

Intentions and influencing factors regarding natural childbirth among urban pregnant women in China, based on the theory of reasoned action and structural equation modeling

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Abstract

Objectives: In the present study, we aimed to analyze the status of natural childbirth and factors influencing delivery behaviors among pregnant women in urban areas based on the theory of reasoned action, to provide a basis for health education on natural childbirth.

Methods: We recruited 658 pregnant women at West China Second University Hospital, Sichuan University. Using a literature review, expert consultation, and self-report questionnaires based on the theory of reasoned action, we investigated delivery behaviors and influencing factors among the included pregnant women. The questionnaires primarily comprised general situations and behavioral intentions regarding natural childbirth among pregnant women. The data were analyzed using IBM SPSS 21.0 software.

Results: According to structural equation modeling, participants' behavioral intentions regarding natural childbirth were influenced by normative beliefs (standardized regression coefficient 0.402), outcome evaluation (standardized regression coefficient 0.123), and behavioral beliefs (standardized regression coefficient 0.316). Conformity motivation and knowledge about childbirth affected the choice of natural childbirth via normative beliefs (standardized regression coefficients 0.431 and 0.338, respectively).

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Conclusions: We found that the behavioral intentions of urban pregnant women with respect to natural childbirth were affected by normative beliefs, outcome evaluations, behavioral beliefs, conformity motivation, and knowledge about childbirth.

Keywords

Natural childbirth, behavioral intention, theory of reasoned action, structural equation modeling, influencing factors, pregnant women

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Introduction

Pregnancy and childbirth are normal and natural physiological phenomena in women of childbearing age. Most women of a suitable age can give birth naturally to a healthy baby via the vagina. Cesarean section is an essential first aid measure to resolve severe complications during pregnancy, abnormal labor, and dystocia; this procedure saves the lives of mothers and infants.¹ An increase in the rate of cesarean sections as well as recent establishment of the second child policy in China has placed the spotlight on natural childbirth in all sectors of Chinese society and has drawn considerable attention from the National Health and Family Planning Commission.² There is extensive literature on the factors influencing natural childbirth behavior in China, but most studies lack theoretical bases and guidance.³⁻⁵

The theory of reasoned action (TRA) was first proposed by American scholars Fishbein and Ajzen in the 1970s.⁶ The premise of this theory is based on the following. 1) People's behavior is mostly controlled by their own will and rationale. 2) Whether a person engages in a behavior directly depends on their intention to act.⁷ According to the TRA, the most direct determinant of whether an action takes place is the intent to act, i.e., whether the

act is or is not intended to be carried out. The subjective behavioral norms and attitudes of individuals are important factors that determine behavioral intentions. Personal behavioral patterns are determined by individual beliefs, i.e., whether certain people approve or disapprove of the behavior influences whether the individual decides to conform to the opinions of these people. Many international research studies have used TRA as a theoretical framework to analyze and predict individual behavior, especially in the field of social psychology. The TRA can successfully predict behavior and behavioral intentions in multiple domains;^{8,9} however, the theory has rarely been used in China. Based on the TRA, we comprehensively investigated the behavioral intention of pregnant women in Chengdu regarding natural childbirth and its related influencing factors, to provide a theoretical basis for future intervention strategies.

Structural equation modeling (SEM) is an excellent method that is widely used in social science research.¹⁰ This method gained recognition in the 1980s, but SEM is poorly understood and rarely used in China. Traditional statistical methods cannot solve a problem dealing with relationships among multiple causes and outcomes at the same time or when there is a need to handle unobservable variables

(i.e., latent variables), such as in the fields of social science, management, marketing, and economics.¹¹ SEM makes up for the shortcomings of traditional statistical methods.¹² The technique has developed rapidly and has become an essential tool in multivariate data analyses.¹³ SEM can consider and process multiple dependent variables simultaneously. SEM can process variables (latent variables) that cannot be observed directly, and adopts a more flexible measurement model than other statistical methods. Therefore, in this study, we used SEM to analyze factors influencing the behavioral intentions of pregnant women regarding natural childbirth.

