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RESEARCH

Development and Validation of the Self-Efficacy Regarding Vaginal Birth Scale

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ABSTRACT

Objectives: The purpose of this study was to develop a scale to measure self-efficacy regarding a vaginal birth (SEVB) during pregnancy and to assess its reliability and validity among nulliparous Chinese women.

Design: A panel study.

Setting: Five hospitals in Northern Taiwan.

Participants: The analysis included 700 (second trimester), 637 (third trimester), and 585 (before birth) women who did not have medical indications for cesarean births at the indicated time points.

Methods: The SEVB scale was used to measure the level of confidence in ability to carry the pregnancy to term and give birth vaginally. The scale included nine items, and each was scored on a numeric rating scale from 0 to 10. A higher score indicated a higher level of self-efficacy.

Results: Factor analysis confirmed the one-factor structure, which explained 62.77% and 67.08% of the variance, with Cronbach's alphas for the scale of 0.93 and 0.94 during the second and third trimesters, respectively. The test–retest reliability was 0.73 as determined by the intraclass correlation coefficient. Contrasted group validity supported that those women who preferred cesarean births had significantly lower SEVB scores than women who preferred vaginal births during the second and third trimesters. Those women who tried vaginal births had higher SEVB scores than women who had cesareans without trying vaginal births.

Conclusion: The scale showed acceptable reliability and validity. Health professionals could use the scale to screen women with low self-efficacy during pregnancy and provide appropriate intervention to increase their willingness to try vaginal births.

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The cesarean rate in Taiwan was between 32% and 36% from 2002 through 2015 (Bureau of National Health Insurance, 2015), which is among the highest in the world. Taiwan has a National Health Insurance Scheme (NHIS) that provides coverage for general medical expenses to virtually all of its citizens, including 10 antenatal visits, vaginal birth, and medically indicated cesarean birth. Cesarean births without medical indications are paid by women themselves according to regulations. Almost all births in Taiwan are attended by obstetricians in hospitals. Despite the high rate of cesarean birth in Taiwan, NHIS claims data indicate that only 1.8% of cesarean births are performed at the mother's request without medical indications (NHIS, 2015). There is no gatekeeper system or preoperative/concurrent review for cesarean birth in Taiwan, and obstetrician claims could be inaccurate to prevent nonpayment for cesarean births or loss of patients (Hsu, 2007).

It is believed that a significant proportion of caesarean births in Taiwan are done without medical indication. Researchers reported that approximately 20% of 151 caesarean births at four hospitals in Taipei, Taiwan had no medical indications on the basis of mothers' reports (Chu, Tai, Hsu, Yeh, & Chien, 2010). To control the high cesarean rate in Taiwan, the rate of cesarean birth by institution is listed as a quality indicator for hospital performance and accreditation purposes.

Caesarean birth is believed to be more modern and safer for maternal and child health in Chinese society (Lo, 2003). For obstetricians, natural birth

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is very taxing in terms of time and energy. Under the NHIS in Taiwan, providers receive equal payment for a natural birth and a cesarean birth. In addition, obstetricians may choose a cesarean to ensure the safety of women with slightly concerning symptoms during pregnancy or birth to avoid malpractice suits and/or a high amount of compensation (Han & Lien, 2010).

In a previous qualitative study, researchers suggested that the decision-making process to choose an elective cesarean birth among women centered on controlling the risks of childbirth and ensuring well-being (Huang, Sheu, Tai, Chiang, & Chien, 2013). Pregnant women's beliefs about their ability to cope with childbirth during pregnancy were a determinant in their decisions to have cesarean births. The decision-making process for birth mode among pregnant women started as early as the second trimester, usually before obstetricians discussed the issue with them. Usually in mid-pregnancy, women perceived the threats and fears of childbirth and weighed the risks of birth modes. In late pregnancy, once women decided on cesarean births, their decisions were hard to change. They persuaded stakeholders to agree and gained the required resources for cesarean births (Huang et al., 2013). In a previous study, researchers reported that more than 93% of women who preferred cesarean birth during the second trimester had a cesarean birth (Chu et al., 2010). In Taiwan, obstetricians usually discuss the mode of birth with women after 32 weeks gestation. Even if the obstetrician does not advise in favor of cesarean, a woman can easily find another obstetrician and pay a fee of approximately $400 to have a nonmedically indicated cesarean birth (Bureau of National Health Insurance, 2015).

