ORIGINAL RESEARCH—EDUCATION

Transtheoretical Model-based Postpartum Sexual Health Education Program Improves Women's Sexual Behaviors and Sexual Health

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ABSTRACT

Introduction. Postpartum sexual health education was once routinely administered to postpartum women, but few interventions were specifically described or clearly based on theory, and few sexual interventions affected women's sexual behaviors.

Aim. To evaluate the effectiveness of a refined theory-based interactive postpartum sexual health education program (IPSHEP) in enhancing postpartum women's sexual behavior and health.

Methods. For this prospective, randomized controlled trial, 250 participants were randomized to three groups. Experimental group A received our refined theory-based IPSHEP. Experimental group B received only an interactive, self-help pamphlet. The control group received routine education (a 10- to 15-minute educational talk and a sexual health pamphlet without an interactive design). Data were collected at baseline, 3 days, 2 months, and 3 months postpartum.

Main Outcome Measure. Postpartum women's sexual self-efficacy (SSE), diversity of sexual activity (DSA), return to sexual activity, and sexual satisfaction (SS).

Results. Women who received our theory-based postpartum sexual health education program had significantly greater SSE ($P < 0.05$) and greater DSA ($P < 0.05$), and tended to resume their sexual life earlier than women in the routine teaching and interactive pamphlet-only groups ($P < 0.05$). However, the SS levels of postpartum women who received our program did not differ significantly from those of women who received routine teaching or the interactive pamphlet only.

Conclusions. Our findings suggest that a theory-based postpartum sexual health education program improved women's sexual health and sexual behavior and that the transtheoretical model can be translated into practice, supporting its use to enhance the sexual health of postpartum women. Despite the lack of a significant effect on SS, women who received our theory-based postpartum sexual health education program tended to maintain their prepregnancy level of SS in early postpartum. **Lee J-T and Tsai J-L. Transtheoretical model-based postpartum sexual health education program improves women's sexual behaviors and sexual health. J Sex Med 2012;9:986–996.**

Key Words. Postpartum; Sexuality; Sexual Activity after Childbirth; Health Education; Patient Teaching; Transtheoretical Model

Introduction

Enjoying sexuality, having a healthy baby, becoming a competent mother, and building an emotionally satisfying spousal relationship are important reproductive health objectives for women [1]. Nevertheless, childbearing challenges women's marital satisfaction and sexual life, making the childbearing years a vulnerable stage in women's sexual life.

The first sexual intercourse after childbirth can be an important step for couples to reclaim their

intimate relationship [2]. Couples generally experience a significant decline in sexual activity and intimacy from pregnancy to early postpartum, as adaptation to motherhood takes considerable energy and involves sleep disturbances, profound psychosocial changes, and hormonal effects [3–5]. Most women resume sexual activity within 3 months of delivery, but 83% experience sexual problems and 30–52.5% report painful intercourse [6,7].

In Taiwan, the custom of "doing the month" places a taboo on sexual intercourse during the month after childbirth [8] and produces a sexual approach-avoidance conflict for women. On one hand, the taboo reinforces their fear that sexual intercourse will adversely affect normal body repair after childbirth. On the other hand, they feel obligated to satisfy their husband's desire, and fear not meeting his needs. Due to this cultural practice, combined with improper contraceptive knowledge and fear of unexpected pregnancy [9], Taiwanese women tend to delay returning to sexual activity or may have difficulty deciding to resume sexual life. Postpartum women in Western culture may also have less sexual interest and inhibited performance because of fatigue, perineal pain, decreased vaginal lubrication, and fears of injuring a healing wound or becoming pregnant again [10]. These sexual problems may have a midterm or long-term negative impact on women's physical and mental health and on their relationships and family development [1,11].

Sexual education has been found in the literature reviews to benefit sexual health and behavior [12,13], suggesting that sexual health education would relieve unnecessary pressure on women's and couples' sexual life. Although sexual education has been one aspect of routine postpartum education [14], it does not meet postpartum women's needs as it is limited to the timing of first postnatal intercourse and contraceptive use [1]. However, the effectiveness of postpartum education has seldom been questioned, its effectiveness on sexual behavior has not been established in randomized controlled trials (RCTs) [14], and few interventions were specifically described or are clearly based on theory.

RCTs provide evidence about intervention effects but no insight into why an intervention is effective. If an intervention is not based on theory and offers no empirical evidence, one cannot predict which components are essential for its effect [15]. To promote effective patient education, educational theories must consider not only educational methods and media to suit patients' interests, abilities, and cultural backgrounds, but also whether educational strategies help patients achieve healthy behaviors [16]. One model that appears useful and valid for characterizing women from diverse cultures is Prochaska's transtheoretical model (TTM) [17,18], an integrative model of behavior change that has been applied successfully to such health behaviors as exercise [19], condom use [20], and safe sexual behavior [21,22].