Materials and methods

Participants

Between December 2017 and February 2018, we recruited pregnant women at West China Second Hospital of Sichuan University to participate in our study. The inclusion criteria were: 1) 37 to 40 weeks pregnant and primipara with a single live fetus; 2) voluntary participation in the study and providing a signed informed consent; and 3) able to read and express themselves well in spoken language. The exclusion criteria were: 1) pregnant women with indications for cesarean section; 2) twin or multiple pregnancies, fetal malformation, stillbirth, and so on; 3) mental disorders that cause difficulty with communication; and 4) reluctance to participate in the study after receiving an explanation. We excluded data from participants who withdrew from the study and from questionnaires with missing values.

Methods

A questionnaire was designed based on the theory of rational behavior (TRA) and by consulting extensive literature and clinical

outcomes. Experts' opinions were sampled and revised repeatedly. The final questionnaire was drawn up after a preliminary investigation and comprised two parts: 1) general information, and 2) behavioral intentions and influencing factors regarding natural childbirth. General information comprised 25 items, including age, education level, height, weight before pregnancy, family members and conditions, economic conditions, pregnancy, and childbirth history. The natural delivery behavioral intention portion of the questionnaire was made up of 85 items, including knowledge about childbirth, factors considered in choosing the childbirth mode, and attitudes toward and behavioral intentions regarding natural childbirth. After calculation, the item content validity index (I-CVI) ranged from 0.8333 to 1.0000; the scale-level CVI, universal agreement (S-CVI/UA) value was 0.9587; and the average S-CVI (S-CVI/Ave) value was 0.9914. In the pre-survey, the Cronbach's alpha coefficient of the questionnaire was 0.853. Then, the reliability of the formal survey data was analyzed using IBM SPSS 21.0 (IBM Corp., Armonk, NY, USA); the Cronbach's alpha coefficient of the formal questionnaire was 0.872.

This was a cross-sectional survey, demonstrating three levels of intensity.^{14,15} According to data of the World Health Organization, the rate of cesarean section in China is 46.5%;¹⁶ sample content was calculated according to a rate of 53.5% for natural delivery. The sample size was calculated as follows:

$$n = \left(\frac{Z_{\alpha/2}}{\delta} \right)^2 \pi(1 - \pi)$$

where $\alpha = 0.05$, $Z_{0.05/2} = 1.96$, δ is the allowable error (i.e., 5%), and $\pi = 0.535$.

Therefore,
 $n = \left(\frac{1.96}{0.05} \right)^2 \times 0.535 \times 0.465 = 597$.

The total sample size was estimated to be 656 participants, taking into account missed visits during the investigation process; the rate of missed visits was estimated to be 10%.

Structural equation modeling

This study was based on the TRA, where logical relationships between potential variables and observation variables (measurement model), and potential variables and potential variables (structural model) are established. The premise of rational behavior theory is that individual behavior is determined by behavioral intention, and behavioral intention depends on behavioral attitudes and subjective norms. Behavioral attitudes are determined by the individual's belief in the results of a behavior (behavioral belief) and evaluation of the consequences of a behavior (outcome evaluation). Subjective norms are determined by the expectations (normative beliefs) of people believed by the individual to have an important influence on them, as well as the motivation (compliance motivation) of the individual to satisfy these peoples' expectations.¹⁷

First, we set variables based on the rational behavior theory. We then established endogenous potential variables (depending on the variable, this refers to variables that will be affected by any variable in the model). The behavioral intentions of pregnant women determined whether they choose or do not choose natural childbirth. Exogenous potential variables (independent variables, referring to variables that are not affected by other variables in the model but that directly affect other potential variables) were measured with respect to knowledge and subjective norms with respect to natural childbirth behavioral intentions. Subjective norms are measured according to the beliefs of the surrounding population regarding natural childbirth and the

individual's compliance with the opinions of the surrounding population. The attitudes and behavioral intentions regarding natural childbirth during pregnancy are both potential variables; these are not only influenced by external variables but also by other variables, so they are called mediating variables. The intentions and attitudes during pregnancy regarding natural childbirth were measured by the belief in the importance of natural childbirth to maternal and child health.

Because the variable names were long and complex, we first named the observed and latent variables involved in the structural equation. The specific setting of the variables and assignment of the observed variables are shown in Table 2. An initial model was then designed using IBM SPSS Amos 21.0 software, based on theoretical assumptions (Figure 1).

