

Original Article

# Effects of Birth Plan on the Management of Childbirth Anxiety

Li-Hua Huang<sup>1,2,3</sup>, Shu-Hsin Lee<sup>1,2</sup>, Jui-Yen Wu<sup>1,2</sup>, Su-Chen Kuo<sup>4\*</sup>

<sup>1</sup> Department of Nursing Chung Shan Medical University Hospital, Taichung, Taiwan

<sup>2</sup> School of Nursing, Chung Shan Medical University, Taichung, Taiwan

<sup>3</sup> Department of Maternity Care Center, Chung Shan Medical University Hospital, Taichung, Taiwan

<sup>4</sup> College of Nursing, Taipei University of Nursing and Health Sciences, Taipei, Taiwan

**Background:** A negative childbirth experience can impact on a mother's subsequent childbirth experiences. Few studies have addressed the effectiveness of the birth plan for managing the anxiety of expectant mothers.

**Purpose:** To evaluate the effects of birth plan on childbirth anxiety among expectant mothers.

**Methods:** This case-control study was conducted in the birth unit of a medical center in central Taiwan. Eligible expectant mothers were recruited and randomly allocated into experimental group (n = 73) and control group (n = 75). The experimental group was provided with care according to a birth plan, and the control group was provided with standard care. In addition to demographic and childbirth information, Stat-Trait Anxiety Inventory (STAI) was used as an assessment instrument in this study.

**Results:** The experimental group had a significantly lower degree of childbirth anxiety ( $t = 5.91, p < .001; F = 2.65, p < .001$ ).

**Conclusion:** Birth plan may contribute to reduced childbirth anxiety among expectant mothers. Health professionals can educate expectant parents about developing a birth plan. Mothers with birth plans feel respected and well treated and have more positive feelings about the childbirth experience.

**Keywords:** birth plan, childbirth anxiety, expectant mothers

## Introduction

The birth experiences of mothers can affect the general public's view on childbirth<sup>[1]</sup>. A positive birth experience can improve child-parent relationships and lead to the development of harmonious families and a peaceful society. On the other hand, negative birth experiences may have short- and long-term implications such as mother-infant bonding problems and postpartum depression that can affect the mother's

role and the development of the infant<sup>[2,3,4]</sup>.

Pre-childbirth care for expectant mothers in Taiwan includes enema, shaving of pubic hair, fasting, intravenous injections, and perineal incisions during delivery. However, this is contrary to the World Health Organization (WHO) guidelines on regular childbirth care and women's rights<sup>[5]</sup>. In some hospitals, mothers are not encouraged to walk or to do activities during labor. They are forced to lie on a small delivery table with limited mobility, without freedom or control over their situation. Such treatment may increase the pain of contractions and feelings of unease and anxiety<sup>[4,6]</sup>. If an expectant mother's stress level increases, secretion of adrenaline will be stimulated, resulting in increased pain, inhibited uterine muscle activity, and risks to both the mother and infant<sup>[7]</sup>.

