

Women's cesarean section preferences and influencing factors in relation to China's two-child policy: a cross-sectional study

Huijuan Liang^{1,2}
Yancun Fan¹
Nan Zhang¹
Virasakdi
Chongsuvivatwong²
Qingchun Wang³
Jing Gong³
Hutcha Sriplung²

¹Research Institute for Health Policy of Inner Mongolia, Inner Mongolia Medical University, Hohhot, Inner Mongolia, China; ²Epidemiology Unit, Faculty of Medicine, Prince of Songkla University, Songkhla, Thailand; ³Department of Medical Education, Hohhot First Hospital, Hohhot, Inner Mongolia, China

Objective: This study explored women's preference for cesarean section (CS) and the preference for cesarean sections' influencing factors, particularly nonmedical factors.

Methods: A cross-sectional study was conducted in four tertiary hospitals in Hohhot. We recruited 1,169 pregnant women at ≥ 28 gestational weeks and classified subjects into three groups by delivery mode preference: vaginal birth (VB), CS, and "no clear preference". We identified the influencing factors of women's choices by multinomial logistic regression. The adjusted relative-risk ratios (aRRRs) for the factors affecting the preference for CS and "no clear preference" categories and their 95% CIs were computed, using the preference for VB as the reference group.

Results: VB was preferred by 80.3% of the subjects, 8.8% preferred CS, and 10.9% had not decided yet. In the multinomial logistic regression, pregnant women intending to have more than one child were less likely to prefer CS (aRRR: 0.37; 95% CI: 0.22–0.61); choosing a lucky day for baby birth was the strongest factor for CS preference (aRRR: 12.36; 95% CI: 6.62–23.08), and other factors for CS preference were being aged 40 years and above (aRRR: 4.21; 95% CI: 1.43–12.40), being ethnic minority (aRRR: 2.00; 95% CI: 1.17, 3.41), feeling difficulty in getting pregnant (aRRR: 2.23; 95% CI: 1.20, 4.13), and having husband's preference for CS (aRRR: 7.62; 95% CI: 4.00–14.54). The top reasons for preferring CS were the belief that CS was safer (51.5%), associated with less pain (40.8%), and better for baby's and woman's health (24.3% and 22.3%, respectively).

Conclusion: Less than one-tenth of the study subjects preferred CS. The cultural beliefs had the strongest influence on the decision of delivery mode. Those intending to have two or more children following the two-child policy were less likely to choose CS.

Keywords: mode of delivery, vaginal birth, pregnant women, fertility intention

Introduction

Cesarean section (CS) without medical necessity is associated with higher risks for perinatal complications to mothers and babies than vaginal birth (VB) in short and long term and also affects the subsequent pregnancies.^{1–3} However, the use of CS has increased dramatically worldwide in the past decades despite no evidence showing that the CS without medical justification can reduce the maternal and neonatal morbidity and mortality.^{3,4} China had the highest rate of CS with around half of babies delivered by CS in the year 2007–2008.⁵ Although China's overall annual CS rate decreased to 34.9% in 2014, there were still around a quarter of Chinese counties with the CS rate exceeding 50%.⁶

In addition to medical reasons, women's preference for CS has made a significant contribution to the increase in CS rate.^{7–9} Chinese studies have estimated that

Correspondence: Hutcha Sriplung
Epidemiology Unit, Faculty of
Medicine, Prince of Songkla University,
15 Kanchanawanit Road, Hat Yai,
Songkhla, Thailand
Tel +66 7 445 1165
Fax +66 7 442 9754
Email hutcha.s@psu.ac.th

24.6%–28.4% of CS cases were performed on maternal request without any medical indication.^{10,11} Alongside conventional clinical indications for CS, such as cephalopelvic disproportion, fetal distress, and breech presentation, “women’s strong request for CS” was added into the clinical guideline for CS in Anhui province of China. At the same time, the two-child policy has replaced the one-child policy across China since 29 October, 2015. The new policy encourages fertility intention and allows all couples to have their preferred number of children.^{12,13} Such a change in fertility intention may change women’s decision-making with regard to birth mode and make women consider the harms associated with CS more carefully, especially the potential risks for their further pregnancies.

To our knowledge, few studies have explored women’s preference for CS after the implementation of the two-child policy. This study was conducted to estimate women’s preference for delivery mode and investigate its influencing factors, particularly nonmedical factors, to provide evidence to prevent unnecessary CS in the new policy background.

