

Effect of Spontaneous Pushing Technique during Second Stage of Labor on Labor Outcomes among Primiparas

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Abstract:

Background: Maternal pushing during the second stage of labor is important contributor to the involuntary expulsive force developed by uterine contraction results to influence on the mother and fetus. **Aim of study:** Was to evaluate the effect of spontaneous pushing technique during second stage of labor on labor outcomes among primiparas. **Design:** A quasi- experimental design was utilized to conduct the study. **Setting:** The study was conducted at Obstetrics and Gynecology department in Benha university hospital. **Sample:** A purposive sample was used to conduct the data, the total sample was 300 parturient women (150) control group and (150) study group. **Tools of data collection:** Six tools were utilized for data collection. A structured interviewing questionnaire, physical assessment and observation sheet during labor, visual analogue scale, modified fatigue symptom checklist, birth outcomes sheet and women satisfaction questionnaire. **Results:** (82%) of women in study group had no maternal complications after delivery compared to (55.3%) control group. According to Apgar's score there was a highly statistically significant difference between two groups at the 1st minute while there was a statistically significance difference at the 5th minute, (71.5%) of women at study group were satisfied regarding utilized pushing technique and there was no severe symptoms in study group according to total score of modified fatigue symptoms compared to (64.5%) control group. **Conclusion:** Spontaneous pushing technique during the second stage of labor enhanced maternal and neonatal outcomes and shortens the duration of second stage. **Recommendations:** Spontaneous pushing during second stage of labor could be recommended to be included in maternal hospitals protocol.

Key words: Labor outcomes, Primiparas, Second stage of labor, Spontaneous pushing

Introduction

Labor is defined as a series of physiological phenomena whereby the fetus, membranes and placenta are expelled from the uterus at a period in pregnancy where extra uterine survival is possible (Serrano & Ayres-de-Campos, 2021).

Labor is a continuous process divided into four stages. The first stage refers to the onset of labor until the cervix is fully dilated (Radhakrishnan, 2021). The second stage of

labor is the period from full dilation of the uterine cervix until complete birth of the fetus. The onset of the second stage of labor is usually not identified accurately. It is recorded as the time at which a per vaginal examination first finds the uterine cervix to be fully dilated, but could actually have been reached at any time since the previous per vaginal examination (Hofmeyr & Singata 2020).

During the second stage of labor, the descent of the fetus in a woman's pelvis will

be promoted by maternal pushing efforts. Effective 'push strategies' are areas of non-medical practice which can lead to substantially improved maternal and fetal well-being (Hassan et al, 2021).

Pushing technique in the second stage is generally classified as directed pushing and spontaneous pushing. Direct pushing is referred to as the repeated and strong pushing efforts that continued for 10 seconds with holding the breath (by closed glottis). (ACOG, 2021).

Spontaneous pushing is defined as a woman responding to the urges of body. In spontaneous pushing; women push three to five times per contraction following instincts (open glottis). Spontaneous pushing occurs when laboring women feel an urge to push. Women who were using spontaneous pushing reported increasing levels of satisfaction with birth experience. Spontaneous pushing improved fetal and maternal oxygenation (Genedy et al, 2021).

Nurse's care during second stage of labor focuses on the provision of such support and encouragement whilst continually assessing both maternal and fetal wellbeing, labor progress and descent of the fetus. Maternal factors for consideration include the frequency and effectiveness of uterine contractions, maternal vital signs (including blood pressure every 30 minutes and pulse every 15 minutes), bladder care, maternal positioning, hydration, coping strategies and pain relief, support and reassurance with pushing and assessment of the effectiveness of pushing, progress of the second stage and recognition of any delay (Nash, 2019).

Significance of the study

Effective 'push strategies' are areas of non-medical practice which can lead to substantially improved maternal and fetal well-being, that can helping in descent of the fetus in a woman's pelvis, which promoted by

maternal pushing efforts during the second stage of labor (Hassan et al, 2021). Both maternal and neonatal outcomes as neonatal Apgar scores, perineal and long term urogynecological outcomes are improved when women are allowed to push in response to own spontaneous urges (Lee et al, 2019).

Nearly 64% of new mothers affected by fatigue during the postpartum period, making it the most common problem that a woman faces as women adapts to motherhood (Badr & Zauszniewski, 2017). A relationship has been observed between the valsalva maneuver and reduction of oxygen supply to the fetus, maternal fatigue, and damage to the perineum, can negatively affect fetal acid-base balance, apgar scores and cerebral oxygenation. It can also interfere with the duration of the second stage of labor and impair bladder function, but the results were better when woman's spontaneous pushing was allowed (Başar & Hürata, 2018).

Aim of the study

This study aimed to evaluate the effect of spontaneous pushing technique during second stage of labor on labor outcomes among primiparas.

Research Hypothesis

Applying spontaneous pushing technique during second stage of labor would exhibit positive labor outcomes among primiparas.

Subject and methods

Study design

A quasi- experimental design was utilized to fulfill the aim of the present study.

Setting

The study was conducted at obstetrics and gynecology department in Benha University hospital . This setting was located at the sixth floor of the hospital. This department has three main corridors. The 1st corridor consists of four patient rooms, each room with a capacity of 4 beds and one locker room for nurses. The 2nd corridor consists of two

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patient rooms, each room with a capacity of 4 beds. The 3rd corridor consists of doctors office, secretarial and administrative offices. This setting presented a comprehensive medical treatment, nursing care, support and follow up to achieve health and wellbeing for women. N.B because of corona virus the labor process was performed in the first floor.

Sampling

- **Sample type:** A Purposive sample.
- **Sample size:** The sample consisted of 300 parturient women the sample selected randomly and divided to two groups control group (150) parturient women that used direct pushing technique and study group (150) parturient women that used spontaneous pushing technique.

