



Research article

The influence of breastfeeding attitudes on breastfeeding behavior of postpartum women and their spouses

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ABSTRACT

Purpose: This study aimed to explore: (1) the influence of maternal sociodemographic factors on breastfeeding attitudes, (2) the relationship between breastfeeding attitudes of postpartum women and their spouses, (3) the predictors of breastfeeding behavior (mixed breastfeeding) at two months postpartum, and (4) to establish the reliability of the Chinese version of the paternal Iowa Infant Feeding Attitude Scale (IIFAS) in Taiwan.

Methods: A correlational and follow-up study design was used on a convenience sample of 215 women and 215 fathers recruited from a regional teaching hospital in central Taiwan from July 2020 to December 2020. The participants completed the IIFAS during postpartum hospitalization and a follow-up via telephone at 8 weeks postpartum for information on feeding methods and duration. The Cox proportional hazards model was used to analyze the predictors of breastfeeding duration.

Results: Maternal breastfeeding attitude scores ranged from 42 to 79, with a mean score of 59.78 (SD ± 6.68). Spouses' breastfeeding attitude scores ranged from 46 to 81, with a mean score of 59.60 (SD ± 6.93). Mother and spouse's IIFAS scores were highly correlated ($r = 0.50$, $p < 0.001$), and the scores of both parents were significantly associated with the duration of breastfeeding. With each increased point on maternal and paternal IIFAS scores, the odds of breastfeeding during the first 8 weeks increased 6% and 10%, respectively.

Conclusion: This is the first study to validate the IIFAS (Chinese version) with paternal participants in Taiwan. Identifying and understanding the infant feeding attitudes of mothers and their spouses should be an early step in designing and implementing breastfeeding interventions.

1. Introduction

It is well documented that human milk is beneficial to the health of infants. Furthermore, breastfeeding immediately after birth also promotes the recovery of the mother's uterus and reduce postpartum hemorrhage [1]. The World Health Organization (2022) recommends that all newborns and infants are exclusively breastfed for the first six months of their lives and continue human milk with complementary foods until at least two years of age [2]. The exclusive breastfeeding rate in Taiwan for infants less than six months of age reached 49.6% in 2012 and declined for the next four consecutive years: to 48.7% in 2013, 45.8% in 2014, 45.4% in 2015, and

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44.8% in 2016 [3]. Although the breastfeeding rate increased to 46.2% in 2018 [3], the breastfeeding rate leaves room for improvement. Relevant government units and medical institutions continue their commitment in promoting breastfeeding-related policies and increase the postpartum breastfeeding rate.

A variety of factors such as age, education employment status, parity, sources of support, attitudes, type of delivery influence a woman's decision to initiate and continue breastfeeding [4–10]. Women who deliver vaginally have a greater propensity to initiate and continue breastfeeding during hospitalization compared to women who deliver via C-section [5]. Younger maternal age, higher household income and education, and paternal support are also associated with positive breastfeeding attitudes [11]. Paternal attitudes towards breastfeeding also have an effect on a mother's decision to breastfeed [12,13] and associated with initiation and duration of breastfeeding [11,14–16]. If the father's attitude is not supportive of breastfeeding, the mother is more likely to choose formula or only breastfeed for a shorter period of time [17].

Despite the known influence of fathers on breastfeeding, studies exploring the attitudes of Taiwanese men are limited. At present, only one article discusses the attitudes of men towards breastfeeding in the postpartum period [18]. Most studies on breastfeeding attitudes or breastfeeding behaviors in Taiwan focus on the mothers [6,19]. Also, no study has simultaneously examined postpartum parental breastfeeding attitudes and the effects on maternal breastfeeding behavior. This study is the first to use the Iowa Infant Breastfeeding Attitudes Scale to measure breastfeeding attitudes among Taiwanese fathers. The Iowa Infant Feeding Attitudes Scale (IIFAS) is a valid and reliable instrument that evaluates breastfeeding attitudes in cross-cultural settings [20–25].