Participants and methods

Participants and recruitment procedure

This hospital-based cross-sectional study was conducted from December 2016 to January 2017 in Hohhot, China. Hohhot is the capital city of Inner Mongolia Autonomous Region. In Hohhot, there were four public tertiary hospitals. They provided the majority of obstetric services for the city residents, with more than 5,000 childbirth deliveries in each hospital in 2016. Their CS rates were estimated to be around 40%–50% of all labors in 2014.⁶ Our study collected data in the outpatient obstetric department of the four hospitals.

Eligible participants were pregnant women meeting the following inclusion criteria: 1) attending prenatal care during the period of data collection and 2) gestational age ≥ 28 weeks. Exclusion criteria were: 1) because of the potential medical need for CS, women with a history of previous CS and other uterus surgery were excluded; 2) women with self-reported severe disease in the previous 7 days and women with diagnosed complications, such as heart disease, hyperthyroidism, gestational diabetes, and gestational hypertension, were also excluded.

All pregnant women who were present in the outpatient obstetric care department of each hospital were invited during the period of data collection. The purpose of the study was explained, and written informed consent forms were provided to all eligible women. Those who agreed to participate voluntarily were consecutively recruited into this study.

Out of 1,340 women invited, 1,308 (97.6%) completed the questionnaire. The main reasons for refusals were that women had no enough time to finish the survey or they were not willing to share their personal information. Of 1,308 respondents, 135 were excluded according to the exclusion criteria and four were excluded owing to their incomplete response to the questionnaire. As a result, the final number of participants for analysis was 1,169 pregnant women who completed all the questions.

Questionnaire and variables

The questionnaire was developed based on literature review by the research team. Its face validity was built by a panel of experts, including two local obstetric specialists, two epidemiology experts, and one outpatient health care manager. We conducted a pilot survey to test the feasibility and understandability of the questionnaire. The questionnaire was modified according to the pilot study and then finalized by the experts.

The outcome variable was women’s preference of delivery mode. In the questionnaire, the preference was assessed with the question: “Which birth mode would you like to choose for your current pregnancy?”, then they were asked to choose a single answer of the three choices: “natural birth (referred to “VB” in this paper)”, “cesarean section”, or “no clear preference now”. If the woman gave a clear preference for VB or CS, she was then asked to choose the three most important reasons for their decision.

The explanatory variables for the outcome included: demographics, women’s prenatal characteristics, and family factors. The demographic variables comprised maternal age, ethnicity (Han Chinese or ethnic minorities), marital status, maternal education level, annual household income, maternal occupation, and living environment (urban or rural). The maternal factors covered parity (nulliparous who had no previous birth, or multiparous who had at least one previous birth), gravidity (the current pregnancy was her first/second/third and above pregnancy), gestational age, history of abortion, self-evaluated level of difficulty in getting the current pregnancy (easy/normal/difficult), and doctor’s suggestion for delivery mode. The family factors included husband’s preference, only-child family (whether or not women or her husband was the only child in their own family), ideal number of children (women were asked: “If you do not consider the child-policy restriction, what is your ideal number of children?”), and choosing a lucky day for delivery (women were asked: “Are you going to choose or have you already chosen a lucky day for your baby delivery?”).

Data collection

The survey was conducted by interviewers who were undergraduate students of Inner Mongolia Medical University. Before data collection, interviewers were trained by a professor in our research team. All interviewers were provided with an investigation manual that clearly stated the study purpose, design, population, detailed procedures, and the important precautions for conducting the investigation. An informed consent form was obtained from each participant. Questionnaires were filled out anonymously via a face-to-face interview in the obstetric waiting area, and the comprehensiveness of each questionnaire was checked by the interviewers immediately following the interview. The data collection process followed the same procedure and was conducted simultaneously in the four hospitals.

Data analysis

The data were entered into EpiData 3.1 software; double-entry was performed to reduce the typing error. All data were cleaned and analyzed using R statistical software. Frequencies and percentages were used to describe the characteristics of participants. Chi-squared tests were performed to analyze the difference in the preference of delivery mode. Multinomial logistic regression was performed to analyze the influencing factors of women's preference of delivery mode. The adjusted relative-risk ratios (aRRRs) for the factors affecting the preference for CS and "no clear preference" categories and their 95% CIs were computed, using the preference for VB as the reference group. Statistical significance was set at the type I error of 0.05 by two-tailed tests.

