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Original Article

A proposed mother-friendly childbirth model for Taiwanese women, the implementation and satisfaction survey



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ABSTRACT

Objectives: Pleasant and humane childbirth is every mother's wish. We established one practicable and tailored Taiwanese mother-friendly childbirth model, and the objective of this study was to investigate the implementation, pregnancy outcomes, and women's satisfaction.

Materials and methods: We used the Taiwanese mother-friendly childbirth model. Women from eight hospitals were divided into an experimental group and control group. The experimental group received prenatal care modified by the Taiwanese mother-friendly childbirth model and the control group received routine prenatal care according to their hospital. We performed a quasi-experimental study of women's satisfaction toward this mother-friendly childbirth model by questionnaires and surveyed the practicality and effectiveness of this model.

Results: Seven hundred and fifty-one women from eight hospitals, including three medical centers and five regional hospitals were included. There was significantly different practices between the two groups, such as: (1) intermittent fetal monitoring for low-risk pregnancy; (2) no routine enema; (3) no perineal shaving; (4) less routine parenteral fluid support; (5) using an upright position; and (6) restrictive episiotomy. The mean maternal height, body weight gain, gestational age, birth weight, and episiotomy wound infection rate were indifferent. The epidural anesthesia rate and induction medication use were significantly lower in the experimental group. The self-reported pain score was higher in the experimental group and the self-reported satisfactory score was also higher in the experimental group, without statistical significance.

Conclusion: Women receiving standardized prenatal care modified by the woman-friendly childbirth model of prenatal care had less epidural anesthesia, less induction medication, higher self-reported satisfaction score, and indifferent pregnancy outcomes such as gestational age, birth weight, and wound infection rate.

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Introduction

A pleasant and humanized childbirth experience is every woman's wish as well as every obstetrician's goal. Evidence-based clinical practice obstetric care is valued by all countries worldwide

[1–3]. Some practice such as routine perineal shaving, routine enema, and routine restriction of oral intake seemed to be inappropriate and without medical evidence [4–6]. The World Health Organization emphasizes the over-riding philosophy of respect, support, and care for the pregnant and birthing woman [7]. A positive birth experience is associated with an increased mother–child bond and maternal abilities, and contributes to her sense of accomplishment and self-esteem [8,9].

We established one tailored Taiwanese mother-friendly childbirth model by systemically reviewed the guidelines of several countries. One focus group composed of 13 experts, including six

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obstetricians, five head nurses, one social worker and one women's rights representative was set up, and several different guidelines were systematically reviewed to establish one tailored Taiwanese mother-friendly childbirth model [10].

A total of 10 suggestions were developed in the women-friendly childbirth model, including: (1) intermittent fetal monitoring for low-risk pregnancy; (2) no routine enema; (3) no routine perineal shaving; (4) no routine restricted oral intake; (5) no routine parenteral fluid support; (6) no routine elective amniotomy; (7) providing nonpharmacological pain management; (8) using an upright position; (9) delayed pushing; and (10) restrictive episiotomy.

We investigated the obstetricians' attitude toward the Taiwanese women-friendly childbirth model in a previous study [10]. Actual practice and women's feelings and satisfaction were important. Therefore, the aim of this study was to evaluate whether women's satisfaction improved after we modified the obstetrical care according to the suggestions of this model.

Materials and methods

In order to improve the obstetric service and increased maternal satisfaction in Taiwan, one focus group was set up, and several different guidelines were systematically reviewed to establish one tailored Taiwanese mother-friendly childbirth model. The mother-friendly childbirth model consisted of 10 suggestions based on the consistency, relevance and application. The 10 suggestions are summarized in Table 1.

Next, after establishing the mother-friendly childbirth model, women from eight hospitals, including three medical centers and five regional hospitals were included and were assigned into the experimental group and control group after giving informed consent.

The inclusion criteria of these participants were as follows: (1) informed consent; (2) term pregnancy; (3) available communication in Taiwanese or Chinese; (4) no maternal comorbidity or fetal anomaly; and (5) singleton pregnancy. The exclusion criteria were as follows: (1) patient disagreement; (2) scheduled cesarean section; (3) maternal high-risk pregnancy; (4) fetal anomaly noted prenatally; and (5) multiple gestational pregnancies.