\* Corresponding Author: Su-Chen Kuo

Address: No. 365, Ming-Te Road, Peitou District, Taipei, 112, Taiwan

Tel: +886-2-28227101 ext. 3264

E-mail: suchen@ntunhs.edu.tw

**Table 1. Experimental Group Pre-Labor Birth Plan Conformity (N = 73)**

Items	Choice	Conformity	Non-conformity	Reason for Non-conformity
	n (%)	n (%)	n (%)	
<b>Activity</b>				
Continual motion (walking and swaying)	68 (93.2)	47 (69.1)	21 (30.9)	21 subjects were on bedrest due to epidural
Moving freely on bed	5 (6.8)	5 (100)	0 (0)	
<b>Fetal monitor</b>				
Intermittent	72 (98.6)	50 (69.4)	22 (30.6)	21 subjects were continually monitored due to epidural 1 subject was continually monitored due to slowing of fetal heart rate
Continual	1 (1.4)	1 (100)	0 (0)	
<b>Enema</b>				
Accepted	20 (27.4)	13 (65)	7 (35)	6 subjects did not undergo enema due to natural rupture of amniotic sac  1 subject did not undergo enema due to strong contractions
Not accepted	48 (65.8)	48 (100)	0 (0)	
Other (situational)	5 (6.8)			
<b>Intravenous Transfusion</b>				
Accepted	18 (24.7)	18 (100)	0 (0)	
Not accepted	49 (67.1)	38 (77.6)	11 (22.4)	11 subjects required intravenous transfusion due to epidural
Other (situational)	6 (8.2)			
<b>Non-medical Pain Relief Choices</b>				
Music	11 (15.1)	9 (81.8)	2 (18.2)	2 subjects forgot their music player
Water (shower)	1 (1.4)	1 (100)	0 (0)	
Hot and cold therapy	39 (53.4)	39 (53.4)	0 (0)	
Massage	56 (76.7)	56 (100)	0 (0)	
Birthing ball	46 (63)	33 (71.7)	13 (28.3)	13 subjects were on bed-rest due to epidural
Other (breathing technique)	1 (1.4)	1 (100)	0 (0)	
<b>Medical Pain Relief Choices</b>				
Analgesic Injection	14 (19.2)	1 (7.1)	13 (92.9)	10 subjects used muscle

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Epidural	16 (21.9)	13 (81.3)	3 (18.8)	relaxant to replace analgesics, 3 subjects did not use any medication due to acceptable pain levels
Other (situational)	43 (58.9)			3 subjects did not use epidural due to acceptable pain levels

Note: options with † included multiple choices

The birth rate among women of childbearing age in Taiwan decreased from 1.7‰ to 1.2‰ from 2000 to 2016<sup>[8]</sup>. If the childbirth experience is unpleasant, the national birthrate may further decline. The majority (99.9 %) of Taiwanese mothers deliver their babies in a hospital. Expectant mothers often are subjected to a series of medical treatments when admitted to the hospital. A birth plan can aid expectant mothers to communicate with health care providers, as well as to voice their opinions, express their needs, and ensure their rights in making individualized decisions<sup>[9,10]</sup>.

Currently, there is a lack of investigations in Taiwan on the effects of birth plan on childbirth anxiety of expectant mothers. Therefore, the aim of this study was to provide an evidence-based reference for clinical health care professionals for the care of expectant mothers. Nursing personnel may aid in the reduction of anxiety of expectant mothers by following a birth plan.

## Methods

### 1. Research Population

This was an experimental study. Eligible subjects were enrolled in prenatal outpatient department. Inclusion criteria were: (1) first-childbirth experience; (2) married and 34-36 weeks pregnant; (3) at least 18 years of age; (4) literate and able to communicate in Mandarin Chinese or Taiwanese; (5) not scheduled for C-section; (6) neither mother nor infant has any complications; (7) singleton pregnancy; and (8) accompanied by husband to prenatal check-ups. Multigravidas, multifetal pregnancies and high-risk pregnancies were excluded from this study. This research was approved by the hospital institutional review board (CS09167).

The sample population was calculated using G-Power 3.0 (Windows), with reference to the birth plan research performed by Kuo et al. (2010)<sup>[9]</sup>, where power = 0.8,  $\alpha = 0.05$ , and effect size = 0.25. An effective sample size of 51 subjects per group was estimated. As dropout rate of 20 % was estimated, a total of 150 subjects was required. Subjects were randomly assigned to experimental and control groups, based on the method described by Saghaei (2004)<sup>[11]</sup>. The subjects consisted of expectant mothers who visited a medical center in central Taiwan for prenatal examinations. At 32-weeks of pregnancy, women were asked to participate in a monthly educational class that introduced the Lamaze breathing techniques.

### 2. Demographic and obstetric data

Demographic and obstetric information of expectant mothers including age, educational level, occupation, family income, gestational age, planned pregnancy, attendance of childbirth education course, information resources and main accompanying person during labor was collected.