The effectiveness of behavioral change programs may be increased by framing them with the TTM, which assumes that individuals evolve through five stages (precontemplation, contemplation, preparation, action, and maintenance) of considering or adopting a health-related or health-promoting behavior. The model also describes 10 change processes (consciousness raising, self-reevaluation, self-liberation, counterconditioning, stimulus control, reinforcement management, helping relationships, dramatic relief, environmental reevaluation, and social liberation) [18,23], which can be employed in interventions to facilitate behavior change and progression through the stages. By using the change processes identified as most useful at a particular stage (i.e., matched treatment), behavior change is facilitated more successfully than by using the same intervention techniques with everyone, regardless of change stage [23,24].

Therefore, we used the TTM as the basis for developing an interactive postpartum sexual health education program (IPSHEP) that met the sexual education needs of postpartum Taiwanese women [9,25] and enhanced their sexual health knowledge (SHK), sexual attitudes, and sexual self-efficacy (SSE) [26]. Based on our process evaluation of the IPSHEP, we revised its pamphlet and added an educator's guide booklet. This refined IPSHEP was recently shown to effectively improve Taiwanese women's contraceptive health [36].

Aim

The aim of this study was to evaluate the effectiveness of a refined theory-based IPSHEP on postpartum women's sexual behavior and health, i.e., SSE, diversity of sexual activity (DSA), return to sexual activity (RSA), and sexual satisfaction (SS).

Methods

This study was part of a prospective RCT research project conducted from 2005 to 2007 to evaluate

