Effects of Delayed Pushing During the Second Stage of Labor on Postpartum Fatigue and Birth Outcomes in Nulliparous Women

Man-Lung Lai • Kuan-Chia Lin* • Hsin Yang Li** • Kuang-Shing Shey*** • Meei-Ling Gau****

ABSTRACT: This article studied differences in postpartum fatigue and birth outcomes between women who pushed immediately and those who delayed pushing during the second stage of labor. Data were collected from primiparous women in their 38th to 42nd gestational week who did not receive epidural analgesia during labor and were free of complications during pregnancy. Using a quasi-experimental design, 72 participants selected by convenient sampling were assigned based on individual participant’s preference to either an experimental or control group. For the experimental group, pushing was delayed until the point after full cervical dilation at which (a) the mother felt a strong physical pushing reflex, (b) the fetal head had both descended to at least the +1 level in the pelvis and turned to the occiput anterior position, and (c) uterine contractions were at least 30 mmHg. For the control group, the physician instructed mothers to begin pushing after full cervical dilation at the point when the fetal head was in the occiput anterior position and uterine contractions were at least 30 mmHg. The authors administered the Modified Fatigue Symptom Checklist at 1 and 24 hr after delivery to measure participant’s fatigue levels. Birth outcomes were assessed based on medical chart data. Findings showed a significant difference between the two groups in terms of 1- and 24-hr postpartum fatigue scores. The duration of the second labor stage (experimental group, 70.31 ± 37.17 min; control group, 129.06 ± 75.69 min) also differed significantly. The group that pushed immediately recorded higher cesarean and instrument-assisted birth rates. No significant differences were observed in terms of perineal tears, maternal/neonatal complications, or neonatal Apgar scores. Results of this study provide important insights for caregivers working in the delivery room and suggest that current care procedures change to include the delayed pushing during the second stage of labor. By delaying pushing exertions until the mother feels a reflexive urge to do so, mothers’ feelings of fatigue are significantly reduced.

Key Words: pushing immediately, delayed pushing, second stage of labor, postpartum fatigue.

Introduction

A large majority of mothers retain particularly strong impressions and deep feelings about their first childbirth experience (Simkin, 1992). For the family, labor and childbirth represent important life events fraught with strain and anxiety. Family members naturally seek the assistance of professionals who are experienced and qualified to secure an optimal birth outcome (Tseng, 2000). An exploratory study by Evans and Jeffrey (1995) identified proper pushing techniques, proper breathing techniques, and an explanation of the birthing course as the health education topics of most interest to women in labor. After the slow and painful first stage of labor, women are typically anxious to commence the second stage because it represents the conclusion of the birth process and birth-related pains.
Therefore, as soon as the cervix is fully dilated, women in the second stage of labor tend to push with exceptional force. Roberts (2002) pointed out that pushing forcefully before the optimal time for such exertion can lengthen the total time spent pushing and quicken the onset of fatigue, which can foster doubts in the mother about her strength and ability to complete the labor process successfully.

Williams Obstetrics, the basic educational obstetrics and gynecology reference used by most teaching hospitals in Taiwan, defines the second stage of labor as beginning when the cervix becomes fully dilated, at which point the expectant mother may begin pushing. The reference further advises the expectant mother to breathe deeply, hold her breath, and push hard as soon as uterine contractions commence (Cunningham et al., 2005). Many researchers have conducted studies in recent years into the specific point in time at which force should be applied during the second stage of labor and have raised diverse opinions on the subject (Fraser, Cayer, Soeder, Turcot, & Marcoux, 2002; Fraser et al., 2000; Petersen & Besuner, 1997; Roberts, 2002, 2003; Roberts & Woolley, 1996). These researchers argued that cervical dilation represents just one of several indicators to be considered during the second labor stage. The progress of the fetus down the birth canal and the feelings of the mother also represent important considerations. Thus, time should not be limited to a precise 2-hour period. The second stage of labor may be extended in the absence of concomitant medical conditions because it is considered safe for both mother and child (Petersen & Besuner, 1997). As a result, the point in time when pushing begins has a very significant effect on both mother and child. Research focusing on optimal time for pushing to begin has yet to be conducted in advanced countries.