### 3. Questionnaire

(a) State-Trait Anxiety Inventory Mandarin (STAI-Mandarin)

STAI was developed by Spielberger, Gorsuch, and Lushene in 1970<sup>[12]</sup>. Every item has four responses scored from not at all (1 point) to very much (4 points). Every section is comprised of 20 questions with a total possible score of between 20 and 80 points. The reversed scoring items in the state and trait anxiety indexes were 10 and 7, respectively. Lower score indicates lower anxiety level. STAI assesses the anxiety levels of expectant mothers before and during labor. Spielberger

**Table 2. Experimental Group Labor Birth Plan Conformity (N = 73)**

Items	Choice	Conformity	Non-conformity	Reason for non-conformity
	n (%)	n (%)	n (%)	
<b>Labor Position<sup>†</sup></b>				
Kneeling	13 (17.8)	9 (69.2)	4 (30.8)	4 subjects did not use the kneeling position due to weakness
Semi-sitting	54 (74)	54 (100)	0 (0)	
Squatting	9 (12.3)	7 (77.8)	2 (22.2)	2 subjects did not use the squatting position due epidural
Sitting	20 (27.4)	20 (100)	0 (0)	
<b>Shaving of Public Hair</b>				
Partially	13 (17.8)	13 (100)	0 (0)	
No shaving	54 (74)	48 (88.9)	6 (11.1)	6 subjects were shaved during emergency C-section due to ruptured amniotic sac for more than 24 hours and delayed labor.
Other (situational)	6 (8.2)			
<b>Perineal Incisions</b>				
Physician decision	31 (42.5)	31 (100)	0 (0)	
Performed only when necessary to protect the mother or infant	41 (56.2)	41 (100)	0 (0)	
Other (situational)	1 (1.4)			
<b>Husband Cutting of Umbilical Cord</b>				
Willing	27 (37)	24 (88.9)	3 (11.1)	3 subjects underwent emergency C-section due to ruptured amniotic sac for more than 24 hours and non-LOA position, thus the husbands were unable to cut the umbilical cord.
Unwilling	44 (60.3)	44 (100)	0 (0)	
Other (situational)	2 (2.7)			

Note: options with <sup>†</sup> included multiple choices

suggested that state-anxiety index be completed before trait-anxiety index. The validities of the indexes were both 0.01, suggesting a good level of concurrent validity. Cronbach's  $\alpha$ s for the state and trait indexes were 0.90 and 0.86, respectively. A

study by Hall et al. in 2009 indicated a Cronbach's  $\alpha$  of 0.93 for the state-anxiety index<sup>[13]</sup>. Kuo, Chen, and Tenz indicated a trait-anxiety Cronbach's  $\alpha$  of 0.86 and a state-anxiety Cronbach's  $\alpha$  of 0.94 during labor in their 2014 study<sup>[14]</sup>.

