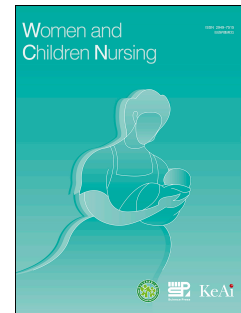


# Journal Pre-proof

The experience of spontaneous pushing during labour among Chinese women: a cross-sectional questionnaire survey

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## **Title**

The experience of spontaneous pushing during labour among Chinese women: a questionnaire survey

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# **The experience of spontaneous pushing during labour among Chinese women: a cross-sectional questionnaire survey**

## **Abstract**

*Objectives:* To explore Chinese women's experience of spontaneous pushing during the second stage of labour.

*Methods:* Women were recruited antenatally in late pregnancy to push spontaneously when in labour. A postnatal survey was conducted to explore women's experience of spontaneous pushing.

*Results:* The study recruited 112 women and 102 of them completed the postnatal survey, including 14 primiparous women and 88 multiparous women. Multiparous women stated that they had different pushing experience in this birth compared with previous directed pushing and that they were able to follow their own body urges and felt in control of their body and the overall process. Results of Childbirth Experience Questionnaire (Chinese version) revealed the average score of women's childbirth experience was high, with the mean score of 61.22 (SD=7.863). Multiparous women had higher total scores ( $P<0.05$ ,  $d=0.736$ ) as well as the score of dimension 1 'Professional support' ( $P<0.05$ ,  $d=1.068$ ). Primiparous women reported higher level of pain during spontaneous pushing ( $P<0.05$ ,  $d=0.636$ ). There is no statistical difference in pushing experience between primiparous women and multiparous women ( $P>0.05$ ).

*Conclusions:* Women reported an overall positive childbirth experience of spontaneous pushing during labour. Additional attention should be paid to primiparous women to improve their perceived professional support during second stage compared with multiparous women.

## **Keywords**

Second labour stage; Childbirth; Childbirth experience; Pushing; Spontaneous pushing

## 1. Introduction

Physiological process of childbirth is highly valued by midwives (Sandall et al., 2016). The second stage of labour, defined as full cervical dilation to the birth of the baby, is a physiological process (Cunningham et al., 2014). Maternal pushing during this period plays a vital role in the progress of labour (Cunningham et al., 2014) and is closely associated with a series of maternal and neonatal outcomes (Lemos et al., 2017). With the fetus descending, labouring women feel the urge to push or bear down, which is usually reflexive and spontaneous (Hanson, 2008). Combined with uterine contractions, maternal pushing efforts expel the baby and the placenta (Cunningham et al., 2014).

Currently, directing a woman to push during the second stage of labour is a common practice observed globally, often termed as directed pushing (Lemos et al., 2017). In this context, healthcare providers often ask a woman to take a deep breath, and to push strenuously with a closed glottis for as long as the uterine contraction persists, this is referred to as the Valsalva manoeuvre (Lemos et al., 2017). However, evidence has revealed that the long, repeated strenuous pushing may bring harm to the woman and newborn, such as an increased risk of perineal trauma (Ahmadi et al., 2017), reduction in venous blood returning to the woman's heart (Roberts, 2002), fetal heart rate changes (Lemos et al., 2017), low umbilical cord pH and PO<sub>2</sub> values (Yildirim & Nezihe, 2008).

To achieve improved health outcomes for women and newborns as well as support a more positive childbirth experience, the World Health Organization (WHO) recommends that women in the second stage of labour should be encouraged and supported to follow their own urge to push (2018). This is referred to as spontaneous pushing (Lemos et al., 2017). Spontaneous pushing supports women to push, following their own bodily urges and at their own pace (Lemos et al., 2017). When pushing spontaneously, women use both open and closed glottis and do not instinctively take a deep breath (Ann, 1995). Women push when a uterine contraction is at its peak rather than at the commencement of the contraction, which is more common with directed pushing (Ann, 1995). The effects of spontaneous pushing on a woman and newborn

have been evaluated in several studies (Araujo et al., 2021; Bloom et al., 2006; Koyucu & Demirci, 2017; Vaziri et al., 2016). A recent systematic review and meta-analysis confirmed spontaneous pushing overall does not increase the risk to the mother (Yao et al., 2022). Instead, it lowers a woman's risk of extended episiotomy and caesarean birth and it does not increase the risk to the newborn (Yao et al., 2022). Consequently, spontaneous pushing is shown to be both safe and beneficial and is currently recommended by professional organisations globally.