We made the following assumptions about the revised model, based on the initial model. 1) Because the coefficient path between knowledge and natural childbirth was not statistically significant, this path was deleted. 2) Because the coefficient path between compliance motivation and natural childbirth was not statistically significant, this path was deleted. 3) According to the estimated modification index (MI) value, the covariant relationships between E1 and E2, E13 and E14, E29 and E30, E24 and E25, and E20 and E38 were established. Via analysis and consideration of the above situation, we adjusted and revised the model, to establish the final model. The revised model is shown in Figure 1.

The analysis of the modified model yielded the following results: $\chi^2 = 1452.831$, $\chi^2/df = 2.996$, confirmatory fit index (CFI) = 0.906, parsimonious CFI (PCFI) = 0.832, normed fit index (NFI) = 0.865, PNFI = 0.795, and root mean square error of approximation (RMSEA) = 0.055. The fitting effect of the modified model was superior.

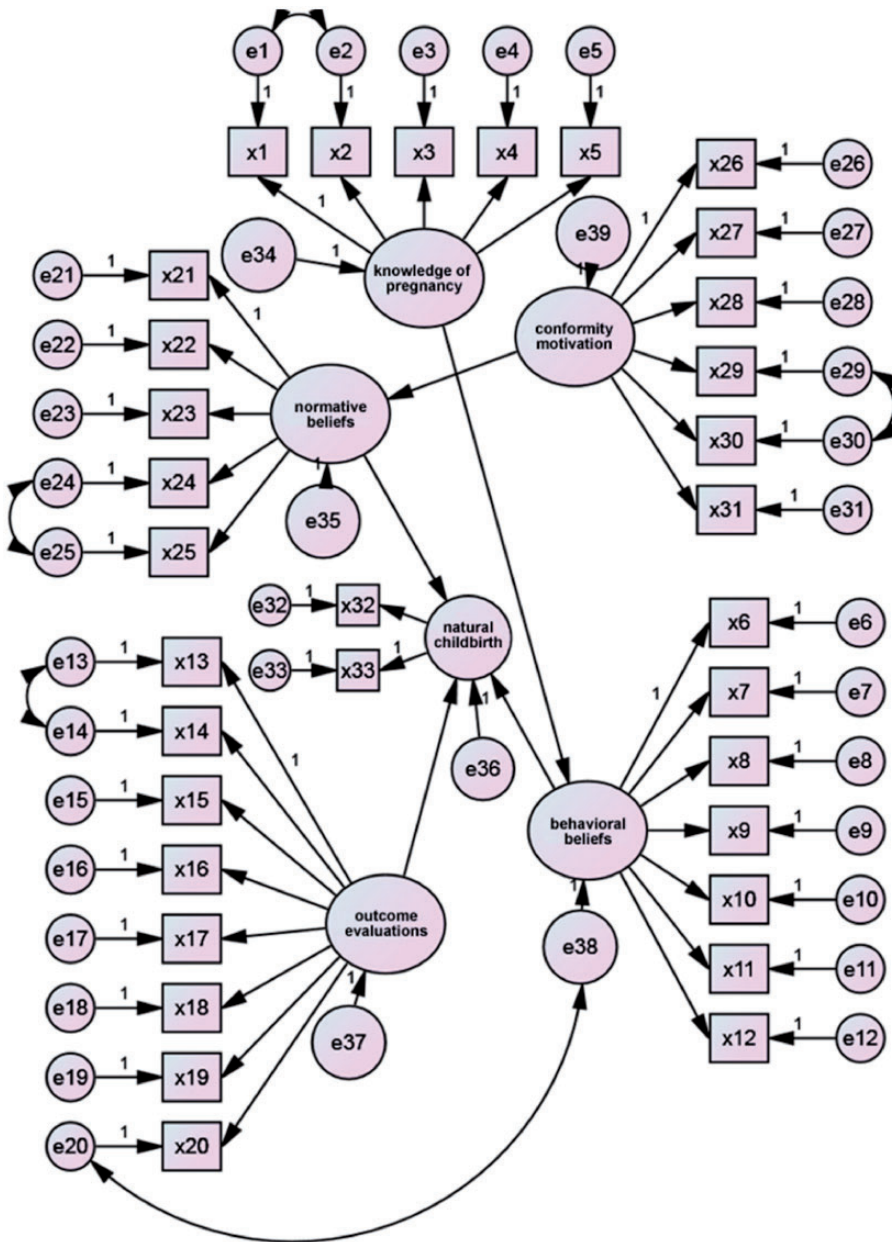


Figure 1. Final model

Data collection

After eligible participants had been informed about the study procedures, confidentiality, and safety and had consented

to participate, the questionnaires were administered. Completed surveys were collected immediately upon completion and carefully checked by the investigators. Questionnaires containing unclear or

incomplete responses were reviewed together with respondents, and errors were corrected in a timely manner. The survey lasted 15 to 20 minutes. Respondents could refuse to participate in the survey. After collecting the questionnaires, they were uniformly coded, sorted, and properly stored.