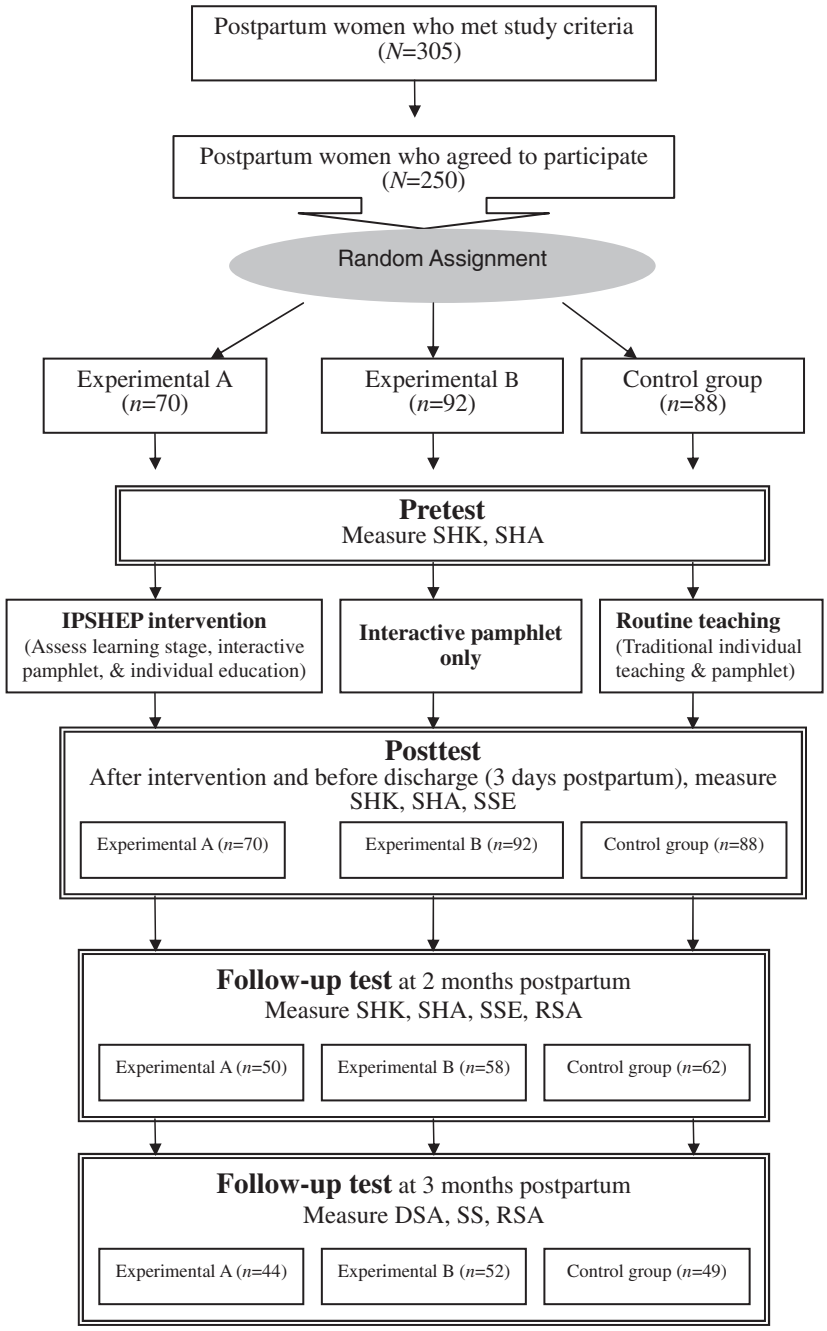

Figure 1 Study design and outcome measures. After random assignment to control and experimental groups, participants were assessed before intervention (pretest) for sexual health knowledge (SHK) and sexual health attitudes (SHAs). For interventions, the control group received routine postpartum teaching, experimental group A received the interactive postpartum sexual health education program (IPSHEP), and experimental group B received the interactive pamphlet only. After the appropriate intervention and before discharge, each group was assessed for SHK, SHA, and sexual self-efficacy (SSE). At 2 months after delivery (second posttest), all three groups were assessed for SHK, SHA, SSE, and return to sexual activity (RSA). At 3 months after delivery (third posttest), all three groups were assessed for diversity of sexual activity (DSA) and sexual satisfaction (SS).

the effectiveness of a refined theory-based IPSHEP. Data were collected at pretest and three posttests at 3 days, 2 months, and 3 months postpartum (Figure 1).

Sample and Setting

Participants were women recovering in the 69-bed postpartum wards of a large-scale medical center and a local hospital in northern Taiwan. Both

institutions had over 90% occupancy rates and about 5,000 births annually. Postpartum women were included if they (i) delivered a single, full-term healthy baby (gestation age 38–42 weeks, body weight >2,500 g, and Apgar score >8); (ii) were admitted for <3 days; (iii) had no perinatal complications or major chronic illness; (iv) were married and lived with their husbands; (v) aged 20–39 years; and (vi) could read, write, and speak Chinese. Of 305 women meeting these criteria, 250 agreed to participate and signed informed consent.

This sample size was based on our estimate for repeated measures within three groups, significance level of 0.05, effect size of 0.4, and power of 80%. Power was calculated for the 2-month posttest, indicating 78 participants needed in each group [27]. Based on a previous questionnaire response rate of 80% [27], we planned 90 participants per group.

Procedures

Before participants were recruited, the study was approved by the study sites' human subjects committees. A research assistant (RA) explained the study process to participants, including the research topic, process, purposes, and their right to withdraw from the research. Participants then signed consent forms. Participants were randomly assigned to three groups: experimental A, experimental B, and control. To determine which ward rooms would first receive the program, a coin was flipped. Participants received postpartum sexual health education or family planning from the researchers only. One RA blinded to group allocation administered the same questionnaires to all groups, thus controlling the potential bias of repeated testing. The same RA administered the pretest and first posttest questionnaires. Data were collected by two RAs with clinical research backgrounds and trained using a researcher-developed data collection protocol and manual.

To control the consistency of health education, all health educators attended a training course in research interventions. The individual health education of group A and the control group was provided by licensed nurses (two educators/group) with background in maternity care and with >1 year experience in obstetrics and gynecology. Group A health educators received not only training in research interventions but also 16 hours of training about the IPSHEP.

The study was conducted in two stages to minimize disturbing participants' postpartum recuperation, which is emphasized in Taiwan, and to avoid providing too much information at once. Individual health education (partial contents of the pamphlets) was presented during admission in the postpartum ward, and the remaining pamphlet content was given to women to read at home, with a reminder phone call to study the pamphlet. At 2 and 3 months postpartum, data were collected from participants by mailed questionnaire.

Experimental Group A: IPSHEP

Women in group A were assessed at pretest for levels of TTM-based learning preparedness, SHK, and sexual health attitudes (SHAs) (Figure 2). The information on learning preparedness was used to determine their health education strategies. In the first stage of the IPSHEP, women were given an interactive self-help pamphlet, "Happy Mother's Sex," to read before scheduling a bedside education appointment. In the second stage, a nurse educator provided 10–15 minutes of individual, interactive sexual health education at bedside according to each woman's readiness to learn. The strategies used in individual, interactive sexual health education were derived from TTM constructs, and outcomes (indicators) were chosen to detect the effects of those strategies.

For example, women in the precontemplative stage are not ready to learn how to promote their sexual health, but nurses are usually unaware of clients' readiness and make the mistake of presenting all the educational materials at once. Besides wasting the nurse's time, this approach is inefficient because the client is not ready to accept or think about the health information. For clients at this stage, consciousness raising (a TTM-based strategy) would be a better strategy to motivate learning.

Similarly, women in the preparation stage are ready to learn but lack sufficient self-efficacy to promote their sexual health or to accept their pregnant/postpartum body. Thus, reinterpreting physical signs and symptoms of pregnancy/postpartum (a TTM-based strategy) would be a better strategy to increase these women's SSE (improve body image). Participants had an opportunity to ask questions, and the nurse educator emphasized pamphlet elements to strengthen through self-study. These pamphlet elements depended on each woman's questions and her TTM-based stage of readiness to change.

