EFFECT OF UPRIGHT POSITION DURING FIRST STAGE OF LABOR ON LABOR OUTCOME: An Evidence Based Approach

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Abstract

Background

Maternal positioning during labor especially upright position may affect course of labor as related to powers, passage, passenger and psyche. It is considered one of non-pharmacological methods that have been proposed to reduce labor pain, fatigue, need for analgesia, and increasing maternal comfort (Abdolahian, 2014). Aim: The aim of the current study was of two folds: 1) Perform randomized control study to examine the impact of different upright positions versus recumbent positions on labor outcomes of primipara women in the first stage of labor. 2) Develop systematic review to analyze previous studies related to upright and recumbent positions for women in the first stage of labour on maternal & neonatal outcomes, in addition to the findings of the current RCT. Design: Two designs were utilized for this study: a randomized control trail as well as a systematic review. Methods: A total of 100 parturient women were recruited randomly and divided equally into study and control groups using sealed opaque envelops technique. Four tools were utilized for data collection: Structured Interviewing Questionnaire, World Health Organization Partograph, Neonatal Apgar’s score, and visual analogue pain intensity scale. Parturient women in the study group, were encouraged to assume one of the upright positions, while, the control group assuming recumbent position.

In systematic review, Pub-Med, Medscape, EMBASE, CINAHL and the Cochrane library were utilized to extract RCT full – text publications in English form, women who assumed one of upright positions during first stage of labor, comparison to women who assumed one of the recumbent positions during the same labor stage. Results: Current RCT findings revealed that, mean pain score in the study group was significantly lower than the control group (P < 0.05). The study group received extra analgesia less than the control group with (P= 0.003 & RR= 0.417). The mean satisfaction score in the study group was significantly higher than in the control group (P =0.000 & RR= 0.020). The duration of the first stage of labour significantly reduced in the study group as compared with control group (P = 0.00, 95% CI= -1.930, -1.106). No significant differences were observed between both groups in relation to neonatal outcomes first min APGAR (P= 0.183) & fifth minute (P= 0.367). Also a total of 75 studies were examined, 49 of them excluded & 8 studies were included with a total of 903 women in the review. Five trials from included study reported significance differences between groups related to duration of first stage of labor in favor of the intervention group with total mean was (8.41 hrs) as compared to (10.14 hrs) in control group. There were significant differences.
between the pain scores of the women in upright position (less pain scores) versus recumbent position in five trails (P=.001). There were no significant differences between groups for other outcomes including duration of the second stage of labor, fetal and neonatal outcomes. **Conclusion:** There was a clear and important evidence that upright positions in the first stage of labor reduced the duration of first stage of labor & pain scores. The study recommended based on the clinical evidence that women in low-risk labor should be informed of the benefits of upright positions, and encouraged to assume it; and disseminate the protocol of care to clinical setting.

**Introduction**

According to the American College of Obstetricians and Gynecologists (ACOG), changing position during labour is likely beneficial and of minimal risk to most women with an uncomplicated pregnancy (ACOG,2019). There are various positions can be assumed during first stage of labour such as, standing, walking, kneeling foreword with support, and sitting position. It results in relieving fatigue, increasing maternal comfort, decreasing need for analgesia and considered one of non-pharmacological methods that have been proposed to reduce labor pain (Abdolahian,2014). Also, adoption of the upright position and ambulation at the first stage of labor are part of the World Health Organization Recommendation for the humanization of health care. It suggests that returning to noninvasive procedures avoids unnecessary or additional interventions and ensures maximum health benefits for the women and her newborn (WHO,2018).

Congruently, there is clear and significant evidence that upright positioning during first stage of labor have several advantages, for example use gravity to aid descent of the fetal head into the pelvis, as the head is applied directly and evenly on the cervix, uterine contractions are intensified in strength, regularity and frequency, as effective contractions are vital to aid cervical dilatation and fetal descent, they have an important role in helping to reduce dystocia (slow
progress in labour). In addition, upright and mobile positions are less likely to cause compression of the abdominal blood vessels by the pregnant uterus and this maximizes uterine blood flow to the placenta and fetus during labour (Ibrahim et al. 2020).

Cochrane systematic review done by Lawrence, et al (2013), on 25 trials (5218 women) to assess the effects of different upright positions and mobilization for women in the first stage of labour on duration of labour, type of birth and other important outcomes for mothers and neonates, concluded that the first stage of labour was approximately one hour and 22 minutes shorter for women randomized to upright as opposed to recumbent position (P < 0.000). Women who were upright positions also, less likely to have caesarean section, less likely to have an epidural for pain relief, and neonates of mothers who were upright were less likely to be admitted to the neonatal intensive care unit, however this was based on one trial (200 women).