The experimental group included two medical centers and two regional hospitals, such as National Taiwan University Hospital, Tri-Service General Hospital, Loving Care Maternity and Children's Health Center, and National Taiwan University Hospital Hsin-Chu Branch. The control group included one medical center and three regional hospitals, such as Mackay Memorial Hospital, Lotung Poh-Ai Hospital, Yong-Xin Maternity and Children's Hospital, and Neo-Gen Obstetric and Pediatric Clinic.

Special nurses provided the mother-friendly childbirth model manual and introduced this model to every mother-to-be about the benefits and risks in the experimental group hospitals. Women in the experimental group were admitted to the delivery room and the specialist nurses assisted the mother-to-be to prepare for delivery,

without enema, perineal shaving, or restricted oral intake unless the women requested it. The women could decide upon bed rest or ambulation, eating or fasting. If fetal distress was noted or other indications for cesarean section, the women underwent cesarean section and were excluded from this study, as shown in Figure 1. The experimental group received standardized prenatal care modified by the woman-friendly childbirth model, summarized in Figure 2. The control group received routine prenatal care as provided by their obstetricians.

The actual practices of the two groups were collected. We asked every mother: "How do you feel about this delivery experience, ranking from 1 to 10; score 1 was the most dissatisfied and 10 was the most satisfied." The self-reported satisfactory score was used to survey women's satisfaction toward this women-friendly childbirth model.

Data including maternal background information and pregnancy outcomes were collected. Maternal background information was as follows: hospital level, age, parity, height (cm), prepregnancy weight (kg), predelivery weight (kg), education, employment, occupation, family incomes, marriage status, planned pregnancy, and attending maternal class. The pregnancy outcomes included gestational age (weeks), birth bodyweight (g), Apgar score at 1 minute and 5 minutes, epidural anesthesia, induction medication, vacuum delivery, laceration wound infection, laceration wound pain score, and self-reported satisfaction score.

The statistical significance of the difference between these two groups was determined by two tailed unpaired Student's *t* test. A value of $p < 0.05$ was considered statistically significant.

Results

Eight hundred women were enrolled in this study. Twenty-eight women were excluded due to emergency cesarean sections and 21 because they did not completely fill in the questionnaires. A final total of 751 women from eight hospitals, including three medical centers and five regional hospitals, were included and the questionnaire completion rate was 93.88% (Figure 1). The experimental group and control group included 396 women and 355 women, respectively.

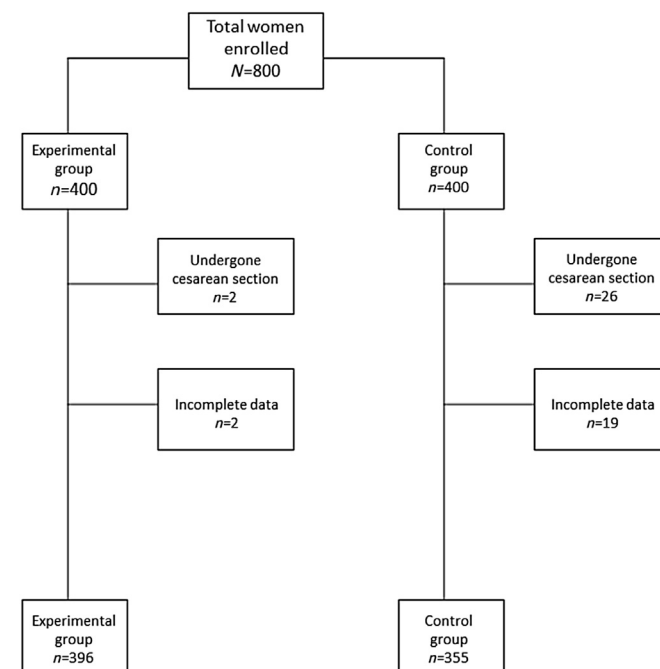


Figure 1. Inclusion and exclusion data in this study.

Table 1
Taiwan mother-friendly childbirth model.