Many studies have pointed to early pushing having an adverse effect on maternal and fetal outcomes, citing higher rates of fetal heart rate deceleration, cesarean and instrument-assisted deliveries, and postpartum fatigue. Most research studies suggest that the benefits to the mother of waiting to push exceed those of pushing immediately. Therefore, this article studied the comparative effects on postpartum fatigue and birth outcomes of pushing immediately and delaying pushing during the second stage of labor.

**Literature Review**

Second stage of labor is typically defined as the point at which the cervix becomes completely dilated and affected, and it ends when the fetus is expelled. This is also known as the pushing stage (Roberts, 2003). Complete dilation of the cervix has typically served as the determining factor in advising the mother when to commence bear-down efforts (Cunningham et al., 2005). However, Roberts (2003) and Roberts and Woolley (1996) suggest that the second stage of labor should be further subdivided into two substages, namely, the early phase and later phase. The former, also called the pelvic stage, is the period after full dilation of the cervix during which the fetal head passes over the pelvis, begins to turn, and proceeds down the birth canal. The later phase is called the perineal phase because the fetal head is lower in the pelvis and distends the perineum. The mother soon feels an involuntary urge to push.

Drake, Hammond, Jacobson, and White (1997) divided the second stage of labor into three substages, namely the latent, active, and transition phases. In the latent phase, women experiencing uterine dilation will begin to feel a growing, but not yet intense, desire to push. Mothers should be allowed to rest up to the point where the desire to push becomes irresistible. The cervix may be completely or nearly completely dilated during this phase. The active phase is marked by a reflexive desire to push hard 3–4 times more during uterine contractions after the passage of the fetal head downward through the birth canal. The transition phase begins with the crowning of the head, when contractions cause the greatest pain levels, accompanied by the strongest desire to push and an inability to control pushing exertions.

Therefore, some researchers recommended that decision making with regard to the time at which instructions or directions should be given to the expectant mother to push cannot be based solely on full cervical dilation and that fetal position and station represent important additional considerations (Petersen & Besuner, 1997; Roberts, Gruener, & Mendez-Bauer, 1987; Yildirim & Beji, 2008). Once approximately 1 cm past the ischial spine, the fetal head begins turning toward the occiput anterior (OA) position, after which the head should begin descending more rapidly. The mother does not experience a strong reflexive desire to push while her child is in the OA position. Rather, the strongest desire occurs once the head has reached the base of the pelvis and triggered the Ferguson’s reflex in pelvic muscles (Roberts, 2003). This is the point at which forceful pushing is most productive.
Researchers who advocate delaying forceful pushing until the second stage of labor (Petersen & Besuner, 1997; Roberts & Woolley, 1996) hold that the reflexive desire to push at this stage represents a natural physical reaction triggered by full cervical dilation and the downward progress of the fetal head. Delaying forceful pushing until the mother feels a reflexive desire to do so can reduce the total amount of time spent pushing. Relying on an entirely natural pushing reflex can further help mothers adopt the most effective pushing rhythm. Because the pushing reflex is extremely difficult to resist, it can enhance the effectiveness of pushing and reduce the amount of time spent on pushing exertions during the second stage of labor. The reduction in pushing-induced fatigue that should follow can help improve a mother’s overall birth experience (Yildirim & Beji, 2008).

Hansen, Clark, and Foster (2002) compared mother/child labor outcomes between delayed pushing and early pushing for nulliparous women with continuous-infusion epidural analgesia. Using 252 participants, results showed that although the second stage of labor was longer for women in the group that delayed pushing, their time spent in pushing exertions was shorter. This group also experienced fewer incidences of fetal heart rate deceleration and postlabor fatigue. Apgar scores, pH values in the umbilical artery, and rates of perineal tearing and endometritis were similar between the two groups. Results suggested that the benefits to the mother of waiting to push exceed those of pushing immediately.