Ethical approval

Before collecting the data, written informed consent forms were obtained from all participants. The protocol of the study was approved by the Research Ethics Committee of Faculty of Medicine, Prince of Songkla University (reference number: 59-261-18-5). No additional ethical approval was required from four hospitals recruited in our study.

Results

Characteristics of pregnant women by mode of delivery preference

A total of 1,169 eligible pregnant women were enrolled. There were 939 (80.3%; 95% CI: 77.9%–82.5%) women preferring VB, 103 (8.8%; 95% CI: 7.3%–10.6%) preferring CS, and 123 (10.9%; 95% CI: 9.1%–12.8%) answering "no clear preference". Table 1 shows the comparison of demographic characteristics among women with the different

preferences. The percentage of women aged 40 years and above among those preferring CS (10.7%) was around six times and four times greater than among those preferring VB (1.8%) and those with unsure preference (2.4%). Among women preferring CS, 31.1% were minority ethnics, while among women preferring VB and unclear preference, only 18.2% and 18.9% were minority ethnics, respectively. No significant difference in delivery mode preference was found by marital status, education, annual household income, occupation, or living area.

Table 2 shows the prenatal information and family characteristics related to the preference of delivery mode. The percentage of women who reported feeling it difficult to get pregnant among those preferring CS (26.2%) was more than two times greater than among those preferring VB (10.9%). No significant difference in the preference was found across the prenatal characteristics, including parity, gravidity, and trimester and abortion history.

In terms of the family influence, preferring CS was associated with doctor's suggestion for CS, husband's preference for CS, one child or no child ideally, and choosing a lucky day for baby delivery.

Multinomial logistic regression for the preference of delivery mode

We analyzed the factors influencing pregnant women's preference for delivery mode by multinomial logistic regression. The outcome variable was grouped into "preferring VB", "preferring CS", and "no clear preference". Table 3 shows aRRR and 95% CI of the preferences by women's characteristics using preferring VB as the reference.

After adjustment for potential confounders, pregnant women who intended to have two or more children were less likely to prefer CS (aRRR: 0.37; 95% CI: 0.22–0.61), compared with women whose ideal child number was one or no child. Age 40 years and above was associated with preferring CS (aRRR: 4.21; 95% CI: 1.43–12.40), compared with age under 40 years. The ethnic minority showed a stronger influence on the preference of CS than Han ethnicity with aRRR of 2.00 (95% CI: 1.17–3.41). Compared with women who reported feeling it easy to get pregnant, those feeling it difficult were more likely to have CS intention (aRRR: 2.23; 95% CI: 1.20–4.13). Husband's preference for CS was significantly related to women's CS preference, with aRRR of 7.62 (95% CI: 4.00–14.54). Women's intention of choosing a lucky day for baby birth was highly associated with preference for CS (aRRR: 12.36; 95% CI: 6.62–23.08).

Table 1 Demographic characteristics of pregnant women by mode of delivery preference

Characteristics	VB (N=939) n (%)	CS (N=103) n (%)	No clear preference (N=127) n (%)	P-value
Age (years)				<0.001
Under 40	922 (98.2)	92 (89.3)	124 (97.6)	
40 and above	17 (1.8)	11 (10.7)	3 (2.4)	
Ethnicity				0.007
Han	768 (81.8)	71 (68.9)	103 (81.1)	
Minority	171 (18.2)	32 (31.1)	24 (18.9)	
Marital status				0.209
Unmarried	25 (2.7)	3 (2.9)	7 (5.5)	
Married	914 (97.3)	100 (97.1)	120 (94.5)	
Education				0.467
High school and below	179 (19.1)	25 (24.3)	32 (25.2)	
Junior college	304 (32.4)	34 (33.0)	42 (33.1)	
Bachelors	368 (39.2)	33 (32.0)	41 (32.3)	
Masters and above	88 (9.4)	11 (10.7)	12 (9.4)	
Annual household income				0.444
<50,000 RMB	221 (23.5)	33 (32.0)	32 (25.2)	
50,000–100,000 RMB	469 (49.9)	46 (44.7)	61 (48.0)	
>100,000 RMB	249 (26.5)	24 (23.3)	34 (26.8)	
Occupation				0.793
Public servant	208 (22.2)	25 (24.3)	33 (26.0)	
Enterprise staff	274 (29.2)	21 (20.4)	29 (22.8)	
Private business owner	161 (17.1)	20 (19.4)	22 (17.3)	
Farmer and laborer	31 (3.3)	3 (2.9)	5 (3.9)	
Unemployed	192 (20.4)	26 (25.2)	27 (21.3)	
Other	73 (7.8)	8 (7.8)	11 (8.7)	
Living environment				0.628
Urban	530 (56.4)	63 (61.2)	74 (58.3)	
Rural	409 (43.6)	40 (38.8)	53 (41.7)	

Abbreviations: VB, vaginal birth; CS, cesarean section.