The midwife nurse plays crucial role of providing care for parturient women in first stage of labor so, the midwife nurse needs clear, consistent, and evidence based knowledge of both the risks and benefits of the used positions and enable women to make decisions about the position choices which will afford the most comfort. Moreover, increasing a woman’s sense of control may have the effect of decreasing the need for analgesia (Nursing & midwifery council, 2019), so, the study done to assess the effect of upright position versus recumbent position during first stage of labor and labor outcomes, and develop systematic review to analyze previous studies related to the same issue in addition to findings of the current RCT.

Significance
ACOG (2019) & WHO (2018) reported that, encouraging upright position during the first stage of labour has been a safe non-pharmacological intervention used for many years. It is an effective and safest intervention to increase the uterine contractions and to decrease the duration of labour; if not contraindicated. Also, the choice of upright position can play a key role as a noninvasive and non-pharmacological method of pain relief and increase sense of control, empowerment of women, as well as enhancing the positive birth experience. Cochrane systematic review done by Lawrence, et al (2013) revealed that, better quality trials are still required to confirm with any confidence the true risks and benefits of upright and mobile positions compared with recumbent positions for all women. In this perspective, the purpose of the current study was to contribute to build powerful evidence regarding the effectiveness of upright position during first stage of labor and enhance the nurse’s knowledge & practice about the different positions that may be assumed during first stage of labor & its importance for parturient women utilizing evidence based approach.

**Aim of the study:** The aim of the current study is of two folds : 1) Perform randomized control study to examine the impact of different upright versus recumbent positions on labour outcomes for primipara women in the first stage of labour.
2) Develop systematic review to analyze previous studies related to upright and recumbent positions for women in the first stage of labour on maternal & neonatal outcomes in addition to findings of the current RCT.

**Research Hypotheses**

H1: Primipara women who assume upright position during first stage of labour will have a decrease in the duration of first & second stage of labor, lower labour pain score and higher satisfaction rate as compared to those who assume recumbent position.
H2: Neonates of primipara women who assume upright position during first stage of labour will have higher APGAR score as compared to those who assume recumbent position.

**Material and Methods**

**Research Design** A combination of two designs were used for this study: a randomized controlled trial as well as a systematic review of previous studies.

**Setting** This study was conducted at Delivery ward (section 10) in the Department of Obstetrics and Gynecology at El Manial University hospital. Data collected through a period of 1 year & 3 months from end of November 2018 till February 2020.

**Sample** A total of (100) parturient women were recruited randomly according to the following inclusion criteria: Healthy (no medical disorder) primipara parturient women who admitted to the delivery unit; 4cm dilatation of the cervix, age ranged between 20-35 years, had a single, viable, and full term fetus (≥ 37 weeks), with normal fetal heart rate pattern (120-160 b/min), fetus in occipito anterior position & free from obstetrical disorders that may interrupt labor progress. Exclusion criteria: all women deviated from normal progress of labor according to the partograph or have obstetrical intervention by cesarean section were excluded and replaced. The sample was divided into two groups, a study group and a control group utilized random assignment. The sample size was calculated using a G-power version 3.1.1 for power analysis. A Power of .95 (β = 1-.95 = .05) at alpha .05 (one-sided) was used as the significance level, and effect size= (0.5) was utilized.

Two steps of selection process were used to ensure the randomization. Random sample was done on the admission of women who met the eligibility criteria. The investigator distributed number to women and then selected the women with odd number to be recruited in the study. While, random assignment of the sample into groups study group or control group was done by sealed opaque envelops. The study group (n= 50) assumed one of upright positions during first
stage of labor, defined as walking and upright non-walking (i.e., sitting, standing, kneeling & squatting). Control group (n= 50) assumed one of the recumbent positions during the same labor stage as a hospital routine care (i.e., supine, semi-recumbent & lateral position). Both groups received the same management of first stage of labor including routine analgesia according to the regimen of care by the emergency unite.

**Tools for Data collection** Five tools were used for data collection in the RCT study: structured interviewing questionnaire, Labor Progress Record (Partograph). Visual Analogue Pain Intensity Scale, maternal satisfaction with assumed position & Neonatal Apgar Score. While, Cochrane risk of bias tool & Data extraction sheet were used for systematic review.