In addition to facilitating a reduction in overall time spent pushing, which helps prevent overexertion, delaying the commencement of forceful pushing has also been shown to help prevent damage to pudendal nerves, lessen labor-induced fatigue, decrease length of time spent pushing during the second stage of labor (Hansen et al., 2002), and reduce the need of instrument-assisted delivery techniques. Waiting to push until the mother feels a reflexive need to do so can reduce the need for an episiotomy and the incidence of second- to fourth-degree perineal tearing (Minato, 2000). Albers and Borders (2007) conducted a critical review of the literature to explore differences in outcomes between waiting to push and pushing immediately during the second stage of labor in mothers receiving epidural analgesia. The study, which reviewed nine articles addressing 2,953 cases of women awaiting delivery, found that those in the delayed pushing group had relatively longer second stages of labor but relatively shorter pushing times. This group also had a lower rate of instrument-assisted births than that of the early pushing group, which helped reduce perineal tearing and postpartum pain.

Researchers further stated that extended exertions in the second stage of labor place greater physical demands on the mother, which fatigue muscles and increase the caesarean section rate. Overexertion can also overstretch vaginal and pelvic structures, contributing to future bladder control problems, unnecessary perineal tearing, and increased episiotomy rates (Allen, Hosker, Smith, & Warrell, 1990; Mayberry, Gennaro, Strange, Williams, & De, 1999; Minato, 2000).

Roberts and Woolley (1996) stated that although persistent and forceful exertion during the second stage of labor helps move the fetal head downward and speeds the birthing process, such added pressure on the fetal head and umbilical cord increases chances of neonatal hypoglycemia. Their research also found that birth outcomes highly correlated with length of time spent in exertion from full cervical dilation until birth. Recommendations included advising against overintervention during the second stage of labor to achieve better labor outcomes for both mother and child.

In summary, most studies argued that enhancing the effectiveness of pushing exertions by the mother during the second stage of labor represents the most effective way to reduce postpartum fatigue, amount of time spent pushing, and occurrence of concomitant medical conditions. Such findings highlight the importance of the point at which pushing begins, pushing method used, and position in which pushing is done in care delivered during the second stage of labor. The authors hope that related adjustments to care delivery measures will help reduce injury to mothers and infants and effectively diminish the degree of postpartum fatigue experienced by new mothers.

Methods

This quasi-experimental study was conducted in the maternity units of one teaching and one regional hospital in northern Taiwan. Written ethical approval for the study was obtained from the ethical review board of the hospitals.

Study Sample

The study sample consisted of low-risk primiparous women between 38 and 42 weeks’ gestation who volunteered
to participate in this study. They were expected to give birth vaginally with a healthy single vertax fetus. Women were excluded if epidural analgesia had been administered or if any condition was present that necessitated a shortening of the second stage of labor. Power Analysis and Sample Size for Window 6.0 (PASS 6.0) software was applied on results from an initial pilot study to estimate an optimal sampling number. Each group consisted of 36 participants to ensure that test results achieved power .80, as recommended by PASS.

**Study Variables**

**Demographic and obstetric characteristics data**

Demographic variables collected included age, level of education, physical height, prepregnancy weight, marital status, employment status, province of origin, religious affiliation, smoking status, alcohol status, and sleeping condition. Obstetric characteristics data included gestational weeks, use of induced labor techniques, analgesics, or other medication during labor, and infant birth weight.

