ORIGINAL ARTICLE

Medical Science 2018; June, Vol-6(1):1-5

Pain and comfort level associated with Entonox use in parturient mothers: A pretest – posttest study

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Information about the article

Received: May. 31, 2018
Revised: Oct. 15, 2018
Accepted: Nov 5, 2018
Published online: Nov 30, 2018

Abstract

Background

Entonox (inhalation analgesia) is very effective in alleviating the pain during childbirth and resulting as painless normal vaginal delivery. Although it is used worldwide, its usage in Kerala is comparatively very less. We aimed to investigate the efficacy of Entonox on pain and comfort during first stage of labor among parturient mothers.

Methods

This was a quasi-experimental pretest – posttest control group design with 60 mothers (30 each in experimental and control) of 37-40 weeks of gestation in selected hospitals in Kollam, Kerala. The tools were demographic proforma, Visual analogue scale and Comfort assessment checklist. Descriptive and inferential statistics were used to identify the statistically significant relationships.

Results

Out of 60,45% of the mothers were in the age group of 24-29 years. Most of them were primi gravidae with gestational age of 39-40 weeks. The mean post interventional pain score of the experimental group was lower than that of control group (4.07/9.93, $p < 0.05$). Also, the mean post interventional comfort score of the experimental group was lower than that of control group (7.37/15.77, $p < 0/05$).

Conclusion

Entonox provides significant pain relief and improves comfort and it can be quickly implemented during painful labor.

Key words

Analgesia, pain, comfort, mothers, labor

ISSN 2321-5291
Medical Science 2018; June, Vol-6(1):1-5

Background

Labor pain is considered as a feeling of unpleasant sensation while giving a natural exit to the baby from the womb into the world, moreover the one among severe types of pain [1] Easement of pain is described as a means of providing comfort and support to women in labor.[2] During the process of childbirth, the pain experienced by women as they undergo labor can lead to exhaustion, debilitation and feelings of frustration, further draining the woman of vital energy that she will need later in the birthing process. Furthermore, this can lead to damage towards fetus as well as mother such as laceration of the perineum, atony and rupture of uterus and even maternal fatality.[3] However, more and more women especially the educated urbans, are now opting for elective caesarean delivery, both to avoid pain as well as deliver the baby according to their convenience.[4] Besides, the experience of labor pain differs from one another remarkably. It can also alter for the same person in various phases of the labor. Its intensity varies extensively and normally soared as labor progresses. [1]

Many methods have been used for the relief of labor pain, which constitutes non pharmacological methods such as relaxation therapy and others are by pharmacological agents.[3] Pharmacological methods of pain relief includes nitrous oxide inhalation, opioids and regional analgesia with an epidural or a central nerve block.[5] Entonox is a pre-mixed homogenous gas mixture of 50:50 nitrous oxide and oxygen compressed in a cylinder.[6] Albeit, its balanced ratio reassures appropriate oxygenation. [7]

Nitrous Oxide is an odorless, colorless, short acting potent analgesia for procedures that may cause pain, discomfort and anxiety. Nitrous oxide's lower solubility in blood means it has a very rapid onset and offset, providing analgesia within minutes of commencing administration.[8] Entonox is fast, effective and easily self-administered by mothers under the supervision of midwives and pain is relieved within 2-3 minutes.[7]The mechanism of its action is apparently the release of hormones in the brain such as endorphin and dopamine triggers the pain stimuli through the descending spinal and nerve pathways and which in turn reduces labor pain to a sustainable and satisfactory level.[9]

Entonox is an optimal choice for obstetric analgesia when the pain during contractions is recurrent. The important and obvious aspect of Entonox usage is it's self-administered and hence self- controlled as when and how much she requires [10]. However, the usage of Entonox in Kerala, India is comparatively very less than other countries. Needless to say that the current health care system is moving ahead to enhance the care provided, so more emphasis should be given for labor support in promoting comfort as well as reducing pain. Unfortunately the number of studies concerning assessment of comfort is quite less than pain. Therefore, the present study tried to empirically prove the need for comfort assessment among parturient mothers during labor.

The present study was aimed to investigate the efficacy of inhalation analgesia (Entonox) on pain and comfort during first stage of labor among parturient mothers in selected hospitals in Kollam, Kerala.

Material and Methods

Study Period

This study was conducted in the month of January 2013.