The sample size was estimated using the following formula:

- $$n = \frac{N}{1 + N(e)^2}$$
- Where "n" is the sample size
- "N" is the total number of parturient women.
- "e" is coefficient factor (level of precision or sampling error) = 0.05.
- Based on the previous year women in labor unit census report (**Benha University Hospital census, 2019**) (1200 women).

Inclusion criteria

- Primigravida with full term singleton fetus and presented by cephalic.
- Parturient women during second stage of labor and fulfilled the criteria of vaginal delivery without contraindications.
- Free from obstetric or medical complications.

Tools of data collection

Six main tools were utilized for data collection:

Tool I: A structured interviewing questionnaire:

It was designed by researcher after reviewing related literatures regarding the study (**Elzihiri et al, 2016**), it included the following two parts:

- **First part Socio-demographic data**, it included (age, education level, occupation and residence).
- **Second part concerning with current pregnancy and labor data** as (gestational age, antenatal care received, onset of antenatal care, number of antenatal care visits, duration of labor pain until the time of admission, frequency of uterine contraction, bladder condition and enema performed).

Tool II: Physical assessment and observation sheet during labor:-

This tool was adopted from (**Mohamed, 2013**) and was used to assess maternal and newborn conditions, which included general examination on admission (maternal vital signs, anthropometric measurements, vaginal examination, condition of membrane, amniotic fluid color and uterine contractions) and general examination during second stage of labor (vital signs , fetal heart rate (FHR), oxytocin use of augmentation, increase in oxytocin dose during the second stage of labor, station of fetal head at initiation of pushing, uterine contractions, duration of uterine contraction, number and duration of pushing during each contraction)

Tool III: Visual Analogue Scale (VAS):

It was used to assess the level of pain. It was developed by (**Wewers and Lowe, 1990**). It is a vertical or horizontal line usually 10 cm. the right end is marked 0 which indicate (no pain) and the left is marked 10 which indicate (sever intolerable pain). The characteristics of the pain intensity were reported by the parturient and the pain level was recorded at two evaluation time points at 10 cm of cervical dilatation and after one hour after the first pain evaluation. A high score reflects more intense pain and low score means less pain intensity. For scoring the pain level, the scale was categorized into three grades:

| Level of pain | Characteristics of pain | Range of score |
|---------------|-------------------------------|----------------|
| Mild pain | Pricking, pinching, aching | 1<4 |
| Moderate pain | Pressing, cramping, burning | 4<8 |
| Severe pain | Cutting, killing, suffocating | 8-10 |

Tool (IV): Modified Fatigue Symptom Checklist" MFSC" :

This was developed by (Pugh, 1993) to assess women feeling of fatigue during the four hours after delivery. It is a norm referenced, 30-item Likert type scale with a possible score ranging from 30 to 120 (item range =1–4) that provided information on levels of fatigue among postnatal women. The participants were asked to answer statements describing physical and psychological symptoms women had generally experienced within one to four hours after the birth.

The four categories for scoring system were:

- Not at all: means the feeling doesn't occur.
- Mild symptoms: means the feeling less than 50% of total score.
- Moderate symptoms: means the feeling occurs 50- less than75% of total score.
- Severe symptoms: means the feeling \geq 75% of total score.

Tool (V): Birth Outcomes Sheet which include two parts:

- **Part 1:** Maternal Outcomes: it was designed by researcher after reviewing related literatures regarding the study (Mohamed, 2015, Elzihiri et al, 2016 and Başar & Hürata, 2018), tool was written in the form of close and open-ended questions. It included (duration of the second and third stage of labor, placental delivery, placental appearance, condition of the perineum and maternal complications after delivery).

- **Part 2:** Newborn outcomes: Neonatal Apgar at first minute and fifth minutes, birth weight and neonatal complications.

- **Apgar** score is a simple method to assess the condition of the newborn infant. It is performed in the first minute and after five minute for fetal expulsion **Apgar et al, (1953)**. It is based on assessment of five physical signs namely: heart rate, respiratory effort, reflex irritability, muscle tone and color. The total score ranges from 0 to 10. A score of zero means none of these signs is present and ten means a completely normal infant. Infants rarely score ten at one minute. If the infant score ranges from 7 to 10, this indicates normal infant condition. A score from 4 to 6 indicates moderate infant condition (moderate asphyxia) and from 0 to 3 indicates very bad infant condition (sever asphyxia).

Tool (VI): Semi structured women's satisfaction questionnaire:

This tool was developed by (Yurachai, 2006). It was used to assess the level of women's satisfaction regarding the pushing technique used during labor. It was demonstrated by selecting one of two options: either satisfied score 1 or not satisfied score.

Total score:

Unsatisfactory -----less than 60% of total satisfaction score.

Satisfactory ----- \geq 60% of total satisfaction score.

Tools validity and reliability

The validity of questionnaire was reviewed by (3) jury experts in the field of Obstetrics & Gynecological Nursing to ascertain clarity, relevance, comprehensiveness and applicability of tools. The questionnaire was modified according to the expert's comments and recommendations. Reliability of proposed tools was done utilizing Cronbach alpha test. Reliability for

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modified fatigue symptom scale was Cronbach alpha 0.81, also reliability for visual analogue scale was 0.963, and was 0.825 for women's satisfaction scale.

Ethical considerations

Ethical aspects considered before implementation of the study as the following:

- Approval of the faculty ethics committee for scientific research was obtained for the fulfillment of study.
- An official permission from the director of the selected study setting was obtained for the fulfillment of the study.
- Each woman was informed about the purpose and benefits of the study at the beginning of interview and time throughout the study.
- An informed consent was obtained from each woman before starting data collection.
- Confidentiality was ensured throughout the study process, where personal data were not disclosed, and the women were assured that all data was used only for research purpose.
- Each woman was informed that, participation is voluntary and withdrawal will not affect care.
- The study didn't have any physical, social or psychological risk on the participants.