**Fatigue scale**

The Fatigue Symptom Checklist was originally developed to measure fatigue in Japanese industrial workers (Yoshitake, 1978). Milligan, Parks, Kitzman, and Lenz (1997) created the Modified Fatigue Symptom Checklist (MFSC) by adapting the Fatigue Symptom Checklist for use with new mothers of full-term infants. Milligan et al. (1997) indicated that childbirth is a physically and emotionally demanding period during which a woman may face labor pains, strain, anxiety, and/or feelings of hopelessness. The MFSC consists of 10 statements that measure physical and psychological fatigue. Four questions address physical aspects of fatigue, and 6 questions address psychological aspects of fatigue, with answers given as either “yes” or “no.” Possible scores range from 0 to 10. The classification of participant’s fatigue status is based on mean and standard deviation scores of the sample. A participant’s score 1 SD above the sample mean score is categorized as severe fatigue, whereas a score of 1 SD below the sample mean score is categorized as mild fatigue (Pugh, Milligan, Park, Lenz, & Kitzman, 1999). In previous studies, psychometric testing of the MFSC established content (Milligan et al., 1997) and concurrent validity (tiredness, $r = .64$, $p < .01$; depression, $r = .46–.71$, $p < .01$; stress, $r = .36–.73$, $p < .01$) (Corwin, Brownstead, Barton, Heckard, & Morin, 2005; Milligan et al., 1997; Pugh et al., 1999). Translation and back-translation of the MFSC into Chinese by bilingual individuals with bicultural experience established both content and semantic equivalence (Lee, 2005). Internal consistency reliability (Kuder–Richardson formula) ranged from .82 to .85 (Corwin et al., 2005; Milligan et al., 1997; Pugh et al., 1999). Internal consistency for the Chinese MFSC achieved .76 (2 weeks postpartum) and .77 (4 weeks postpartum; Lee, 2005) and .82 in this study.

**Birth outcomes**

Birth outcomes were assessed based on factors that included length of the second stage of labor, method of delivery (spontaneous vaginal, caesarean, or instrument-assisted vaginal delivery), labor complications (fever, blood loss more than 500 mL, fetal deceleration, or need for admission to the neonatal intensive care unit), degree of perineal tearing, and Apgar scores at 1 and 5 min.

**Intervention Protocol**

Apart from the time at which pushing exertions began, key labor variables, including pushing technique and physical position during pushing, were the same for experimental and control group participants. The researcher personally instructed participants in proper pushing techniques and accompanied participants through labor and delivery.

Key labor variables are explained below:

1. Timing: For the experimental group, pushing was delayed after full cervical dilation until the point at which the mother felt a strong physical pushing reflex, the fetal head had descended to at least the +1 level in the pelvis and already turned to the OA position, and uterine contractions became intense (at least 30 mmHg). For the control group, pushing was instructed to begin after full cervical dilation once the fetal head was in the OA position and uterine contractions were at least 30 mmHg. For the control group, pushing was instructed to begin after full cervical dilation once the fetal head was in the OA position and uterine contractions were at least 30 mmHg.

2. Technique: Mothers were instructed to push forcefully 3–4 times more for 4–6 s per time at each uterine contraction. Breath should not be held while pushing, and the glottis should be open.

3. Position: When pushing, the mother should be in the Fowler’s position, clasping her knees with both
hands, with legs held apart, and head raised and facing toward abdomen.

Data Collection Procedures and Ethical Considerations

After receiving approval from their institutional review boards, the researchers visited target institutions and associated labor and delivery units to explain research purpose and methods to obstetricians, nursing managers, and nurse clinicians before data collection. Before this intervention study, the two hospitals targeted in this study routinely instructed laboring women to commence pushing immediately after full dilation. Potential participants who met study criteria were clearly briefed on research purposes, intervention benefits and risks, and procedures. Before participation, they were asked to sign a consent form. After doing so, women were assigned into one of the two groups based on their personal choice once full dilation was confirmed. The researcher accompanied each participant from 8-cm dilation until birth and conducted a vaginal examination every 30 min. Participants were instructed on pushing techniques, with control group participants asked to commence immediately after full dilation and experimental group participants asked to delay pushing until either the urge became overwhelming or full dilation had already occurred for a 2-hr period, the fetal head was in the OA position, uterine contractions were at least 30 mmHg, and the fetal head had already descended to station +1 or below. Fathers were able to accompany the women through the entire process. A curtain was drawn during pushing exertions to maintain privacy. Any sign of danger during pushing exertions (e.g., significant loss of blood, fetal distress) ended the data collection, with the attending physician brought in immediately to deliver emergency care. After each birth, the researcher collected birth outcome data from patient medical records and at 1 and 24 hr postpartum collected data on fatigue using a structured questionnaire.