"Happy Mother's Sex" was developed to be culturally appropriate for postpartum Taiwanese women and to allow readers to dialog with

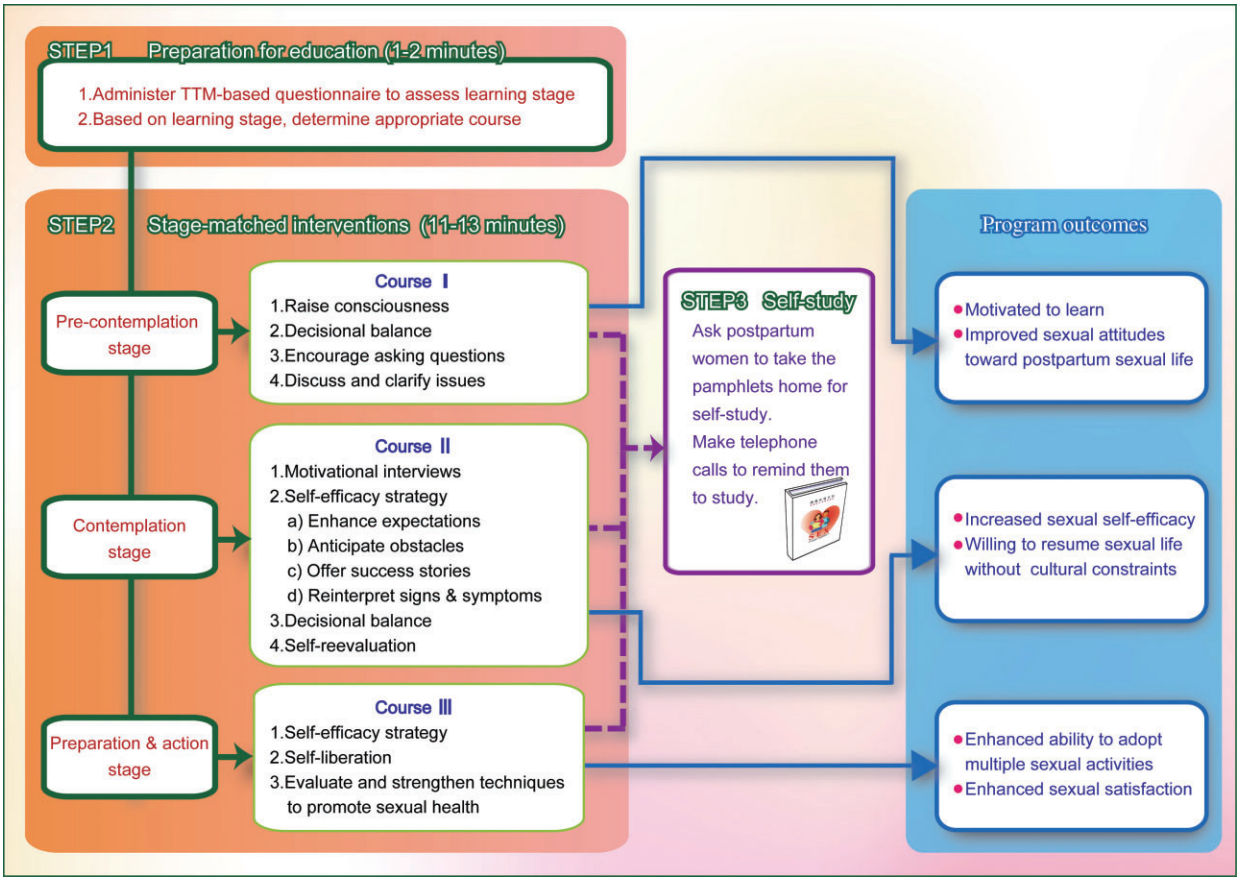

Figure 2 Scheme for interactive postpartum sexual health education program (adapted with permission [26]). Strategies were derived from transtheoretical model (TTM) constructs, and outcomes (indicators) were chosen to detect the effects of those strategies. For example, in Course II, we used reinterpreting physical signs and symptoms (a strategy derived from the TTM construct, self-efficacy) to promote postpartum women's sexual self-efficacy (SSE). Women's negative body changes were interpreted positively to mean "the marks of a great mother" to help women accept and appreciate their body and to enhance their self-efficacy toward sexuality. Thus, SSE became a study outcome.

instructors, to self-instruct, to self-evaluate, and to feel involved, thus reinforcing the learning effects [26]. The pamphlet had two main components, contraception and postpartum sexual adjustment, divided into seven instructional units: the fundamentals of physical sexuality after childbirth, preparation for postnatal sex, birth control, psychological sexuality after childbirth, intimate relationships, the sex life of a breast-feeding mom, and the husband.

Experimental Group B: Interactive Pamphlet Only

This group was designed to answer the question, "Does a refined interactive sexual health education pamphlet effectively function instead of a nurse in health education?" Thus, after group B women were pretested (Figure 1), they also received "Happy Mother's Sex." They were asked to read the pamphlet without individual health education or any opportunity to discuss questions.