Once a decision is made to have a cesarean birth, some Chinese women select an auspicious time because of a cultural belief that a person's fate, to a large extent, is determined by the hour, date, and year of birth. Many people believe that an auspicious time of birth has beneficial effects on a child's fate and may also ensure the safety of mothers and children. Therefore, mothers who decide to have a cesarean choose the time and date for the cesarean birth, and obstetricians usually comply. Researchers found that election of an auspicious time for birth was associated with cesarean birth, cesarean birth before 39 weeks gestation, and planned cesarean birth without presence of labor signs (Chien, Lee, Lin, & Tai, 2015; Chu et al., 2015).

The notion of perceived self-efficacy was first proposed by Bandura (Bandura, 1977, 1986). Self-efficacy is defined as a person's own judgment of capability to perform a certain activity to attain a certain outcome (Zulkosky, 2009). Self-efficacy beliefs are significant predictors of choices and behaviors (Bandura, 2004). Previous researchers reported that women with low self-efficacy measured by the Childbirth Self-Efficacy Inventory (CBSEI) experience more fear in giving birth and losing control during birth (Lowe, 2000). The CBSEI is meant to be applied in late pregnancy to estimate women's confidence in applying certain behaviors during labor to cope with childbirth. The CBSEI is designed for women with normal pregnancies that end in normal labor and birth (Ip, Chan, & Chien, 2005; Khorsandi et al., 2008); it is not intended to be used among women who plan to have cesareans without experiencing childbirth. There is no established self-efficacy scale suitable for women in their second trimester of pregnancy or women who prefer cesarean births during pregnancy.

Traditional Chinese culture often classifies a woman's body as good or bad for childbirth and refers to the general reproductive functioning of a woman based on her body size, body shape, and physical constitution (Wang et al., 2010). In Chinese culture, a vaginal birth involves not only a woman's ability to cope with childbirth but also her body size/shape and general reproductive functioning (Huang et al., 2013). The reproductive functioning of a woman includes the ability to conceive, carry a pregnancy to term, and deliver vaginally. In addition, researchers reported that informal tragic birth stories caused negative ideas about vaginal births among pregnant women (Carlsson, Ziegert, & Nissen, 2014; Huang et al., 2013). Women then turned to elective cesarean births as a solution (Huang et al., 2013). Therefore, low self-efficacy regarding a vaginal birth during pregnancy could predict cesarean births without medical reasons in a context where cesarean is loosely regulated.

If providers can screen women with low self-efficacy during pregnancy early using an instrument to measure general self-efficacy beliefs regarding a vaginal birth, interventions to increase

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self-efficacy and mitigate concerns about and obstacles to a vaginal birth could be provided. Such interventions may help increase women's willingness to try vaginal birth and reduce the rate of cesareans. The objectives of this study were to develop a scale to measure self-efficacy regarding a vaginal birth during pregnancy (the Self-Efficacy Regarding Vaginal Birth scale, SEVB) and to assess its validity and reliability among nulliparous women in Taiwan. To examine contrasted group validity, mean SEVB scores were compared between women in the preferred vaginal or preferred cesarean birth groups during the second and third trimesters of pregnancy and among women according to the actual mode of birth (vaginal birth, cesarean after trying vaginal birth, and cesarean without trying vaginal birth).

Methods

Development of the new SEVB scale was done in two phases. In Phase 1, we conducted a literature review and in-depth interviews with women to clarify the concept and contents of the scale. In Phase 2, the validity and reliability of the scale were examined by a panel of nulliparous women.

Phase 1

After an extensive literature review and reflection on our own clinical experiences, we defined *self-efficacy regarding a vaginal birth* as the level of confidence in the capability to carry the pregnancy to term, deliver vaginally, and successfully give birth to a healthy baby. In a concept analysis of self-efficacy, Kear (2000) conducted a literature review from a broad range of disciplines and identified three key characteristics of self-efficacy, namely self-concept, self-control, and self-cognition. Therefore, we designed items to reflect these three characteristics. *Self-concept* regarding a vaginal birth was defined as a level of confidence that the woman's personal physical condition was adequate for a vaginal birth. *Self-control* regarding a vaginal birth was defined as a level of confidence in controlling self during the labor process. *Self-cognition* regarding a vaginal birth was defined as a level of confidence in motivating self to assess and cope with potential problems associated with a vaginal birth. Then we conducted personal interviews with three primigravid and two primiparous women to validate the definitions and provide feedback on the items for the scale. The final scale included nine items. The confidence level for each item was rated on the basis of an 11-point (0–10) numeric rating scale. The scores ranged from 0 to 90, with a higher score indicating a higher level of self-efficacy.