In addition, there are no reported studies of breastfeeding attitudes among Taiwanese fathers using the IIFAS, which may be different from attitudes in other cultures [23,26–28]. This study can not only validate the use of the IIFAS in fathers, but also use the results to understand the current attitudes of fathers towards breastfeeding in Taiwan. During the clinical implementation of breastfeeding, IIFAS can be used to assess the breastfeeding attitudes of postpartum parents, provide a breastfeeding plan that meets the needs, and provide appropriate assistance to help postpartum mothers start breastfeeding as soon as possible and smoothly.

During prenatal consultation, it is common for mothers to plan or prepare for breastfeeding, but spousal opposition to breastfeeding during postpartum care can affect the mother's attitude towards breastfeeding and increase the likelihood of formula feeding [14,17]. Clinically, calls from mothers regarding breastfeeding discontinuation occur during the first two months postpartum [6]. This is also the time for working mothers to return to work, which could also influence the decision to discontinue breastfeeding. Therefore, this study aimed to explore: (1) the influence of maternal sociodemographic factors on breastfeeding attitudes, (2) the relationship between breastfeeding attitudes of postpartum women and their spouses, (3) the predictors of breastfeeding behavior (mixed breastfeeding) at two months postpartum, and (4) to establish the reliability of the Chinese version of the paternal IIFAS in Taiwan.

2. Methods

2.1. Study design

This was a quantitative, correlational and follow-up study to investigate the correlation between parental breastfeeding attitudes and their effects on breastfeeding behavior in the first two months after delivery.

2.2. Participants

Convenience sampling was recruited between July 2020 to December 2020, and the study subjects were screened in the postnatal ward of a regional teaching hospital in central Taiwan, certified by the Maternal and Infant Goodwill Medical Institute. Inclusion criteria were: (a) postpartum women and their spouses aged ≥ 20 years old and agreed to complete the questionnaires and telephone interviews; (b) live in Taiwan and be able to read, write, and understand Chinese; (c) initiated breastfeeding at least once after childbirth; (d) married marital status; (e) infant is ≥ 36 weeks gestation and newborn weight >2000 g; and (f) newborn has no abnormal condition after birth and admitted to the well-baby nursery. Exclusion criteria were: (a) maternal complications or diseases that require treatment during hospitalization; (b) the mother or spouse suffers from mental illness or cognitive impairment; and (c) newborns admitted to the neonatal intensive care unit or moderate-severe ward.

2.3. Sample size determination

Sample size calculation was completed using the Cox proportional hazards model to estimate the number of events required (the number of mothers who stopped breastfeeding), and further divided the number of events by the percentage of the total population to estimate the total sample required. To achieve the set statistical power, the number of incidents and the total number of samples must be satisfied at the same time in the future [29]. Thus, we set α (Type I error rate) to 0.05, β (Type II error rate) to 0.2, and RH (relative hazard) to 2. We calculated 72 incidents using this criterion. According to the 2018 data, the exclusive breastfeeding rate in Taiwan for two months after childbirth was 62.5% [3], further converting the cessation rate of exclusive breastfeeding to approximately 37.5%. The required sample size was calculated to be 192 by dividing the number of incidents by the percentage of the total population ($72/0.375 \approx 192$). Finally, 215 pairs of eligible parents who met the criteria were recruited and provided consent to participate in this study.

2.4. Data collection procedures

After obtaining IRB approval, data collection was conducted in two phases: a structured questionnaire survey and a telephone interview. The questionnaire survey was used to collect maternal demographic data and breastfeeding attitudes of both mothers and spouses at the same time during postpartum hospitalization.

The researcher conducted follow-up telephone interviews at two months postpartum to inquire about maternal breastfeeding behaviors (exclusive breastfeeding, mixed breastfeeding, or formula feeding). At the conclusion of the follow-up, the researchers summarized the breastfeeding behaviors and breastfeeding duration. Maternal cessation of breastfeeding behavior was defined as switching to formula feeding. A total of 215 pairs of parents (215 women and 215 fathers) completed the questionnaire survey and telephone interview follow-up.