**Tool 1: Structured Interviewing Questionnaire.**

This questionnaire designed by the researcher which contained data related to sociodemographic characteristics included age, educational level, occupation, residence; current Obstetric data & position assumed during labor.

**Tool 2: Labor Progress Record (Partograph):**

It is a standardized tool, designed by the World Health Organization (WHO, 2000) to monitor the progress of labor. The partograph has been used to collect data related to labor progress. It included (11 items) about cervical dilatation, descent of head, and uterine contractions, augmentation of labor, condition of membrane, duration of first, second stages of labor; 2) Fetal condition, which included fetal heart rate, color of liquor, and degree of molding.

**Tool 3: A Visual analogue pain intensity scale (VAS):** It is a standardized linear scale developed by Freyd et al. (1923). It is a self-reported 10 cm horizontal line which represented the subjective estimation of pain intensity. It comprised 0-10-point numerical scale, the investigator asked the woman to place a mark on number that best indicated the pain being experienced. The
two opposite ends representing no pain to severe pain as follows: No pain (0), Mild pain (< 4), Moderate pain (4-6), Sever pain (7-10). Each degree of pain was elaborated with facial expressions of a picture.

**Tool 4: Maternal satisfaction with assumed position:** which included two questions 1) if women were satisfied with assumed position during 1st stage of labour? And 2) if they preferred the assigned position in future deliveries?

**Tool 5: Neonatal Apgar Score:** It is a standardized tool established by Apgar, V, 1963, is valuable methods to determine the health of the newborns immediately after delivery and at fifth minute which is more objective. it determined by allocating scores to five simple criteria Activity (Muscle tone), Pulse (Heart rate), Grimace (reflex irritability) Appearance (Skin color) & Respiratory effort (breathing). A total score (0-3) revealed sever neonatal distress, (4-7) indicated moderate distress & (8-10) indicated absence of difficulty in adjusting to extra uterine live.

**Systematic review tools**

1. **Cochrane Risk of Bias Tool** Used of the modified Cochrane Collaboration tool to assess risk of bias for randomized controlled trials. Bias was assessed as a judgment (high, low, or unclear) for individual elements from five domains (selection, performance, attrition, reporting, and other) (2011).

2. **Data extraction sheet.** Data extraction sheet that been developed by the Cochrane collaboration for clinical evidence based studies via their website (http:// www.cochrane.org) Version 1.8, updated 29 November 2016. It helped the research investigator to summarize the main data of any research article into main points. These points were utilized for writing a systematic review.
Procedure. An official permission was taken from the administrative personnel in the recommended settings. On admission, medical, obstetrical & ultrasound examination was done to fulfill the selection criteria carried out by the obstetrical team of the emergency unite. Each woman who met the inclusion criteria was interviewed. Written consent was obtained. Baseline data regarding to socio-demographic status, medical history, obstetrical history were collected from both groups study & control group using tool I. Initial assessment was performed for each woman to obtain the baseline data such as vital signs, assessed cervical dilatation, effacement, station and assessed condition of membranes if intact or ruptured and auscultate of fetal heart sound as well as, assessed the uterine contraction by using tool II, and pain severity was evaluated by using tool III. For the study group, the researcher investigator asked the woman to assume one of upright positions during 1st stage of labor (walking and upright non-walking) as sitting, standing, kneeling, or squatting. Each woman assumed such position for 15-20 minutes every one hour as well as, she allowed to lie down on bed on the rest of the time. Regarding to control group women assumed one of recumbent positions during 1st stage of labour (supine, semi-recumbent, lateral), and received a routine hospital care. During that time, the researcher evaluated labor progress every 1 hr. in term of uterine contraction characteristics (duration, interval, and frequency), cervical dilatation, fetal head descent, and fetal heart rate by using Tool II and evaluation of the severity of pain by using Tool III.

Evaluation of labor pain intensity was done. As well as, maternal satisfaction with the assumed position and their preferences to this position in the future deliveries was assessed by maternal satisfaction tool IV. Their responses were recorded as either yes or no. In addition,
evaluation of duration of first stage of labor in hours and second stage of labor in minutes were done, as well as neonatal Apgar score evaluation for the first & fifth minutes.

**In relation to systematic review**, the investigator was undertaking an extensive literature search for RCTs cataloged in Pub-Med, Medscape, EMBASE, CINAHL and the controlled trial registry of the Cochrane library as well as Egyptian RCTs related to positions during 1st stage of labor up to (September, 2020). Used search terms (First stage of labor, Upright position, Recumbent position, Labor outcomes).