Content validity was assessed by the content validity index (CVI). Five experts, including two obstetricians, two clinical nurses from obstetrics units, and a nursing professor, evaluated the representativeness and appropriateness of the scale items using a 5-point Likert scale. An item score of 1 indicated that the item should be deleted, 2 indicated that the item could be deleted or needed major revision, 3 indicated that the item should be retained but needed major revision, 4 indicated that minor revision was needed, and 5 indicated that no revision was needed. The CVI was calculated as the number of items with an expert rating of 4 or 5 divided by the total number of items. A CVI greater than 0.8 indicated good content validity (Waltz, Strickland, & Lenz, 1991).

Phase 2

This phase included a prospective panel study conducted from November 2010 through December 2012. The study panel included pregnant women recruited at five hospitals in Taipei, Taiwan. We approached pregnant women when they applied for a mother's manual at the hospitals (usually before the end of the second trimester). The inclusion criteria were adult primigravid woman who had an uncomplicated prenatal course at the time of recruitment and were able to communicate in Mandarin Chinese. Participating women completed a structured questionnaire at 15 to 27 weeks of pregnancy, 28 to 36 weeks of pregnancy, and 4 to 5 weeks after birth.

Participants

A total of 1,037 women completed the questionnaire during second trimester. Of these 1,037 women, 770 women were successfully followed up on their self-efficacy regarding a vaginal birth during the third trimester and their actual mode of birth at 1 month postpartum. Of the 770 women, we included only women who did not have medical reasons for cesarean births at the indicated time points (second trimester, third trimester, and before birth). Whether the women had medical reasons for cesarean births before birth was asked retrospectively at 1 month postpartum. The resultant samples included 700, 637, and 585 women during the second and third trimesters of pregnancy and before birth, respectively. A flow diagram of the study samples is presented in Figure 1.

Measurements

The study variables included personal characteristics (age, educational level, work status, marital status, chronic diseases [heart disease, diabetes, hypertension, hyperthyroidism, and

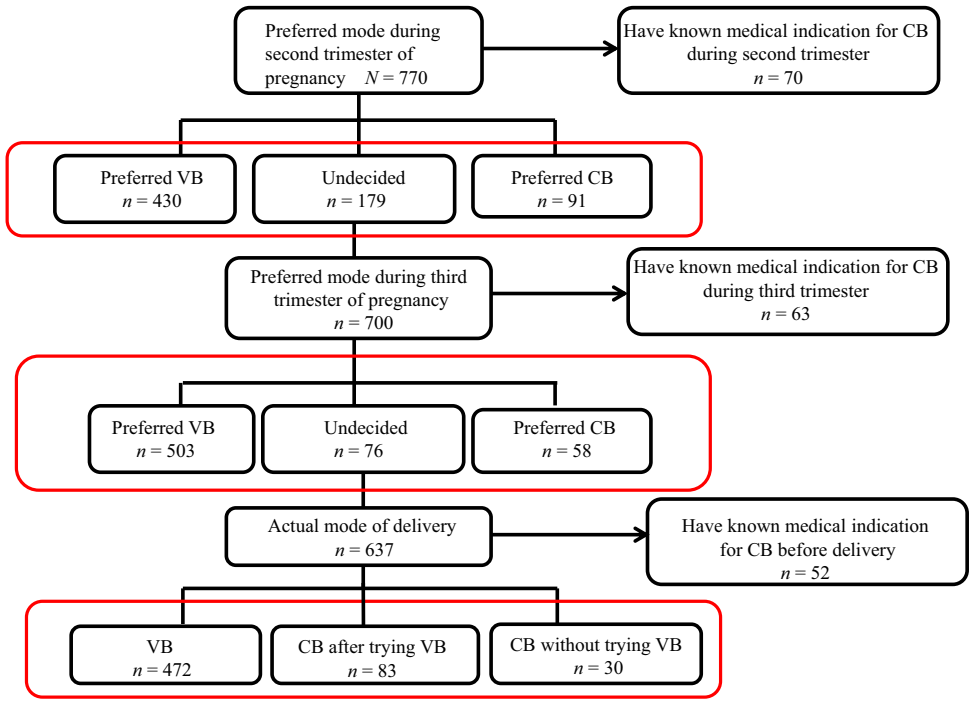


Figure 1. Flow diagram of the study samples by preferred and actual birth mode. CB = cesarean birth; VB = vaginal birth. Red circles indicate study samples at different time points.

asthma] before pregnancy, private insurance status), obstetric variables (history of abortion, planned pregnancy, infertility treatments), self-efficacy regarding a vaginal birth, and actual mode of birth. Data on self-efficacy regarding a vaginal birth were collected during the second and third trimesters of pregnancy. Data on medical indications before birth, actual mode of birth, whether the women tried vaginal birth, and reasons for cesarean birth were collected at 4 to 5 weeks after birth. All other variables were collected during the second trimester.