In Chinese context, increasing attention is being paid to facilitate evidence-based, woman-centered maternity care and spontaneous pushing is recommended by Chinese guideline (Chinese Medical Association, 2020). Nevertheless, this strategy is only partially adopted in some facilities while the routine practice is still directed pushing in most regions. A study from a northeast province in China investigated 61 hospitals and confirmed that directed pushing was routinely implemented in 66% and partially implemented in 33% of the investigated hospitals (Yan et al., 2021).

Hence, limited evidence explored Chinese women's experience of spontaneous pushing during labour, and more evidence is urgently needed to find out effective strategies for the promotion of spontaneous pushing and a change of practice. Hence, the aim of this study is to explore Chinese women's experience, including pushing experience and childbirth experience, in their spontaneous pushing in the study, thus to provide evidence for improvement of clinical practice. This study is part of a larger feasibility study conducted in China exploring the feasibility of implementing spontaneous pushing during the second stage of labour in large-scale trial in the future. As part of the feasibility study, recruited women who were supported to spontaneous push during second stage of labour, were asked to complete a postnatal survey regarding their experience. The results of the feasibility study are presently undergoing review for publication. This paper will focus specifically on the women's lived experience of pushing during labour.

## **2. Methods**

### **2.1 Study design and setting**

This study was conducted as part of a non-randomised feasibility study, which occurred in a large public maternal hospital in Hebei Province, situated in the middle region of China. Convenient sampling method was used to select this site-specific hospital for the larger feasibility study. The research protocol has been published and can be accessed online for further details (Yao et al., 2024). This study was a questionnaire survey, conducted as part of the feasibility study.

### **2.2 Participants**

Eligible participants included pregnant women attending maternity care at the study site. Pregnant women were invited to participate in the study if they were in the third trimester of pregnancy, 18 years and older, had a singleton pregnancy with a healthy fetus presenting in the cephalic presentation. Participants who provided consent but subsequently experienced preterm labour and birth before 37 gestation weeks, received epidural analgesia during labour, encountered medical or obstetric complications affecting second stage management, or underwent a Caesarean birth during labour were subsequently excluded from the study.

Sample size was calculated using statistical power analysis in PASS 15.0 software with statistical power at 90%,  $\alpha$  at 0.05, dropout rate at 20%. As this was part of the feasibility study comparing the two groups, namely spontaneous pushing and directed pushing, the duration of the second stage of labour was set as the primary outcome for sample size calculation based on previous study (Lemos et al., 2017). For each group, sample size was calculated to be  $n=105$ . The calculation process could be found in the published research protocol (Yao et al., 2024).

### **2.3 Recruitment**

Posters and information leaflets were used to advertise the study in the antenatal clinic of the site hospital. The researcher approached women while they were in the antenatal clinic waiting room and discussed the study, assessing their willingness to receive

further information about the study and/or participate. Verbal information and a written information sheet outlining the study were provided. Written consent was obtained before the study.

## **2.4 Implementation of spontaneous pushing**

Upon admission to the birth suite in labour, participating women were supported to pushing spontaneously by midwives. Before the commencement of the study, a specific group of midwives had undergone an education program, regarding the strategies to support participating women to push spontaneously during labour. Comprehensive and evidence-based practice information on the management of pushing with a focus on the management of spontaneous pushing was provided. Detailed information regarding the education program has been included in the published study protocol (Yao et al., 2024).

