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# Effectiveness of Spontaneous Pushing versus Valsalva Pushing in the Second Stage of Labor on Maternal and Neonatal Outcomes: A Systematic Review and Meta-analysis

Jaruwan Kownaklai, Titaree Phanwichatkul,\* Atchara Chaichan, Amanda Lee

**Abstract:** Vaginal birth is a natural process, but maternal pushing is an essential factor in the mechanism and process of delivery. This systematic review examined the evidence comparing the effectiveness of two methods of pushing techniques (spontaneous pushing versus Valsalva pushing) on maternal and neonatal outcomes in the second stage of labor. A literature search of Scopus, PubMed, ScienceDirect, CINAHL, PsycINFO, and ThaiJo for articles published between 2012 and 2023 revealed 12 studies with a focus on maternal pushing during the second stage, but four with neonatal outcomes (APGAR scores) and maternal outcomes (fatigue and duration of labor). Meta-analysis of the four studies did not support the benefit of spontaneous pushing in reducing the duration of labor but did support spontaneous pushing in lessening maternal fatigue two hours postpartum. Spontaneous pushing did not directly benefit the neonatal APGAR scores at 1 or 5 minutes postpartum. The result that spontaneous pushing did not shorten labor was unexpected; this is contrary to other studies that have reported a shorter labor duration. The small number of studies makes it difficult to conclude the effectiveness of either pushing technique. Further evidence is necessary to include possible confounding variables postpartum, including women's choice, advanced assessments of neonatal outcomes, and maternal recovery beyond the immediate postpartum period.

**Keywords:** Maternal pushing, Meta-analysis, Neonatal outcomes, Maternal outcomes, Second stage of labor, Systematic review, Valsalva pushing

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## Introduction

The second stage of normal labor begins when the cervix opens completely at ten centimeters until the baby is born. The first pregnancy takes an average of one hour and should not exceed two hours. The second pregnancy takes an average of 30 minutes and should not exceed one hour. The birth process and the successful fetal navigation through the pelvis

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are often referred to as the 5Ps. The birth process in this stage consists of power (uterine contractions and maternal pushing), passage (fetal movement through the pelvis), passenger (the fetus and placenta), psyche (maternal well-being) and physical condition.<sup>1</sup> In

the second stage, maternal pushing forms an important part of the mechanism and process of normal vaginal birth. To maximize the effectiveness of pushing, nurses/midwives may offer either 'push guidance' or be less directive by supporting a more voluntary, spontaneous process.<sup>2,3</sup>

While nurses/midwives give push guidance, spontaneous pushing at the second stage of labor is considered more natural. It occurs at the woman's discretion based on physical mechanisms and sensations that produce natural urges to push during uterine contractions.<sup>3</sup> With directed or Valsalva pushing, pregnant women bow down to strain after the cervix is fully dilated and exert force by holding their breath and pushing during uterine contractions, as directed by the nurse/midwife. However, the Valsalva pushing technique increases a woman's pressure in the thoracic and abdominal cavities, and the blood flows back to the heart. The heart rate is reduced, blood pressure is lowered, blood vessels are constricted, and blood supply to the brain is decreased, resulting in the possibility of fetal hypoxia and fetal acidosis.<sup>4</sup> When they stop pushing, the blood pressure will rebound, and if the woman has a heart condition, tachycardia and cardiac arrest may occur.<sup>2</sup>

Spontaneous pushing has been reported to shorten the duration of the second labor stage and produce higher APGAR scores than Valsalva pushing.<sup>3</sup> Conversely, in the decade-old systematic review that compared spontaneous and Valsalva pushing techniques,<sup>5</sup> Valsalva pushing produced a shorter duration of the second stage of labor. However, there was no effect on neonatal APGAR scores. These results were based on three randomized controlled trials with combined samples of 425 women and a mean difference of 18.59 minutes duration (95% CI 0.46–36.73 minutes). A comparison of four types of pushing techniques (spontaneous pushing versus directed pushing and delayed pushing versus immediate pushing) found that the duration of the second stage of labor was longer; however, the "active pushing" time was shorter.<sup>6</sup>

Some midwives have reported favoring spontaneous pushing over Valsalva pushing, associating it with preferred maternal and neonatal outcomes;<sup>7</sup> however, studies have not consistently shown a clear difference in the effect of one or both pushing techniques on the duration of the second stage of labor and neonatal outcomes.<sup>6,8–11</sup> Thailand's general hospital maternity care guidelines recommend controlled/guided pushing or Valsalva pushing techniques.<sup>9</sup> Nurses/midwives would benefit from knowing current evidence of which support mode ensures a more satisfactory and unhindered birth process. Choosing the appropriate pushing technique may help reduce labor time in the second stage and optimize maternal and neonatal outcomes.