Control Group: Routine Postpartum Sexual Health Education

The control group was designed to answer the question, "Does a refined theory-based IPSHEP enhance postpartum women's sexual behavior and health better than noninteractive sexual health education?" This group received the hospitals' routine non-IPSHEP. This program comprised a 10- to 15-minute educational talk and a sexual health pamphlet (the same content and color printing as "Happy Mother's Sex" but without the interactive design), both given by the nursing staff without formal training in interactive sexual health education for postpartum women.

Main Outcome Measures

IPSHEP effectiveness was examined using a self-report instrument to measure background information and four dependent variables: SSE, RSA (in weeks), DSA, and SS. The SSE, RSA, and SS subscales were previously developed [9,26,28,37]; the DSA subscale was developed for this study. The instrument's content validity determined by five clinicians and three PhD-level professors was 0.90. The face validity determined by five postpartum women was 0.92. Validities and reliabilities for each subscale are given below. Internal consistency reliability of the overall scale was 0.67–0.85 for the main sample in this study.

SSE or participants' confidence in their perceived ability to perform healthy postpartum sexual behaviors was measured by the questionnaire's 26-item postpartum SSE subscale [26] with three dimensions: sexual psychology, sexual biology (e.g., self-care of perineal wound, vaginal lubrication), and sexual communication. Item responses are scored from 0 (no confidence) to 4 (very confident). Higher scores indicate greater confidence in perceived ability to perform a sexual behavior. Total scores range from 0 to 104; internal consistency (alpha coefficient) was 0.94.

RSA was categorized as "sexual intercourse within 2 months after childbirth" (yes/no) and "sexual intercourse within 3 months after childbirth" (yes/no). These outcomes were measured by one self-report item (RSA assessment [9]) on sexual activity since the last testing period. Participants were asked, "Did you and your spouse resume sexual intercourse? If yes, please indicate the number of weeks after the baby's birth."

DSA was used to evaluate postpartum women's interpersonal behavior with their partners regarding sexuality. The DSA subscale is a researcher-designed list of sex behaviors based on a review of the literature [29–31]. The initial list of 14 categories of sex behaviors was tested in a pilot study with 23 postpartum women, and its content validity was examined by eight experts. Based on participants' and experts' advice, the DSA was reduced to nine categories.

From this list, participants choose sex behaviors used with their partners and evaluate satisfaction with each activity for the "recent 4 weeks" at 3 months postpartum. Sexual activities comprise nine categories: (i) caressing the body, excluding genitals; (ii) masturbating each other by hand, including genitals; (iii) self-masturbation; (iv) masturbating partner; (v) genital sexual stimulation, outercourse; (vi) vaginal intercourse; (vii) cunnilingus; (viii) fellatio; and (ix) anal sex. Participants rate satisfaction with each behavior from 1 (not satisfied at all) to 7 (very satisfied); higher scores indicate greater satisfaction. For this study, DSA internal consistency reliability was $\alpha = 0.74$, content validity index was 0.97, and concurrent validity was 0.258 ($P < 0.01$) compared with Hetherington's intimate relationship scale [32].

To address the importance and strength of each sex-related behavior, we weighted each behavior. For masturbating each other by hand, including genitals, the weighting factor (WF) = 9; for cunnilingus, WF = 8; caressing the body, excluding genitals, WF = 7; intercourse, WF = 6; fellatio, WF = 5; masturbating partner, WF = 4; genital sexual stimulation, WF = 3; self-masturbation, WF = 2; and anal sex, WF = 1. The total DSA score is calculated by summing across items, item satisfaction score (1–7) multiplied by its WF (1–9).

Background information included demographics (age, education level, religion, number of children, previous unintended pregnancy, and previous postpartum sex health education) and clinical data (gravida, parity, delivery method, perineal laceration, artificial abortion, and breastfeeding method). Demographic information was collected from participants, and clinical data were collected from medical records.

Data Analysis

Data were analyzed using SAS 9.1 (SAS Institute Inc., Cary, NC, USA) and SPSS 17.0 (SPSS Inc., Chicago, IL, USA). Before data analysis, variables were examined for univariate and multivariate outliers and normal distribution. Results were used to transform data if needed. Participants' characteristics were summarized by means and percentages. The internal consistency reliabilities of the SSE, DSA, and SS subscales were examined by Cronbach's α coefficient. Concurrent validity of the DSA was examined by Pearson correlation coefficient. Group effects on SSE and SS scores were assessed by generalized estimating equation methodology. Significance of DSA differences among groups was determined by one-way analysis of variance (ANOVA). RSA differences among groups were determined by logistic regression. SS was further compared by least squares difference test. Statistical significance was considered $P < 0.05$, with 95% confidence intervals reported.