Women who had no clear preference of delivery mode were more likely to be those feeling difficulty in getting pregnant (aRRR: 1.97; 95% CI: 1.16, 3.77), receiving doctor's suggestion for CS (aRRR: 5.44; 95% CI: 1.31–22.69), and intending to choose a lucky day for baby delivery (aRRR: 3.22; 95% CI: 1.60–6.50).

Main reasons for preferring CS

Women were asked to choose the three most important reasons for their preference of delivery mode. Table 4 shows the ranking of main reasons among 103 women who preferred CS. "CS is safer than VB", "CS is less pain than VB", and "CS is better for baby's health than VB" were the three main reasons chosen by the women most frequently, with 51.5%, 40.8%, and 24.3% successively. About 22.3% of women believed "CS is better for women's health than VB".

Discussion

This study investigated pregnant women's preference of delivery mode in the background of recently launched

China's two-child policy. Less than one-tenth of participants preferred CS. The fertility intention to have more than one child reduced the likelihood of preference for CS. Women's preference of delivery mode was also influenced by age, husband's and doctor's suggestions, social culture and beliefs, as well as the awareness of CS.

Among our participants, 8.8% preferred CS, whereas 10.9% still had no clear preference. The percentage of CS preference was lower than some previous findings obtained from similar population before the two-child policy was introduced in 2016.^{14,15} A study conducted in five provinces of China in 2015 showed that the preference of CS accounted for 15.1% among 1,755 pregnant women, which is significantly larger than that found in our study with a chi-square *P*-value of <0.001.¹⁴ Consistently, another survey conducted in Beijing in 2014 found 18.9% of 450 pregnant women at the gestational age between 28 and 37 weeks preferred CS, which differs from the finding in our study at a chi-square *P*-value of <0.001.¹⁵

Interestingly, our study showed that the ideal number of children was associated with preference of childbirth mode.

Table 2 Prenatal and family characteristics of pregnant women by mode of delivery preference

Characteristics	VB (N=939) n (%)	CS (N=103) n (%)	No clear preference (N=127) n (%)	P-value
Parity				0.171
Nulliparous	741 (78.9)	80 (77.7)	109 (85.8)	
Multiparous	198 (21.1)	23 (22.3)	18 (14.2)	
Gravidity				0.263
1st pregnancy	657 (70.0)	67 (65.0)	91 (71.7)	
2nd pregnancy	205 (21.8)	21 (20.4)	27 (21.3)	
3rd and above	77 (8.2)	15 (14.6)	9 (7.1)	
Gestational age				0.662
28–36 weeks	586 (62.4)	66 (64.1)	87 (68.5)	
37–38 weeks	208 (22.2)	21 (20.4)	26 (20.5)	
≥39 weeks	145 (15.4)	16 (15.5)	14 (11.0)	
History of abortion				0.253
No	788 (83.9)	80 (77.7)	104 (81.9)	
Yes	151 (16.1)	23 (22.3)	23 (18.1)	
Self-evaluated difficulty in getting pregnant				<0.001
Easy	540 (57.5)	48 (46.6)	60 (47.2)	
Normal	297 (31.6)	28 (27.2)	44 (34.6)	
Difficult	102 (10.9)	27 (26.2)	23 (18.1)	
Doctor's suggestion				0.003
VB	106 (11.3)	7 (6.8)	8 (6.3)	
CS	9 (1.0)	5 (4.9)	4 (3.1)	
No clear suggestion	824 (87.8)	91 (88.3)	115 (90.6)	
Husband's preference toward CS				<0.001
No	909 (96.8)	70 (68.0)	119 (93.7)	
Yes	30 (3.2)	33 (32.0)	8 (6.3)	
Only-child family				0.682
No	599 (63.8)	69 (67.0)	78 (61.4)	
Yes	340 (36.2)	34 (33.0)	49 (38.6)	
Ideal children number				<0.001
0 or 1	253 (26.9)	49 (47.6)	44 (34.6)	
2 or more	686 (73.1)	54 (52.4)	83 (65.4)	
Choosing lucky day for delivery				<0.001
No	910 (96.9)	67 (65.0)	114 (89.8)	
Yes	29 (3.1)	36 (35.0)	13 (10.2)	

Abbreviations: VB, vaginal birth; CS, cesarean section.

