolic blood pressure mean (1) experimental group, (2) control group

The mean Apgar score (5-minutes assessment) was higher in the experimental group (Group A m= 8.65, Group B m=8.92). The higher the score, the healthier the baby is after birth [10]. The difference was statistically significant between the two groups p = .05. The effect-size of the five minutes APGAR scores was calculated by using the means and standard deviations of two groups. The findings reported Cohen's d = - .5, and effect- size r = -.2, which indicated a small effect. There was no significant difference between the two groups regarding Epidural requests, it was requested by 87.5% of the participants in the experimental group requested, and 88.5 % of the control condition participants. In addition, Pearson's correlation results showed a significant negative correlation between the QPP mean scores and the usage of pain medications r=-.37, n=40, p=.017. The increase of pain medications was associated with lower QQP mean scores. Heart rate and QPP were negatively correlated r = -.14, and the decrease of the heart rate was associated with higher QPP mean scores. However, this correlation was not significant.

4. Discussion

The results show that introducing nature imagery to the LDR had positive impacts on women during labor, including lower heart rates, higher APGAR scores, and higher QPP scores in the evaluation of their labor experiences. Support, information, intervention, decision making, and pain relief are some of the aspects that were revealed in a trial study investigating the aspects of a woman's childbirth experience that were perceived as important [11]. Satisfaction with the labor experience was related to previous childbirth; women who had multiple childbirths had more positive experiences than first-time mothers [12]. The study findings showed similar results; women who had previous childbirth scored a higher mean in the QPP sub-scale compared to the first-time mothers. Access to nature or to nature imagery was recommended by England and Horowitz [13] to help women cope with the pain during labor. They suggested adding imagination to breath awareness techniques, for example, imagining a flower opening slowly. That will keep the brain busy focusing on slow breathing and

on imagining the flower image, which leaves a limited amount of concentration on the pain [13]. Adding nature imagery to the LDR environment could facilitate such a technique and encourage it, especially with exercising these kinds of techniques before going to labor. Previous studies documented a decrease in the systolic blood pressure because of the calming nature effect [14]. This study found a slight difference between the two groups in the mean of the systolic blood pressure: control group m= 123.9, experimental group m= 122.8. In contrast, heart rate was lower in the experimental condition; the experimental condition was m= 84.60, while the control condition was m= 90.49. The average heart rate is normally between 60 (beats per minute) and 100 (beats per minute) if a person is sitting or lying and relaxed [15]. Lower heart rates in the experimental condition support the findings from literature that nature imagery can reduce heart rate and autonomic arousal [5] [14] [16]. When blood pressure or heart rates decrease but are still in the normal level, it means the person is less stressed and calm. Relaxation techniques can reduce stress symptoms by slowing the heart rate and reducing blood pressure. Incorporating representative types of nature into the LDR can cause this calming effect, which is shown in the slight decrease of the vital signs level [17]. However, vital signs can be affected by other variables including induction, Epidural Anesthesia, and labor duration. For instance, taking an Epidural will drop a mother's vital signs significantly [9]. In this study, about 88% of the mothers in both groups requested Epidural, which may eliminate the explanation that vital signs decreased in the experimental condition because of the Epidural effect. The study results were different than the Staricoff, Duncan and Wright study their findings showed a 7% decrease in the frequency of Epidural Anesthesia requests in the study group when a movable screen with an image inspired by nature was introduced into the labor and delivery room [18].

The study results showed a higher average Apgar score for the experimental group m= 8.92. The Apgar score is associated with several factors including high-risk pregnancy, C-section, and whether the mother had a good labor or complicated one [19]. Studies also showed that psychological stresses during pregnancy may cause complications which directly affect both the mother and the newborn, including the APGAR score. For instance, VandeVusse, Irland, Berner, Fuller, and Adams conducted a study to examine the effect of self-hypnosis training sessions on a woman's labor experience [20]. The study findings suggested that the use of self-hypnosis may have benefits for both mothers and infants. Infants in the hypnosis condition had significantly better 1-minute Apgar scores than those in the control condition [21]. Higher Apgar scores for the experimental condition can be associated with having a better labor experience for this group of participants. Access to nature images can help the mothers to cope with pain without the side effects and the additional costs of using medical methods to sooth pain. In addition, this study found that adding the nature images to the LDR increases mother satisfaction by 3.5%. Healthcare organizations should create environments to achieve higher patient satisfaction and encourage repeat visits, which increases profit [22]. If the mother and her family received the level of care they hope for, that will encourage them to considering this facility for any future care. That stressed the importance of administrators, policymakers and providers understanding that women's satisfaction with their childbirth experience is an indicator of maternity care quality [23]. This study suggested incorporating nature imagery into the patient's environment to achieve the previous goals: higher patient satisfaction, lower side effects, and lower financial costs. Theories suggest that there is a healing power of nature, which lies in the unconscious response to elements from nature. Certain natural places may be viewed by the unconscious mind as safe places in which human beings used to have greater rates of survival [24]. Such theories support the idea that incorporating nature images into the healthcare environments can be beneficial for most health populations, despite cultural or spiritual differences. This idea becomes more important in LDR settings since most of those women are not suffering from diseases that could affect their responses toward nature. If the brain or unconscious responses cause the positive response to being exposed to nature, then the nature theme in designing LDR would significantly help mothers achieve a positive childbirth experience.

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