2.5. Measurement

Demographic data form. Demographic variables included age, education level, occupation, parity, type of delivery, breastfeeding experience, and breastfeeding support system.

Iowa Infant Feeding Attitude Scale (IIFAS). The Chinese version of Iowa Infant Feeding Attitude Scale (IIFAS) was developed by de la Mora et al. [30], translated into Chinese by Ho and McGrath [31], and used to assess maternal attitudes toward infant feeding. The original IIFAS (English version) was found to have high internal reliability (Cronbach's $\alpha = 0.86$) in postpartum women [30]. The Chinese IIFAS testing 120 postpartum women yielded a Cronbach's α reliability of 0.74 for the overall scale [31]. This test consists of 17 items that measure infant feeding attitudes, each with 5-point Likert responses ranging from 1 (strongly disagree) to 5 (strongly agree). Eight items are worded to be favorable toward breastfeeding and nine items are worded to be favorable toward formula feeding. Items favoring formula feeding were reverse coded before the sum of the IIFAS score was obtained. The total scores ranged between 17 and 85, with higher scores being reflective of more favorable attitudes toward breastfeeding and lower scores being reflective of positive attitudes toward formula feeding [30]. The Cronbach's α in this study were 0.65 (215 mothers) and 0.69 (215 spouses), and the Cronbach's α of the mothers and spouses combined (430) was 0.67. The IIFAS were found to have an acceptable level of internal consistency in this study [32]. For this study, breastfeeding behavior were operationally divided into three categories: (a) exclusive breastfeeding; (b) mixed breastfeeding; and (c) formula feeding. Exclusive breastfeeding was defined as the infant received

Table 1
Demographic characteristics of postpartum women (N = 215).

Demographic Characteristics	n	%
Age (years)		
20-24	19	8.8
25-29	57	26.5
30-34	73	34.0
≥ 35	66	30.7
Education		
High school or lower	41	19.1
University or College	152	70.7
Graduate or higher	22	10.2
Employment		
No	74	34.4
Yes	141	65.6
Parity		
First birth	123	57.2
Second birth	72	33.5
Third birth or more	20	9.3
Type of delivery		
Vaginal delivery	152	70.7
Caesarean section	63	29.3
Breastfeeding experience		
No	117	54.4
Yes	98	45.6
Breastfeeding support-spouse		
No	23	10.7
Yes	192	89.3
Breastfeeding support- parents (in-laws)		
No	80	37.2
Yes	135	62.8
Breastfeeding support-friends		
No	138	64.2
Yes	77	35.8
Breastfeeding support—health professionals		
No	60	27.9
Yes	155	72.1

only human milk, with no formula milk provided. Mixed breastfeeding was defined as infants who received human milk and formula by bottle-feeding. Formula feeding was defined as infant received formula from a bottle.

2.6. Data analysis

The Statistical Package for Social Science (SPSS) for Windows, Version 22 (SPSS Inc. Chicago, IL, USA) was used for data analysis. Categorical variables were analyzed in frequency and percentages, while continuous variables were analyzed as means and standard deviations. Analysis of variance (one way ANOVA) and independent *t*-test were used to analyze differences between demographic variables and maternal breastfeeding attitudes. Pearson correlation was used to examine the correlation between postpartum women and their spouse's breastfeeding attitudes.

The means of the "total attitude" and each "single attitude" score were compared using an independent samples *t*-test. Predictors of breastfeeding duration were assessed in the regression analysis using the Cox proportional hazards model. All statistical significances were set at a $p < 0.05$.

2.7. Ethical considerations

The Institutional Review Board of Jen-Ai Hospital, Taiwan, approved this study. By clarifying the purpose and process of the study, the anonymity and confidentiality rights of all eligible participants are protected. The participants were informed that they could withdraw from the study at any time and withdrawal would not affect the care received from their healthcare providers. Informed consent was obtained from all participants in this study.