Results

Participant Characteristics

The 250 participants who completed the pretest also completed one of three groups of health edu-

Table 1 Baseline characteristics of participants (N = 250)

Characteristic	Experimental group A (N = 70)		Experimental group B (N = 92)		Control group (N = 88)		Total (N = 250)		
	N	%	N	%	N	%	N	%	χ^2 (*P*)
Age (years)									3.04 (0.80)
20–24	5	7.1	6	6.5	8	9.1	19	7.6	
25–29	24	34.3	40	43.5	31	35.2	95	38.0	
30–34	34	48.6	36	39.1	42	47.7	112	44.8	
35–39	7	10.0	10	10.9	7	8.0	24	9.6	
Highest education									3.22 (0.20)
Undergraduate college	15	21.4	30	32.6	29	33.3	74	29.7	
College graduate	55	78.6	62	67.4	58	66.7	175	70.3	
Religion									7.02 (0.14)
None	37	52.9	42	46.2	35	41.2	114	46.3	
Buddhist/folk religion	27	38.6	39	42.9	47	55.3	113	45.9	
Other	6	8.6	10	11.0	3	3.5	19	7.7	
Parity									2.46 (0.29)
1	28	40.0	45	48.9	46	52.3	119	47.6	
≧2	42	60.0	47	51.1	42	47.7	131	52.4	
Delivery method									10.46 (0.005)
Vaginal birth	37	52.9	70	76.1	52	59.1	159	63.6	
Caesarean section	33	47.1	22	23.9	36	40.9	91	36.4	
Previous sexual health education									4.59 (0.10)
Yes	9	12.9	24	26.1	16	18.2	49	19.6	
No	61	87.1	68	73.9	72	81.8	201	80.4	
Previous unintended pregnancy									1.67 (0.43)
Yes	27	39.1	16	28.6	25	37.3	68	35.4	
No	42	60.9	40	71.4	42	62.7	124	64.6	

cation (control, N = 88; group A, N = 70; group B, N = 92) and the 3-day posttest (Figure 1). The questionnaire recovery rates of the three groups at the 3-month posttest were 55.7, 58.6, and 56.5%, respectively (for details, see Figure 1).

Participants' average age was 29.94 years (standard deviation [SD] = 3.58, range 20–39), and the majority was multipara (52.4%) and had delivered vaginally (63.6%) (Table 1). Only 19.6% had ever received postpartum sexual health education or related materials from professionals, highlighting the problem of low exposure to sexual health education. The three groups were not significantly different at baseline in demographic and clinical characteristics (Table 1), except for delivery method ($P < 0.01$). However, comparison of participants by vaginal birth vs. caesarean section showed no significant differences in SHK and SHA pretest scores ($P > 0.05$).

Effects of IPSHEP

SSE

Discrepancies among SSE posttest scores of the three groups changed over time and held true at the 2-month follow-up. Our results also demonstrate that, after controlling for groups, all three interventions had positive time-varying effects on SSE at 3 days and 2 months, indicating that all participants' SSE increased over time (Table 2). However, after accounting for the time effect, the SSE of group A improved significantly more than that of group B ($P = 0.011$) and the control group ($P = 0.02$; Table 3). Thus, the IPSHEP significantly improved postpartum women's SSE more than the interactive self-help pamphlet and traditional postpartum teaching.

RSA

Over half of the participants (59.3%) resumed sexual activity by 2 months. Furthermore, group A, group B, and the control group returned to sex, on average, at 6.42 ± 0.23, 6.84 ± 0.20, and 6.88 ± 0.19 weeks, respectively (Table 4). Comparison of groups by simple logistic regression analysis using "RSA or not" as a categorical variable showed that group A and the control group differed significantly ($P < 0.05$). That is, group A tended to resume sexual activity earlier than the control group (odds ratio [95% confidence interval] = 0.431 [0.205–0.905]), indicating that the IPSHEP significantly decreased women's RSA relative to traditional postpartum teaching.

DSA

At 3 months postpartum, women tended to use intercourse (75.3%), caressing the body, excluding genitals (51.4%), and masturbating each other by hand, including genitals (46.5%). The

Table 2 Sexual self-efficacy and sexual satisfaction of postpartum women by group and time (N = 250)

	Experimental group A (N = 70)			Experimental group B (N = 92)			Control group (N = 88)		
	Mean ± SD								
Outcome	Pretest	3 days postpartum (1st posttest)	2 months postpartum (2nd posttest)	Pretest	3 days postpartum (1st posttest)	2 months postpartum (2nd posttest)	Pretest	3 days postpartum (1st posttest)	2 months postpartum (2nd posttest)
Sexual self-efficacy	None	1965.64 ± 341.04	2078.21 ± 340.53 $P = 0.037^*$	None	1819.00 ± 303.85	1979.55 ± 380.57 $P = 0.003^*$	None	1759.69 ± 415.86	1990.51 ± 368.38 $P < 0.001^*$
	Before pregnancy		3 months postpartum	Before pregnancy		3 months postpartum	Before pregnancy		3 months postpartum
Sexual satisfaction	16.18 ± 3.36		16.11 ± 3.23 $P = 0.899^\dagger$	15.88 ± 3.35		14.83 ± 4.42 $P = 0.053^\dagger$	16.57 ± 2.92		14.85 ± 3.58 $P = 0.002^\dagger$