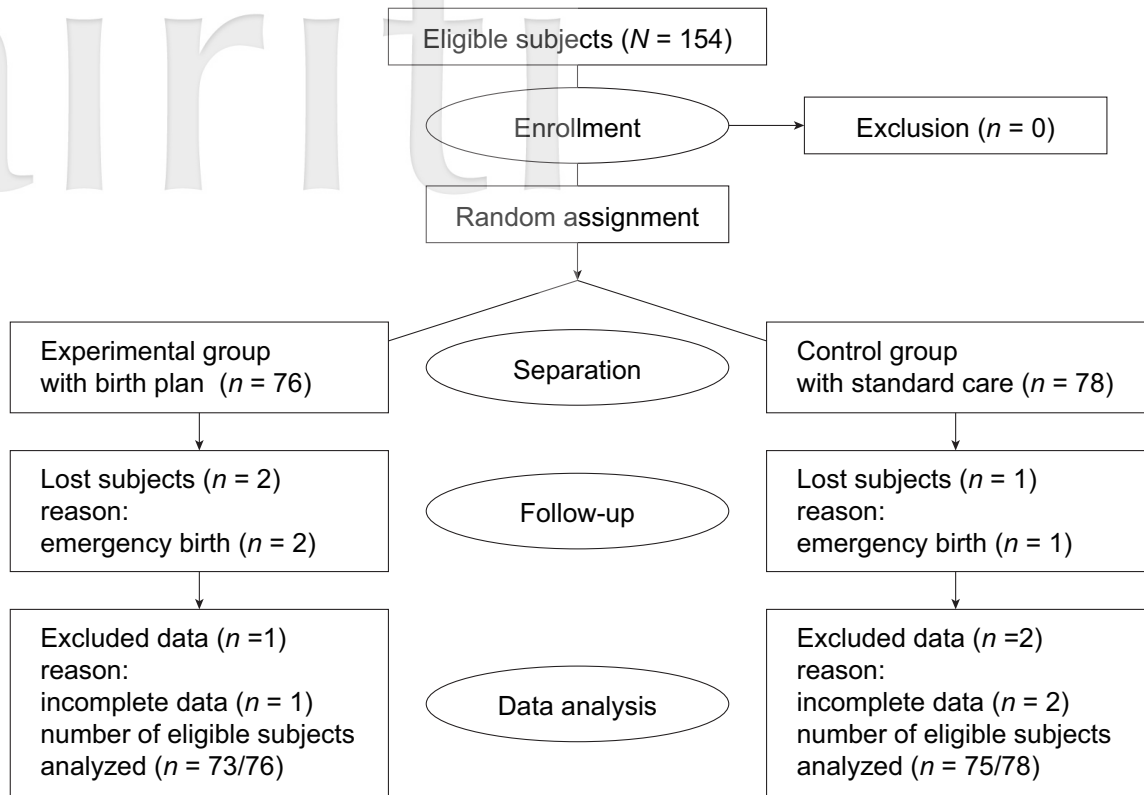


Fig 1. Subject Tracking Flowchart

(b) Childbirth support, birth plan, and mother-friendly birth plan health education forms

"Childbirth support materials" and "mother-friendly birth plan health education form" were provided to the expectant mothers by the researchers. Childbirth support materials included instructions on hot and cold therapy; massage methods and positions, acupressure; and birth ball exercises. The mother-friendly birth plan health education form described the benefits of mother-friendly childbirth, the purpose of accompanied childbirth; and pros and cons of childbirth-related measures including shaving of pubic hair, enema, intravenous infusion, food intake, moving around, fetal monitor, labor postures, and perineal incisions. To reduce fatigue and inattention of subjects, birth plan introductions were limited to between 10 and 15 mins. Birth plan items for the experimental group are presented in Table 1 and Table 2. No supportive childbirth plan was provided for the control group, only standard care. STAI was completed by the mothers 3 days after

delivery.

## Results

The subjects were selected according to the established criteria. A total of 154 expectant mothers participated in this study. The participants were randomly assigned to experimental and control groups that consisted of 76 and 78 participants, respectively. After excluding emergency births and incomplete subject information (3.9 % loss rate as shown in Figure 1) the final numbers of participants were 73 and 75 for the experimental and control groups, respectively. The average age of the participants was  $29.5 \pm 3.9$  years and most had a university education or higher (56.8 %). Most of the pregnancies (67.6 %), were planned and the majority of expectant mothers (62.2 %) did not participate in pre-childbirth education course. Their childbirth information mainly came from their mothers or nurses (56.1 %). There