## **2.5 Data collection**

Women who took part in the study and experienced spontaneous pushing were accessed during their stay on the postnatal ward for the completion of a postnatal survey. The survey was comprised of three parts. The first part was demographic information, including age, parity, education level, previous mode of birth if applicable. The second part was pushing experience, assessing women's experience of pushing during current labour and previous labour if applicable labour. This part comprised of a total of six self-developed questions, scored using a 5-point Likert scale (1=disagree, 2=mostly disagree, 3=neutral, 4=mostly agree, 5=agree). The third part was women's childbirth experience. This was facilitated by the Childbirth Experience Questionnaire (Chinese version) (CEQ-C) (Zhu et al., 2019) (Supplementary Material 1). The CEQ-C is a validated tool that has been published in English and validated in Chinese by Zhu et al (2019). The content validity of CEQ-C was 0.96 and Cronbach's alpha was 0.802 (Zhu et al., 2022). It contains a total of 19 items in four dimensions. Each item is scored using a 4-point Likert scale ranging from 1 (totally disagree) to 4 (totally agree), with the maximum score of 76. As part of CEQ-C, three additional items were listed at the end of the questionnaire to explore women's experience of pain, control and feeling of safety with a visual analog scale (VAS) from 0 to 100 (Zhu et al., 2019).

## 2.6 Data analysis

Data was analysed using the software SPSS for MacBook, Version 27 (IBM Corp. Armonk, NY, USA). Differences were tested using independent group *t* tests and effect size for continuous variables and chi-squared tests and risk ratios for categorical variables. Cohen's *d* was selected to describe effect size and was classified as small ( $d=0.2$ ), medium ( $d=0.5$ ) and large ( $d\geq 0.8$ ) (Larner, 2014). The significance level for the comparison was set at 0.05. Statistical description and evaluation were conducted using mean value, standard deviation, number of cases, and proportions (in percent).

## 3. Results

A total of  $n=112$  women were supported to spontaneously pushing and  $n=102$  of these (91%) proceeded to complete the postnatal survey. Ten women did not respond to the survey for the following reasons: scanned the code for survey but did not submit the survey ( $n=5$ ), declined to answer the survey ( $n=2$ ), left the hospital before completion of the survey ( $n=3$ ).

For the 102 women who completed the survey, 88 were multiparous and 14 were primiparous. The mean age was 32 years, and ten women were 35 years old and above. The majority of the women had postgraduate qualification (73%) and most of the multiparous women experienced a previous spontaneous vaginal birth, and two women experienced a previous vacuum extraction and one woman required a forceps extraction (Table 1).

**Table 1:** Demographics of participants

Variable		N	%	Variable		N	%
Age	18 to 35	92	90.2%	Education level	Middle school and below	10	9.8%
	More than 35	10	9.8%		High school	7	6.9%
Parity	Primiparous	14	13.7%		Technical diploma	11	10.8%
	Multiparous	88	86.3%		Diploma	42	41.1%
Number of children before current childbirth	0	14	13.7%		Bachelor	31	30.4%
	1	70	68.6%		Master and above	1	1.0%
	2	17	16.7%	Previous mode of birth	Normal vaginal birth	85	96.6%
	3	1	1.0%		Vacuum extraction	2	2.3%
					Forceps extraction	1	1.1%
					Caesarean birth	0	0%