Women intending to have at least two children were less likely to prefer CS than those intending only one child. The ideal number of children has been used to reflect personal fertility intention.^{16,17} Some other Chinese studies have also found that the intention to have only one child increased the preference for CS.^{18,19} Another study showed that the restricted family size had increased the risk of women choosing CS in the era of one-child policy.²⁰ Now without the family size control and being aware of their potentially subsequent delivery, women may consider the harms caused by CS for their further pregnancy more carefully. Therefore, the introduction of two-child policy may provide a chance to reduce the CS rate, especially among those who intend to have a second baby. Indeed, a study analyzing around seven million births found that CS rates declined steadily

after the relaxation of one-child policy, particularly among women with similar characteristics as our participants – the nulliparous and multiparous without a uterine scar.²¹

Furthermore, pregnant women aged 40 years and above were more likely to prefer CS. Some previous studies consistently reported that older pregnant women were more likely to have the preference for CS.^{14,22,23} Liang's study showed that more than 60% of women aged 40 years and above delivered by CS.²¹ With the implementation of the two-child policy, more women who already have the first child would give birth to the second one at an older age at which the risk of delivery complications increases and the chance of having previous CS is high. Therefore, it is essential to control the CS delivery in the two-child policy era, especially at the first birth.

Table 3 Multinomial logistic regression for the preference of delivery mode (reference group of outcome variable=VB)

	CS Adjusted RRR (95% CI)	No clear preference Adjusted RRR (95% CI)
Age (years)		
Under 40	Ref	Ref
40 and above	4.21 (1.43–12.40)**	1.78 (0.49–6.49)
Ethnicity		
Han	Ref	Ref
Minority	2.00 (1.17–3.41)*	0.98 (0.60–1.59)
Parity		
Nulliparous	Ref	Ref
Multiparous	1.34 (0.71–2.52)	0.63 (0.36–1.10)
Self-evaluated difficulty in getting pregnant		
Easy	Ref	Ref
Normal	0.98 (0.56–1.70)	1.33 (0.87–2.03)
Difficult	2.23 (1.20–4.13)*	1.97 (1.16–3.77)*
Doctor's suggestion		
VB	Ref	Ref
CS	5.23 (0.99–27.45)	5.44 (1.31–22.69)*
No clear suggestion	1.82 (0.73–4.50)	1.89 (0.89–4.02)
Husband's preference toward CS		
No	Ref	Ref
Yes	7.62 (4.00–14.54)***	1.65 (0.72–3.77)
Ideal children number		
0 or 1	Ref	Ref
2 or more	0.37 (0.22–0.61)***	0.73 (0.48–1.09)
Choosing lucky day for delivery		
No	Ref	Ref
Yes	12.36 (6.62–23.08)***	3.22 (1.60–6.50)**

Notes: *** $P < 0.001$, ** $P < 0.01$, * $P < 0.05$.

Abbreviations: VB, vaginal birth; CS, cesarean section; Ref, reference group of predictors; RRR, relative risk ratio.

Some cultural and social concerns also influence women's preference for delivery mode. In particular, the intention of choosing a lucky day for baby delivery had the most significant impact on the preference among Chinese. The lucky day, also known as "Auspicious day", is a social phenomenon specific to Chinese and some Asian populations.²⁴ Many Chinese believe that a person's fate is largely determined by the day or even the time they were born.²⁵ The CS allows them to choose an expectant day for childbirth. Some other studies

in China have also reported that the desire to select a specific day of birth was associated with the preference for CS.^{14,22,25,26} In addition, feeling it difficult to get pregnant increased the risks of preferring CS delivery and "no clear preference" response in our study sample. A baby successfully carried after mother experiencing a history of spontaneous abortion or a difficult time in becoming pregnant, was documented as a "precious fetus" on medical records in China.⁷ There was no clear clinical definition for "precious fetus", but the terminology was classified into "social factors".^{7,27} The percentage of CS performed for "precious fetus" was increasingly reported on women's medical records in various hospitals in China, and even became a leading non-medical cause for CS in some hospitals.^{7,27,28}