Ethics approval was provided by the Medical Ethics Committee of West China Second Hospital of Sichuan University.

Results

General information

In this study, 670 questionnaires were administered, and 666 were returned, with a response rate of 99.40%. Questionnaires with missing values (>20%) were excluded. A total of 658 valid questionnaires were completed, with an efficiency rate of 98.8%.

The included pregnant women were mainly of Han ethnicity, aged 30 ± 4.1 years. The average age of participants' spouses was 31 ± 5.3 years. A total 68.69% of the pregnant women had an undergraduate education or higher, and 73.10% of spouses had a bachelor's degree or higher. Among all participants, 81.76% were planned pregnancies, and 76.14% had a monthly household income of more than 4000 RMB. Participants' pre-pregnancy body mass index (BMI) values were

mostly within the normal range, with a proportion of low BMI before pregnancy of 21.58%. Participants were at 37.5 + 0.828 weeks' gestation, attended an average of eight antenatal examinations, and attended birth class less than once, on average. Additional obstetric characteristics of participants are presented in Table 1.

Results of structural equation modeling

The results of structural equation model fitting showed the following. Normative beliefs had a direct impact on pregnant women's choice of natural childbirth (standardized regression coefficient 0.402). Compliance motivation indirectly affected

Table 2. Variables included in the structural equation

Latent variables (code)	Observed variables (code)
Knowledge	Do you know about the benefits of natural childbirth? (X1)
	Do you know about the dangers of cesarean section? (X2)
	Do you know how to relieve the pain of natural childbirth? (X3)
	Do you know what a doula is? (X4)

Results of model analysis: $\chi^2 = 1964.607$, $\chi^2/df = 4.026$, CFI = 0.856, PCFI = 0.791, NFI = 0.818, PNFI = 0.756, and RMSEA = 0.068. The model was acceptable according to these findings; its suitability was also acceptable.

Table 1. Clinical data of pregnant women (N = 658)

Project	Mean number	Standard deviation
Months preparing for natural pregnancy	3.264	5.323
Gestational age (wk)	37.500	0.828
Number of antenatal care visits	8.388	1.971
First week attended antenatal care	10.538	3.604
Number of times attending birth class	0.807	1.575
First week attended birth class	7.588	11.588
Number of natural abortions	0.237	0.585
Number of abortions	0.508	0.826

the choice of natural childbirth by directly influencing normative beliefs (standardized regression coefficient 0.431). Outcome evaluation had a direct impact on the choice of natural delivery among pregnant women (standardized regression coefficient 0.123). Behavioral beliefs also had a direct impact on pregnant women's choice of natural childbirth (standardized regression coefficient 0.316). Finally, knowledge indirectly affected the choice of natural childbirth by directly influencing behavioral beliefs (standardized regression coefficient was 0.338).

Discussion

Participants' intentions regarding natural childbirth

Among the 658 pregnant women included this study, most chose natural delivery. However, 12.01% of participants were unwilling to delivery naturally. There were no significant differences in general conditions such as maternal age. More than half of women who chose cesarean birth did so primarily because they feared the pain of natural childbirth. Second, participants worried about not being able to successfully deliver naturally and had such concerns as natural birth taking too long, involving too much risk, and affecting their sex life. Pain is an independent risk factor for adverse mood during childbirth.¹⁸ Pain stimulates neuroendocrine changes in pregnant women, excites sympathetic nerves, and releases catecholamines, leading to increased blood pressure in women during childbirth.¹⁹ This can cause serious problems such as fetal ischemia, hypoxia, and fetal distress.²⁰ Therefore, obstetricians should assess the degree of pain in a timely manner and should actively intervene while preparing for delivery.