3. Results

3.1. Characteristics of the postpartum women

More than one-third of the women ($n = 73$, 34.0%) were 30–34 years of age, 141 (65.6%) were employed, and 152 (70.7%) had a university education. Over one-half of the women were primiparas ($n = 123$, 57.2%), and delivered vaginally ($n = 152$, 70.7%)

Table 2
Differences in maternal demographics and infant feeding attitudes (N = 215).

Variables	Mean (SD)	t/F	p
Age (years)		1.35	0.260
20-24	59.79 (7.56)		
25-29	58.47 (6.15)		
30-34	59.79 (6.64)		
≥ 35	60.89 (6.84)		
Education		1.01	0.364
High school or lower	58.85 (6.93)		
University or College	59.80 (6.54)		
Graduate or higher	61.36 (7.13)		
Employment		0.64	0.523
No	59.38 (6.34)		
Yes	59.99 (6.86)		
Parity		1.23	0.296
First birth	59.59 (6.53)		
Second birth	59.49 (6.50)		
Third birth or more	62.00 (8.07)		
Type of delivery		0.33	0.740
Vaginal delivery	59.89 (6.22)		
Caesarean section	59.52 (7.73)		
Breastfeeding experience		-0.81	0.420
No	59.44 (6.45)		
Yes	60.18 (6.95)		
Breastfeeding support-spouse		-3.17	0.002
No	55.70 (6.75)		
Yes	60.27 (6.56)		
Breastfeeding support- parents (in-laws)		-1.84	0.067
No	58.70 (6.45)		
Yes	60.42 (6.75)		
Breastfeeding support-friends		-0.44	0.658
No	59.63 (6.75)		
Yes	60.05 (6.59)		
Breastfeeding support-health professionals		-1.60	0.112
No	58.62 (6.73)		
Yes	60.23 (6.62)		

(Table 1).

Breastfeeding behaviors in this study included exclusive breastfeeding, mixed breastfeeding, and formula feeding. At 2 months postpartum, 71 (33.0%) were exclusively breastfeeding, 70 (32.6%) were mixed feeding and 74 (34.4%) were formula feeding.

3.2. Differences in maternal demographics and infant feeding attitudes

An independent-samples *t*-test was used to compare the differences of maternal employment, type of delivery, breastfeeding experience, breastfeeding support system, and maternal breastfeeding attitude. The results showed that maternal employment ($t = 0.64$, $p = 0.523$), type of delivery ($t = -0.33$, $p = 0.740$), maternal breastfeeding experience ($t = -0.81$, $p = 0.420$), support from parents (in-laws) ($t = -1.84$, $p = 0.067$), friends ($t = -0.44$, $p = 0.658$), and health professionals ($t = -1.60$, $p = 0.112$) were not significantly different from reported maternal breastfeeding attitudes. Spousal support ($t = -3.17$, $p = 0.002$) was significantly different from maternal breastfeeding attitudes.

One-way ANOVA was used to compare the differences in age, education, parity and maternal breastfeeding attitude. The results showed that maternal age ($F = 1.35$, $p = 0.260$), education ($F = 1.01$, $p = 0.364$), parity ($F = 1.23$, $p = 0.296$) were not significantly different from reported maternal breastfeeding attitudes (Table 2).

3.3. Correlations between maternal and spousal attitudes

Maternal breastfeeding attitude scores ranged from 42 to 79, with a mean score of 59.78 (SD \pm 6.68). Spousal breastfeeding attitude scores ranged from 46 to 81, with a mean score of 59.60 (SD \pm 6.93). Pearson correlation was used to measure the strength and direction between the maternal and spouse's attitudes. Maternal attitude scores were positively and significantly correlated with spousal attitude scores ($r = 0.50$, $p < 0.001$).

The independent samples *t*-test was used to compare the differences between each item of breastfeeding attitudes of mothers and their spouses. The couples shared similar "single item" infant feeding attitudes to all but five of the 17 items (Table 3).