Pilot study

A pilot study was carried for 10% of the total sample (30) parturient women to evaluate simplicity, clarity and applicability of study tools and the time needed to fill in the questionnaire. According to the results of the pilot study, simple necessary modifications were done in the form of adding and omitting some questions such as (duration of labor pain until the time of admission & number of antenatal care visits). Pilot study were excluded from main study

sample and the researcher added another (30) parturient women.

Field work

The study was implemented for nine months, from the beginning of July 2020 to the end of March 2021. Implementation of study was carried out at obstetrics and gynecology department in Benha university hospital .

- After administrative approval to conduct the study the researcher began the study by visiting the obstetrics and gynecology department in Benha university hospital, two days weekly (Saturday and Sunday), from 9 a.m. to 6 p.m.
- The researcher introduced herself and explained the purpose of the study to the parturient women.
- The researcher checked the data of the laboring women according to the inclusion criteria from women history cards, interviews and physical examination records of admission.
- The researcher divided the sample randomly into two groups by using lottery which odd number (control group) and even number (study group).

Control Group

This group was subjected to the conventional pushing (directed pushing) during the second stage of labor. On duty the progression of labor determined by vaginal examination, when detected that the cervix fully dilated. The researcher detected the uterine contractions by placing the palm of the hand over the woman's abdomen at the funds. As a contraction started, the laboring women were asked to take a deep breath and hold it while both hands hold on the bedside rails and push strongly for as long as possible (closed glottis) and were instructed to repeat the same procedure with every contraction until birth, and when the crown was visible at

2-3 cm, the laboring woman was sent to the delivery room using the lithotomy position to complete the birthing process.

Study Group

Parturient women in this group were subjected to spontaneous pushing technique. During the first stage, women were instructed by the researcher to relax during uterine contractions by inhaling deeply-slowly and exhaling deeply-slowly until the contraction had ceased (breathing exercise), while in second stage women were instructed to push spontaneously, by pushing only during contraction when women felt the urge to do so rest in between, without any specific instructions about the timing and duration of pushing. When the crown was visible at 2-3 cm, the laboring woman sent to the delivery room to complete the birthing process.

- The women were followed from the time of birth to the end of the second stage of labor. A watch was used to read and measure the amount of time with numerical values for hours, minutes and seconds.
- The researcher detected uterine contraction by placing the palms of the hands over the woman's abdomen at the fundus, counted the number of pushing and measured its duration. The visual analogue scale (VAS) was used to estimate the intensity of pain for both groups.
- Physical assessment sheet was used during the second stage of labor to assess vital signs, uterine contractions, number and duration of pushing during each uterine contraction, fetal heart rate, station at full cervical dilatation and mode of rupture of membranes.
- Delivery was conducted by the on duty physician assisted with the researcher. Then birth outcomes sheet was used for both groups following the second stage of labor to assess the following:

- Maternal outcomes: duration of the second and third stage of labor, placental delivery, placental appearance, condition of the perineum and maternal complications after delivery.
- Neonatal outcomes: Apgar scores at the first and fifth minutes, birth weight and neonatal complications.
- Pain assessment by using the visual analogue scale (VAS) was estimated for the second time after one hour from the onset of the second stage of labor. Fatigue assessment was also assessed by Modified fatigue symptoms checklist within one to four hours after the birth. As well as, women's satisfaction regarding the technique that was assessed on the discharge time.

Statistical analysis:

Data analysis was performed using IBM SPSS statistical software version 22. The data were explored. Descriptive statistics with mean and standard deviation (SD) for continuous variables and frequency for categorical variables were analyzed. Qualitative variables were compared using chi square test (χ^2) as the test of significance, independent (t) test were used to compare mean score between two groups respectively. The p-value is the degree of significant. A significant level value was considered when $p\text{-value} \leq 0.05$ and a highly significant level value was considered when $p\text{-value} \leq 0.001$, while $p\text{-value} > 0.05$ indicates non-significant results.

Study limitations:

High drop-out rate during the study (i.e. Five mothers were refused to give experiences at the six point of assessment; after 4 hours postpartum and 3 participants delivered by cesarean section). Thus, they were replaced by others and waste extra time to complete the assigned sample size.

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Results

Table (1): Indicates that there was no statistically difference between studied women in both study and control groups regarding personnel characteristics, including (age, educational level, occupation and residence) ($p > 0.05$). Half of women were in age group from 24<29 years, with mean of 25.65 ± 5.74 and 25.98 ± 6.32 of both study and control groups respectively. In addition, more than half of women in both study and control groups had a secondary education, and were working and live at urban settings this reflect group homogeneity.

Table (2): Indicates that there was a statistically significant difference between studied women in both study and control groups regarding labor pain during second stage of labor when the cervix was fully dilated, in addition there was a highly statistically significance was indicated after one hour from first labor pain assessment .

Table (3): Reveals that there was a highly statistically significance difference between both study and control groups

studied women regarding modified fatigue symptoms.

Table (4): Shows that there was a highly statistically significant difference between studied women in both study and control groups regarding the maternal outcomes (regarding duration of both 2nd stage, 3rd stage of labor and the maternal complication after delivery). Moreover, that there was a statistically significant difference regarding the placental examination and postpartum hemorrhage .while there was no statistically significant difference between both groups regarding placental delivery and perineum condition.

Table (5): Reveals that there was a highly statistically significant difference between studied women in both study and control groups regarding neonatal outcomes including Apgar score at the 1st minute while there was statistically significance difference at the 5th minute. On the other hand there was no statistically significant significance difference regarding neonatal birth weight and neonatal complication.