Women were asked about their preferred mode of birth during the second and third trimesters of pregnancy. The categories were "vaginal birth, cesarean birth, or undecided." Actual birth mode was determined postpartum as a vaginal birth, cesarean after trying vaginal birth, or cesarean without trying vaginal birth. *Trying vaginal birth* was defined on the basis of whether the women actually went into labor. Reasons for cesarean births were recorded by the interviewers. Whether the decision about cesarean birth was medically indicated was coded by the researchers according to the list from the National Health Insurance Administration of Taiwan (National Health Insurance Administration, Ministry of Health and Welfare, 2014).

Data Analysis

Data analysis was performed using IBM SPSS software version 18.0. Descriptive analyses were performed by calculating frequencies, percentages, means, and standard deviations. Construct validity of the scale was assessed using exploratory factor analysis. Contrasted group validity was assessed by comparing mean SEVB scores by preferred birth mode during pregnancy (vaginal, cesarean, and undecided) and actual birth mode (vaginal birth, cesarean after trying vaginal birth, and cesarean without trying vaginal birth) using Student's *t* test or one-way analysis of variance. Although the data were repeatedly measured from the same women, we examined only whether the SEVB scores discriminated among women of different birth modes at each time point for the purpose of validating the scale, and did not intend to analyze changes in SEVB scores in relation to birth mode in this study. Internal consistency was assessed using Cronbach's alpha coefficient, with 0.7 or above considered acceptable (Wu, Chin, Chen, Lai, & Tseng, 2011). The test–retest reliability was

assessed by the intraclass correlation coefficient between SEVB scores at the second and third trimesters of pregnancy.

Results

The characteristics of the study participants are summarized in Table 1. The mean age of the women was 32.75 years (standard deviation [*SD*] = 3.47, range = 22–42 years). Most women were currently married (97.4%, *n* = 682). A total of 602 women (86.0%) had private health insurance, 21.6% of the women (*n* = 151) had a history of abortion, and 73.1% of the women (*n* = 510) had planned this pregnancy.

Content validity as assessed by the CVI yielded a rating of 0.96 for the self-efficacy scale. The Kaiser–Meyer–Olkin score was 0.94 during the second and third trimesters, and Bartlett's test of sphericity reached statistical significance ($p < .001$), indicating that factor analysis could be performed on the scale. Factor analysis showed a one-factor structure for the scale (see Table 2). Factor loadings for the scale items ranged from 0.72 to 0.90. One factor explained 62.77% and 67.08% of the variance for the second and third trimesters, respectively (see Table 2).

Table 1: Characteristics of the Study Participants (*N* = 700)

Variable	*n*	%
Age in years		
≤30	174	24.9
31–40	519	74.1
≥41	7	1.0
Currently married	682	97.4
Work status		
None	149	21.3
Part time	68	9.7
Full time	483	69.0
Educational level		
High school or lower	66	9.4
Vocational school or university	515	73.6
Postgraduate	119	17.0
Have private health insurance	602	86.0
History of abortion[a]	151	21.6
Planned pregnancy[b]	510	73.1
Conceived with infertility treatment	73	10.4
Had chronic diseases before pregnancy	42	6.0

[a]Missing = 1. [b]Missing = 2.

Women who preferred cesareans without medical reasons had significantly lower mean Self-Efficacy Regarding Vaginal Birth scores during pregnancy than women who preferred vaginal births.