All studies were randomized controlled trials in English language form and intervention were women who assumed one of upright positions during first stage of labour, comparison intervention were women who assumed one of the recumbent positions during the same labour stage. Any other design rather than RCTs were excluded from the study. The methodology of the trial has been assessed type of clinical questions, design, the process of assigning trial subjects to treatment or control groups to reduce bias, availability of mother’s data, how trials were applied and how data were obtained, the effectiveness of intervention, statistical techniques.

![Figure (1). Study flow diagram of literature selection](image-url)
by tool VI and data extracted from the trials using the Pregnancy and Child Birth Cochrane group data extraction sheet had been summarized by tool VII. A total of 57 studies were identified by the search strategy from 2000 to 2020 (almost 20 years) as in study flow diagram of literature selection (figure 1).

Results:

Table (1)

Socio-demographic Characteristics of Mothers among the Study and the Control Groups

<table>
<thead>
<tr>
<th>Items</th>
<th>Study group (n= 50)</th>
<th>Control group (n= 50)</th>
<th>X²</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>%</td>
<td>No</td>
<td>%</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-&lt;25</td>
<td>37</td>
<td>74%</td>
<td>41</td>
<td>82%</td>
</tr>
<tr>
<td>25- &lt;30</td>
<td>10</td>
<td>20%</td>
<td>7</td>
<td>14%</td>
</tr>
<tr>
<td>30-34</td>
<td>3</td>
<td>6%</td>
<td>2</td>
<td>4%</td>
</tr>
<tr>
<td>Mean± SD</td>
<td>23.72±3.39</td>
<td></td>
<td>22.88±3.42</td>
<td></td>
</tr>
<tr>
<td>Education level</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Read &amp;Write</td>
<td>8</td>
<td>16.0%</td>
<td>4</td>
<td>8.0%</td>
</tr>
<tr>
<td>Primary School</td>
<td>14</td>
<td>28.0%</td>
<td>13</td>
<td>26.0%</td>
</tr>
<tr>
<td>Preparatory School</td>
<td>16</td>
<td>32.0%</td>
<td>18</td>
<td>36.0%</td>
</tr>
<tr>
<td>Secondary School</td>
<td>11</td>
<td>22.0%</td>
<td>10</td>
<td>20.0%</td>
</tr>
<tr>
<td>University School</td>
<td>1</td>
<td>2.0%</td>
<td>5</td>
<td>10.0%</td>
</tr>
<tr>
<td>Occupation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>House wife</td>
<td>48</td>
<td>96%</td>
<td>49</td>
<td>98%</td>
</tr>
<tr>
<td>Working</td>
<td>2</td>
<td>4%</td>
<td>1</td>
<td>2%</td>
</tr>
<tr>
<td>Residence</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>28</td>
<td>56%</td>
<td>33</td>
<td>66%</td>
</tr>
<tr>
<td>Rural</td>
<td>22</td>
<td>44%</td>
<td>17</td>
<td>34%</td>
</tr>
</tbody>
</table>
*significant at p-value <0.05

The demographic characteristics of the study participants (n=100) were explained in (Table 1), it shows that the age range of the sample was from (20-34 years old), with no statistical significant differences between both groups in term of age, educational level, occupation and residence (p= > 0.05).

Table (2)
Mean Labor visual analogue Pain Score Among mothers in Study and Control Groups

<table>
<thead>
<tr>
<th>Items</th>
<th>Number of the sample</th>
<th>Study group Mean ±SD</th>
<th>Control group Mean ±SD</th>
<th>t</th>
<th>p-value</th>
<th>95% CI Lower</th>
<th>95% CI Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labor pain score 1st hour</td>
<td>50 50</td>
<td>4.640±0.484</td>
<td>4.960±0.347</td>
<td>-3.793</td>
<td>0.000</td>
<td>-0.487</td>
<td>-0.153</td>
</tr>
<tr>
<td>Labor pain score 2nd hour</td>
<td>50 50</td>
<td>5.140±0.782</td>
<td>6.180±0.628</td>
<td>-7.324</td>
<td>0.000</td>
<td>1.321</td>
<td>-0.758</td>
</tr>
<tr>
<td>Labor pain score 3rd hour</td>
<td>50 50</td>
<td>5.800±0.571</td>
<td>6.900±0.543</td>
<td>-9.859</td>
<td>0.000</td>
<td>-1.321</td>
<td>-0.879</td>
</tr>
<tr>
<td>Labor pain score 4th hour</td>
<td>50 50</td>
<td>6.900±0.707</td>
<td>7.400±0.606</td>
<td>-3.796</td>
<td>0.000</td>
<td>-0.761</td>
<td>-0.238</td>
</tr>
<tr>
<td>Labor pain score 5th hour</td>
<td>50 50</td>
<td>8.120±0.895</td>
<td>8.340±0.592</td>
<td>-1.449</td>
<td>0.151</td>
<td>-0.521</td>
<td>0.813</td>
</tr>
<tr>
<td>Labor pain score 6th hour</td>
<td>45 50</td>
<td>9.244±0.883</td>
<td>9.320±0.712</td>
<td>-0.461</td>
<td>0.646</td>
<td>-0.401</td>
<td>0.249</td>
</tr>
<tr>
<td>Labor pain score 7th hour</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Labor pain score
8th hour