Table (1): Distribution of personnel characteristics of the studied sample (n=300).

| personnel characteristics | Study group N=150 | | Control group N=150 | | Chi square | P value |
|---------------------------|----------------------|-------|------------------------|-------|------------|---------|
| | No | % | No | % | | |
| Age in years | | | | | | |
| 20<24 | 42 | 28.0% | 46 | 30.7% | 1.07 | >0.05 |
| 24<29 | 75 | 50.0% | 78 | 52.0% | | |
| 29-35 | 33 | 22.0% | 26 | 17.3% | | |
| Mean \pm SD | 25.65 \pm 5.74 | | 25.98 \pm 6.32 | | | |
| Educational level | | | | | | |
| Illiterate | 22 | 14.7% | 15 | 10.0% | 7.38 | >0.05 |
| Read & write | 35 | 23.3% | 31 | 20.7% | | |
| Secondary education | 77 | 51.3% | 97 | 64.7% | | |
| University education | 16 | 10.7% | 7 | 4.6% | | |
| Occupation | | | | | | |
| Working | 80 | 53.3% | 85 | 56.7% | 0.377 | >0.05 |
| House wife | 70 | 46.7% | 65 | 43.3% | | |
| Residence | | | | | | |
| Urban | 76 | 50.7% | 82 | 54.7% | 0.481 | >0.05 |
| Rural | 74 | 49.4% | 68 | 45.3% | | |

Table (2): Distribution of labor pain during second stage of labor among the studied women at both study and control group (n=300).

| Variable | Variable | Study group N=150 | | Control group N=150 | | Chi square | P value |
|---|---------------|----------------------|-------|------------------------|-------|------------|----------|
| | | No | % | No | % | | |
| when the cervix is fully dilated at 10 cm | Mild pain | 0 | 0.0% | 0 | 0.0% | 4.74 | <0.05* |
| | Moderate pain | 37 | 24.7% | 22 | 14.7% | | |
| | Sever pain | 113 | 75.3% | 128 | 85.3% | | |
| after one hour from first pain evaluation | Mild pain | 0 | 0.0% | 0 | 0.0% | 22.41 | <0.001** |
| | Moderate pain | 96 | 64.0% | 55 | 36.7% | | |
| | Sever pain | 54 | 36.0% | 95 | 63.3% | | |

Table (3): Distribution of modified fatigue symptom among the studied women at both study and control group (n=300).

| Item | Study group N=150 No | Control group N=150 No | Independent t test | P value |
|---|----------------------------|------------------------------|--------------------|----------|
| My head feels heavy | 2.1300±.65975 | 3.0350±.92088 | 11.29 | <0.001** |
| My body feels tired | 2.1600±.69774 | 2.8600±1.05163 | 7.84 | <0.001** |
| My legs feel tired | 2.1650±.47846 | 3.0600±.71340 | 14.73 | <0.001** |
| I yawn a lot | 2.1950±.39719 | 3.2100±.40833 | 25.19 | <0.001** |
| My brain feels hot and muddled | 2.2700±.44507 | 3.3200±.46765 | 23.00 | <0.001** |
| I am drowsy | 2.2250±.51546 | 3.0750±.72249 | 13.54 | <0.001** |
| My eyes feel strained (tired) | 2.1300±.45180 | 3.0650±.71648 | 15.61 | <0.001** |
| My movements are rigid or clumsy | 2.2650±.44244 | 3.3100±.46365 | 23.06 | <0.001** |
| Tam unsteady when standing | 2.2550±.47019 | 3.2100±.56346 | 18.40 | <0.001** |
| I want to lie down | 2.3500±.60774 | 3.3550±.70815 | 15.23 | <0.001** |
| It's difficult to think | 2.0550±.71028 | 2.7950±1.05286 | 8.24 | <0.001** |
| I get weary talking | 2.1450±.44153 | 3.1000±.57590 | 18.61 | <0.001** |
| I am nervous | 2.1100±.31367 | 3.1050±.30732 | 32.04 | <0.001** |
| I can't concentrate | 2.1100±.41078 | 3.1850±.38927 | 26.86 | <0.001** |
| I am unable to get interested in things | 2.2950±.52856 | 3.2050±.63640 | 15.55 | <0.001** |
| I am apt to forget things. | 2.0650±.36254 | 3.0100±.50115 | 21.60 | <0.001** |
| I lack self-confidence | 2.2300±.45622 | 3.2400±.42815 | 22.82 | <0.001** |
| I am anxious about things | 2.2450±.49619 | 3.2350±.52070 | 19.46 | <0.001** |
| I can't straighten my posture | 2.0150±.73994 | 2.6950±1.16134 | 6.98 | <0.001** |
| I lack patience | 1.9300±.25579 | 2.8800±.47617 | 24.85 | <0.001** |
| I have a headache | 2.0550±.33547 | 3.0100±.43687 | 24.52 | <0.001** |
| My shoulders feel stiff | 2.2300±.94953 | 3.0250±.93205 | 8.45 | <0.001** |
| My back hurts | 1.8950±.33845 | 2.8300±.55916 | 20.23 | <0.001** |
| It's hard to breathe | 1.8700±.40487 | 2.6600±.75315 | 13.06 | <0.001** |
| I'm thirsty | 1.7850±.45807 | 2.5300±.85013 | 10.91 | <0.001** |
| My voice is husky | 1.8700±.35174 | 2.6600±.75315 | 13.44 | <0.001** |
| I feel dizzy | 2.1500±.43410 | 3.1500±.55592 | 20.05 | <0.001** |
| My eyelids twitch | 1.9750±.30798 | 2.8900±.45710 | 23.47 | <0.001** |
| My legs or arms tremble | 1.9400±.37025 | 2.7700±.63965 | 15.88 | <0.001** |
| I feel ill | 1.9100±.46148 | 2.8000±.62607 | 16.18 | <0.001** |

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Table (4): Distribution of maternal outcomes among the studied women at both study and control group (n=300).