## **Study Aim and Review Question**

This systematic review and meta-analysis aimed to examine the published evidence comparing the effectiveness of two methods of pushing techniques (spontaneous pushing versus Valsalva pushing) on maternal and neonatal outcomes in the second stage of labor. The review or search question was "*What is the effectiveness of spontaneous pushing versus Valsalva pushing on the maternal and neonatal outcomes in women during the second stage of labor?*"

## **Methods**

**Design:** The study was registered with the Joanna Briggs Institute (JBI) and followed its methodology for systematic reviews and meta-analysis protocol.<sup>12</sup> The systematic review gathered the recently available empirical research by using clearly defined, systematic methods to obtain answers to a specific question. The meta-analysis analyzed and combined statistical results from similar studies.<sup>13,14</sup> This review was conducted by searching the Scopus, PubMed, ScienceDirect, CINAHL, PsycINFO, and ThaiJo electronic databases.

**Ethical considerations:** The study received approval from the Mahasarakham University Ethics

Committee, Thailand, with an exemption review (#313–317/2021) issued on 22 September 2021.

**Search strategy:** Multiple keywords were used in searching the six databases to provide evidence supporting the effectiveness of two pushing techniques in the second stage of labor (**Appendix, Table 1**).

**Study selection:** Screening of retrieved articles from the initial database search was undertaken to reduce the number of papers. The process included 1) identification of articles with experimental, quasi-experimental, and observational study designs by relevance (screening by title, then abstract), 2) publication status (full text or abstract available, articles from peer-reviewed publications), 3) language (Thai or English language), and 4) publication time frame

2012–2023 (11 years).

**Eligibility:** The criteria for including studies for the systematic review were based on the specialized PICO framework: Population (hospitalized pregnant women between the second stage of labor and two hours postpartum, Intervention (spontaneous pushing), Comparator (Valsalva pushing and routine or standard care), and Outcomes (Maternal: timed duration of the second stage of labor and fatigue two hours postpartum; Neonatal: APGAR scores at 1 and 5 minutes). Commentaries and editorials were excluded from the review. The identification, selection, and screening process for eligibility are presented in a Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) flow diagram (**Figure 1**).<sup>15</sup>