Results

Participant Sociodemographic and Obstetric Characteristics

Table 1 shows the sociodemographic and obstetric characteristics of participants. The average age of participants was 29.42 ± 3.86 years. Most patients noted junior college as their highest level of education (n = 41, 56.9%); nearly all were married (n = 70, 97.2%), and most were employed (n = 42, 58.3%). Oxytocin was the most frequent medication used during labor (n = 24, 33.3%).

The average weight of newborn infants was 3,110.10 ± 289.42 g, and average head circumference was 32.93 ± 1.06 cm. After using a chi-square test and t test to compare the two groups, a significant difference was found only in fundal height. All other variables revealed no statistically significant differences (Table 1).

Comparisons on Duration of the Second Stage, Expulsion Phase in Labor, and Birth Outcomes

Table 2 shows that the average duration of the second stage and the expulsion phase of labor in the immediately pushing group was longer than those stages in the delayed pushing group, and the difference between groups was statistically significant (p < .05). The experimental group had a higher natural vaginal birth rate than that of the control group, and the difference between groups was statistically significant (p < .05). In terms of neonatal birth outcomes, no significant differences in Apgar scores at 1 and 5 min or neonatal complications were observed between the groups. Differences in incidences of episiotomy and perineal tears, blood loss, and maternal complications were not significant between the groups (Table 2).

The Impact of Different Methods of Pushing on Postpartum Fatigue

Scores for postpartum fatigue after 1 hr were 2.08 ± 1.87 for the experimental group and 4.17 ± 2.6 for the control group (t = -3.825, p < .01). Scores for postpartum fatigue after 24 hr were 1.47 ± 1.66 for the experimental group and 3.36 ± 2.13 for the control group (t = -4.21, p < .01). Results showed comparatively lower fatigue scores for the experimental group at both 1 and 24 hr postpartum.

Demographic and obstetrics variables for which differences between the two groups were found to be significant (fundal height, length of second labor stage, and total expulsion time) were controlled. Using generalized estimating equation analysis to control these variables, results found that none of the three variables (fundal height, length of second labor stage, and total pushing time) impacted postpartum fatigue. Only method of exertion registered an impact on postpartum fatigue levels. Fatigue
scores for participants in the delayed pushing group averaged 1.54 points less than those for participants in the control group, a difference that registered as significant ($p < .01$; Table 3).

**Discussion**

This study found that participants in the experimental group spent less time on pushing exertions and a shorter average duration of the second stage, a result similar to those of other researchers (Drake et al., 1997; Fraser et al., 2000; Hansen et al., 2002; Roberts, 2003). In terms of birth outcomes, Hansen et al. (2002) compared perinatal outcomes in women receiving epidural analgesia who waited to push until full cervical dilation and those who began pushing immediately and found the two groups to be similar in terms of perineal laceration incidence and use of instrument-assisted birth techniques. The different outcome result obtained in this study may result from differences in routine standards related to episiotomies between the institutions used in this study and hospitals overseas. In this study, with the exception of one participant who gave birth through cesarean section, all mothers received routine episiotomies. Thus, there is no basis for comparing this study with that of Hansen et al. along participant subsets categorized by degree of perineal laceration severity.

This study found a higher rate of instrument-assisted delivery among participants in the group that pushed immediately than those in the group that delayed pushing. The finding is similar to that of Roberts (2002), who also
found that beginning exertions earlier than necessary increases the need for instrument-assisted delivery. Fitzpatrick, O’Brien, McQuillan, O’Connell, and O’Herlihy (2000) did a comparative study of birth outcomes for primipara women who had received epidural analgesia and either pushed immediately or delayed pushing. The natural delivery rate was higher for the group that immediately pushed than the group that delayed pushing (62% vs. 50%).