3.4. Predictors of maternal breastfeeding behavior in the first two months postpartum

To understand the predictors of maternal demographic data, maternal and spouse's infant feeding attitudes on breastfeeding behavior at two months postpartum. We used the Cox proportional hazards regression analysis of the predictors. Maternal breastfeeding attitude ($p < 0.001$), spousal breastfeeding attitude ($p = 0.005$), and the risk of cessation of breastfeeding behavior at two months postpartum were significantly different. The hazard ratio for cessation of breastfeeding at two months postpartum for a one-point higher IIFAS score was 0.90 (95% CI: 0.86–0.95) and was statistically significant ($p < 0.001$). For a one-point higher spousal

Table 3

Comparison of infant feeding attitude scale Scores of postpartum women and their spouse.

breastfeeding attitude	Mean (SD)		Mean difference	P	95% CI
	Mothers (n = 215)	Fathers (n = 215)			
^a The benefits of breastfeeding last only as long as the baby is breastfed	3.12 (1.33)	2.96 (1.34)	0.16	0.206	-0.09–0.42
^a Formula feeding is more convenient than breastfeeding	2.82 (1.00)	2.76 (1.03)	0.06	0.570	-0.14–0.25
Breastfeeding increases mother infant bonding	4.60 (0.66)	4.60 (0.68)	0	0.943	-0.13–0.12
^a Breast milk is lacking in iron	3.63 (0.92)	3.45 (0.86)	0.18	0.041	0.01–0.35
Formula fed babies are more likely to be overfed than breastfed babies	3.25 (1.06)	3.17 (1.05)	0.08	0.439	-0.12–0.28
^a Formula feeding is the better choice if the mother plans to go back to work	2.63 (0.95)	2.58 (0.98)	0.05	0.583	-0.13–0.23
Mothers who formula feed miss one of the great joys of motherhood	2.77 (1.23)	3.30 (1.22)	-0.53	$P < 0.001$	-0.76–0.29
^a Women should not breastfeed in public places such as restaurants	4.31 (0.94)	4.11 (1.03)	0.20	0.041	0.01–0.38
Breastfed babies are healthier than formula fed babies	3.68 (1.12)	3.94 (1.01)	-0.26	0.014	-0.46--0.05
^a Breastfed babies are more likely to be overfed than formula fed babies	3.64 (0.91)	3.48 (0.95)	0.16	0.087	-0.02–0.33
^a Fathers feel left out if a mother breast feeds	4.10 (0.87)	4.20 (0.81)	-0.10	0.186	-0.27–0.06
Breast milk is the ideal food for babies	4.36 (0.83)	4.42 (0.77)	-0.06	0.434	-0.21–0.09
Breast milk is more easily digested than formula	4.40 (0.72)	4.27 (0.85)	0.13	0.087	-0.02–0.28
^a Formula is as healthy for an infant as breast milk	2.92 (1.04)	3.16 (1.05)	-0.24	0.019	-0.44--0.04
Breastfeeding is more convenient than formula	3.40 (1.05)	3.34 (1.02)	0.06	0.056	-0.14–0.25
Breast milk is cheaper than formula	4.05 (1.07)	3.93 (1.02)	0.12	0.249	-0.08–0.31
^a A mother who occasionally drinks alcohol should not breastfeed her baby	2.11 (1.16)	1.91 (1.10)	0.20	0.066	-0.01–0.41
Total score	59.78 (6.68)	59.60 (6.93)	0.18	0.782	-1.11–1.47

Items marked with asterisks (^a) are favorable to formula feeding and are reverse scored (i.e., 1 = 5, 2 = 4, 4 = 2, and 5 = 1). Higher scores indicate more positive attitudes toward breastfeeding.

IIFAS score, the hazard ratio for maternal cessation of breastfeeding at two months postpartum was 0.94 (95% CI: 0.90–0.98), a statistically significant difference ($p = 0.005$) (Table 4).