Of the 700 women who did not have medical indications for cesarean births during the second trimester, 430 (61.4%) preferred a vaginal birth, 91 (13.0%) preferred a cesarean birth, and 179 (25.6%) were undecided. The mean SEVB scores from high to low were 62.46 (*SD* = 12.21) for preferred vaginal birth, 52.03 (*SD* = 13.34) for undecided, and 44.10 (*SD* = 14.30) for preferred cesarean birth ($F = 98.57$, $p < .001$; all pairwise comparisons $p < .001$; see Table 3). Of the 637 women who did not have medical indications for cesarean births during the third trimester, 503 (79.0%) preferred a vaginal birth, 58 (9.1%) preferred a cesarean birth, and 76 (11.9%) were undecided. The mean self-efficacy scores from high to low were 60.22 (*SD* = 12.79) for preferred vaginal birth, 48.67 (*SD* = 13.32) for undecided, and 39.88 (*SD* = 15.82) for preferred cesarean birth ($F = 79.44$, $p < .001$; all pairwise comparisons $p < .001$; see Table 3). Post hoc comparisons showed that the group who preferred cesarean without medical indications had a significantly lower mean SEVB score than the other two groups during pregnancy. Of the 585 women who did not have medical indications for cesareans before birth, 472 (80.7%) had a vaginal birth, 83 (14.2%) had a cesarean after trying vaginal birth, and 30 (5.1%) had a cesarean without trying vaginal birth. The group who had a cesarean birth without medical reasons and without trying vaginal birth had a lower mean SEVB score during pregnancy than the group who tried vaginal birth regardless of success (42.13 for cesarean without trying vaginal birth vs. 56.96 for cesarean after trying vaginal birth or 58.29 for vaginal birth; both $p < .001$). These results supported the contrasted group validity of the scale (see Figure 1 and Table 3).

The internal consistency of the scale as assessed by Cronbach's alpha was 0.93 and 0.94 during the second and third trimesters, respectively. The test–retest reliability as assessed by the

Table 2: Factor Analysis for the Scale of Self-Efficacy Regarding Vaginal Birth (SEVB)

Concept/Items	Factor Loadings for the Second Trimester	Factor Loadings for the Third Trimester
Self-concept regarding a vaginal birth		
I am confident in having a smooth vaginal birth.	.89	.90
I have confidence in my pelvic anatomy and overall body build for a successful birth.	.73	.79
I know that I can supply adequate nutrition for my baby to undergo a vaginal birth.	.79	.83
Self-control regarding a vaginal birth		
I am confident in dealing with pain from uterine contractions during vaginal birth.	.76	.80
I can handle myself during vaginal birth.	.85	.87
Self-cognition regarding a vaginal birth		
I am confident in cooperating with medical personnel during vaginal birth.	.83	.87
When problems arise during labor, I have more than one way to counter them.	.73	.72
I am well-prepared for the challenges of vaginal birth.	.79	.82
Family support gives me strength to overcome the challenges of vaginal birth.	.76	.76
Eigenvalue	5.65	6.04
% of variance	62.77	67.08

intraclass correlation coefficient between the SEVB scores at the second and third trimesters of pregnancy was 0.73, which was deemed acceptable.

Discussion

Through our study findings we provide evidence of the validity and reliability of a newly developed scale of self-efficacy regarding a vaginal birth, the SEVB scale, among Taiwanese pregnant women with a Chinese cultural background. The internal consistency of the SEVB was well above 0.90 and deemed satisfactory. The instrument had good test–retest reliability during pregnancy, as evidenced by an intraclass correlation coefficient greater than .70. Construct validity of the instrument was supported by factor analysis. We regarded the three characteristics of self-efficacy (self-concept, self-control, and self-cognition) as closely related, and this was supported by the one-factor structure. Among women who did not have known medical indications for cesarean births, the SEVB discriminated between women who preferred cesarean births from those who preferred vaginal births during the second and third trimesters of pregnancy as well as women who actually tried vaginal birth from those who received cesarean without trying vaginal birth.

There is no external preoperative/concurrent review required for cesarean birth in Taiwan (Han & Lien, 2010). Once the women and her obstetrician agreed, cesarean could be performed and would not be monitored (Huang et al., 2013). Under this context, we found that women who preferred cesarean births had lower self-efficacy regarding a vaginal birth during the second and third trimesters of pregnancy. Researchers have shown that self-efficacy affects coping and experiences in childbirth among women who are about to go through a natural labor process (Drummond & Rickwood, 1997; Lowe, 2000). Women with low self-efficacy experienced more fear about giving birth and losing control during birth (Lowe, 2000).