<table>
<thead>
<tr>
<th></th>
<th>Study group</th>
<th>Control group</th>
<th>X²</th>
<th>p-value</th>
<th>RR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(n= 50)</td>
<td>(n= 50)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>yes</td>
<td>10</td>
<td>24</td>
<td>8.734</td>
<td>0.003*</td>
<td>0.417</td>
</tr>
<tr>
<td>No</td>
<td>40</td>
<td>26</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>50</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*significant at p-value <0.05

Table (2) reveals that the mean labor pain scores in 1st hour was (4.640±0.484) in the study as compared with (4.960±0.347) in the control group with highly statistical significance differences between groups (t =-3.793, p=0.000). There were also, statistical significant differences between mean labor pain scores among both groups every hour up to 4th hours after admission. The maximum effect time of upright position was on 1st, 2nd, 3rd & 4th hours after admission with highly statistical significant differences between study and control group (p=0.000). Started with 5th hour until 8th hr mean labor pain scores increased in the study group as well as in the control group with no statistical significant difference between groups (P= > 0.05).

Table (3)

<table>
<thead>
<tr>
<th>Items</th>
<th>Study group</th>
<th>Control group</th>
<th>$X^2$</th>
<th>p-value</th>
<th>RR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(n= 50)</td>
<td>(n= 50)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>10</td>
<td>24</td>
<td>8.734</td>
<td>0.003*</td>
<td>0.417</td>
</tr>
<tr>
<td>No</td>
<td>40</td>
<td>26</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>50</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*significant at p-value <0.05

Table (3), reveals that 20% of mothers in study group as compared to 48% in control group received extra analgesia only one time, with statistical significant differences between groups ($x^2$ =8.734, p=0.003), Almost all the mothers who received analgesia were in the active acceleration
phase which the cervix dilated was 6 cm with mean cervical dilatation (6.70±0.949) in the study group as compared with (6.50±1.319) in the control group, with no statistical significant differences between groups (t=0.433, p=0.668). Regarding to type of analgesia, all mothers received pethidine analgesia by dose of one amp (100mg) diluted in 10cm normal saline and given 2.5 cm intravenous. The findings of the Relative Risk test of using extra analgesia (RR) was (0.417), which means that assumed upright position in study group had decreased administration of extra analgesia during delivery than in the control group with positive effect in decreasing administration of extra analgesia by 58% as presented in Relative risk reduction (RRR)= 0.583.

**Table (4) Mean Duration of First & Second stage of Labor Among mothers in Study and control Group**

<table>
<thead>
<tr>
<th>Items</th>
<th>Study group (n= 50)</th>
<th>Control group (n= 50)</th>
<th>T</th>
<th>p-value</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
<td></td>
</tr>
<tr>
<td>First stage of labor (hrs)</td>
<td>6.58</td>
<td>0.854</td>
<td>8.1</td>
<td>1.195</td>
<td>-7.308</td>
</tr>
<tr>
<td>Second stage of labor (Min)</td>
<td>32.14</td>
<td>6.078</td>
<td>33.04</td>
<td>7.096</td>
<td>-0.617</td>
</tr>
</tbody>
</table>

Concerned to mean duration of first & second stages of labor, table (4), shows that mothers in the study group had shorter duration in the active phase than the control group with mean duration 6.58±0.854 hours in the study group as compared with 8.10±1.195 in the control group with highly statistical significant differences between groups (t= -7.308, p=0.000). On the other hand, there was no statistical significant difference between two groups related to second stage of labor (t= -0.617, p=0.504).
The findings of the study show that, (98%) of the mother in the study group was satisfied with upright position during first stage of labor and want to be in the same position in the next delivery as compared with 4% only in the control group was satisfied with supine position with highly statistical significant differences between study and control group (p=0.000) While, only one mother in the study group was not satisfied with the kneeling position. The findings of the study reveals that the Relative Risk of non-satisfaction/satisfaction with position during delivery (RR) = (0.020), which means that assumed upright position in the study group improved feeling of comfort and satisfaction during delivery than in the control group by 94% as presented in Relative risk reduction (RRD)= 0.940.