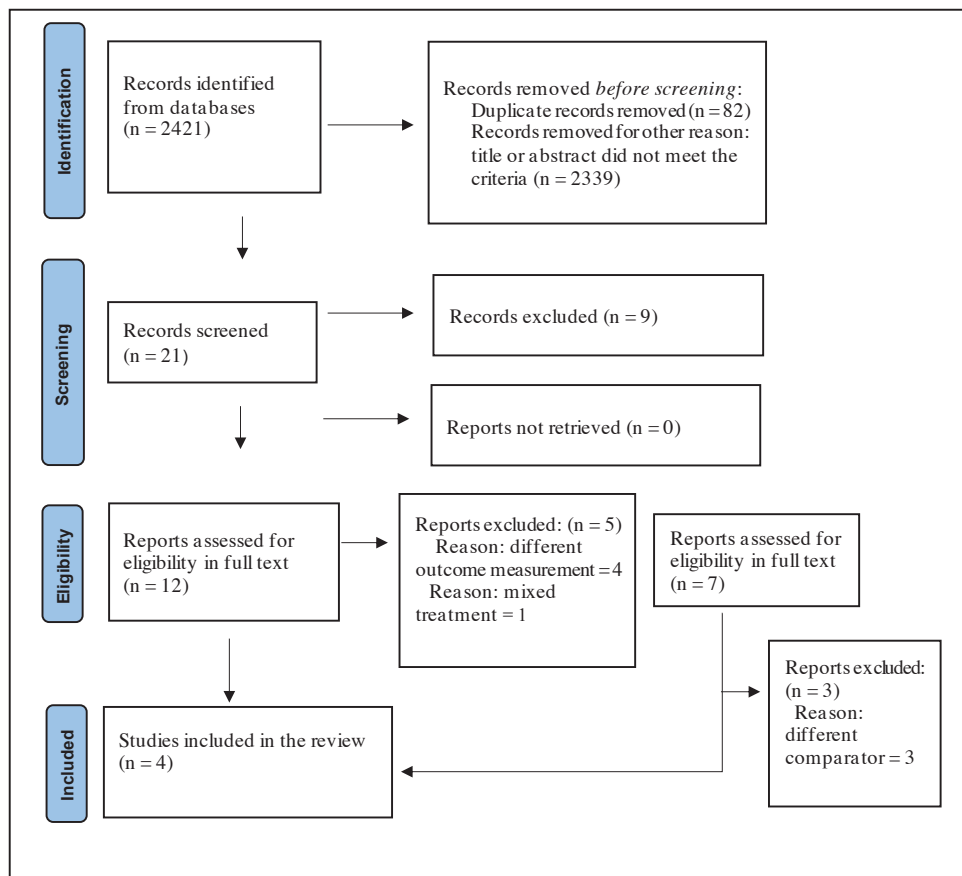


Figure 1. PRISMA review flowchart

**Methodological quality:** Four of the 12 full-text research articles that met the eligibility criteria underwent full evaluation by two reviewers using JBI's critical appraisal checklists for randomized controlled trials and quasi-experimental studies. The reviewers responded to the checklists' items as yes, no, or unclear, with options for the rationale. They judged the four included articles as relevant and trustworthy in meeting the aims of the systematic review.

**Publication bias determination:** A funnel plot was constructed to assess if publication bias existed for the three study outcomes. The funnel plot was visually asymmetrical for two outcomes (the duration of the second stage of labor and 2-hour postpartum fatigue).<sup>16</sup> Thus, publication bias could not be determined for these two outcomes. However, the funnel plot for articles related to the APGAR scores was visually symmetrical, indicating no publication bias.

**Data extraction:** The two independent reviewers entered data about each study's participants, study design, intervention, and key findings or outcomes into JBI's System for the Unified Management, Assessment, and Review (SUMARI) data extraction program.<sup>17</sup> An author of one of the studies was contacted for additional data to clarify the statistics reported in the article.<sup>18</sup> When disagreements arose between the two reviewers, they reached a consensus after discussion.

**Data synthesis:** The SUMARI program calculated for the meta-analysis either the odds ratios (for dichotomous data) or weighted (or standardized) post-intervention mean differences (for continuous data), including 95% confidence intervals. Based on the combined effect sizes of individual studies, the SUMARI program calculated the extent of heterogeneity using the standard I-squared ( $I^2$ ) test, with three levels for interpretation:<sup>14</sup> (low < 50%, moderate = 50%–75%, high > 75%). Summary effect sizes were then calculated using a fixed model when  $I^2 = 0\%$  and a random effects model when  $I^2 = 88\%$ –98%.<sup>19</sup> However, the choice of the effects model was selected not only because of the statistical values for heterogeneity but also because of the

recognition that there is inherent clinical variability in the frequency, intensity, and skill of pushing that occurs among women during the second stage of labor that can affect the outcome.<sup>20</sup>

## Results

### Characteristics of the Included Studies

Two randomized controlled trials (RCTs)<sup>21,22</sup> and two quasi-experimental research<sup>18,23</sup> were included with participants from three countries. The four studies compared spontaneous pushing versus Valsalva pushing in the second stage of labor among primiparous women in secondary and tertiary-level hospitals. Two studies were conducted in Thailand,<sup>18,21</sup> one in Egypt,<sup>23</sup> and one in Turkey.<sup>22</sup> **Appendix, Table 2** presents the four studies' countries/settings, patient characteristics, sample sizes of intervention and control groups, outcomes measured, and main results.

The two RCTs and two quasi-experimental studies had similar populations (combined samples  $n = 890$ ) of primigravida women, gestational ages between 37–42 weeks, cephalic presentation, outcomes measures of the duration of the second stage of labor, fatigue scores two hours postpartum, and APGAR scores. However, the four studies did not have identical outcome measures (**Appendix, Table 2**). Nevertheless, we decided in advance to synthesize the four outcomes individually and conduct subgroup meta-analyses (**Table 1**).