| Variable | Study group N=150 | | Control group N=150 | | Chi square | P value |
|---|----------------------|-------|------------------------|-------|------------|----------|
| | No | % | No | % | | |
| Duration of second stage of labor (in minutes) | | | | | | |
| 30-60 | 121 | 80.7% | 85 | 56.7% | 20.07 | <0.001** |
| >60 | 29 | 19.3% | 65 | 43.3% | | |
| Duration of third stage(in minutes) | | | | | | |
| 20<30 | 104 | 69.3% | 67 | 44.7% | 18.62 | <0.001** |
| 30<60 | 33 | 22.0% | 59 | 39.3% | | |
| ≥60 minutes | 13 | 8.7% | 24 | 16.0% | | |
| placental delivery | | | | | | |
| Spontaneous separation | 131 | 87.3% | 128 | 85.3% | 0.254 | >0.05 |
| manual separation | 19 | 12.7% | 22 | 14.7% | | |
| Placental examination | | | | | | |
| Complete | 122 | 81.3% | 98 | 65.3% | 9.81 | <0.05* |
| Incomplete | 28 | 18.7% | 52 | 34.7% | | |
| Condition of the perineum | | | | | | |
| Intact | 10 | 6.7% | 13 | 8.7% | 0.424 | >0.05 |
| Episiotomy | 140 | 93.3% | 137 | 91.3% | | |
| Maternal Complications after delivery | | | | | | |
| No | 123 | 82.0% | 83 | 55.3% | 24.78 | <0.001** |
| Yes | 27 | 18.0% | 67 | 44.7% | | |
| What complication? | | | | | | |
| Vaginal tears | 7 | 4.7% | 6 | 4.0% | 28.59 | <0.001** |
| Perineal tears | 20 | 13.3% | 61 | 40.7% | | |
| Primary postpartum hemorrhage | | | | | | |
| No | 138 | 92.0% | 119 | 79.3% | 9.80 | <0.05 |
| Yes | 12 | 8.0% | 31 | 20.7% | | |

Table (5): Distribution of neonatal outcomes among the studied women at both study and control group. (n=300).

| Variable | Study group N=150 | | Control group N=150 | | Chi square | P value |
|--|----------------------|-------|------------------------|-------|------------|----------|
| | No | % | No | % | | |
| APGAR interpretation at 1st min | | | | | | |
| (7-10) Normal | 122 | 81.3% | 97 | 64.7% | 10.66 | <0.001** |
| (4-6) mild to moderate asphyxia | 18 | 12.0% | 36 | 24.0% | | |
| (0-3) sever asphyxia | 10 | 6.7% | 17 | 11.3% | | |
| APGAR interpretation at 5th min | | | | | | |
| (7-10) Normal | 125 | 83.3% | 105 | 70.0% | 7.61 | <0.05* |
| (4-6) mild to moderate asphyxia | 22 | 14.7% | 41 | 27.3% | | |
| (0-3) sever asphyxia | 3 | 2.0% | 4 | 2.7% | | |
| Birth weight in grams | | | | | | |
| 2350<3000 | 33 | 22.0% | 37 | 24.7% | 4.27 | >0.05 |
| 3000-3500 | 95 | 63.3% | 79 | 52.7% | | |
| >3500 | 22 | 14.7% | 34 | 22.7% | | |
| Neonatal complications | | | | | | |
| Yes | 29 | 19.3% | 116 | 77.3% | 0.502 | >0.05 |
| No | 121 | 80.7% | 34 | 22.7% | | |

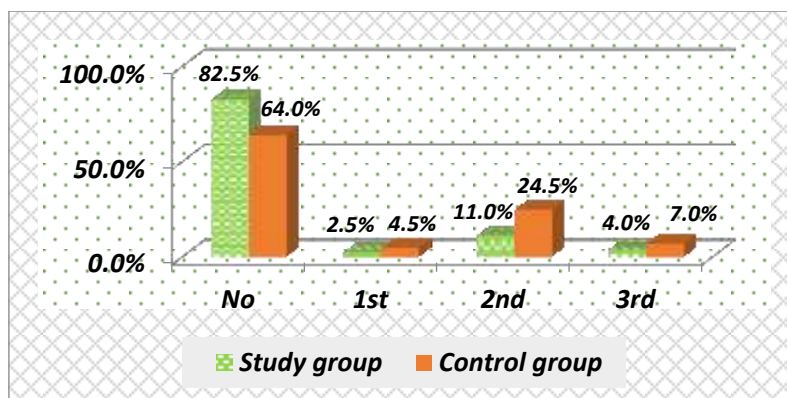


Figure (1): Distribution of perineal tear degree among studied women at both study and control group. (n=300).

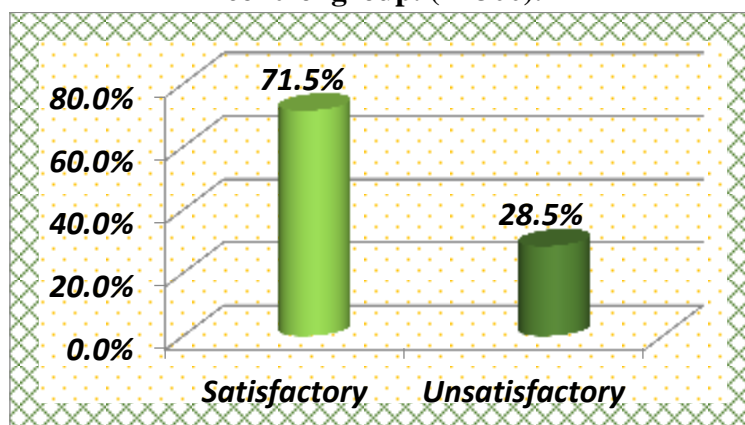


Figure (2): Total satisfactory level of the studied women at the study group regarding utilized pushing technique (n=300)

Discussion

The findings of the present study supported the stated hypothesis that applying spontaneous pushing technique during second stage of labor will exhibit positive labor outcomes among primiparas, as there was a highly significant differences between both study and control group regarding labor outcomes, as the vast majority of women at the study group had higher positive maternal and neonatal outcomes than women at the control group.