**Table 3. Demographic Information and Obstetric Distributions (N = 148)**

Items	Experimental Group	Control Group	$\chi^2/t$	<i>p</i> -value
	<i>n</i> = 73	<i>n</i> = 75		
	<i>n</i> (%)	<i>n</i> (%)		
<b>Age</b>	30.12 ± 4.0	28.88 ± 3.8	2.46	.06
<b>Education</b>				.29
High school or lower	17 (11.5)	20 (13.5)		
Technical college	17 (11.5)	10 ( 6.8)		
University or above	39 (26.4)	45 (30.4)	3.56	.31
<b>Career</b>				
Professional	17 (11.5)	17 (11.5)		
Semi-professional	11 ( 7.4)	17 (11.5)		
Technical	15 (10.1)	20 (13.5)		
Semi-technical	30 (20.3)	21 (14.2)	7.01	.03
<b>Income</b>				
≤ 30,000 NT	18 (12.2)	7 ( 4.7)		
30-50,000 NT	27 (18.2)	39 (26.4)		
≥ 50,000 NT	28 (18.9)	29 (19.6)	1.36	.24
<b>Planned Pregnancy</b>				
Yes	46 (31.1)	54 (36.5)		
No	27 (18.2)	21 (14.2)	3.33	.07
<b>Prenatal Education Participation</b>				
Yes	33 (22.3)	23 (15.5)		
No	40 (27.0)	52 (35.1)		
<b>Source of Childbirth Information (multiple answers)</b>				
Mother	36 (24.3)	47 (31.8)	2.68	.10
Sister	28 (18.9)	34 (23.0)	0.74	.39
Physician	40 (27.0)	41 (27.7)	0.00	.99
Nurse	36 (24.3)	47 (31.8)	2.68	.10
News or magazine articles	43 (29.1)	25 (16.9)	9.74	.00
Books	21 (14.2)	20 (13.5)	0.08	.78
Internet	35 (23.6)	30 (20.3)	0.95	.33
Other family members	3 ( 2.0)	7 ( 4.7)	1.60	.21

was no significant difference in the demographic information for the two study groups, and the

**Table 4. Differences in Anxiety Among Expectant Mothers (N = 148)**

Variables	Experimental Group (n = 73)	Control Group (n = 75)	t/F	p-value
	M ± SD	M ± SD		
Pre-labor				
Trait-anxiety	41.56 ± 7.55	41.56 ± 7.76	.001	.99
State-anxiety	45.22 ± 9.77	48.52 ± 11.06	- 1.92	.06
Post-labor				
State-anxiety	40.58 ± 8.05	49.36 ± 9.91	-5.91/2.65	< .001

distributions are presented in Table 3. Before childbirth, there was no statistical difference in the STAI scores for the two groups ( $t = .13$ ,  $p = .99$ ;  $t = -1.92$ ,  $p = .06$ ). After childbirth, state-anxiety significantly differed between the two groups ( $t = -5.91$ ,  $p < 0.001$ ). Mothers in the experimental group exhibited lower childbirth anxiety than mothers in the control group. The analysis of covariance (ANCOVA) indicated that mothers in the experimental group exhibited significantly lower anxiety than mothers in the control group after developing birth plan ( $F = 2.65$ ,  $p < .001$ ; shown in Table 4).

## Discussion

The results of this study indicated that birth plan can reduce the anxiety of expectant mothers. A prior study indicated that during labor mothers have to undergo clinical procedures such as shaving of pubic hair, enema, continual fetal monitoring, fasting, intravenous infusion, labor induction, and perineal incisions which can increase anxiety<sup>[6]</sup>. This increase in stress and anxiety may lead to serious complications or even death for mothers and infants<sup>[15,16]</sup>. In this study, pain reduction methods, pushing techniques, and rights during labor and childbirth were explained to expectant parents. After learning this information, expectant parents feel more confident and believe in their own abilities to respond to situations during childbirth<sup>[17]</sup>. The birth plan communicates childbirth-related issues to the expectant parents

to reduce childbirth-related anxiety. The birth plan is also a medium for expectant parents to understand childbirth-related knowledge, and make sound decisions in consideration of their rights, birthing environment, equipment, and medical interventions<sup>[18,19]</sup>. All of these measures can help reduce the anxiety and increase the confidence of expectant mothers.