- (1) Intermittent fetal monitoring for low-risk pregnancy
- (2) No routine enema
- (3) No routine perineal shaving
- (4) No routine restricted oral intake
- (5) No routine parenteral fluid support
- (6) No routine elective amniotomy
- (7) Providing nonpharmacological pain management
- (8) Using an upright position
- (9) Delayed pushing
- (10) Restrictive episiotomy

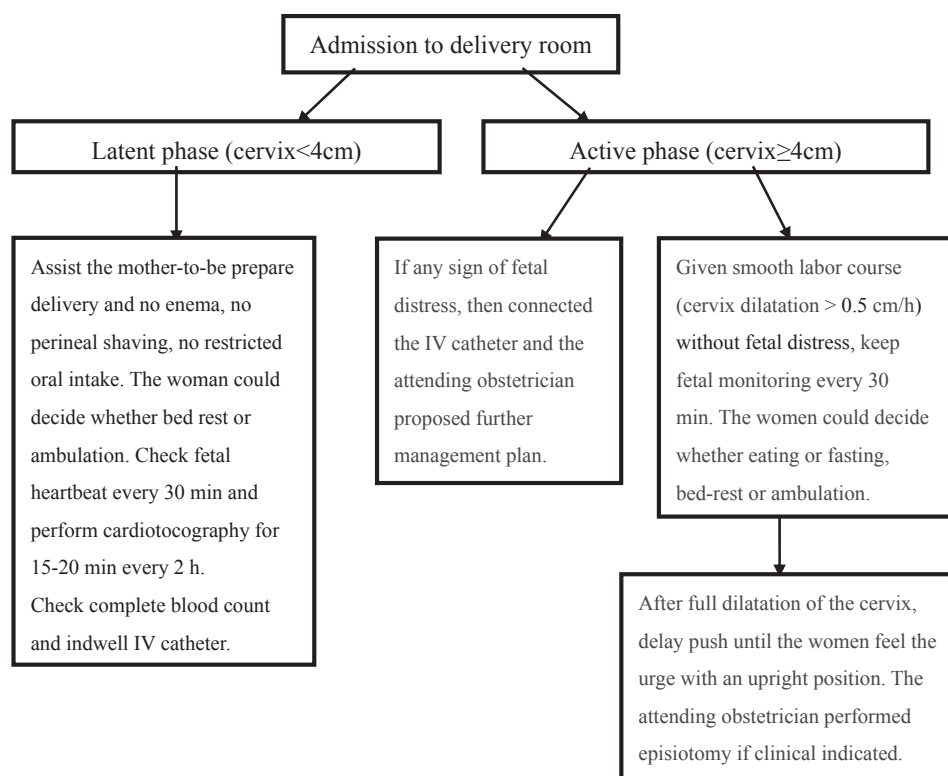


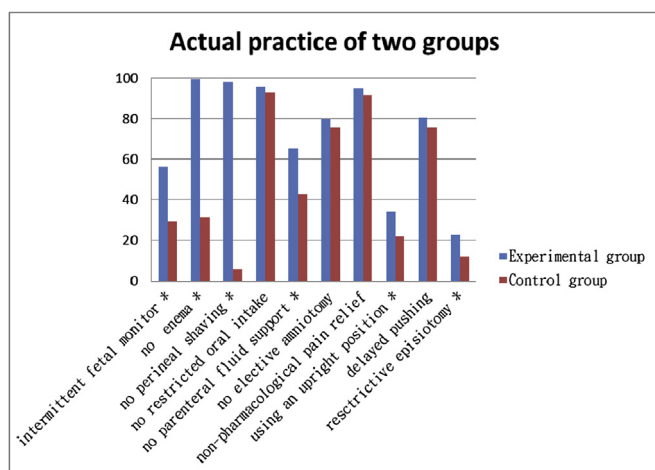
Figure 2. Standardized prenatal care in the experimental group.