*Time duration of the second stage of labor:* Two studies reported that spontaneous pushing gave a shorter time duration in the second stage of labor compared to Valsalva pushing.<sup>21,23</sup> In contrast, a third study reported that Valsalva pushing produced a shorter duration.<sup>22</sup> The combined effect sizes of the three studies<sup>21–23</sup> showed a high level of heterogeneity ( $I^2 = 98\%$ ). The summary effect size from the random effects model was not statistically significant, thus not supporting the benefit of spontaneous pushing in reducing the duration of labor [overall effect size =  $-0.89$  (95% CI =  $-3.39, 1.28, p = .376$ )].

Table 1. Summary of synthesis and meta-analysis of maternal and neonatal outcomes

Outcome	Time duration of the second stage of labor				Fatigue two hours postpartum				APGAR score at 1 minute				APGAR score at 5 minutes			
	Experiment spontaneous pushing (n = 33)	SD	M	SD	Control Valsalva pushing (n = 33)	SD	M	SD	Experiment spontaneous pushing (n = 40)	SD	M	SD	Control Valsalva pushing (n = 50)	SD	M	SD
Studies																
1. Taedaengpet et al. (2012) <sup>21</sup>	32.94	17.03	42.95	15.95	58.25	16.75	65.75	16.75	9.97	0.17	9.88	0.42	10	0	9.97	0.17
2. Koyucu & Demirci (2017) <sup>22</sup>	63.2	21.3	46.6	23.4	-	-	-	-	-	-	-	-	9.75	0.63	9.52	0.75
3. Elzihiri et al. (2016) <sup>23</sup>	29.5	6.6	50.3	5.8	57.1	7.8	71.7	7.6	7.8	1	4	1.4	9.5	0.5	9.4	0.8
4. Sukying, et al. (2018) <sup>18</sup>	-	-	-	-	18.21	10.26	32.36	11.68	-	-	-	-	-	-	-	-
#studies	3				3				2				3			
#participants	246				232				166				246			
Statistical method	Standard mean difference (Weight, IV, Random, 95% CI)				Standard mean difference (Weight, IV, Random, 95% CI)				Standard mean difference (Weight, IV, Random, 95% CI)				Mean difference (Weight, IV, Fixed, 95% CI)			
Effect estimate	-0.89 (-3.39, 1.28)				-2.86 (-2.02, -0.38)				1.19 (-1.09, 4.46)				1.4 (-0.02, 0.10)			
p-value	0.376				0.004				0.233				0.16			
Heterogeneity $I^2$ (%)	98				88				98				0			

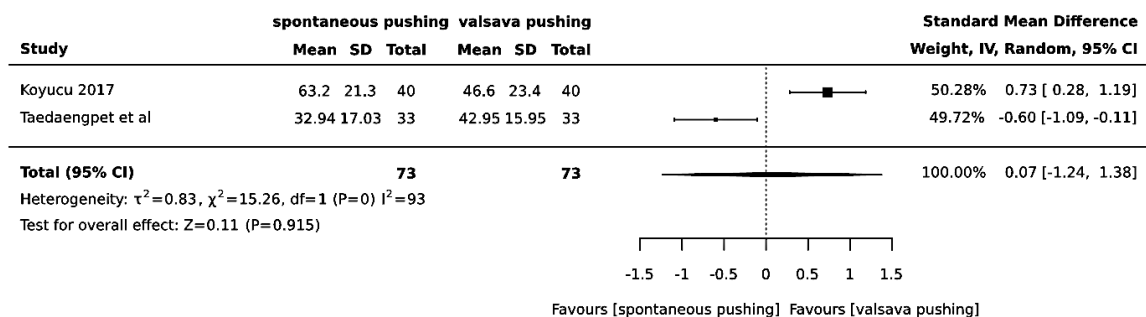
**Fatigue two hours postpartum:** Three studies showed that spontaneous pushing produced significantly less fatigue two hours postpartum than Valsalva pushing.<sup>18,21,23</sup> The combined effect sizes had high heterogeneity ( $I^2 = 88\%$ ). The summary effect size was statistically significant based on the random effects model, supporting the benefit of spontaneous pushing in lessening fatigue [overall effect size =  $-2.86$  (95% CI =  $-2.02, -0.38, p = .004$ )].