Extending from previous results, we found that low self-efficacy regarding a vaginal birth as early as the second trimester was a risk factor for

having cesarean without trying vaginal birth among women who did not have known medical indications for cesarean births. Women with low self-efficacy regarding a vaginal birth may view cesarean births as a solution to deal with fear and uncertainty related to vaginal births (Huang et al., 2013). They may perceive cesarean birth as safer and less painful than vaginal birth. Huang et al. (2013) reported that women actively collected information about mode of birth and weighted the risks and benefits during the second trimester of pregnancy. Health professionals could initiate discussion about mode of birth with pregnant women during the second trimester and assess their self-efficacy regarding a vaginal birth. Support and intervention should be provided for women with a low self-efficacy to boost their confidence. Accurate risk information about cesarean births should be communicated.

We found that women who had non–medically indicated cesarean birth without trying vaginal births had lower self-efficacy regarding vaginal birth than women who actually tried a vaginal birth. If we can identify women with low self-efficacy during pregnancy early, interventions to clarify concerns about and obstacles to vaginal birth could be provided. In a previous study, researchers reported that over 93% of women who preferred cesarean births during the second trimester did not change their decision and eventually had a cesarean birth (Chu et al., 2010). Initiating a discussion with women who have low self-efficacy regarding a vaginal birth and prefer a cesarean birth during the second trimester could help decrease unnecessary cesareans. Nonetheless, further study is needed to examine this issue.

The newly developed Self-Efficacy Regarding Vaginal Birth scale could be used to screen women with low self-efficacy during pregnancy to increase their willingness to try vaginal birth.

According to Bandura, self-efficacy beliefs affect the level of motivation, and individuals with high self-efficacy tend to face situations without resistance, make more effort, and persist longer in the face of obstacles than individuals with low self-efficacy. In contrast, people who doubt their capabilities tend to avoid situations that they believe exceed their self-efficacy (Bandura, 1986; Bandura 2004; Carlsson et al., 2014). Our results are consistent with the theoretical perspective that nulliparous women who had low self-efficacy toward a vaginal birth preferred cesarean birth

Table 3: Mean Self-Efficacy Regarding Vaginal Birth Scores by Preferred Mode of Birth During Pregnancy and Actual Mode of Birth

Variable	Mean (*SD*)	*t*/*F*	Post hoc tests
Preferred mode during second trimester of pregnancy	—	98.57*	VB > cesarean*
VB	62.46 (12.21)	—	VB > undecided*
Cesarean	44.10 (14.30)	—	—
Undecided	52.03 (13.34)	—	—
Preferred mode during third trimester of pregnancy	—	79.44*	VB > cesarean*
VB	60.22 (12.79)	—	VB > undecided*
Cesarean	39.88 (15.82)	—	—
Undecided	48.67 (13.32)	—	—
Actual mode of birth	—	18.67*	VB > cesarean without trying VB*
VB	58.29 (14.02)	—	Cesarean after trying VB > cesarean without trying VB*
Cesarean after trying VB	56.96 (12.32)	—	—
Cesarean without trying VB	42.13 (18.43)	—	—

Note. VB = vaginal birth.
*$p < .001$.

during pregnancy and had a cesarean without trying vaginal birth. Because the notion of self-efficacy in childbirth has been supported in various cultures (Carlsson et al., 2014; Khorsandi et al., 2008; Lowe, 1993), we believe that the SEVB could be used in countries where mother-requested cesarean births (to avoid vaginal births) are possible, although further validation of the scale in other cultures may be needed.

Limitations

There are limitations to the current study. The reasons for cesarean birth were based on reports by the women. Then we coded the reasons to determine whether they were medically indicated or not. This practice could cause misclassification errors. However, we found that the women described the reasons for their cesarean births clearly, although we were unable to validate their answers. We believed that mothers' reports were more accurate than the hospital records or obstetrician reports because the indications in the hospital records were given to justify the cesareans rather than to describe the real medical condition of the women (Chu et al., 2010). Reasons for cesarean birth and actual mode of birth were determined at 1 month postpartum because of Chinese cultural practices in which new mothers rest as much as possible during the month after childbirth. Nonetheless, the study was strengthened by use of a prospective design and restriction of the study samples to women without known medical indications for cesarean birth.

Conclusions

The SEVB had acceptable reliability and validity among pregnant women in Taiwan. Nurses could use the SEVB to identify women with low self-efficacy during pregnancy. Support and interventions to increase self-efficacy and mitigate concerns about and obstacles to a vaginal birth could be provided for women with a low self-efficacy to boost their confidence, which could help increase their willingness to try vaginal births and decrease unnecessary cesarean births.

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