Regarding the personnel characteristics of the studied women, the present study findings revealed that half of women were in age group from 24<29 years, with mean of 25.65 ± 5.74 and 25.98 ± 6.32 of both study and control groups respectively. In addition, more than half of women in both study and control

groups had a secondary education, and were working and live at urban settings. Moreover, that there was no statistically difference between studied women in both study and control groups regarding personnel characteristics, including age, educational qualification, occupation and residence this reflect group homogeneity. These findings were in the same line with **Mohamed & AbdElati, (2015)** in Egypt in the study to evaluate the effect of spontaneous versus valsalva pushing techniques at the second stage of labor among primiparas women on labor outcomes, reported that there was no statistically significant difference between both spontaneous and valsalva pushing groups regarding general characteristics of participants including age, educational qualification, occupational condition,

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bodyweight ,height, and body mass index . In additional these findings were supported by **Hassan et al, (2021)** in a comparative study to evaluate spontaneous versus directed pushing technique: maternal and neonatal outcomes in Northern Upper Egypt, reported that there was no significant difference was found between directed and spontaneous pushing for age, body weight, height and body mass index or education level.

Regarding the labor pain during second stage of labor as a one of maternal outcomes among the studied women at both study and control group, the present study findings revealed that there was a statistically difference between studied women regarding labor pain during second stage of labor when the cervix was fully dilated and in addition there a highly statistically significance difference was indicated after one hour from first labor pain assessment , as the women in the study group had a low pain score than these in the control group. This may be due to spontaneous pushing allows for a slower and more controlled descent of the fetus, resulting in a gradual stretching of the perineal muscles. Pushing when an irresistible urge is present also reduces the pressure that was applied on the anterior vaginal wall, the cervical ligaments and the connective tissue supporting the vaginal walls, as pressure is not applied unless the fetus has already started to descend **Antsaklis et al, (2020)**.

The present study findings indicated that there was a highly statistically significant between both study and control groups studied women regarding modified fatigue symptoms. These findings may be related to that the modified fatigue symptoms were lower among women with spontaneous pushing than these in the directed pushing group. These findings were agreed with **Mohamed & AbdElati, (2015)**, who indicated that the women in spontaneous

pushing had a lower fatigue symptoms than these in the directed pushing group. In addition, **Szu et al., (2021)**, who added that a statistically significant difference was found between the spontaneous pushing and control group women regarding the average fatigue, and energy scores. This result may be related to the time needed for pushing was minimized for group used spontaneous push because the pushing didn't rely on the birth attendants instructions, but on the bodies of women asking them to push.

Regarding the duration of the second stage of labor among the studied, as a maternal outcome. The present study findings added that there was a highly statistically significant difference among women in both study and control group. These findings may be due to that the duration of the second stage of labor was short among women in study than in control group because the effect of breathing technique on duration of second stage. These findings were agreed with **Ahmadi et al, (2017)** in a randomized clinical trial study to determine the effect of breathing technique of blowing on the extent of damage to the perineum at the moment of delivery who added that the duration of the second stage of labor was often longer with directed pushing women than spontaneous pushing. Furthermore **Cahill et al, (2018)** who indicated that women in the spontaneous pushing group had a significantly shorter mean duration of the second stage of labor (102.4 minutes) vs women in the directed pushing group (134.2 minutes) (mean difference, -31.8 minutes [95% CI, -36.7 to -26.9 minutes], $P < .001$; Table 2). The directed pushing group had a significantly longer mean duration of active pushing (83.7 minutes) vs the spontaneous pushing group (74.5 minutes) (mean difference, 9.2 minutes [95% CI, 5.8 to 12.6 minutes], $P < .001$).

On the other hand, these study findings disagreed with **Lemos et al, (2017)** who added that there was no clear difference in the duration of the second stage among spontaneous versus directed pushing techniques. Also the present study findings disagreed with **Koyucu & Demirci, (2017)** who indicated that also discovered, although the duration of the second stage of labor was often longer with spontaneous pushing, women were able to give birth without requiring any verbal or visual instruction, without exceeding a time limit of two hours and without affecting fetal or neonatal wellbeing.

Moreover, the present study finding revealed that there was a highly statistically significant difference between studied women at both study and control group regarding the duration of the third stage of labor, this may be due to that the spontaneous pushing women had shorter duration of the 3rd stage than women in the directed pushing group. These findings are in the same line with **Mohamed & AbdElati, (2015)** who added that there was a highly statistically significant difference between both study and control group regarding the duration of the third stage of labor, and women at spontaneous pushing had short duration of the third stage of labor than women in the directed pushing group.

Concerning the effect of spontaneous pushing on the perineal tear and damage among the studied women, the present study findings revealed that there was a highly statistically significant difference. This may be due to that spontaneous pushing has the key advantage of reducing tissue damage, as the perineal muscles are allowed to stretch slowly and steadily **Ahmadi et al, (2017)**.

In addition, **Antsaklis et al, (2020)** added that spontaneous pushing allows for a slower and more controlled descent of the fetus, resulting in a gradual stretching of the

perineal muscles. Pushing when an irresistible urge is present also reduces the pressure that is applied on the anterior vaginal wall, the cervical ligaments and the connective tissue supporting the vaginal walls, as pressure is not applied unless the fetus has already started to descend. These findings were in the same line with **Lee et al, (2019)** in the study to evaluate maternal and neonatal outcomes from a comparison of spontaneous and directed pushing in second stage who added that spontaneous pushing reduce possibility of perineal lacerations and pelvic floor damage as compared with directed pushing. Furthermore, **De Tairac and Letouzey (2016)** in a review study to evaluate methods of pushing during vaginal delivery and pelvic floor and perineal outcomes indicated that spontaneous pushing reduces the risk of perineal tears.