*Compared with 3 days postpartum.
†Compared with before pregnancy.
SD, standard deviation.

most satisfactory sexual activities were masturbating each other by hand, including genitals (5.9 ± 1.33), cunnilingus (5.84 ± 1.53), and caressing the body, excluding genitals (5.56 ± 1.45) (Table 5). Comparison of DSA among groups by one-way ANOVA revealed significant differences ($F = 3.286$, $P < 0.05$). Post hoc test showed that DSA of group A was significantly higher than that of the control group ($P = 0.04$) and group B ($P < 0.05$). In other words, the IPSHEP significantly improved women's DSA relative to traditional postpartum teaching and the interactive pamphlet only.

SS

The SS scores of group B and control group women were significantly lower at 3 months postpartum than before pregnancy ($P < 0.05$ and $P < 0.002$, respectively), but the SS scores of group A did not change ($P > 0.05$; Table 2). That is, SS decreased for women who received an interactive self-help pamphlet or traditional postpartum teaching, but women who received the IPSHEP tended to maintain their SS level. However, this superior effect of the IPSHEP on SS was not significant when the time effect was taken into account (Table 3). These results demonstrate that the IPSHEP maintained women's SS scores until 3 months postpartum.

Discussion

Our findings support the importance of TTM self-efficacy strategies in enhancing the SSE of postpartum women. We found that postpartum women who received the IPSHEP had significantly greater SSE than those who received routine teaching and the interactive self-help pamphlet. These findings confirm our previous finding that the IPSHEP significantly improved postpartum women's SSE [26], demonstrate that the TTM can be translated into practice, and support its use to enhance postpartum women's SSE.

We found that SS at 3 months postpartum was lower than before pregnancy among women who received traditional postpartum teaching or an interactive self-help pamphlet, similar to postpartum women's usual experience [3–5]. However, women who received the IPSHEP tended to maintain their SS level. Therefore, the IPSHEP might have helped postpartum women adapt to sexual life and maintain their SS level in early postpartum even though their SS was not significantly greater than those who received routine teaching or the

Table 3 Group effects on postpartum sexual self-efficacy and sexual satisfaction

	Group (z [*P*])				
Variable	Intercept	Control	Experimental group A	Experimental group B	Experimental A vs. B
Sexual self-efficacy	1818.68	Baseline	2.32 (0.02)	–0.33 (0.742)	2.53 (0.011)
Sexual satisfaction	16.48	Baseline	–0.32 (0.753)	–0.98 (0.327)	1.45 (0.148)

Generalized estimating equation analysis was used for repeated measurements.

interactive pamphlet only. Studies are needed to determine the factors influencing women's SS and to develop more strategies to improve SS consistent with theories about those factors.

Nonetheless, our analysis showed that intervention effects on behavioral outcomes were greater if the intervention also successfully improved conceptual mediators, indicating that interventions are worthwhile if they target only conceptual mediators [33]. As SSE is a predictor (or mediator) of sexual health behavior, and the TTM-based IPSHEP enhanced postpartum women's SSE, the IPSHEP has a greater chance of successfully improving postpartum women's SS.

Our results show that women who received the IPSHEP tended to resume sexual activity earlier after childbirth (6.42 weeks) than women in the routine teaching (6.88 weeks) and interactive pamphlet-only (6.84 weeks) groups. Although women's RSA varies greatly, the first sexual intercourse after childbirth can be an important step for couples to reclaim their intimate relationship [2]. Our RSA results are similar to reports that the average time for first sexual intercourse after childbirth was 6.98 weeks for Taiwanese women [9], the median time was 6 weeks for UK women [34], and the median time was 5–8 weeks for European and U.S. women [3–7].

Our results are noteworthy because Taiwanese postpartum women follow the cultural practice of "doing the month," which places a taboo on sexual intercourse during the month after childbirth [8,9]. Thus, the IPSHEP may have helped Taiwanese women learn to assess their recovery from delivery by themselves and judge whether the perineal wound is healed and sexual intercourse can be resumed. Therefore, our intervention appeared to have helped women resume sexual activity earlier and to be less susceptible to cultural constraints.

Women who received the IPSHEP had significantly greater DSA at 3 months postpartum than those who received routine teaching and an

Table 4 Postpartum women's return to sexual activity by group (N = 186)

Group	Mean ± SD (weeks)	Odds ratio (95% confidence interval)	*P**
A	6.42 ± 0.23	2.32 (1.105–4.881)	0.026
B	6.84 ± 0.20	1.41 (0.709–2.792)	0.328
Control	6.88 ± 0.19		

*Significance determined relative to the control group.
SD, standard deviation.