Study design, participants

Quasi experimental pre-test post-test control group design with quantitative approach was the adopted research design. The participants for the study were the first and second gravida parturient mothers in the age group of 18-35 years. The control group was selected from Govt. Victoria Hospital, Kollam and the experimental group from three hospitals namely ESIC Model and Super specialty Hospital, Kollam, Taluk Head Quarters Hospital, Punalur and Upasana Hospital, Kollam based on the availability of parturient mothers during the study period.

Response Rate

The response rate was 95 percent. Of the 60 participants included, 30 were in the experimental and 30 were in the control group.

Questionnaire design

Section 1:

Demographic proforma includes 5 items seeking information about socio demographic data and obstetrical data which includes age in years, educational status, gravida, gestational age and occupation.

Section 2:

Visual Analogue Scale ; End points of the scale are considered as no pain (0) and the worst pain possible (10) and the score range is categorized as severe pain (7-10), moderate pain (4-6), mild pain (1-3), and no pain (0).

Section 3:

The Comfort Assessment Checklist was developed by the researcher, comprising 21 items covering the physiological and behavioral dimensions. In the physiological dimension, items like respiration and heart rate are included. In the behavioral dimension, items like alertness, calmness, crying, physical movement and facial tension are included. And each dimension is having 3 responses.

The item in the Comfort Assessment Checklist is scored in the following manner. For each item total score is 3 and the

ISSN 2321-5291
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scores are distributed as 1-3. The maximum score is 21 and minimum score is 7. The scores were categorized according to the median scores of the pre-test items and it is classified as better comfort (7-14) and poor comfort (15-21).

Validity of the Questionnaire

The proforma for selected demographic variables, visual analogue scale and the comfort assessment checklist were content validated by nine experts from Medicine (n=1) and Nursing (n=8). Majority had given 100% agreement. Suggestions given by the experts were incorporated and the final tool was prepared.

Inclusion criteria

The primi and second gravida who are in the active phase of first stage of labor with 37 – 40 weeks of gestation and willing to participate in the study.

Exclusion criteria

We excluded the maternal high risk cases, fetal distress, gestational age less than 37 weeks and the mothers with history of taking opioids, sedatives or regional anesthesia.

Sample size calculation

Prior to the study, the pilot study for sample size calculation showed that with 80% power at 5% significance level, the required sample size was 10,but we have taken 30 in each group.[11]

Explanatory and outcome variable

The explanatory variable was inhalation analgesia whereas; the outcome variable was pain and comfort during first stage of labor among parturient mothers.

Ethical committee approval

Formal written permission was obtained from the concerned authorities of the selected hospitals and the Ethical Committee of Bishop Benziger College of Nursing, Kerala (BBCON/317/12).

Data management and statistical analysis

Inhalation analgesia of 3 puffs was administered to experimental group for the two contractions in the active phase of first stage of labor and no intervention was provided for the control group. Post test was conducted with the Visual Analogue Scale and Comfort Assessment Checklist in the next contraction for the experimental and control group.The demographic data and the explanatory variables were analyzed by differential statistics and the outcome variable by inferential statistics.

Results

Analysis of the selected demographic variables revealed that 45 percent of the parturient mothers were in the age group of 24- 29 years. Out of 60 participants, 35 percent had undergone upper primary education. Fifty five percent of the parturient mothers were 39-40 weeks of gestation and 61.7 percent of them were primi gravidae. Majority 86.7 percent were sedentary workers.

Table 1: Frequency and percentage distribution of parturient mothers based on demographic proforma (n=60)

Demographic variables	n(%)
Age	
18-23 years	24 (40)
24-29 years	27 (45)
30-35 years	9 (15)
Education	
Lower	5 (8.3)
Upper	20 (33.3)
Secondary	17 (28.3)
Graduation	13 (21.7)
PG and above	5 (8.3)
Gravida	
Primigravidae	37 (61.7)
Second gravidae	23 (38.3)
Gestational age	
37-38 weeks	27 (45)
39-40 weeks	33 (55)
Occupation	
Heavy worker	0 (0)
Moderate worker	8 (13.3)
Sedentary worker	52 (86.7)

Table 2: Comparison of the frequency of pre-test pain and pre-test comfort in experimental and control group

	Category	Score	n(%)	Experimental (Mean±SD)	Control (Mean±SD)
Pain	Mild	1-3	0(0)	8.7±1.01	8.63±0.72
	Moderate	4-6	0(0)		
	Severe	7-10	60(100)		
Comfort	Poor	15-21	34(56.67)	15±0.83	14±1.18
	Better	7-14	26(43.33)		