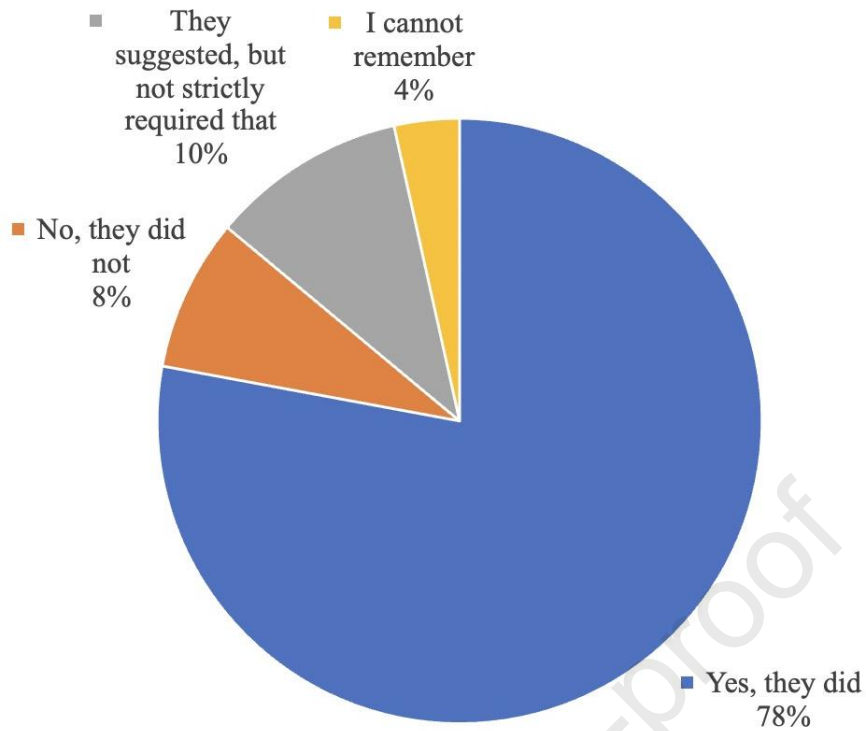
### 3.1 Women's pushing experience

Most of the women reported a high level of midwifery support (Mean=4.72, SD=0.736) and feelings of safety (Mean=4.58, SD=0.801). More than three quarters of women felt capable of the pushing spontaneously when supported by the midwife (Mean=3.93, SD=1.101). Meanwhile, women scored relatively lower for their experience in having a say in how to push during labour (Mean=3.55, SD=1.354) (Table 2).

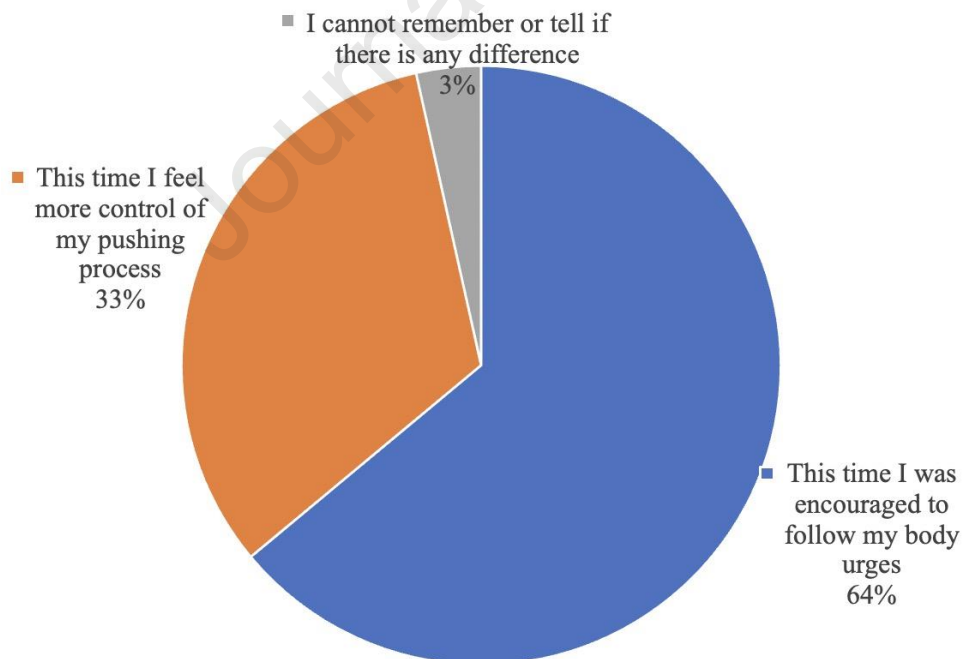
**Table 2:** Women's pushing experience

Item	N	Range	Mean	SD	Agree or mostly agree (n (%))
I felt I could have a say in how to push during my labour	102	1-5	3.55	1.354	63 (62%)
I felt I was capable of pushing during labour	102	1-5	3.93	1.101	77 (76%)
I believe my midwife provided me enough professional support during pushing	102	1-5	4.72	0.736	95 (93%)
I felt safe pushing during the second stage of labour	102	1-5	4.58	0.801	92 (90%)

When multiparous women were asked about their previous birthing experience, most of them (78%) reported that they were directed to push during the second stage of labour. Some (10%) were provided with direction on pushing but were not made to adhere to the instruction. Only seven (8%) of this group has been supported to push spontaneously in a previous birth confirming directed pushing as the more commonly used practice (Fig.1). Comparing their previous pushing experience (mostly directed pushing) with the current one (spontaneous pushing), women reported that the biggest difference was midwives' encouraging them to follow their own body urges to push (64%). The women also highlighted that they felt more in control of the pushing process (33%) (Fig. 2).



