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## The effects of Pethedine on maternal outcome of labor in nulli-parous women; A randomized controlled trial

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### ABSTRACT

The purpose of this study was to investigate the effects of Pethedine on maternal outcome of labor in nulli-parous women. In a randomized clinical trial 90 nulli-parous women with uncomplicated singleton pregnancies at term were randomly assigned into two groups. The first group received 50 mg Intra Muscular Pethidine and the second group received an equal volume Intravenous Normal Saline as Placebo throughout active labor. Duration of active phase and second stage of labor were shorter in Pethidine group in compared to Normal Saline group, but not for the third stage. Pethidine reduced the need to labor augmentation. Maternal nausea and vomiting were similar between groups. Pethidine significantly decreased the duration of active labor and reduced the frequency of both Cesarean Section and Oxytocin administration in nulli-parous women.

**Keywords:** Nulliparous women, Oxytocin administration, randomized clinical trail

### INTRODUCTION

The length of active phase of labor in one of the main factors influences maternal and neonatal outcome of delivery (1, 2). There are many pharmacological and non- pharmacological factors affect of labor duration. The pharmacological methods such as Oxytocin (3, 4), over hydration (5-7), Propranolol (8-10), Epidural regional analgesia (11) and Nitrous oxide (12, 13). In a prospective study compared the effect of combined spinal epidural, epidural and IV Pethidine (14) can effect on the labor progresses.

Pethidine, Meptazinol and piritramide are the most common opioids used in parturient during labor (11). Pethidine or Meperidine hydrochloride is the first synthetic opioid synthesized in 1932. Pethidine can reduce the duration of active labor in nulliparous women with a singleton pregnancy at term (15) and patients with uterine dystocia (14). Keskin et al evaluate and compare the effects of tramadol and pethidine among 59 full term parturient and reported that the duration of labor is similar in two groups (16). However, in contrast, another randomized clinical trial compares the outcome of intramuscular administration of pethidine and tramadol among 160 full-term Iranian parturient. The results showed that Tramadol cause a shorter duration of labor in compression with Pethidine (17).

A previous study reported that Intra Muscular Pethidine analgesia during the first stage of labor hasn't significance side effect (18). However, Pethidine and Tramadol have similar effect on labor duration, but also it is established that Pethidine is a better choice than Tramadol in parturient with obstetric analgesia (16). The Pethidine can reduced the duration of active labor in Nulliparous women with normal pregnancy and term gestational age (19). However,

in contrast, other study reported that the use of Pethidine caused the slower labor (20). A randomized clinical trial indicated that both Meperidine and control groups have an equal duration of labor. The pH of the umbilical cord arterial was lower in the Meperidine group compared with the control group; although the difference was not statistically significant (14).

The present study was carried out to examine the effects of Intra Muscular Pethedine on the following: labor duration, the need for Oxytocin administration, type of delivery and maternal nausea and vomiting.

### MATERIALS AND METHODS

A total of 90 pregnant women were investigated in a randomized clinical trial, as was previously described for other clinical trial studies(21), (22), (23), (1) between December 2012 to March 2014, at the Ilam Mustafa Hospital, Ilam, Iran.

This study was conducted with the approval of the ethics committee of Ilam University of Medical Sciences. Participation in the study was voluntary and the participants were free to withdraw from the study whenever they wished to do so. An informed consent was obtained from all participants before they were enrolled in the study. The including criteria were considered as nulliparity, age between 18 and 35 years, singleton pregnancy, spontaneously active labor, cervical dilation between 4 and 5 cm, gestational age between 38 and 40 weeks, normal fetal heart rate tracings, intact membranes, and vertex presentation. Elective labor induction, emergency cesarean delivery, known Cephalopelvic disproportion, diagnosed Pre-eclampsia, Chorioamnionitis, Pyelonephritis, Maternal cardiac, renal disease, intrauterine growth restriction, and cervical dilation greater than 5 cm were all excluded from this study.

The participants were selected by the simple random sampling method. Then, all participants were examined by a gynecologist in order to identify the inclusion and exclusion criteria. Then, randomization was carried out in the obstetric triage unit on a 1:1 basis using a random number table and 45 participants were allocated in each group. The researcher was not aware of grouping of participants. The data collection was carried out by a trained midwife who was not also aware of each medication and with no idea about the plan of the study. The Biostatistician who analyzed the data was blind too about each group.

All participants were matched for effective factors on labor duration in inclusion and exclusion criteria and randomly assigned to Pethedine and Normal Saline as they presented in labor. The participants in Pethedine group received 50 mg Intra Muscular Pethedine. Those in the Normal Saline group received an equal volume normal slain IV.

A checklist was used to collect the demographic and obstetric data. The partogram was used to monitor the labor progress. Amniotomy was performed by a trained midwife when cervical dilation reached 5 cm if the membranes had not ruptured spontaneously. The main outcome data (duration of the active phase of labor, durations of the second, third and fourth stages of labor, need for Oxytocin augmentation, type of delivery and maternal side effects, including nausea and vomiting were recorded prospectively by a trained midwife on the paper form. All collected data were analyzed using SPSS version 14. A P value of 0.05 was considered statistically significant. Statistical comparisons were made using the Chi-square test and unpaired t-test

### RESULTS

Ninety nulli-parous full term woman candidate for Normal Vaginal Delivery were randomly allocated into two groups of Intra Muscular Pethedine (N = 45) and Normal Saline (N = 45). All participants received a single dose of Pethedine or Normal Saline. None of the 90 enrolled women withdrew for any reason. At the time of admission, age and BMI of mothers, and GA based on the last day of the period were recorded. During first, second, and third stage of delivery was assessed and recorded by a trained midwife. Key variables known to affect labor outcomes, such as maternal age and weight, cervical dilation, and station of the fetus, were similar between two groups ( $P > 0.05$ ).