The actual practices of these two groups are summarized in Table 2 and Figure 3. In the experimental group, not every suggestion was implemented and not every suggestion was rejected in the control group. However, there was significantly different practice between the two groups, such as: (1) intermittent fetal monitoring (56.3% vs. 29.3%); (2) discontinued routine enema (99.7% vs. 31.3%); (3) discontinued perineal shaving (98.2% vs. 5.6%); (4) discontinued routine parenteral fluid support (65.4% vs. 42.8%); (5) using an upright position (34.3% vs. 22.0%); and (6) no routine episiotomy (23.0% vs. 12.1%), with $p < 0.05$. Several suggestions were indifferent, such as: (1) discontinued restriction of oral intake (95.7% vs. 93.2%); (2) discontinued routine amniotomy (79.8% vs. 75.8%); (3) providing non-pharmacological pain management (94.9% vs. 91.8%); and (4) delayed pushing (80.8% vs. 75.8%). The most prominent changes between these two groups were as follows: (1) discontinued routine enema; (2) discontinued perineal shaving; and (3) discontinued routine parenteral fluid support (Figure 3).

The background data of these women were collected and summarized in Table 3. As for hospital level, 39.9% were from medical centers and 60.1% were from regional hospitals. There were more women from medical centers in the experimental group. As for maternal age, the experimental group was older than the control group ($p = 0.007$) and most were in their 30s. As for parity, 56.1% were having their first child and these two groups showed no significant difference. The mean maternal height was 160.13 cm with a standard deviation of 6.03 cm and these two groups did not differ. The mean prepregnancy weight and the mean predelivery weight were 55.14 ± 8.73 kg and 66.78 ± 9.84 kg, respectively, and these two groups did not differ. As for maternal education status, 19.6% had a high school degree; 70.1% had a bachelor's degree; and 10.3% had a masters or doctoral degree. The majority had a bachelor's degree and the experimental group had higher education status than the control group. As for occupational status, 71.1% were employed. The family incomes were significantly higher in the experimental group and the

Table 2
Actual practice of two groups.

Parameter	Experimental group		Control group		Total	p
	n=396	%	n=355	%	N=751	%
Fetal monitoring						<0.001
Intermittent	223	56.3	104	29.3	327	43.5
Continuous	173	43.7	251	70.7	424	56.5
Enema						<0.001
Yes	1	0.3	244	68.7	245	32.6
No	395	99.7	111	31.3	506	67.4
Perineal shaving						<0.001
Yes	7	1.8	335	94.4	342	44.5
No	389	98.2	20	5.6	409	54.5
Restricting oral intake						0.14
Yes	17	4.3	24	6.8	41	5.5
No	379	95.7	331	93.2	710	94.5
Parenteral fluid support						<0.001
Yes	137	34.6	203	57.2	340	45.3
No	259	65.4	152	42.8	411	54.7
Elective amniotomy						0.19
Yes	80	20.2	86	24.2	166	22.1
No	316	79.8	269	75.8	585	77.9
Nonpharmacological pain management						0.12
Yes	376	94.9	326	91.8	702	93.5
No	20	5.1	29	8.2	49	6.5
Delivery position						<0.001
Supine	260	65.7	277	78.0	537	71.5
Upright	136	34.3	78	22.0	214	28.5
Delayed pushing						0.09
Yes	320	80.8	269	75.8	589	78.4
No	76	19.2	86	24.2	162	21.6
Episiotomy						<0.001
Yes	305	77.0	312	87.9	617	82.2
No	91	23.0	43	12.1	134	17.8



* $p < 0.05$.

Figure 3. Actual practice of two groups. * $p < 0.05$.

majority earned 50,001–100,000 New Taiwan dollars per month. Most of them were married and it was a planned pregnancy, and 64.2% women did not attend maternal classes.

The pregnancy outcomes were collected and summarized in Table 4. All women included in this study were low-risk

pregnancies and no maternal mortality or major morbidity was noted. The mean birth bodyweight was 3078 ± 398.01 g at 38.72 ± 1.37 gestational weeks in the experimental group, while the mean birth bodyweight was 3099 ± 349.65 g at 38.62 ± 2.22 gestational weeks in the control group. There was no significant difference between these two groups. The Apgar score at 5 minutes did not differ. In the experimental group, 21.2% of women received epidural anesthesia, compared with 33.5% of women in the control group. The epidural anesthesia rate was significantly lower in the experimental group. In the experimental group, 33.3% of women received induction medication, compared with 44.8% in the control group, and the induction medication use was significantly lower in the experimental group. In both groups, 11.5% of women received vacuum-assisted delivery. The episiotomy wound infection rates were around 0.5% in both groups. The mean wound pain score was 4.79 ± 2.51 in the experimental group, while it was 4.46 ± 2.67 in the control group. The self-reported pain score was higher in the experimental group, although not significantly.