A considerable number of studies have shown that full expansion and squeezing of the birth canal is conducive to the

structural and functional development of the neonatal respiratory system and motor nervous system functions, as well as the future development of intelligence in the infant.²¹ Uterine contractions can promote milk secretion and help postpartum recovery in the mother; contractions also contributes to the discharge of postpartum lochia and reduce the risk of postpartum hemorrhage. The promotion and use of the new birth chart in China encourages reduced restrictions on birth process time and advocates for the reduction of interventions in the birth process.²² Because no regulations in China specify the time of childbirth, it is suggested that excessive intervention should be avoided, to allow the birth canal to expand fully. All sectors of society should strive to deepen their awareness about and understanding of the concept of natural childbirth so that pregnant women will realize that natural childbirth is the normal physiological process of human reproduction. In this way, more women will come to believe that they and their fetus have the potential to actively participate in and successfully complete the natural childbirth process.

Normative beliefs and compliance motivation

Normative beliefs refer to pregnant women's explicit recognition of certain results caused by intentional guidance regarding natural childbirth; compliance motivation refers to the degree of recognition of and compliance with similar normative beliefs. Research data show that normative beliefs have a direct impact on pregnant women's choice of natural childbirth. Compliance motivation indirectly affects the choice of natural childbirth by directly influencing normative beliefs. The observed variable of normative beliefs in this study was the perception of natural childbirth by people surrounding the

pregnant women. The observed variable of compliance motivation in this study was whether women agreed with the opinions of the people around them. Our findings showed that the normative beliefs of pregnant women who prioritized others' opinions on natural childbirth over their own affected their behavioral intention regarding natural childbirth. In our investigation, the opinions of mothers, mothers-in-law, and husbands had a greater impact on the natural childbirth behavioral intentions of pregnant women, with mothers having the largest impact. These findings are consistent with previous research.²³ We found that the mothers of 91.64% of pregnant women supported natural birth, and mothers were often the deciding factor in their daughter's choice to have cesarean birth. The ability of mothers to influence their daughters' decisions could stem from most pregnant women of childbearing age being young themselves. Parents sometimes do not want to see their children suffer in the least, so they hope to influence their daughters to select a quicker and more convenient cesarean birth. In addition, low educational level among mothers and a lack of adequate knowledge about natural childbirth are important factors affecting the behavioral intentions of pregnant women in natural childbirth. Therefore, it is imperative to properly guide mothers of pregnant women and provide them with necessary education on natural childbirth. This will enhance the self-confidence of pregnant women and will improve their ability to cope with natural childbirth, to improve their behavioral intention to have natural delivery.²⁴ This should begin by addressing the concerns of pregnant women, mothers, and others using properly designed health education and strengthening health guidance and knowledge for pregnant women, which will help them to make vital decisions and be able to self-govern their natural childbirth behavioral intentions.

Behavioral beliefs and outcome evaluation

Behavioral intentions of natural childbirth and the results of outcome evaluation showed that behavioral beliefs had a direct impact on pregnant women's choice of natural childbirth (standardized regression coefficients 0.316 and 0.123, respectively). Accordingly, beliefs about natural childbirth among pregnant women that they could breastfeed as early as possible after delivery and that they would experience less harm during delivery directly affected their behavioral intentions. Therefore, in community health centers, hospitals, and pregnancy education classes, improved information should be provided about breastfeeding and the advantages of natural childbirth and postpartum recovery, to effectively influence natural childbirth behavioral intentions in pregnant women. Images can be used in prenatal education to make comparisons between postpartum outcomes of cesarean and natural births, which will be useful to visually promote and encourage pregnant women to choose natural childbirth.²⁵ We found that knowledge about childbirth also indirectly affected behavioral intention in pregnant women by directly influencing their behavioral beliefs (standardized regression coefficient 0.338). The observed variables in this study were included to show the benefits of natural childbirth and the harm that can be caused in cesarean section (standardized regression coefficients 0.481 and 0.600, respectively). We can conclude from our findings that pregnant women can learn and understand the benefits of natural childbirth and the risk of cesarean section to the mother and infant, improve their knowledge about childbirth, change their attitudes about childbirth, and ultimately make better behavior-related decisions regarding childbirth.²⁶

Declaration of conflicting interest

The authors declare that there is no conflict of interest.

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