Being an ethnic minority was another culture-related factor that increased the risk of preferring CS. The relative risk of preferring CS was two times among ethnic minorities than among Han Chinese compared with that of preferring VB. A consistent finding was reported in the USA, which showed that the ethnic groups were more likely to prefer CS.^{26,29} Women's awareness of baby delivery was influenced by

Table 4 Ranking of main reasons for delivery mode preference among 103 women preferring CS

Ranking	Reasons	N	%
1	CS is safer than VB	53	51.5
2	CS is less pain than VB	42	40.8
3	CS is better for baby's health than VB	25	24.3
4	CS is better for women's health than VB	23	22.3
5	CS is better for couple's life than VB	9	8.7
6	CS is of lower cost than VB	6	5.8
7	Other reasons	6	5.8

Note: Women were asked to choose at most three important reasons for their preference of delivery mode.

Abbreviations: VB, vaginal birth; CS, cesarean section.

social norms, cultures, beliefs, and healthcare services.^{26,29,30} Mongolian minority is the dominant minority in Hohhot.³¹ They maintained unique social cultures and have their traditional Mongolian medicine healthcare system. Consistently, a recent study published in the *JAMA* showed that the northeast of Inner Mongolia has the highest CS rates ranging from 40% to more than 60% in 2014.⁶ Ethnic minorities collectively live in the northeastern part of Inner Mongolia especially the Mongolian Chinese.³¹

Husband's and doctor's preference or suggestion influenced the preference of a woman on delivery mode. Our study found that husband's preference for CS greatly increased women's preference for CS. Consistent findings were reported in previous studies, which indicated that husband preferring CS influenced women's preference for CS delivery during pregnancy,^{15,32} as well as the preference change from VB to the actually having CS.^{22,32} This preference change was also largely contributed to by the doctor's suggestion for CS.²² After adjusting the other factors, we found that the doctor's suggestion was not independently associated with women's preference for CS but associated with women having an unclear preference. There were still 10.9% of women having no clear preference for child delivery at the time of interview in our study. As they were indecisive in choosing CS or VB, their doctor's suggestions or appropriate education would have potential impacts on women's decision-making. Although the result of our study revealed only 139 (11.9%) of 1,169 participants reporting that they received doctor's suggestions, a large body of previous studies argued that doctors tended to suggest CS frequently to make profits, partly because of strong incentives by the fee-for-service payment system in China.^{7,8,22} However, to control such provider's effect on the increased CS rate, the number of CS cases performed for nonmedical indications was an indicator for evaluating the performance of the hospitals in recent years.²¹ Thus, doctors were less likely to be encouraged to suggest CS. On the other hand, the doctor-patient relationship in China has become increasingly deteriorated, and CS is performed as a defensive clinical practice to protect doctors from the fear of malpractice accusations.^{8,22} These complex concerns make doctors challenging to provide appropriate suggestions for women's delivery mode. Therefore, policy makers should take comprehensive consideration of these issues as an opportunity to control the unnecessary CS caused by the provider's effects.

Inappropriate awareness toward the benefit of CS was also a reason for women's preference for CS. Our participants choosing CS believed that CS was safer, less painful,

and better for their baby's health than VB. Inadequate knowledge about CS influenced women's decision-making for CS.¹⁵ Consistent findings in previous studies showed that women's fear of pain and their beliefs of CS as a means to ensure newborn survival or stillbirth contributed to women's intentions for CS and the high rate of CS.^{7,22,33-35}

Our study has some limitations. First, the small sample size in some categories of variables leads to wide confidence intervals in this cross-sectional study. Direct causal relationships could not to be obtained. Second, the face-to-face interview may introduce reporting bias, as participants might not be willing to express their sincere opinions or answers. Our questionnaire had few sensitive questions; women were provided the choice of "no clear preference" so that they did not answer the outcome question in a socially favorable way when they did have no clear decision. A pilot study was conducted to check the appropriateness of the items in the questionnaire. Therefore, the reporting bias in our study was considered well controlled and compromised for such the bias to a certain level. Third, the sample recruited from all tertiary hospitals of only one city limits the generalization of the results of this study to the whole of Inner Mongolia. The findings may not be nationally representative and should not be extrapolated to rural areas or to other cities in China, because of significant regional difference in local health, medical care service and social culture.