This study found no significant relationship between the two groups in terms of Apgar score or neonatal intensive care unit or intensive care unit admittance. Such is similar to findings by Menticoglous, Manning, Harman, and Morrison (1995) of a significant relationship between length of the second stage of labor and either low 5-min Apgar scores or neonatal intensive care unit or intensive care unit admittance. Study findings also agreed with those of Hansen et al. (2002) that Apgar score results were no different between the two groups.

Dunemann (1999) stated that fatigue is typically related to ineffectual labor progress or slow fetal progress through the birth canal after full dilation. This finding is similar to

<table>
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<tr>
<th>Item</th>
<th>Experimental (n = 36)</th>
<th>Control (n = 36)</th>
<th>t</th>
<th>p</th>
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<tr>
<td>Duration of the second labor stage (min)</td>
<td>70.31 ± 37.17</td>
<td>129.06 ± 75.69</td>
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<td>Total pushing time (min)</td>
<td>47.53 ± 30.85</td>
<td>123.19 ± 73.93</td>
<td>-5.668</td>
<td>&lt;.001**</td>
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<td>Apgar score at 1 min</td>
<td>7.94 ± 0.41</td>
<td>7.92 ± 0.37</td>
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<td>Apgar score at 5 min</td>
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<td>Blood loss in delivery</td>
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<td>782.58 ± 671.83</td>
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Note. *Linear-by-linear association chi-square test; **Fisher’s exact test.
*p < .05. **p < .001.
Effects of Delayed Pushing

that of this study. Study results found no significant difference in times in labor between the two groups. However, it was found that degree of fatigue after 1 and 24 hr was higher in the group experiencing a longer second stage of labor and larger time in exertion.

Results agreed with the findings of this study, which found no difference in total time in labor between the two groups and a relatively greater degree of 1 and 24 hr postpartum fatigue in the group that spent relatively longer times in the second stage of labor and in pushing exertions. This result is similar to that obtained by research done by Minato (2000) and Ladewig, London, and Davidson (2006).

Pugh et al. (1999) also stressed the critical importance to nursing care delivery of understanding postpartum fatigue factors and levels of fatigue severity. This research also found that the application of different pushing techniques during the second stage of labor could reduce postpartum fatigue severity. Fatigue that arises during the second labor stage can encourage the mother and family members to abandon the natural birth process in hopes that surgery will resolve birthing difficulties. Fatigue can also cloud rational thinking and lead to misjudgments and impatience. Symptoms increasingly affect one another as level of fatigue severity rises. Mother and family member's confidence that a successful birth will increase if time spent in pushing exertions during the second stage of labor is reduced, and pushing exertions are made more productive. Also, utilizing aids such as mirrors to show fetal head progress to the mother can enhance positive anticipation and joy in the mother and family members, ease the anxiety and discomfort of labor, and reduce fatigue. Therefore, adjusting approaches to care during the second stage of labor can help reduce emotional distress and postpartum fatigue.

Conclusions

This study, in which women in labor were instructed to delay pushing during the second stage of labor, found that delayed pushing reduced the time these women spent in the second labor stage, reduced the need for instrument-assisted delivery, and lessened postpartum fatigue. Extended fatigue affects indirectly the health of both mother and infant, whereas fatigue-induced despondency can trigger postpartum depression and undermine the mother’s normal patience and ability to think rationally. Concurrently, proper care for the newborn infant is negatively affected. Thus, such a result serves to undermine the mother’s overall satisfaction in the delivery process. Individuals who provide healthcare service to mothers in labor in the hospital or clinic play a critical role. With delivery treated as a natural process and pushing exertions allowed to follow a mother’s natural rhythms (rather than being forced to fit external standards and expectations), unnecessary harm to the mother may be avoided. By delaying pushing exertions until the mother feels a reflexive urge to do so, the need to remind the mother of proper pushing technique is significantly reduced.