2- Fetal and Neonatal Outcomes

2.1 Fetal heart rate

In the study group the fetuses had normal fetal heart rate between (120-160) bit/min as compared with 90% in the control group with no statistical significance different between both groups (x² =5.263, p=0.056). while, 10% of mothers in the control group their fetuses suffered from transient delayed bradycardia for few seconds and returned to normal after proper management such as lying left lateral recumbent position, provide oxygen, administer atropine, and intravenous fluid.

2.2 Neonatal Apgar Scoring, Sex and Weight

Table (5)

<table>
<thead>
<tr>
<th>Items</th>
<th>Study group (n= 50)</th>
<th>Control group (n= 50)</th>
<th>t</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>First minute</td>
<td>Mean 8.86 SD 0.405</td>
<td>Mean 48.7 SD 0.487</td>
<td>1.340</td>
<td>0.183</td>
</tr>
</tbody>
</table>

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Table (5). Shows mean neonatal Apgar scoring at 1st & 5th minutes among the study and the control group, the findings of the result revealed that there was no statistical significant difference between the study and the control group related to 1st and 5th minutes Apgar score (t=1.340, p=0.183 and t=0.907, p=0.367 respectively). In relation to neonatal mean weight in the study group was (3.029±189.66 kg) as a compared with (3.052±186.98 kg) in the control group with no statistical significant difference between (t=−0.605, p=0.546).

In relation to Systematic Review’s Results (qualitative synthesis): Primary maternal outcomes:

1- Pain Experienced by the women: Findings from Five trails suggested that labour pain intensity in upright position was lower than in the control group, Gau 2011; reported that decreased the mean labor pain in the birth ball exercise group at 4 cm cervical dilatation (4.0 ±1.7) as compared to (6.0 ±1.6) in the control group with statistical significant differences P= 0.001, and at 8cm dilatation the mean labor pain was (6.5 ±1.3) in the study group as compared to (8.2 ±1.1) in the control group with statistical significant differences P= 0.027. Abdolahian 2014; reported significant differences between dance labor group & control group related to pain severity p=0.008, (Taavoni 2011 &Shirazi 2019); mentioned that the mean score of pain intensity in the birth ball group was significantly less than that of the control P= 0.001. Hassen 2021; revealed statistical significant differences between both groups from 1st hour until 5th hour p= 0.000. On the other hand, two trials done by
Moquelutti 2007 & Ibrahim et al, 2020; reported no significant differences between groups were observed for labor pain p=0.230. Only one trial by Mathew 2012; didn’t report data about labor pain.

2- **Duration of First stage of labor:** Five trials from included study reported significance differences between groups related to duration of first stage of labor in favor of the intervention group with total mean was (8.41hrs) as compared to (10.14 hrs) in the control group; Mathew 2012; reported significance differences in ambulation group & birthing ball group with control group P= 0.000, mean duration in the study group was (8.85 hrs) as compared to (12.71hrs) in the control group. Shirazi 2019, reported mean duration of first stage of labor in the study group was (6.61 hrs) as compared to mean of control group was (7.051hrs) with statistical significant differences between both groups (P= 0.003). In relation to Gau 2001, mentioned that mean duration of first stage of labor in the study group was (6.3 hrs) as compared to (8.081hrs) in control group with significance differences between both groups (p= 0.035); and Ibrahim et al,2020 reported mean duration (11.88 hrs) in the study group as compared to (12.74hrs) in the control group with p value =0.018. Also, Hassen 2021, revealed that the mean duration 6.58±0.854 hours in the study group as compared with 8.10±1.195 in the control group with highly statistical significant differences between groups (t= -7.308, p=0.000). On the other hand, two trials done by Moquelutti 2007& Taavoni 2011; reported no significance differences between groups in relation to duration of first stage (p=0.591& p=0.605 respectively). Only one study done by Abdolahian 2014; didn’t report data about it.