Conclusion

Less than one-tenth of the study subjects preferred CS. This preference was associated with fertility intention to have more than one child and the advice from their husband. With the current two-child policy allowing couples to have more than one child and such influence, the pattern of overall CS should decline in the future. The fact that women's decisions for CS delivery were still strongly influenced by their inappropriate awareness of CS and social beliefs of choosing a lucky day for birth requires a change in health policy. Health promotion programs for controlling unnecessary CS should also consider these factors, as well as focus on the group of ethnic minorities and pregnant women aged more than 40 years old.

Acknowledgments

This study is a part of the Huijuan Liang's thesis in partial fulfillment of the requirements for a PhD at Prince of Songkla University, Thailand, and the China Medical Board under the project of "A second collaborative program to improve the health research capacity of western medical universities

in China and Prince of Songkla University (14-181)".³⁶ We thank the Research Institute for Health Policy of Inner Mongolia, Inner Mongolia Medical University. The authors would also like to thank all participants enrolled in this study.

Disclosure

The authors report no conflicts of interest in this work.

References

- Betran AP, Torloni MR, Zhang JJ, Gulmezoglu AM; WHO Working Group on Caesarean Section. WHO statement on caesarean section rates. *BJOG*. 2016;123(5):667–670.
- Blustein J, Liu J. Time to consider the risks of caesarean delivery for long term child health. *BMJ*. 2015;350:h2410.
- World Health Organization Human Reproduction Programme. WHO statement on caesarean section rates. *Reprod Health Matters*. 2015; 23(45):149–150.
- Vogel JP, Betrán AP, Vindevoghel N, et al. Use of the Robson classification to assess caesarean section trends in 21 countries: a secondary analysis of two WHO multicountry surveys. *Lancet Glob Health*. 2015;3(5):e260–e270.
- Lumbiganon P, Laopaiboon M, Gülmezoglu AM, et al. Method of delivery and pregnancy outcomes in Asia: the WHO global survey on maternal and perinatal health 2007–08. *Lancet*. 2010;375(9713):490–499.
- Li HT, Luo S, Trasande L, et al. Geographic variations and temporal trends in caesarean delivery rates in China, 2008–2014. *JAMA*. 2017;317(1): 69–76.
- Feng XL, Wang Y, An L, Ronsmans C. Caesarean section in the People's Republic of China: current perspectives. *Int J Womens Health*. 2014;6: 59–74.
- Deng W, Klemetti R, Long Q, et al. Caesarean section in Shanghai: women's or healthcare provider's preferences? *BMC Pregnancy Childbirth*. 2014;14:285.
- Wang E. Requests for cesarean deliveries: the politics of labor pain and pain relief in Shanghai, China. *Soc Sci Med*. 2017;173:1–8.
- Hou L, Li G, Zou L, et al. [Caesarean delivery rate and indications in mainland China: a cross sectional study in 2011]. *Zhonghua Fu Chan Ke Za Zhi*. 2014;49(10):728–735. Chinese.
- Liu Y, Li G, Chen Y, et al. A descriptive analysis of the indications for caesarean section in mainland China. *BMC Pregnancy Childbirth*. 2014; 14:410.
- Zeng Y, Hesketh T. The effects of China's universal two-child policy. *Lancet*. 2016;388(10054):1930–1938.
- Wang J. The influence of fertility policy adjustment to the birth population size in China. *Popul J*. 2015;37(2):22–23.
- Wang L, Xu X, Baker P, et al. Patterns and associated factors of caesarean delivery intention among expectant mothers in China: implications from the implementation of China's New National Two-Child Policy. *Int J Environ Res Public Health*. 2016;13(7):686.
- Zhang H, Wu J, Norris J, Guo L, Hu Y. Predictors of preference for caesarean delivery among pregnant women in Beijing. *J Int Med Res*. 2017; 45(2):798–807.
- Gu B. [Fertility intention, fertility behavior and fertility level]. *Popul Res*. 2011;35(2):44. Chinese.
- Jiang Q, Li Y, Sanchez-Barricarte JJ, Intention F. Fertility intention, son preference, and second childbirth: survey findings from Shaanxi Province of China. *Soc Indic Res*. 2016;125(3):935–953.
- Zhu X, Gu C, Tao H, Ding Y, Ye J, Bao B. [Survey on normal primipare's expected mode of delivery and its influencing factors under two-child policy]. *Chin J Nurs*. 2016;51(9):5. Chinese.