**Fig.1.** Primiparous women's responses to question "During your previous birth(s), did doctors or midwives direct you on how to push?"



**Fig.2.** Primiparous women's responses to question "What do you think is the difference between your pushing experience during this birth with your previous birth(s)?"

### 3.2 Women's childbirth experience

Results using the CEQ-C showed that the average score of women's childbirth experience was 61.22 (SD=7.863), ranging from 34 to 75. The quartiles were 56 (25%), 62 (50%), and 67 (75%).

Four dimensions were assessed. *Dimension 1: 'Professional support'* ranked the highest (Mean=3.69, SD=0.489) and *Dimension 3 'Perceived safety'* ranked the lowest (Mean=2.74, SD=0.651). For each item, 16 of the total 19 items scored three and above, for which the response 'I felt secure' ranked the highest. Three items scored three and less belonged to *Dimension 3 'Perceived safety'* and *Dimension 4 'Participation'* (Table 3).

**Table 3:** Women's childbirth experience (using the CEQ-C)

Dimension	Item content	Mean	SD
1 Professional support		<b>3.69</b>	<b>0.489</b>
	13 My midwife devoted enough time to me.	3.70	0.523
	14 My midwife devoted enough time to my partner.	3.66	0.572
	15 I was kept informed.	3.68	0.548
	16 My midwife understood my needs.	3.66	0.536
	17 I felt very well taken care of by the midwife.	3.71	0.537
	18 I felt secure.	3.73	0.510
2. Own capacity		3.23	0.566
	1 Labor progress went as I had expected.	3.47	0.671
	2 I felt strong.	3.38	0.676
	4 I felt capable.	3.25	0.727
	6 I felt happy.	3.01	0.814
	7 I have many positive memories.	3.03	0.917
	19 The situation was well handled.	3.25	0.740
3. Perceived safety		<b>2.74</b>	<b>0.651</b>
	3 I felt scared. <sup>R</sup>	2.47	0.930
	5 I felt tired. <sup>R</sup>	2.10	0.802
	8 I have many negative memories. <sup>R</sup>	3.14	0.845
	9 I felt depressed. <sup>R</sup>	3.25	0.852
4. Participation		2.91	0.765
	10 I could choose whether to be up and moving or lying down.	3.05	0.894
	11 I could choose the delivery position.	2.61	1.016
	12 I could choose the pain relief method.	3.08	0.864

\*R: Ratings of negatively worded statements are reversed.

Responses to three questions at the end of CEQ-C indicate that women felt secure during their birth with the average score being as high as 88 (range 0-100). Some women reported a high level of pain (Mean=80, range 0-100) and relatively low control of childbirth (Mean=70, range 0-100) (Supplementary Material 2, Table 1).

### 3.3 Comparison of women's experience

We compared women's pushing experience and childbirth experience between their first and subsequent labour/birth. Results from this study indicate multiparous women appeared to have had an enhanced childbirth experience than primiparous women. Multiparous women received a higher total score from the CEQ-C ( $P < 0.05$ ,  $d = 0.736$ ) as well as higher scores for *Dimension 1 'Professional support'* ( $P < 0.05$ ,  $d = 1.068$ ). Primiparous women experienced more intense pain during the second stage of labour ( $P < 0.05$ ,  $d = 0.636$ ) and lower control during their pushing experience than multiparous women however, the difference was not statistically significant ( $P = 0.160$ ,  $d = 0.596$ ). There is no statistical difference in the results comparing the pushing experience between primiparous and multiparous women ( $P > 0.05$ ) (Table 4).