3- **Maternal satisfaction with positioning:** Only three trials from included study stated that women were satisfied with being in upright position during labor, Mathew 2012; reported
that 95% of mothers were satisfied with ambulation and birthing ball used during labour and 85% of mothers from ambulation group and 95% of mothers from birthing ball group, would like to recommend its use to others. Abdolahian 2014; reported significance differences between dance labor group & control group related to women satisfaction P=0.021. Also, Hassen 2021, reported that (98%) of the mother in the study group was satisfied with upright position during first stage of labor and want to be in the same position in the next delivery as compared with 4% only in the control group was satisfied with supine position with highly statistical significant differences between study and control group (p=0.000). But, Moquelutti 2007 reported no significance differences between groups. The other trials of included study didn’t report data about women satisfaction with position.

**Secondary maternal outcomes**

1- **Duration of second stage of labour:** There was no difference between groups in the duration of the second stage of labour in the 5 trials that reported this outcome, (Moquelutti 2007, Gau 2001, shirazi 2019, Ibrahim et al,2020 Hassen 2021) reported no statistical significant differences between both groups, with total mean duration in minutes in upright position group was (39.88 min) as compared to (41.11min) in the control group. Only one trial done by Mathew 2012; reported significance differences between groups p=0.000 with mean duration in the study group (32.72 min) as compared to (49.93 min) in control group.

2- **Fetal & Neonatal outcome**

Five studies examined first, fifth minutes Apgar scores; shirazi 2019 reported that 93% of upright group at fifth min Apgar score was 9 as compared to 82% of the control group with no significance differences between groups. Mathew 2012; Reported no significant
improvement found on newborn outcome after the use of ambulation and birthing ball therapy without reporting data. Also, Hassen 2021, reported no statistical significant difference between the study and the control group related to 1st and 5th minutes Apgar score ($t=1.340,p=0.183$ and $t=0.907,p=0.367$ respectively). On the other hand, three trials done by (Abdolahian 2014, Taavoni 2011 & Gau 2001) didn’t report data about it. Regarding to fetal heart rate two trials (Ibrahim et al, 2020 & Hassen 2021) reported no significant differences were observed between upright and control group regarding fetal heart rates ($P=0.256$ & $P=0.056$ respectively).

**Discussion**

The study findings prove the 1st hypothesis in relation to a decrease in the duration of first stage of labor, lower labour pain score and higher satisfaction rate as compared to those who assume recumbent position, and not support the 2nd hypothesis. Several studies reported the effect of upright position on maternal outcomes. The findings of the current study revealed a highly statistical significant difference between both groups related to labor pain started in 1st hr until to 4th hr. These results are in harmony with a study done by (Emam & Alzahrani, 2018) who examine the effect of upright versus recumbent position during first stage of labour among primipara women on 100 parturient women and reported high statistical significant differences between both groups started with the first hour until to 4th hour ($p < 0.001$). Also, the study results are consistent with a systematic review and meta-analysis on 25 trials (5218 women) done by (Lawrence, et al; 2013) who assess the effects of different upright and recumbent positions and mobilization for women in the first stage of labour on duration of labour, type of birth and other
important outcomes for mothers and babies, concluded that women who were upright were also less likely to have an epidural for pain relief (95% CI 0.66 to 0.99).

The results of the study are contradicted with RCT study conducted by Moquelutti (2007) who assess 107 nulliparous parturient women which did not show any difference in the mean pain score with no significance differences between groups were observed p=0.230 Also, RCT study conducted by Ibrahim et al, (2020) on 150 women in first stage of labor and reported no significance differences (P > 0.05) were observed between both groups related to mean labor pain score at all post intervention time point. These contradictions in the findings among studies may be due to differences in sample size & different culture urban than rural.

Findings of the current study showed that the Study group received extra analgesia less than the control group with statistical significant differences between groups ($x^2 = 8.734$, p=0.003). The results of the study are in the same line with Gizo et al (2014), who conducted a cohort study to compare a recumbent and alternative positions in terms of labor process, reported statistical significant differences between groups related to analgesia request (P<0.0001). This finding contradicted with RCT study conducted by Garcia (2011), who assess the effects of using birth balls during the first and second stage of labor, perineal integrity, perception of pain intensity, and safety, and reported no significant differences between groups in relation to maternal request and administration of analgesia (P>0.05).

The finding of the current study revealed that the mothers in the study group had shorter duration in the active phase of labor than the control group, the study findings are consistent with the findings done by Ibrahim et al, (2020), who revealed that statistical significant difference
between the study and control groups regarding the duration of the first stage of labor \((P = 0.018)\). The mean duration of the first stage was \(11.88 \pm 2.50\) hrs in the study group as compared with \(12.74 \pm 1.86\) hrs in the control group. Also, Farrag & Omar (2018), reported that the mean duration of the first stage of labor was shorter in the study group as compared to the control group \((3.01\pm1.21&4.32\pm1.65\) hr respectively), with highly statistical significant differences \((P=0.001)\). On the other hand, contradicted with two clinical trials done by Moquelutti (2007) & (Taavoni 2011); reported that there were no significance differences between groups in relation to duration of first stage \((p=0.591& p=0.605\) respectively).