Postpartum hemorrhage is one of the most important maternal outcomes that should be concerned while studying the effect of different pushing techniques, as reported by different research **Mohamed & AbdElati, (2015)** and **Farg & Hassan, (2019)**. The present study findings revealed that there was a statistically significant difference between both women at study and control groups regarding percentage of postpartum hemorrhage, as the percentage of postpartum hemorrhage was higher among women in control group than these in the study group. These study findings agreed with **Hassan et al, (2021)** in a comparative study to evaluate spontaneous versus directed pushing technique: maternal and neonatal outcomes in Northern Upper Egypt who revealed that there were four statistically significant findings found concerning maternal outcome include postpartum hemorrhage, condition of the perineum, the severity of perineal pain, and amniotic fluid characteristics.

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As regarding the neonatal outcomes among the studied women at both study and control groups, was a highly statistically significant difference between studied women in both study and control groups regarding neonatal outcomes including Apgar score at the 1st minute while there was statistically significance difference at the 5th minute, these findings may be due to that the neonate at the study group had a higher scores of Apgar scores as compared with the neonate in the control group, and this may be due to that neonatal wellbeing can also be compromised by directed pushing, as **Antsaklis et al, (2020)** explained, when forceful pushing lasts for more than six seconds, maternal hemodynamic measurements are altered. This results in inhibited venous return to the heart along with decreased cardiac output and lowered blood pressure, which in turn decrease placental blood perfusion. Ultimately, this can lead to reduced blood flow and oxygen to the fetus and a higher risk of poor fetal outcomes. These findings agreed with **Mohamed & AbdElati, (2015)**, who indicated that there was a highly statistically significant difference between women in both spontaneous and directed pushing regarding the neonatal Apgar scores at 1st and 5th minutes. Also **Hassan et al, (2021)** reported that the neonates' Apgar score among the spontaneous pushing group showed higher and stronger scores compared to the directed pushing. Such results because the fact that directed pushing is associated with closed pushing of glottis, which affects maternal hemodynamic and increases intrathoracic pressure. This consequently reduces venous return to the heart, cardiac production, maternal arterial pressure, and placenta blood perfusion, which affects the supply of oxygen to the fetus and is seen in the lower PH and Po₂ of the umbilical arterial blood. Though exhalation and open glottis are associated

with bearing down during spontaneous pressing, air escapes, and the thoracic pressure is not preserved.

On the other hand ,these study findings were disagreed with **Cahill et al., (2018)**, who revealed that there were no statistically significant differences following spontaneous or Valsalva pushing in Apgar scores <7 after 5 minutes, mean Apgar scores after 5 minutes, mean umbilical artery pH, mean umbilical vein pH, umbilical artery pH <7.20.

Accordingly, the study hypothesis was accepted. Women with spontaneous pushing during the second stage of childbirth would have a shorter period of the second stage of labor, better perineal status, less postpartum exhaustion, and better fetal well-being than those with direct pushing technique.

Conclusion

Spontaneous pushing technique during the second stage of labor enhanced maternal and neonatal outcomes whilst directed pushing technique was associated with an increase duration of the second stage of labor and risk of adverse neonatal outcomes. In addition, there was a highly statistically significance difference between both study and control groups studied women regarding modified fatigue symptoms and there was a highly statistically significance was indicated after one hour from first labor pain assessment.

Recommendation

- Maternity nurses should encourage the parturient women to push spontaneously during the second stage of labor to achieve better birth outcomes.
- Spontaneous pushing technique during the second stage of labor should be recommended in maternity hospital protocols due to its effect on labor outcomes.

- Training women in the first stage of labor on the spontaneous pushing method and offering assistance in the second stage for spontaneous pushing.
- Dissemination of the present study finding to all hospital and MCH health services.

Further studies needed to be performed:

- Ongoing educational programs regarding spontaneous pushing technique are recommended for the nurses working in obstetrics units.

References

Ahmadi, Z., Torkzahrani, S., Roosta, F., Shakeri, N., & Mhmoodi, Z. (2017). Effect of breathing technique of blowing on the extent of damage to the perineum at the moment of delivery: a randomized clinical trial. *Iranian journal of nursing and midwifery research*, 22(1), pp 62.

American college of obstetrics and gynecologists (ACOG) Committee Opinion No. 766 Summary. (2021). Approaches to Limit Intervention During Labor and Birth, *Obstetrics & Gynecology*, 133(2), pp 164-167. Approaches to Limit Intervention During Labor and Birth | ACOG.

Antsaklis, P., Papamichail, M., Theodora, M., Syndos, M., Daskalakis, G., & Loutradis, D. (2020). Natural Methods to Assist Delivery during the Second Stage of Labour: Part II: Timing and Type of Pushing. *HJOG*, 19(1), pp11-26.

Apgar, V. (1953). A proposal for a new method of evaluation of the newborn infant. *Curr Res Anesth Analg.* 32(4), pp 260–267.

Badr, H. A., & Zauszniewski, J. A. (2017). Meta-analysis of the predictive factors of postpartum fatigue. *Applied nursing research*, 100(36), pp 122-127.

Başar, F., & Hürata, S. Ş. (2018). The effect of pushing techniques on duration of the second labor stage, mother and fetus: a

randomized controlled trial. *International Journal of Health Services Research and Policy*, 3(3), pp 123-134.

Cahill, A. G., Srinivas, S. K., Tita, A. T., Caughey, A. B., Richter, H. E., Gregory, W. T., & Tuuli, M. G. (2018). Effect of immediate vs delayed pushing on rates of spontaneous vaginal delivery among nulliparous women receiving neuraxial analgesia: a randomized clinical trial. *Jama*, 320(14), pp 1444-1454.

De Tayrac, R., & Letouzey, V. (2016). Methods of pushing during vaginal delivery and pelvic floor and perineal outcomes: a review. *Current Opinion in Obstetrics and Gynecology*, 28(6), pp 470-476.