During labor, mothers are faced with an unfamiliar environment and inability to prepare for childbirth. Most childbirth education courses only teach the Lamaze breathing techniques. Many expectant mothers are unfamiliar with the medical procedures and process of childbirth. If they do not participate in pre-labor classes, they may feel unsure and helpless during childbirth. The birth plan is an important medium for the implementation of humanized childbirth. Women can plan the experience of labor and childbirth<sup>[4]</sup>. The birth plan can provide knowledge and instructions for family members to effectively assist the expectant mother and to alleviate fear and anxiety<sup>[20]</sup>. The birth plan can be used to communicate childbirth knowledge and childbirth-related medical routines to expectant mothers and give them the right to choose an individualized experience<sup>[9,21]</sup>. In 1985, WHO pointed out that the birth plan is a method for empowering women and de-medicalizing the childbirth process<sup>[22]</sup>. In this study, birth plan allowed expectant mothers to receive childbirth-related support information, and provided for their autonomy in choosing an individualized birthing procedure. Expectant mothers who understand the medical care process



during childbirth feel prepared and have less stress during childbirth.

In Taiwan, some expectant mothers want to induce labor or rupture the amniotic sac artificially to shorten the time to childbirth. However, this can increase pain and even affect the mother's mobility during labor. Therefore, most hospitals adopt physician-oriented decision making. They often overlook the information and rights that should be provided to the expectant mother and her family members. If there are accidents, it is not only devastating for the mother, the family, and the newborn, but also for the physician who has to face legal consequences. Therefore, it is suggested that a birth plan be used to aid in the education of and communication with expectant mothers and to establish trust with their attending physicians. Humanized childbirth also encourages and empowers women so that they can gain control over the childbirth process and actively participate in decision making<sup>[4,23-25]</sup>.

During pregnancy, most people are concerned about the fetus, and few pay attention to the psychological changes of the mother<sup>[26,27]</sup>. During the later stage of pregnancy, with the approach of labor and childbirth, expectant parents often experience anxiety and helplessness<sup>[28,29]</sup>. The reproductive health studies established by WHO in 1996 indicate that the goal of obstetric care in reproductive health is the health of mothers and babies. Use of medical intervention must have clear reasoning and be proven safe. For an expectant mother it is desirable to be involved in the childbirth process, to influence the birthing experience and to participate in decision-making<sup>[9]</sup>. With advances in medical technologies, the benefits of clinical intervention should be decided by women themselves through communication and empowerment. Birth plans can enable the nursing personnel of different shifts to understand a mother's requests and needs. Mothers may also feel empowered by their active participation in the childbirth process. It is therefore recommended that hospitals incorporate birth plan-related courses as part of their prenatal education. The use of birth plans in clinical practice, can give expectant mothers more self-confidence and peace

of mind and allow the clinical staff to effectively provide professional support. Birth plans can also be included in obstetric medical and nursing curricula for training new and current health care professionals.

The study subjects consisted of low risk mothers with first-time childbirth experience. Therefore, the results may not apply to other maternal groups. The study location was a medical center in central Taiwan. Therefore, the results have limited inference. It is suggested that in future studies the number of subjects and sampling locations be increased. A single-blind subject enrollment process can also be used to expand the inference. Further investigations can be extended to postpartum anxiety and postpartum depression-related factors.

## Conclusion

The results of this study support the development of birth plans for reducing the anxiety of expectant mothers. Currently, many local birth plan seminars are organized for nursing personnel only. Few hospitals have prenatal courses for expectant parents that introduce birth plans. It is suggested that medical staff encourage the discussion of a birth plan with expectant parents for understanding the needs of mothers, as well as for allowing mothers to actively participate in the birthing process to create a positive childbirth experience. With the current promotion of supportive childbirth concepts and the low birth rate, the public is increasingly demanding quality childbirth services. Health care givers' support of birth plans can impact on the successful promotion of this intervention. The results of this study provide evidence for clinical medical personnel regarding the importance of expectant parents' involvement in the childbirth process. Allowing expectant parents to choose their desired birthing process also enables them to exercise their rights.

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