**APGAR scores at 1 minute postpartum:** One RCT<sup>21</sup> and one quasi-experimental study<sup>23</sup> reported that the neonates' APGAR scores at 1 minute were better with spontaneous pushing than with Valsalva pushing. Despite their results, the combined effect sizes showed high heterogeneity ( $I^2 = 98\%$ ). A random effects model calculated a non-statistically significant summary effect size [overall effect size =  $1.19$  (95% CI =  $-1.09, 4.46, p = .233$ )]. Spontaneous pushing provided no additional benefit to this neonatal outcome.

**APGAR scores at 5 minutes postpartum:** Neither of the two RCTs<sup>21,22</sup> nor one quasi-experimental study<sup>23</sup> reported significant differences between the spontaneous

and Valsalva pushing techniques for APGAR scores at five minutes. The combined effect sizes were homogeneous ( $I^2 = 0\%$ ); based on a fixed effect model, the summary effect size was not statistically significant [overall effect size =  $1.4$  (95% CI =  $-0.02, 0.10, p = 0.16$ )]. Spontaneous breathing did not directly benefit the neonatal APGAR scores at 1 or 5 minutes postpartum.

**Subgroup meta-analysis of time duration:** Time duration in the second stage of labor was further explored by comparing one RCT<sup>21</sup> that found spontaneous pushing had a shorter duration with another RCT<sup>22</sup> that found, in contrast, that Valsalva pushing produced a shorter duration. Because of the high level of heterogeneity in combined effect sizes ( $I^2 = 93\%$ ), a random effects model was used to calculate the summary effect size. It was not significant, again not supporting the benefit of spontaneous pushing in reducing the duration of labor [overall effect size =  $0.11$  (95% CI =  $-1.24, 1.38, p = .915$ )]. A Forest plot shows the subgroup analysis of the time duration of the second stage of labor (**Figure 2**).

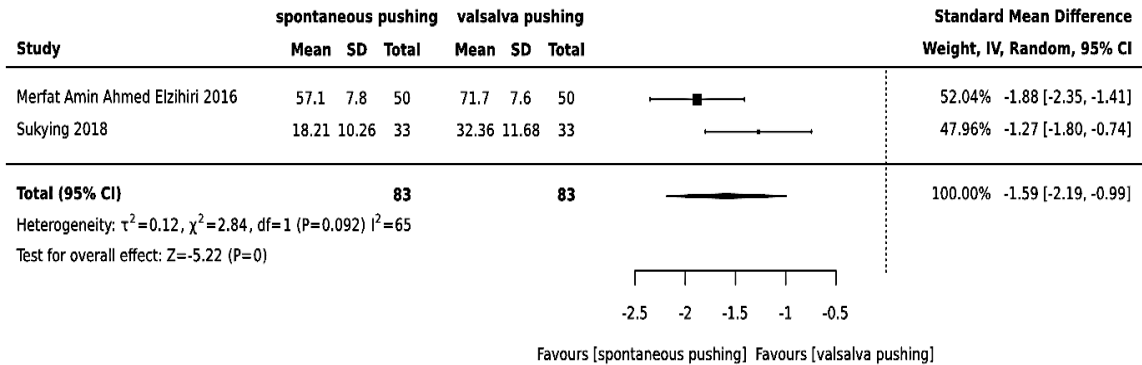


**Figure 2.** Forest plot of the subgroup analysis of time duration of the second stage of labor (two randomized controlled trials)

**Subgroup meta-analysis of fatigue:** Two studies<sup>22,23</sup> reported that fatigue at two hours postpartum was less for women who used spontaneous pushing than those who used Valsalva pushing. Heterogeneity for the combined two effect sizes was moderate ( $I^2 = 65\%$ ), and the summary effect size was statistically significant using

a random effects model. This supports the results of both studies that spontaneous pushing benefits women in lessening their postpartum fatigue [overall effect size =  $-5.22$  (95% CI =  $-2.19, -0.99, p < .001$ )]. A Forest plot shows the subgroup analysis of maternal fatigue two hours postpartum (**Figure 3**).