Duration of the active phase of labor were significantly shorter in Pethidine group in compared to Normal Saline group ( $230.62 \pm 31.19$  min in the Pethidine group Vs  $247.73 \pm 37.94$  min in Normal Saline group;  $P = 0.038$ ). The differences in the duration of the second stage of labor were also significantly shorter in Pethidine group in

compared to Normal Saline group ( $52.22 \pm 14.16$  min in the Pethidine group Vs  $60.44 \pm 20.1$  min in Normal Saline group;  $P= .032$ ). However, the differences in duration were not significant for the third stage of labor ( $P= .908$ ).

Overall, 72 (80%) of all participants had normal vaginal delivered while 18 (20%) had cesarean deliveries. Seven women in Pethidine group and 11 women in the Normal Saline group had a cesarean delivery because labor failed to progress or other complications. However, there were no significant differences in the type of delivery between two groups ( $P= .292$ ). All cesarean deliveries were performed under spinal anesthesia. With 35.6% in Pethidine group and 42.2% in Normal Saline group, the percentages of participants who needed labor augmentation with Oxytocin not differed between groups ( $P= .666$ ). Comparison of labor outcomes between groups are presented in Tables 1. The fourth stage of labor was no significant difference in all participants with vaginal delivery. Maternal side effects, including nausea and vomiting were similar between groups.

## DISCUSSION

Considering the side effects of prolonged labor on the mother and infant, a lot of research has been done to reduce the length of labor (1, 2, 24). The purpose of the present study was to investigate the effects of Pethidine on maternal labor outcome in nulli-parous women

The maternal age, parity, the cervical condition and the relationship of the size and position of the fetus to the size of the birth canal are affected factors in duration of labor (25). Therefore, we tried to make the diversity of maternal age, gestational age, and delivery duration similar in both groups as much as possible.

This study demonstrated that using 50 mg Intra Muscular Pethidine reduced both active phase and second stage of labor in nulli-parous women.

Our results were in line with previous studies (15, 26). A clinical trial compares the efficacy and safety of Meperidine hydrochloride and Valethamate bromide against placebo in shortening the duration of active labor. One hundred sixty nulli-parous women with a singleton pregnancy at term randomly assigned to one of three groups; 50 mg of Meperidine, 16 mg of Valethamate bromide or a normal saline solution as placebo. The intervals between infusion and complete cervical dilation and between infusion and delivery were significantly reduced in the Meperidine group in contrast to the placebo group. Meperidine, significantly shortened the duration of active labor in nulliparous women with a singleton pregnancy at term (15). In another study, 88 participants were divided randomly into two groups. The case group received 75 mg Pethidine Intra Muscular and the control group received the same volume of Normal Saline as a placebo. The length of both infant and placenta delivery was shorter in Pethidine group in comparison to the placebo group (26).

But in contrast, a study, evaluate and compare the effects of Tramadol and Pethidine in labor. Overall, 59 full term parturient was randomly assigned to one of two groups in active labor. Group 1 received 100 mg Pethidine; group 2, 100 mg Intra Muscular Tramadol. No significant difference was found between the groups when compared for duration of labor (16). Another clinical trial evaluated the effectiveness of Meperidine, administered during the first stage of labor in patients with uterine dystocia. Two hundred forty nulli-parous women with a singleton pregnancy at term who were diagnosed with uterine dystocia in labor randomly assigned to receive either a single dose of 50 mg Meperidine in 10 ml of saline or 10 ml of isotonic saline. The results show no statistically significant difference between the two groups in length of labor ( $P = .159$ ) (14).

Based our results, there was no significant differences in the type of delivery between two groups. An individual patient meta-analysis evaluated 2,703 nulli-parous women who were randomized to either epidural analgesia or intravenous opioids. The results of this study reported that there was no difference in the rate of cesarean deliveries between the two analgesia groups (27). In another meta-analysis study, evaluated the effects of Neuraxial Analgesia on cesarean and instrumental vaginal deliveries in nulli-parous women. The result of this study showed that the women receiving early Neuraxial Analgesia had not at increased risk of operative delivery, whereas those receiving early Parenteral Opioid and late epidural analgesia had a higher risk of instrumental vaginal delivery (28). In the present study, maternal nausea and vomiting were not statistically significant difference between the two groups. A randomized clinical trial reported that Pethidine increased the incidence of nausea and vomiting in compression Tramadol in parturient (17).

Table 1: Comparison of labor outcomes between groups <sup>a</sup>

Characteristic	n=45		P- value
	Pethidine	Normal Saline	
Duration of the third stage <sup>b</sup>	6.24 ± 3.97	6.33 ± 3.23	.908
Labor augmentation <sup>c</sup>	35.6	42.2	.666
<b>Mode of delivery</b>			.292
Vaginal	84.4	75.6	
Cesarean	15.6	24.4	
Fetal distress	11.1	11.1	
Prolonged labor	4.4	8.9	
Vaginal bleeding	0	4.4	

*a* Values are given as mean±SD or percentage unless otherwise indicated

*b* Vaginal deliveries only.

*c* With Oxytocin.

## CONCLUSION

Pethidine is an effective agent both in shortening the labor duration and in reducing the frequency of cesarean section without any adverse effects on the mother.

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