The results of this study provide important insight to caregivers working in the delivery room and suggest a change in current care procedures, which recommend that pushing exertions commence immediately upon commencement of the second stage of labor. Proper pushing techniques should also be taught to nurses in continuing education courses and through clinical demonstrations. Videos and health pamphlets may also be produced to improve awareness on the subject. The results of this study may also be referenced when making revisions to relevant textbooks and reference manuals. Such dissemination of information will make it easier for both nurses and expectant mothers to obtain the most up-to-date knowledge on proper delivery care.

Ethical and clinical environment considerations disallowed this study from randomly assigning participants to experimental and control groups. Although the authors found no significant variation in either sociodemographic or obstetric variables (with the exception of fundal height) between the two groups, study results should be interpreted with caution due to potential confounding factors.

Table 3. Comparing Factors of Influence on Postpartum Fatigue Using a Generalized Linear Model

<table>
<thead>
<tr>
<th>Variable</th>
<th>Estimator</th>
<th>SD</th>
<th>95% Confidence interval</th>
<th>Z</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>−1.54</td>
<td>0.44</td>
<td>−2.41 to −0.66</td>
<td>−3.45</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Fundal height</td>
<td>−0.05</td>
<td>0.10</td>
<td>−0.25 to 0.16</td>
<td>−0.44</td>
<td>.66</td>
</tr>
<tr>
<td>Duration of the second labor stage</td>
<td>&lt;0.01</td>
<td>0.01</td>
<td>−0.03 to 0.02</td>
<td>−0.62</td>
<td>.53</td>
</tr>
<tr>
<td>Total pushing time</td>
<td>0.01</td>
<td>0.01</td>
<td>−0.01 to 0.04</td>
<td>1.00</td>
<td>.32</td>
</tr>
</tbody>
</table>

Note. *Early pushing group as the reference group.
caused by the nonrandom nature of distribution between the two (Shadish, Cook, & Campbell, 2002). Further studies with randomized designs are needed. This study was limited to expectant mothers who did not receive epidural analgesia. In light of the fact that most women in labor in Taiwan receive epidural analgesia and that the exertion experience of women under such conditions differs from that of women not receiving epidural analgesia, the effects on delivery outcomes and postpartum fatigue of times spent in pushing exertion and pushing technique should be greatly magnified. Because no relevant research into this participant has been conducted in Taiwan, it is hoped that future research can examine the different outcomes realized by women in labor who received or did not receive epidural analgesia injections in terms of delayed pushing, postpartum fatigue, and delivery results.

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**References**


第二產程延遲用力對初產婦產後疲憊及生產結果之影響

賴國蓉 林寬佳** 李新揚*** 石光興**** 高美玲****

摘要：本研究目的是探討初產婦第二產程立即用力與延遲用力對產後疲憊及生產結果的影響。研究對象為懷孕 38-42 週初產婦，待產期間未施打硬脊膜外麻痺，且懷孕期間無任何合併症，於待產期間向其解釋研究目的及收集方法後予以收集，採用實驗設計法，以便比較並依個案之意願分派於實驗組及控制組。實驗組於子宮頸完全擴張後等到強烈想用力的感覺，胎頭位到達坐骨棘連線下 1 公分以下，胎頭位置轉到枕前位，子宮收縮規律強度至少 30mmHg 才教導向下用力；控制組於子宮頸完全擴張後即教導向下用力，共收案 72 位。產後以簡化的疲憊症狀量（Modified Fatigue Symptom Checklist, MFSC）測量婦女在產後 1 小時及 24 小時的疲憊情形及參考病歷分析實驗組及控制組婦女生產結果。研究結果顯示實驗組在產後 1 小時及 24 小時的疲憊程度低於控制組，在第二產程總時間實驗組（70.31 ± 37.17 分）較控制組（129.06 ± 75.69 分）短。對於有較高比例的剖腹產及器械輔助生產，但在會陰撕裂傷、母體/新生兒產後合併症、新生兒 Apgar Score 結果皆無統計上顯著差異。本研究的結果建議現今的產房護理人員應改變子宮頸開全立即用力的常規，在個案出現無法控制用力的反射時再用力，會明顯地降低個案的疲憊感。

關鍵詞：立即用力、延遲用力、第二產程、產後疲憊。

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