Table 3: Comparison of the post-test pain and post-test comfort score in experimental and control group

	Group	Mean±SD	P value
Pain	Experimental	4.07±0.78	0.0001†
	Control	9.93±0.25	
Comfort	Experimental	7.37±0.56	0.0001†
	Control	15.77±0.90	

†P<0.01 statistically significant

The findings of the present study revealed that there was significant difference in the pain scores before and after inhalation analgesia in the experimental group (p<0.05). In

ISSN 2321-5291
Medical Science 2018; June, Vol-6(1):1-5

the comfort of the parturient mothers, there was significant difference in the scores before and after intervention ($p<0.05$). This suggests inhalation analgesia is effective in decreasing pain and enhancing comfort.

Discussion

The present study demonstrated that Entonox provides significant pain relief and improves comfort during labor. The mean post interventional pain was lower in the experimental group and comfort score was better when compared to the control group. Although there are multiple published studies which showed efficacy of Entonox in terms of alleviating pain, only few studies assessed the comfort level. The present study utilized its strength to assess the comfort level of parturient mothers during labor.

Our study findings were supported by a descriptive study, conducted by Lubna et al in 2005 on 100 mothers who delivered vaginally on labor pain experience and intensity were enrolled from the postpartum unit of a major hospital in Jordan. The results revealed that pain intensity levels of ≥8 on the Numerical Pain Intensity Scale in eighty-one women (ranging from 0–10). The mean pain intensity level was 8.83 during the second stage of labor. [12]

The study results revealed that in the experimental group, the mean pre interventional comfort scores is 15+/-0.83 and of the control group is 14+/-1.18. Similarly, a quasi-experimental study was conducted on the effectiveness of analgesia on labor outcome and behavioral responses of 20 gravid women during the first stage of labor. There was a significant difference in behavioral responses of gravid woman among control and experimental group ($p <0.05$). It is also found that there is a significant difference in the outcome of labor in gravid mothers. [13]

In the current research, it revealed that the pain relief and comfort enhancement effect of Entonox during first stage of labor. The findings of the study were supported by a self-controlled clinical trial conducted by Esfandiari, et al (2007) in Iran on the efficacy of Entonox on the severity of labor pain in 40 nulliparous women over 16-30 years of age.The mean of numeric pain scale plunged from 8±1 to 5±1 after inhalation of Entonox. ($p<0.05$). Entonox caters an adequate effective analgesia for many pregnant women and isconcurrently safe for the mother and her baby. [14]

Similarly, in 2003, Kolcobaexplored the existence of comfort during labor in a sample of 50 healthy, primigravid women from three regions of the US Midwest, experiencing a normal labor and birth using childbirth comfort questionnaire and numerical pain rating scale. Mean comfort and pain scores were analyzed using analysis of variance. Women who had used comfort measures had significantly higher comfort scores ($p <0.0001$). [15]

Some of the side effects of Entonox are light headedness, dry mouth and tingling feeling (due to hyperventilation). Since in the current study, mothers are using Entonox under the supervision of skilled midwives, and the unpleasant side effects were avoided by rhythmic, steady breathing and adequate hydration.

In the present scenario, the health care team members should possess a critical role in providing training classes and educational brochures to increase the awareness of the society towards the benefits of normal birth delivery. Along with the provision of appropriate protocols for the selection and usage of analgesia during labor in all health care centers is important for the maternal and child wellness.

Conclusion

Entonox (inhalation analgesia) alleviates pain and improves comfort of the parturient mothers. Generally, the antenatal education about the various available options for enhancing comfort and decreasing pain will enable the mother to adopt the safest and reliable method for their perinatal care. On the brighter side, the health care system is now focusing high on enhanced care, so the focus is being shifted from reducing pain to promoting comfort.

Limitations & future scope of the study

The main drawback is refusal of some subjects to participate in the study as they were unaware about the benefits of Entonox in labor.

Competing interests

The author declares no conflict of interests.

Authors' contribution

SJ conceived the study, constructed the questionnaire, deduced the data, drafted the manuscript and revised it.

Acknowledgments

The author is very thankful to all the participants and extends the earnest and warm gratitude to Management, Bishop Benziger College of Nursing, Kollam for providing the opportunity to undertake the research work successfully.

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