Discussion

Ten suggestions were set up in this mother-friendly childbirth model by a focus group and 751 women from eight hospitals were investigated for their satisfaction with this model. These 751 women were assigned into an experimental group and control group according to their attending hospital, and the experimental

Table 3
Background data of mothers.

Parameter	Experimental group		Control group		Total		p
	n = 396	%	n = 355	%	N = 751	%	
Hospital level							<0.001
Medical center	200	50.5	100	28.2	300	39.9	
Regional hospital	196	49.5	255	71.8	451	60.1	
Age (y)							0.007
18–20	3	0.7	3	0.8	6	0.8	
21–30	132	32.0	154	41.5	286	38.1	
31–40	252	61.0	191	51.5	443	59.0	
41–45	9	2.2	7	1.9	16	2.1	
Parity							0.364
1	229	57.8	192	54.1	421	56.1	
2	136	34.3	132	37.2	268	35.7	
3	28	7.1	23	6.5	51	6.8	
4	3	0.8	8	2.2	11	1.4	
Height (cm)	160.20 ± 5.05		160.05 ± 6.97		160.13 ± 6.03		0.736
Prepregnancy weight (kg)	54.76 ± 8.64		55.57 ± 8.82		55.14 ± 8.73		0.204
Predelivery weight (kg)	66.71 ± 9.37		67.47 ± 10.32		66.78 ± 9.84		0.071
Education							<0.001
High school	66	16.7	81	22.8	147	19.6	
Bachelor	269	67.9	257	72.4	526	70.1	
Master or doctor	61	15.4	17	4.8	78	10.3	
Employment							0.754
Yes	299	75.5	235	66.2	534	71.1	
No	97	24.5	120	33.8	217	28.9	
Family incomes (per mo)							<0.001
< NT\$30,000	23	5.8	41	11.6	64	8.5	
NT\$30,001–NT\$50,000	92	23.2	123	34.6	215	27.3	
NT\$50,001–NT\$100,000	181	45.7	147	41.4	328	42.1	
> NT\$100,001	100	25.3	44	12.4	144	18.6	
Marriage status							0.542
Married	387	97.7	341	96.3	728	97.0	
Single	9	2.3	14	3.7	23	3.0	
Planned pregnancy							0.793
Yes	295	74.5	261	73.5	556	74.0	
No	101	25.5	94	26.5	195	26.0	
Attending maternal class							0.077
Yes	153	38.6	116	32.7	269	35.8	
No	243	61.4	239	67.3	482	64.2	

NT\$ = New Taiwan dollars.

Table 4
Pregnancy outcomes.

Parameter	Experimental group		Control group		Total		p value
	n = 396	%	n = 355	%	N = 751	%	
Gestational age (wk)	38.72 ± 1.37		38.62 ± 2.22		38.67 ± 1.82		0.454
Birth weight (g)	3078 ± 398.01		3099 ± 349.65		3088 ± 375.9		0.426
Apgar score at 1 min	8.43 ± 0.72		8.41 ± 0.55		8.43 ± 0.64		0.37
Apgar score at 5 min	9.45 ± 0.71		8.97 ± 0.15		9.21 ± 0.58		0.37
Epidural anesthesia							<0.001
Yes	84	21.2	112	33.5	196	26.1	
No	312	78.8	243	68.5	555	73.9	
Induction medication							0.047
Yes	132	33.3	159	44.8	291	38.7	
No	208	52.5	164	46.2	372	49.5	
Vacuum delivery							0.639
Yes	36	9.1	50	14.1	86	11.5	
No	360	90.9	305	85.9	665	88.5	
Episiotomy wound infection							0.39
Yes	2	0.5	2	0.6	4	0.5	
No	394	99.5	353	99.4	744	99.5	
Episiotomy wound pain score	4.79 ± 2.51		4.46 ± 2.67		4.63 ± 2.59		0.093
Self-reported satisfactory score (1–10)	8.33 ± 1.73		8.28 ± 1.60		8.31 ± 1.67		0.27

group received standardized prenatal care modified by the mother-friendly childbirth model.