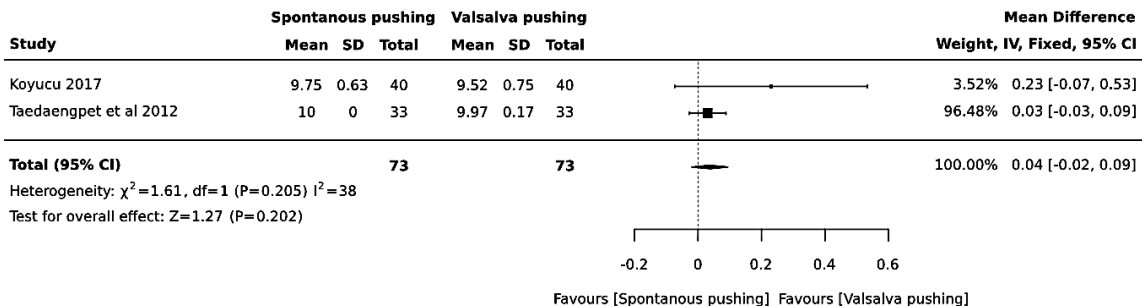




**Figure 3.** Forest plot of subgroup analysis of maternal fatigue two hours postpartum (two quasi-experimental studies)

*Subgroup meta-analysis of APGAR scores at 5 minutes:* Two studies<sup>22,23</sup> found no significant differences in APGAR scores at 5 minutes in neonates of women who used either the spontaneous or Valsalva pushing technique. The two combined effect sizes showed low homogeneity

( $I^2 = 38\%$ ). A fixed effects model calculated a summary effect size that was not significant [overall effect size = 1.27 (95% CI = -0.02, 0.09,  $p = .20$ )]. A Forest plot shows the subgroup analysis of APGAR scores at 5 minutes postpartum (Figure 4).



**Figure 4.** Forest plot of subgroup analysis of APGAR scores at 5 minutes postpartum (subgroup two RCT studies)

## Discussion

### Duration of the second stage of labor

This systematic review examined recent evidence comparing the effectiveness of spontaneous versus Valsalva pushing techniques in the second stage of labor on maternal and neonatal outcomes. Although two of the three studies in which women who used spontaneous pushing had a significantly shorter duration in the second stage of labor compared to those who used the Valsalva pushing technique, the meta-analysis did not support their conclusions. This was an unexpected

result, given the two studies' findings and because our result contradicts other studies that reported a shorter labor duration.<sup>3,24</sup> However, other evidence has shown that neither directed pushing nor spontaneous pushing affects the duration of labor,<sup>5,8,11</sup> nor does the Valsalva pushing technique necessarily shorten the length of labor.<sup>2</sup>

The results varied because every study that observed the second stage of labor was within a period not exceeding two hours, which may explain the lack of an effect on the duration of labor for both pushing techniques. However, prolonged pushing and holding breath can cause changes in the maternal cardiovascular



system and uteroplacental perfusion, leading to other physiological changes, such as in blood acid.<sup>5,6,8,10,11,24-26</sup> Thus, a normal range of the second stage duration would not affect the difference between either pushing method.

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#### **Fatigue two hours postpartum**

We found that women who used directed or Valsalva pushing experienced more fatigue two hours postpartum than spontaneous pushing. Other studies have reported similar results.<sup>3,27</sup> Valsalva pushing for long periods with increasing intensity for each uterine contraction, especially at immediate full cervical dilatation, can lead to higher strain and fatigue scores.<sup>28</sup> If women are directed to use Valsalva pushing immediately when the cervix is completely dilated, even when there is no desire to strain fully, the method is inefficient. Women expend much physical energy in straining when entering the actual period of labor and become fatigued with longer times to push, often leading to the use of equipment to help deliver the baby, resulting in more fatigue postpartum.<sup>29</sup>

#### **APGAR scores at 1 and 5 minutes**

Although the two pushing techniques differ, the babies' APGAR scores were not significantly different. Other studies have similarly reported no statistical differences in APGAR scores.<sup>3,10,30,31</sup> The pushing technique may be less significant than the length of pushing times. Pushing for a short period results in no changes in the circulatory system with low risk to the woman and the fetus.<sup>9</sup> Many other factors can affect APGAR scores.<sup>29,32</sup>

#### **Limitation**

Although four studies met the inclusion criteria in the analysis, that small number makes it difficult to

conclude the effectiveness of either pushing technique on the maternal and neonatal outcomes. Future search strategies should include grey literature, perhaps retaining the literature found in prior systematic reviews and not restricting the review to a time period.

### **Recommendations**

Until a gold standard emerges based on additional high-quality evidence, we recommend educating and guiding women about the benefits of the spontaneous pushing technique in the appropriate clinical context, including the use of epidurals and instrument-assisted deliveries. The recommendation should consider maternal choice and satisfaction and other outcomes not covered in this review, such as possible pain levels and labor experiences.