Table 5 Diversity of sexual activity of postpartum women by group (N = 150)

	Group A				Group B				Control group				Total					
	Activity		Score		Activity		Score		Activity		Score		Activity		Score		Rank	
Sexual activity	N	%	M	SD	N	%	M	SD	N	%	M	SD	N	%	M	SD	%	M
Caressing the body, excluding genitals	24	64.9	5.79	1.38	24	47.1	5.6	1.63	25	46	5.26	1.3	73	51.4	5.56	1.45	2	3
Masturbating each other by hand, including genitals	26	31.6	6.04	1.34	17	34	5.63	1.46	23	43	5.95	1.2	66	46.5	5.9	1.33	3	1
Self-masturbation	4	11.8	4	2.16	6	12	4.5	1.52	5	9.3	5.2	1.6	15	10.9	4.6	1.68	8	8
Masturbating partner	12	34.3	5.25	1.6	16	32	5.27	1.71	12	22	5.33	1.3	40	28.8	5.28	1.52	5	6
Genital sexual stimulation, outercourse	14	35.9	5.21	1.93	10	20	5.6	2.01	8	15	4.88	2	32	22.4	5.25	1.92	7	7
Intercourse	35	85.4	5.34	1.97	38	74.5	5.45	1.45	37	69	5.41	1.3	110	75.3	5.4	1.56	1	4
Cunnilingus	14	37.8	6	1.71	11	22	5.64	1.8	14	26	5.85	1.1	39	27.7	5.84	1.53	6	2
Fellatio	16	43.2	5.63	1.71	19	38	5.22	1.9	16	30	5.13	1.7	51	36.2	5.33	1.76	4	5
Anal sex	5	14.7	3	2.55	2	4	2.5	2.12	0	0	0	0	7	5.1	2.86	2.27	9	9

N and % represent the frequency and percentage, respectively, of adopting a sexual behavior; M represents the mean satisfaction score for each sexual behavior.
S, standard deviation.

interactive self-help pamphlet. That is, the IPSHEP might have encouraged postpartum women to adopt multiple sexual activities at early postpartum. These various sexual activities might have enhanced the sexual enjoyment of the IPSHEP group since women reporting a greater diversity of sexual behaviors at 3 months postpartum also reported more satisfaction with their sexual relationship [35]. For many women who never or only occasionally reach climax through intercourse without additional clitoral stimulation, especially during early postpartum, sexual enjoyment may come from other sexual activities such as nongenital caressing followed by vaginal intercourse and passive manual-genital stimulation [31]. Therefore, we suggest that health professionals offer postpartum women some examples of different ways to express sexual passion and intimacy within their social and cultural context. We also suggest that future studies use DSA as an indicator to measure women's SS.

Limitations

Despite its contributions, this study has some limitations. First, the sample was drawn from northern Taiwan, precluding generalization of the results to postpartum women from other areas of Taiwan. Second, the generalizability of our findings may have been compromised by attrition, despite offering incentives to keep subjects in this longitudinal study. Third, the study was underpowered at the second posttest (3 months) for SS with power of 0.48–0.55 [27], even though the questionnaire response rates for the three groups at 3 months postpartum (56–59%) were comparable to or better than 53% for a related study [7]. Thus, the small sample at 3 months postpartum may not have had enough power to detect group differences in SS. Therefore, we suggest increasing the sample size to reach adequate power in future studies. Fourth, the three study groups had similar characteristics, except for one potential confounding variable (delivery method), which was used to adjust the results. Fifth, two outcome indicators, DSA and SS, were measured only at posttest and follow-up due to the emphasis on postdelivery recuperation in Taiwan. Thus, no baseline data were obtained for these indicators, and IPSHEP effects on them should be further investigated.

Conclusion

Overall, the IPSHEP successfully enhanced postpartum women's SSE, initiation of sexual intercourse, and diversity of sexual behaviors in early postpartum. First, these results add to the body of knowledge on sexual behavior as no previous RCT clearly identified a theoretical basis or model for comparing strategies to effectively communicate sexual behaviors during postpartum. Second, this refined theory-based IPSHEP met the sexual needs of postpartum women, while being well suited to current short hospital stays. Thus, one session of our program may resolve postpartum education problems due to limited health education competence of staff nurses and time limitations in clinical settings. Third, this RCT demonstrates that the IPSHEP improved postpartum women's SSE and might influence the way knowledge is translated into sexual behavior. Fourth, this study used the TTM to classify women by their learning preparedness, allowing the intervention to be tailored to meet each mother's individual sexual health educational needs.

We recommend that an ideal sexual health educational program should be culturally appropriate, theory-based, and compatible with the existing delivery of postpartum sexual health education. Our program included 10–15 minutes of individual, interactive sexual health education and an interactive self-help pamphlet. By matching sexual health education strategies to the learning preparedness of postpartum women, our program optimized use of medical professionals' time and efficacy of sexual health education.

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Statement of Authorship

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