The findings of the current study revealed no statistical significant difference between two groups related to second stage of labor \((t= -0.671, p=0.504)\). The study findings are in the same line with the study done by Ibrahim et.al, (2020), who reported that there was no statistical significant difference between the study and control groups regarding the duration of the second stage of labor \((P > 0.05)\). This finding contradicted with a cohort study done by Gizzo et al (2014), who reported statistical significant differences between both groups in relation to length of second stage of labor \((P=0.001)\). These contradictions in the findings among studies may be due to the difference in the design used in the study which was cohort study.

The findings of the current study revealed a highly statistically significant difference between both groups related to maternal satisfaction with their positions during active phase of labor \((p=0.000)\). The findings of the current study are in consistence with an RCT study done by Mathew (2012) who reported that 95% of mothers were satisfied with ambulation and birthing ball used during labour and 85% of mothers from ambulation group and 95% of mothers from
birthing ball group, would like to recommend its use to others. Moreover, another RCT study conducted by Abdolahian 2014; reported significant differences between dance labor group & control group related to women satisfaction p=0.021.

In relation to mean Apgar score 1st & 5th minutes the result showed that there was no statistical significant difference between the study and the control group (t=1.340, p=0.183 and t=0.907, p=0.367 respectively). The study findings are agree with systematic review done by Lawrence et al (2013) & Gizzo et al., (2014), who found no significant differences between the studied groups in terms of neonatal Apgar scores (p>0.05). Also, RCT study done by shirazi (2019), reported that 93% of upright group fifth min of Apgar was 9 as compared to 82% of control group with no significance differences between groups (p > 0.05). The study findings are contradicting with the study done by Emam& Alzahrani (2018), who reported that significant difference between both groups in relation to Apgar score of the neonate during both first and fifth minute (p < .05). These contradictions in the findings among studies may be due to the difference in the design used in the study which was quazi experimental study.

In relation to systematic review, eight trials addressing the effect of upright position versus recumbent position during first stage of labour on maternal & neonatal outcomes. In relation to evaluation of primary outcomes, suggests that labour pain intensity in upright position was lower than in control group with total sample of (736 women from five trials), and reported significant differences between groups related to duration of first stage of labour in favor of the intervention group with total sample of (676 women in five trials).
Regarding to maternal satisfaction with upright positioning, its effect was unclear, data of satisfaction reported from three studies accounted for almost 24\% of the sample. The evaluation of secondary outcomes suggests that the upright position is a safe intervention. At the same time, while, it produces no apparent benefit on duration of second stage of labour & neonatal outcome, neither does it appear to do any harm.

The researcher identified previous two reviews that addressed this area of study. Lawrence et al.2013, systematically reviewed reports about effects of maternal position/mobility from the 25 included trials (5218 women) on several measures, one of which was length of first stage. From 21 controlled studies, they assigned a total of (n= 3706) women to upright, or recumbent position group. Global mean lengths of first stage were unstated, with a significant difference reported (p= 0.05). First stage of labor was an hour shorter for upright/walking women, as compared with those who recumbent or were semi-recumbent. Lawrence et al.2013, reported also, more research of better quality is still needed to validate these results for all women in labour. However, women should be encouraged and supported to use upright and mobile positions of their choice during first stage labour, as this may enhance the progress of their labour and may lead to better outcomes for themselves and their babies.

In a further systematic review of RCT’s, (Souza et al,2006); examined the effect of upright position/ambulation upon length of first stage of labor. Data was pooled from several studies, accumulating a total of (n = 2,166) participants, in which the length of the first stage of labor and results were in favor of the intervention group, but the high level of heterogeneity (I = 88.4\%) impaired the meaning of this finding. The intervention did not affect other outcomes studied (use of analgesia, and condition of the child at birth).
Conclusion

There was a clear and important evidence that assuming upright position during first stage of labor results in advantages for the parturient primipara woman by significant improvement in reduction of labor pain score, shorten duration of the first stage of labor. And a highly statistical significant difference regarding maternal satisfaction and preference of the assumed position in next labor.

Recommendations: The study recommended based on the clinical evidence that women in low-risk labor should be informed of the benefits of upright positions, and encouraged to assume it; and disseminate the protocol of care to clinical setting.

References