**Table 4:** Comparison of women's pushing experience and childbirth experience between parity

Outcomes	Primiparous N=14		Multiparous N=88		p-Value	Effect size (Cohen's <i>d</i> )
	Mean	SD	Mean	SD		
Pushing experience						
Average score	4.16	0.836	4.20	0.745	0.861	0.050
Have a say	3.86	1.027	3.50	1.398	0.362	0.263
Feel capable	4.29	0.611	3.88	1.153	0.196	0.374
Enough professional support	4.21	1.188	4.80	0.609	0.094	0.816
Feel safe	4.29	1.204	4.63	0.716	0.322	0.426
Childbirth Experience Questionnaire						
Total score*	56.36	9.787	61.99	7.285	<b>0.012</b>	<b>0.736</b>
Dimension 1 Professional support	19.57	4.863	22.52	2.289	<b>0.043</b>	<b>1.068</b>
Dimension 2 Own capacity	17.86	3.255	19.65	3.373	0.067	0.533
Dimension 3 Self-perception	10.14	2.070	11.09	2.668	0.208	0.365
Dimension 4 Participation	8.79	2.424	8.73	2.288	0.930	0.025
Painful	89.86	8.761	78.70	18.512	<b>0.001</b>	<b>0.636</b>
Control	58.85	29.091	71.24	19.294	0.160	0.596
Secure	85.00	15.028	88.33	14.448	0.445	0.229

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Note: \*: Total score of CEQ-C is calculated by adding the scores of 19 items from four dimensions, except the three items scored by VAS from 1 to 100.

We also compared women's pushing experience and childbirth experience according to the midwives who supported them. Six midwives with more than 10 years of experience were placed into group 1 and considered senior midwives. The other three midwives who had clinical experience for less than 10 years were placed into group 2. There was no statistical difference in women's pushing experience and childbirth experience between the two groups (Supplementary Material 2, Table 2).

## **4. Discussion**

In this study, we assessed Chinese women's experience of spontaneous pushing and childbirth experience in a feasibility study conducted in a large hospital in China. Both primiparous and multiparous women's childbirth experience was assessed using the CEQ-C and was shown to be an overall positive experience for most of the women. However, primiparous, and multiparous women had different levels of perception of their pushing and overall childbirth experience.

### **4.1 Transiting from routine practice to spontaneous pushing**

The transition to spontaneous pushing during labour was found to be acceptable change in practice. When multiparous women compared their previous pushing experience (predominantly directed pushing) with their current experience of spontaneous pushing, they reported receiving more encouragement this time to follow their natural body urges and felt they had more control of the pushing process.

In many countries around the world, including China, directed pushing is common practice during second stage (Lemos et al., 2017). This practice was firstly advocated and promoted to reduce the rate of forceps, which was routinely used in 1950s (Simkin et al., 2017). Increasingly, more recently researchers have begun to challenge this routine practice, and commented it as directive instead of supportive (Roberts et al., 2007). In recent years, several trials have tested the effects of spontaneous pushing and results confirmed that spontaneous pushing is a safe strategy (Araujo et al., 2021) and that women are very capable of giving birth without

instructions (Koyucu & Demirci, 2017). Spontaneous pushing brings additional benefits, such as shorter duration of second stage of labour (Jahdi et al., 2011), lower risk of postpartum urinary incontinence (Low et al., 2013) and decreased rates of extended episiotomy and Caesarean birth (Yao et al., 2022).

Findings in this study add to the existing body of literature about the positive outcomes of spontaneous pushing during the second stage of labour, further advocating for the implementation and promotion of spontaneous pushing during labour.

## 4.2 Enhancing women's pushing and childbirth experience

Women's ratings of their childbirth experience in this study were generally high, indicating that they balanced positively with fatigue and anxiety. The average score using the CEQ-C was higher than in similar studies conducted elsewhere in China (Zhu et al., 2019). Consistent with a previous study (Zhu et al., 2019), the *Dimension 1 "Professional support"* scored highest among all four dimensions in this study. The item 'I felt secure' and VAS item of security both ranked the highest among others (Zhu et al., 2019). Hence, it is confirming that in spontaneous pushing, high quality midwifery support is acknowledged as a positive element by women.

However, despite this, women still feel a low level of perceived safety, including their perceived feeling of tiredness and fear. This may suggest that regardless of the pushing strategy (spontaneous or directed pushing), women perceive the effort they need to exert during second stage of labour quite intensive. Furthermore, a woman's perception of fear of labour was prevalent among both primiparous and multiparous women (Nilsson et al., 2018). The fear may be associated with a lack of professional information during the antenatal period, of what to expect during second stage of labour and their concern for their baby (Kananikandeh et al., 2022).