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### **Conflicts of interest**

There is no conflict of interest in this project.

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## Appendix

**Table 1.** Databases and search terms

Database	Search terms	Search date	Years	Initial results	#Selected in first screening
PubMed	Effects of spontaneous versus valsalva pushing during the second stage of labor	11/11/2023	2012-2023	7	4
	Effects of spontaneous pushing during the second stage of labor	11/11/2023	2012-2023	39	2
	Types of pushing during the second stage of labor	12/8/2021	2012-2023	4	3
Scopus	Effects of spontaneous versus valsalva pushing during the second stage of labor	11/11/2023	2012-2023	7	1
	Types of pushing during the second stage of labor	12/8/2021	2012-2023	37	1
ThaiJo	Pushing during the second stage of labor	11/11/2023	2012-2023	5	2
ScienceDirect	Effects of spontaneous pushing during the second stage of labor	11/11/2023	2012-2023	822	0
	Effects of spontaneous pushing during the second stage of labor	12/8/2021	2012-2023	1500	8
CINAHL	Types of pushing during the second stage of labor	12/8/2021	2018-2023	0	0
PsycINFO	Types of pushing during the second stage of labor	12/8/2021	2018-2023	0	0
Totals				2421	21

**Table 2.** Characteristics of two randomized controlled trials and two quasi-experimental studies<sup>11</sup>

Study	Country Setting/context/	Participant characteristics	Groups C = control I = Intervention	Outcomes measured	Description of main results
Taedaengpet et al. (2012) <sup>21</sup>	Thailand Khon Kaen province	66 pregnant women with nulliparous, GA 37– 42 weeks, Age 20–34 years, Birth weight ≤ 70 kg, length ≥ 145 cm, EFW 2500–4000 gm, cervix dilatation ≤ 7 cm, and free of complications during pregnancy	<b>RCT</b> C: 33 women with standard care pushing (Valsalva) technique I: 33 women with spontaneous pushing	– Duration of active pushing stage, – Mode of delivery, – Fatigue at 2, 12, and 2 hours postpartum, – APGAR scores	The experimental group had significantly shorter mean pushing time than the control group ( $p < .001$ ). After the birth, the experimental group had significantly less median postpartum fatigue score than the control group at 2 hours after delivery ( $p < .05$ ). No significant differences were found between the two groups in type of delivery, APGAR score, and postpartum fatigue score in 12, 24 hours.
Koyucu & Demirci (2017) <sup>22</sup>	Turkey Tertiary maternity clinic in Istanbul	– 80 pregnant women – Nulliparous – Age 18–40 years – GA 38–40 weeks – Vaginal birth – Cephalic – Singleton – EFW 2500–4000 gm	<b>RCT</b> C: 40 women with Valsalva pushing I: 40 women with spontaneous pushing	<u>Maternal outcomes:</u> Time duration of second stage, cervix and perineal laceration, blood loss, pain score, POP–Q examination results, Q–tip test score <u>Neonatal outcomes:</u> APGAR score, EFM/FHS, meconium stained, Newborn resuscitation, NICU requirement	The spontaneous pushing group had significantly longer than Valsalva group. Hb levels decreased in Valsalva pushing group higher than spontaneous pushing group. Valsalva pushing group was observed an increased urethral mobility rate.
Elizhiri et al. (2016) <sup>23</sup>	Egypt Mansoura University Hospital	100 pregnant women with primigravida women, GA ≥ 37* in 1st stage of labor, purposive sampling technique and free of complications during pregnancy, only posttest in 2 groups, with or without epidural analgesia	<b>Quasi-exp.</b> C: 50 women with standard care (closed glottis/ Valsalva) I: 50 women with spontaneous pushing	– Duration of second stage of labor, – Fatigue at 2 and 24 hours postpartum, – Newborn health status, – APGAR score and –NICU requirement	Duration of second stage, newborn health status, and Apgar score were significantly different between the two groups ( $p < 0.001$ ).