4. Discussion

4.1. Distribution and reliability of parental IIFAS scores

This is the first study in Taiwan to simultaneously report maternal and spousal infant feeding attitudes and analyze their impact on breastfeeding duration using an easy-to-administer tool known as IIFAS (Chinese). The IIFAS (Chinese) demonstrated an internal reliability of $\alpha = 0.65$ for mothers, $\alpha = 0.69$ for spouses, and $\alpha = 0.67$ for mothers and spouses combined. This is comparable to the original IIFAS Cronbach's $\alpha = 0.68$ in a sample of breastfeeding women. A unique finding in this study is that the IIFAS also appears reliable for measuring breastfeeding attitudes among Taiwanese male spouses.

The mean score of maternal attitudes towards breastfeeding in this study was 59.78 (SD \pm 6.68) and that of their spouses was 59.60 (SD \pm 6.93), similar to mean scores reported in other groups. One study reported mean IIFAS scores of 62.5 (SD \pm 6.50) for postpartum women, and 58.7 (SD \pm 7.60) for her partner [23]. In another previous study of 230 parents in India, mean IIFAS scores reported were 67.13 (SD \pm 4.90) for mothers and 67.55 (SD \pm 5.38) for fathers [26]. A 2015 survey explored breastfeeding attitudes of 502 U.S. males aged 21–44 years and reported a mean IIFAS score of 57 (SD \pm 8.13) [28]. The IIFAS does not have a cutoff point for the scale, but previous research indicated that total scores of ≤ 60 were optimal cutoff scores for predicting negative breastfeeding attitudes [33].

Using the previous findings [33] to guide our interpretation, both mothers and spouses in this study demonstrated an overall weak breastfeeding attitude. We found that 33.0% of mothers had an exclusive breastfeeding rate at two months postpartum that are lower than the exclusive breastfeeding rate recommended by the World Health Organization. Lower maternal exclusive breastfeeding rates may be associated with lower IIFAS scores in mothers and their spouses. Previous research found the attitudes measured with IIFAS to be a predictor of breastfeeding duration and exclusivity in various groups of women and in populations of expectant fathers [13,21, 34].

Table 4

Factors associated with the continuation of breastfeeding in multiple cox regression models.

Factors	Coefficient	Hazard ratio	95% CI		p
			Lower	Upper	
Age (years)					
20–24 ^a	0	1			
25–29	0.41	1.51	0.61	3.75	0.378
30–34	0.15	1.16	0.43	3.17	0.766
≥ 35	0.00	1.00	0.38	2.66	0.998
Education					
High school or lower ^a	0	1			
University or College	−0.39	0.68	0.35	1.30	0.241
Graduate or higher	−1.25	0.29	0.08	1.08	0.066
Employment					
Yes ^a	0	1			
No	−0.03	0.97	0.57	1.63	0.898
Parity					
First birth ^a	0	1			
Second birth	0.68	1.98	0.80	4.88	0.140
Third birth or more	−0.31	0.73	0.17	3.08	0.669
Delivery					
Vaginal delivery ^a	0	1			
Caesarean section	−0.18	0.83	0.45	1.56	0.570
Breastfeeding experience					
No ^a	0	1			
Yes	−0.17	0.84	0.34	2.06	0.705
Breastfeeding support-spouse					
No ^a	0	1			
Yes	0.19	1.21	0.56	2.63	0.628
Breastfeeding support- parents (in-laws)					
No ^a	0	1			
Yes	0.26	1.30	.072	2.34	0.384
Breastfeeding support-friends					
No ^a	0	1			
Yes	−0.32	0.73	0.40	1.34	0.305
Breastfeeding support—health professionals					
No ^a	0	1			
Yes	0.18	1.20	0.68	2.12	0.524
Maternal breastfeeding attitude	−0.10	0.90	0.86	0.95	$P < 0.001$
Spouse's breastfeeding attitude	−0.07	0.94	0.90	0.98	0.005

^a Reference category.