Elzihiri, M., Fathy, T., El-Nemer, A., Mohamed, M., & Fahemy, N. (2016). Effect of applying spontaneous pushing technique during second stage of labor on women's early postpartum fatigue. *Mansoura Nursing Journal*, 3(1), pp 165-182.

Farag, D., & Hassan, H. (2019). Maternal postpartum sleep disturbance and fatigue: factors influencing. *ARC Journal of Nursing and Healthcare*, 5(2), pp 33-46.

Genedy, A. S. E., Hassan, H. E., & Gamel, W. M. A. (2021). Spontaneous Versus Directed Pushing Technique: Maternal and Neonatal Outcomes: A Comparative Study in Northern Upper Egypt. *International Journal of Studies in Nursing*, 6(1), pp 24.

Hassan, H. E., Gamel, W. M. A., & Genedy, A. S. E. (2021). Spontaneous Versus Directed Pushing Technique: Maternal and Neonatal Outcomes: A Comparative Study in Northern Upper Egypt. *International Journal of Studies in Nursing*, 6(1), 24.

Hofmeyr, G. J., & Singata-Madliki, M. (2020). The Second stage of Labor. *Best Practice & Research Clinical Obstetrics & Gynaecology*, 67 (2020), pp 53-64.

Koyucu, R. G., & Demirci, N. (2017). Effects of pushing techniques during the

Effect of Spontaneous Pushing Technique during Second Stage of Labor on Labor Outcomes among Primiparas

second stage of labor: A randomized controlled trial. *Taiwanese Journal of Obstetrics and Gynecology*, 56(5), pp 606-612.

Lee, N., Gao, Y., Lotz, L. and Kildea, S. (2019). Maternal and neonatal outcomes from a comparison of spontaneous and directed pushing in second stage. *Women and Birth*, 32(4), pp e433-e440.

Lemos, A, Amorim, M, Dornelas de Andrade, A, de Souza, A, Cabral Filho, J & Correia, J. (2017). Pushing/bearing down methods for the second stage of labour', *Cochrane Database of Systematic Reviews*, viewed 10 May 2020, <https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD009124.pub3/abstract>

Mohamed, A. A. H. (2013). Effect of directed versus spontaneous pushing during the second stage of labor on birth outcome among primiparas. Master thesis, faculty of nursing, Zagazig University. pp112-119.

Mohamed, A. I., & AbdElati, I. H. (2015). Spontaneous versus valsalva pushing techniques at the second stage of labor among primipara women on labor outcomes. *Journal of Nursing and Health Science*, 4(4), pp 82-88.

Nash, K. J. (2019). Midwives decision-making during the second-stage of labour (Doctoral dissertation, University of Southampton).

Pugh, L. C. (1993). Childbirth and the measurement of fatigue. *Journal of Nursing Measurement*, 1(1), pp 57-66.

Radhakrishnan, r (2021). What Are the 4 Stages of Labor? Available at : What Are the 4 Stages of Labor? Childbirth (medicinenet.com)

Serrano, S., & Ayres-de-Campos, D. (2021). Normal Labour. *The EBCOG Postgraduate Textbook of Obstetrics &*

Gynaecology: Obstetrics & Maternal-Fetal Medicine, pp 359.

Szu, L. T., Chou, P. Y., Lin, P. H., Chen, C., Lin, W. L., & Chen, K. H. (2021). Comparison of maternal and fetal outcomes between delayed and immediate pushing in the second stage of vaginal delivery: systematic review and meta-analysis of randomized controlled trials. *Archives of Gynecology and Obstetrics*, 303(2), pp 481-499.

Wewers, M. E., & Lowe, N. K. (1990). A critical review of visual analogue scales in the measurement of clinical phenomena. *Research in nursing & health*, 13(4), pp 227-236.

Yurachai, M. (2006). The effect of directed versus spontaneous pushing on postpartum fatigue, perineal pain and childbirth satisfaction [thesis]. Thailand: Mahidol University.

تأثير الدفع التلقائي أثناء المرحلة الثانية للولادة على نواتج الولادة بين البكرات
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الولادة هي عملية فسيولوجية طبيعية يتم خلالها طرد الجنين من رحم الأم إلى العالم الخارجي. المرحلة الثانية هي واحدة من المراحل الحاسمة لكل من الأم والجنين. غالبًا ما تتميز بانقباضات منتظمة ومتكررة تشعر بها المرأة أثناء الولادة بضغط مهبطي وضغط في المستقيم والحاجة إلى الدفع أثناء المرحلة الثانية، تساعد جهود الدفع لدى الأم في نزول الجنين حيث يكمل الجنين الحركات الأساسية للولادة، بالتناوب والنزول عبر حوض الأم. لذا هدفت الدراسة إلى دراسة تقييم الدفع التلقائي أثناء المرحلة الثانية للولادة على نواتج الولادة بين البكرات. وقد أجريت هذه الدراسة في قسم النساء والتوليد بمستشفى بنها الجامعي. تم تطبيق هذه الدراسة على 300 امرأة مخاضة وتم اختيار العينة عشوائياً وقسمت إلى مجموعتين المجموعة الضابطة (150) امرأة ومجموعة الدراسة (150) امرأة خلال فتره 6 أشهر. حيث خلصت الدراسة إلى ان الدفع التلقائي أثناء المرحلة الثانية من الولادة يحسن نواتج الولادة لكلا من الأم وحديثي الولادة بينما ارتبط أسلوب الدفع الموجة بزيادة مدة المرحلة الثانية من الولادة وزيادة خطر النتائج العكسية على حديثي الولادة. كما اوصت الدراسة بتقنية الدفع التلقائي أثناء المرحلة الثانية من الولادة في بروتوكولات مستشفى الولادة وذلك بسبب تأثيره على نواتج الولادة والاستمرارية في عمل البرامج التعليمية التي تتعلق بتقنية الدفع التلقائي للممرضات العاملات في وحدات الولادة.