Overall, despite women's overall positive experience when pushing spontaneously, maternal fear during labour calls for further attention. Results from this study suggest that the fear may be reduced by the provision of enhanced professional support and reassurance antenatally and during labour.

### 4.3 Acknowledging difference between parity

A difference of childbirth experience between parity was observed in this study, with multiparous women of better experience and more control. Multiparous women's experience was significantly higher than primiparous women in their overall score from the CEQ-C as well as "*Professional support*" dimension scores. This finding was consistent with previous studies from other countries (Mukamurigo et al., 2021; Place et al., 2022; Soriano-Vidal et al., 2016). One possible explanation for primiparous women's low ratings pertaining to their childbirth experience may be the high level of labour pain they perceived. Evidence suggests labour pain can be one of the most painful experiences during a woman's life and can be a key factor related to the experience of childbirth (Donate-Manzanares et al., 2021). Another explanation could be the mismatch between primiparous women's expectation and experiences of childbirth (Webb et al., 2021). It has been suggested that some primiparous women may have 'idealistic' or 'romanticised' expectations of childbirth (Diezi et al., 2023).

Furthermore, in this study, primiparous women reported lower control of their labour than multiparous women. Previous studies highlighted woman's control during labour includes internal control of their feelings and body and external control of decision making (Diezi et al., 2023; Green & Baston, 2003). Women with more control of their childbirth are inclined to report a better experience (Meyer, 2013). Similarly, in a qualitative study by Donate-Manzanares et al. (2021), women reported a better birth experience when they had control of the pain relief rather than the type of pain relief they used.

The findings of this study indicated that multiparous women, having experienced directed pushing in previous labour(s), may rate professional support higher due to the contrast with past experience. For primiparous women, a lack of prior comparison might result in different perceptions of support, suggesting that further strategies to improve a primiparous woman's childbirth experience need to be considered. These include prenatal education to help women establish an appropriate expectation of childbirth, including labour pain as well as options available to them for pain relief, and other

initiatives including midwifery support to encourage and facilitate a woman's sense of control and decision making regarding their labour and birth before and during labour.

#### **4.4 Implications for research and clinical practice**

The positive findings in this study provided several implications for future clinical practice. Firstly, a change of practice is in urgent need. Directed pushing is still common practice in maternity care in most regions of China as well as some other regions, and the negative effect of this routine practice is being increasingly reported. The findings in this study demonstrate spontaneous pushing is well accepted by women and facilitated positive pushing and childbirth experience. Spontaneous pushing during labour appears to be an acceptable alternative of current routine practice in clinical context. Secondly, future studies may facilitate the use of a qualitative design to provide further information on women's, especially primiparous women's experience of spontaneous pushing and their thoughts on what kind of support may be needed during labour, thus to provide reference for clinical practice.

### **5. Conclusion**

The findings from this study suggest spontaneous pushing during labour was well received, with women reporting an overall positive experience, indicating spontaneous pushing as acceptable change of practice in Chinese context. However, primiparous women reported comparatively higher levels of perceived pain resulting in lower ratings of their childbirth experiences. Offering additional professional information and support, empowering women to control their birth process and decision making may enhance the childbirth experience for primiparous women.

### **6. Strengths and limitations**

To our knowledge, this study is the first to explore women's experience of pushing in the Chinese context. The favourable outcomes from this study offer direction and guidance for adopting and the implementing of spontaneous pushing, especially as directed pushing continues to be common practice in many regions in China as well as other countries globally. The use of the CEQ-C to assess women's childbirth experience, is widely used in many countries, allowing for a comparison globally. Several questions



were included in the survey with the purpose to explore women's individual experiences of pushing, yielding valuable insights for the future implementation of spontaneous pushing.

However, there are some limitations of the study. Firstly, we managed to recruit the same numbers of primiparous and multiparous women to the study. However, due to the high use rate of epidural analgesia among primiparous women, many were excluded from participating in the study after onset of labour. The limited number of primiparous women in this study may not provide comprehensive information on primiparous women's experience of spontaneous pushing. Secondly, the experience of women was assessed by quantitative data from the survey, which limits the ability to fully explore women's experiences.

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