4.2. Maternal socio-demographic factors on breastfeeding attitudes

This study showed that spousal support in the breastfeeding support system differed significantly in mothers' attitudes towards breastfeeding. Mothers with spousal support for breastfeeding had significantly higher IIFAS scores compared to mothers without spousal support, and consistent with the results of previous studies [11,12,17]. The literature also indicates that maternal breastfeeding attitudes are more positive with positive support from the male partner or spouse. Since spousal support affects maternal breastfeeding attitudes, it is recommended that future target fathers [35].

4.3. Correlation between mothers and their spouses' breastfeeding attitudes

In addition, the results of this study indicated significant positive correlation between maternal breastfeeding attitudes and spousal breastfeeding attitudes, similar to previous studies [26,36]. The total attitude scores of the couples (mother and spouse) in this study reflected an overall negative attitude toward breastfeeding. In terms of single item scores, there are some significant score differences within couples. Mothers who scored lower reflected the unique maternal role and long-term health benefits to the infants, and the fathers who scored lower were concerned with nutritional value and acceptability of breastfeeding in public. Strengthening education for different gender roles should be considered for future interventions.

For example, regarding the item of "breast milk is lacking in iron", mother's breastfeeding attitude scores were more positive than that of her spouse, which demonstrated that most breastfeeding mothers have more correct knowledge about the nutritional value of human milk. Breastfeeding for 6 months, followed by iron-rich non-staple food, and continued breastfeeding until the age of two can reduce concerns such as "breastfed children are prone to anemia".

On the item "mothers who formula feed miss one of the great joys of motherhood", interestingly fathers rated this item more positive than mothers. For many postpartum mothers, when they return to the workplace or are physically and mentally exhausted, they must feel positively supported in their choices between breastfeeding, provision of human milk from a bottle and formula feeding.

Interestingly, items that were significantly different between mothers and spouses were not the items with the lowest scores. For example, in the item "women should not breastfeed in public places such as restaurants", the maternal score was 4.31 (SD \pm 0.94), and the spouse's score was 4.11 (SD \pm 1.03). On a 5-point Likert scale, these scores demonstrate a favored attitude, consistent with previous research [26]. Additionally, previous literature suggested that increasing men's exposure to breastfeeding may make breastfeeding the preferred method of infant feeding, leading to more positive attitudes toward breastfeeding. Interventions aggressively addressing exposure to breastfeeding may be the most modifiable way to reduce partners' embarrassed toward breastfeeding in public [28,37].

The lowest IIFAS (Chinese) individual item mean score in attitude towards breastfeeding of mothers and their spouses was for the statement: "a mother who occasionally drinks alcohol should not breastfeed her baby." According to the Taiwanese Breastfeeding Handbook published by the Ministry of Health and Welfare [38] states "the alcohol intake of nursing mothers should not exceed 0.5 g per kilogram per day. Usually, the upper limit of intake is less than 1 g per kilogram and will not affect the baby." Therefore, the occasional consumption of a drink that is low alcohol-by-volume in small amounts does not require cessation of breastfeeding. In the clinical implementation and support for breastfeeding, health professionals should provide accurate and appropriate nursing guidance, clarify common breastfeeding myths or misconceptions, and strengthen the concept of the "irreplaceability" of breastfeeding.

Previous study investigated 112 pregnant women and their male partners about the infant feeding attitudes by using the IIFAS and their intended infant feeding method. Results demonstrated that the IIFAS scores of mothers and partners were highly correlated, and that higher breastfeeding attitude scores of mothers and partners were significantly associated with their intentions to breastfeed [23]. Other studies also found that fathers' knowledge on exclusive breastfeeding can significantly improve mothers' knowledge through sharing, and on the other hand, can enhance their own attitudes and provide different supports to partners/wives, thereby increasing mothers' chances of exclusive breastfeeding practice [39]. Therefore, we believe the support of the father, coupled with the positive attitude of the mother, provides the ideal situation for the mother to practice exclusive breastfeeding according to standard guidelines. Additional research has also shown that paternal participation in breastfeeding education can increase the rate of exclusive breastfeeding [40] and educational interventions for fathers could improve breastfeeding knowledge and attitudes [41]. Health professionals can play an active role in educating fathers about the benefits of breastfeeding and the importance of their involvement to encourage greater participation, thereby assisting postpartum women to prolong breastfeeding.