- Ji H, Yang L, Yang L, Ye Q, Jiang H, Qian X. [Study on the correlation between self-efficacy, fertility desire and intention of cesarean section of the women during the second trimester of pregnancy]. *Matern Child Health Care China*. 2012;27:5. Chinese.
- Li J, Meng L, Shen K. [The effect of family size on women's delivery decision – empirical evidence from family economics perspective]. *Chin J Econ*. 2015;2(2):18. Chinese.
- Liang J, Mu Y, Li X, et al. Relaxation of the one child policy and trends in caesarean section rates and birth outcomes in China between 2012 and 2016: observational study of nearly seven million health facility births. *BMJ*. 2018;360:k817.
- Shi Y, Jiang Y, Zeng Q, et al. Influencing factors associated with the mode of birth among childbearing women in Hunan Province: a cross-sectional study in China. *BMC Pregnancy Childbirth*. 2016;16:108.
- Huang K, Tao F, Faragher B, et al. A mixed-method study of factors associated with differences in caesarean section rates at community level: the case of rural China. *Midwifery*. 2013;29(8):911–920.
- Yamasmit W, Chaithongwongwatthana S. Attitude and preference of Thai pregnant women towards mode of delivery. *J Med Assoc Thai*. 2012; 95(5):619–624.
- Lo JC, Jc L. Patients' attitudes vs. physicians' determination: implications for cesarean sections. *Soc Sci Med*. 2003;57(1):91–96.
- Washington S, Caughey AB, Cheng YW, Bryant AS. Racial and ethnic differences in indication for primary cesarean delivery at term: experience at one U.S. Institution. *Birth*. 2012;39(2):128–134.
- Zhuo H. [Reasons and strategies for the increasing rate of cesarean section caused by social factors]. *J Med Theory Pract*. 2014;27(17):3. Chinese.
- Zhao Lp SJ, Ho X. Changing cesarean section rate and indication in 1990 and 2002. *Matern Child Health Care China*. 2005;20:1341–1342. Chinese.
- Janevic T, Loftfield E, Savitz DA, Bradley E, Illuzzi J, Lipkind H. Disparities in cesarean delivery by ethnicity and nativity in New York city. *Matern Child Health J*. 2014;18(1):250–257.
- Kennedy HP, Grant J, Walton C, Sandall J. Elective caesarean delivery: a mixed method qualitative investigation. *Midwifery*. 2013;29(12): e138–e144.
- The 6th National Population Census Leading Group Office of the Inner Mongolia Autonomous Region, the Statistical Bureau of the Inner Mongolia Autonomous Region. *2010 Inner Mongolia Autonomous Region Population Census Data*. Beijing: China Statistics Press; 2012.
- Li WY, Liabsuetrakul T, Stray-Pedersen B. Change of childbirth preference after delivery among nulliparous Chinese women and their partners. *J Obstet Gynaecol Res*. 2014;40(1):184–191.
- Ouyang YQ, Zhang Q. A study on personal mode of delivery among Chinese obstetrician-gynecologists, midwives and nurses. *Arch Gynecol Obstet*. 2013;287(1):5–41.
- Lee LY, Holroyd E, Ng CY, Cy N. Exploring factors influencing Chinese women's decision to have elective caesarean surgery. *Midwifery*. 2001;17(4):314–322.
- Li X, Wang T, Xu L, Gao J. Caesarean section rate and its influence factors in China. *Chin J Public Health*. 2006;22(1):2. Chinese.
- Liang H. *A second collaborative program to improve the health research capacity of western medical universities in China and Prince of Songkla University (14-181)* [doctoral thesis]. Hat Yai: Prince of Songkla University; 2018.

Patient Preference and Adherence

Dovepress

Publish your work in this journal

Patient Preference and Adherence is an international, peer-reviewed, open access journal that focuses on the growing importance of patient preference and adherence throughout the therapeutic continuum. Patient satisfaction, acceptability, quality of life, compliance, persistence and their role in developing new therapeutic modalities and compounds to optimize

clinical outcomes for existing disease states are major areas of interest for the journal. This journal has been accepted for indexing on PubMed Central. The manuscript management system is completely online and includes a very quick and fair peer-review system, which is all easy to use. Visit <http://www.dovepress.com/testimonials.php> to read real quotes from published authors.

Submit your manuscript here: <http://www.dovepress.com/patient-preference-and-adherence-journal>