The women in experimental group had higher socioeconomic status, possibly because more women were included from medical centers. However, the mean age, height, prepregnancy weight, predelivery weight, gestational age, birth weight, and Apgar score at 5 minutes did not differ. The women in the experimental group had a lower rate of epidural anesthesia, although they had higher socioeconomic status. Epidural anesthesia for delivery in Taiwan is not supported by national health insurance and it costs around 8000 New Taiwan dollars. It may be contributed by some changes in prenatal care. However, the association between socioeconomic status and satisfaction with mother-friendly delivery was unclear and this confounding factor was one of our limitations.

The actual practices in these two groups were significantly different in several ways such as: (1) discontinued routine enema; (2) discontinued perineal shaving; (3) discontinued routine parenteral fluid support; (4) using an upright position; and (5) restrictive episiotomy.

It used to be believed that routine enema decreased puerperal and neonatal infection and it might stimulate uterine contraction and accelerate fetal head descent [1]. In our study, in the experimental group, there were indifferent episiotomy wound infection rates. It was compatible with a previous study, which showed no significant difference in the degree of fecal contamination during the first and second stages of labor [2]. In our study, fewer women in the experimental group needed induction medication. Rutgers et al reported that there is no benefit of shortening cervix dilatation duration from enema [3]. A randomized controlled trial included 443 women concluded that there was no significant difference in maternal and neonatal outcomes [11]. A Cochrane review in 2000 also concluded that enemas caused discomfort in women and increased the costs of delivery, but there was no evidence of any benefit in decreasing infection rates [5].

It used to be believed that perineal shaving decreased puerperal infection. In our study, in the experimental group, there were indifferent episiotomy wound infection rates. A previous randomized controlled trial of 458 women concluded that there was no significant difference in the rate of perineal wound infection, wound dehiscence and neonatal infection [12]. A Cochrane review in 2001 also concluded that perineal shaving had no significant effect on perineal wound infection [4].

For routine parenteral fluid support, a randomized controlled trial of 195 woman showed that increasing fluid administration for

nulliparous women in labor accelerated labor course [13]. Shrivastava et al also reported that administration of a dextrose solution was associated with a shortened labor course in a randomized, double-blinded, controlled trial [14]. However, in our study, the use of induction medication was less in the experimental group.

Upright position was first suggested for normal birth in a practical guide published in 1996 by the World Health Organization [1]. A Cochrane review in 2013 concluded that supportive evidence of walking and upright positions reduced the duration of labor, risk of cesarean birth, and the need for epidural anesthesia, without negative effects on mothers and babies [15]. In our study, the epidural anesthesia rate was significantly lower in the experimental group but the self-reported pain score was higher.

As for episiotomy, a Cochrane review in 2009 reported that restrictive episiotomy policies appeared to have a number of benefits: less posterior perineal trauma, less suturing and fewer complications, but there was an increased risk of anterior perineal trauma. There was no difference in severe perineal trauma, dyspareunia, urinary incontinence or several pain measures [16].

This is believed to be the first study of satisfaction in Taiwan using a tailored Taiwanese mother-friendly childbirth model and included 751 women from several delivery centers. In this study, the experimental group had less epidural anesthesia, less induction medication, higher self-reported satisfaction score, and indifferent wound infection rate and pregnancy outcomes. More evidence and further studies are needed to evaluate whether this Taiwanese woman-friendly childbirth model is practicable and beneficial.

Conclusion

Ten suggestions were made in this model. Women receiving standardized prenatal care modified by the woman-friendly childbirth model of prenatal care had less epidural anesthesia, less induction medication, higher self-reported satisfaction score, and indifferent pregnancy outcomes such as gestational age, birth weight, and wound infection rate.

Conflicts of interest

Chien-Nan Lee received research funding from Health Promotion Administration, Ministry of Health and Welfare, Taiwan. The other authors have no conflicts of interest relevant to this article.

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