**Table 2.** Characteristics of two randomized controlled trials and two quasi-experimental studies<sup>11</sup> (Cont.)

Study	Country Setting/context/	Participant characteristics	Groups		Outcomes measured	Description of main results
			C = control	I = Intervention		
Sukying et al. (2018) <sup>18</sup>	Thailand Pattani hospital	66 primigravida - GA 37–42 weeks, - Cephalic, - Age 16–34 years, - Height ≥140 cm, - No complication during pregnancy - EFW 2,500– 3,500 gm	<b>Quasi-exp.</b> <b>C:</b> 33 women with standard care pushing (Valsalva) technique <b>I:</b> 33 women with Yoga breath with spontaneous	- Time duration of second stage - Fatigue at 2 hours postpartum	Mean rank of duration of 2nd stage of labor in experiment group had significantly shorter in the control group ( $Z = -3.98$ , $p < .001$ ) and had significantly less mean rank of 2 hour– postpartum fatigue than control group ( $M = 18.21$ , $SD = 10.26$ vs $M = 32.36$ , $SD = 11.68$ , $p < .001$ ).	

\* We converted the symbol ( $\leq$ ) in the original article published in the Egyptian *Mansoura Nursing Journal* from Mashriqi Arabic (Eastern Arabic) to Western notation ( $\geq$ ). The confusion of what is greater than or less than often arises because Arabic is written right to left.

## ประสิทธิผลของการเบ่งคลอดแบบธรรมชาติ และการเบ่งคลอดแบบวัลซัลวา ในระยะที่ 2 ของการคลอด ต่อผลลัพธ์ด้านมารดาและทารก: การทบทวนวรรณกรรมอย่างเป็นระบบและการวิเคราะห์ห่อภิมาณ

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**บทคัดย่อ:** การคลอดทางช่องคลอดเป็นกลไกตามธรรมชาติ แรงเบ่งของมารดาเป็นอีกหนึ่งปัจจัยที่สำคัญในกลไกและกระบวนการคลอดปกติ การทบทวนวรรณกรรมอย่างเป็นระบบนี้มีวัตถุประสงค์เพื่อเปรียบเทียบประสิทธิผลของการเบ่งคลอดแบบธรรมชาติและแบบวัลซัลวา ในระยะที่ 2 ของการคลอด ต่อผลลัพธ์ด้านมารดาและทารก โดยค้นหาค้นหาการศึกษาวิจัยในฐานข้อมูล Scopus, PubMed, ScienceDirect, CINAHL, PsycINFO และ ThaiJo ที่ตีพิมพ์ระหว่างปี ค.ศ. 2012-2023 มีจำนวน 12 ชิ้นที่ศึกษาเกี่ยวกับชนิดการเบ่งคลอดในระยะที่ 2 และมีเพียง 4 ชิ้นที่ศึกษาผลลัพธ์ด้านทารกแรกเกิด (APGAR scores) และด้านมารดา (ความเหนื่อยล้าและระยะเวลาของการเบ่งคลอด) การวิเคราะห์ข้อมูลสถิติด้วยวิธี Meta-analysis ของการศึกษาทั้ง 4 เรื่องไม่สนับสนุนประโยชน์ของการเบ่งคลอดแบบธรรมชาติ ในด้านการลดเวลาการเบ่งคลอดในระยะที่ 2 แต่ช่วยลดความเหนื่อยล้าของมารดาในระยะสองชั่วโมงหลังคลอดได้ การเบ่งคลอดแบบธรรมชาติ ไม่ส่งผลโดยตรงต่อคะแนน APGAR ของทารกแรกเกิดที่ 1 หรือ 5 นาทีหลังคลอด ในการเบ่งทั้งสองชนิด ประสิทธิภาพของการเบ่งคลอดแบบธรรมชาติ ไม่ได้ทำให้ระยะที่ 2 ของการคลอดสั้นลงเป็นสิ่งที่ไม่คาดคิด ซึ่งตรงกันข้ามกับการศึกษาอื่น ๆ ที่พบว่าทำให้ระยะเวลาการเบ่งคลอดสั้นลง เนื่องจากการศึกษาที่นำมาวิเคราะห์ทางสถิติมีจำนวนน้อยทำให้ยากต่อการสรุปถึงประสิทธิภาพของการเบ่งคลอดที่ดีกว่าของแบบใดแบบหนึ่ง การศึกษาในครั้งต่อไปจำเป็นต้องมีหลักฐานเพิ่มเติมและพิจารณาตัวแปรแทรกแซงอื่น ๆ รวมถึงทางเลือกของสตรี การประเมินผลลัพธ์ทารกแรกเกิดขั้นสูง และการฟื้นตัวของมารดาหลังคลอดที่นานกว่า

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