Therefore, enhancing breastfeeding attitudes of couples is a way to support increasing breastfeeding rates. Health professionals need to understand the father's attitude towards breastfeeding when implementing a breastfeeding support program. Prenatal health professional should give appropriate information and guidance to women during pregnancy and encourage both husbands and wives to participate in prenatal classrooms together, so that fathers can truly understand the importance and related knowledge about breastfeeding, and then support parents to choose breastfeeding for their infant. During the postpartum period, nursing staff should work together with the mother and her spouse to support breastfeeding and to assist the mother in gaining breastfeeding skills. After mothers return home, nurse staffs need to regularly follow up and care for mothers by telephone, and answer questions related to the difficulties encountered during breastfeeding in timely way, thereby assisting postpartum women to breastfeed successfully and continuously.

4.4. Predictors of breastfeeding behavior at two months postpartum

The results of this study revealed that maternal and paternal breastfeeding attitude was a predictor of breastfeeding behavior

during the first two months postpartum. Paternal attitudes were positively associated with breastfeeding duration. Many studies have emphasized that a more positive breastfeeding attitude can promote postpartum breastfeeding behavior and prolong breastfeeding duration, thus positive breastfeeding attitude can effectively predict breastfeeding behavior [21,34,42]. In addition, our findings support the premise that spouses should be encouraged to participate in the study together.

Also, the results of this study reported that for every one point higher on the maternal IIFAS score, there was a 10% increase in the odds of choosing to breastfeed in the first two months postpartum. A one-point increase in the paternal IIFAS score was associated with a 6% increase in maternal attitudes to breastfeed in the first two months postpartum. In a study that examined the breastfeeding attitudes of 394 mothers in a hospital using the IIFAS and followed the exclusive breastfeeding behavior for six months postpartum, found that attitude played the important role in duration of exclusive breastfeeding. Improving breastfeeding attitudes in women without breastfeeding experience can promote the duration of exclusive breastfeeding [43]. A Malaysian study used the IIFAS to investigate paternal breastfeeding support and attitudes and maternal breastfeeding practices. The results showed the duration of exclusive breastfeeding was positively associated with the paternal attitude and breastfeeding support [42].

Our finding also suggests that it is important to raise public awareness of the importance of fathers in the breastfeeding process, for example by highlighting the role of the husband in supporting their wives to breastfeed. Breastfeeding practices can be significantly improved using tested interventions. Interventions that support women at home and in the community and through health services are effective. Interventions should be implemented on a scale and feeding patterns should be regularly monitored to provide feedback to implementers [35]. Thus, couples with poor attitudes should be targeted for future interventions and research should test whether couple-focused interventions can increase the odds that the mothers will breastfeed. Also, future research on breastfeeding attitudes and interventions to change attitudes is needed to understand whether improving spouses' attitudes toward breastfeeding also improves mothers' attitudes, and whether this increases breastfeeding initiation and duration. The mother's attitudes could be measured before and after her spouse completed the spouse-focused intervention, and the scores compared over time.

5. Limitations

The sample for this study was from one regional teaching hospital in central Taiwan, and the breastfeeding behavior was only tracked for two months postpartum, so the scope of inferences was limited. The results may not generalize to all postpartum women and their spouses in Taiwan. In the future, the study can be expanded to more different counties and cities in Taiwan, and the number of samples and tracking time can be increased. Additionally, using a convenient sampling, the study subjects were mothers who had started breastfeeding at the hospital, as their breastfeeding behavior could be tracked when they returned home. Mothers who breastfeed in the hospital may have positive attitudes toward breastfeeding, and they know that researchers will track their breastfeeding behavior when they return home, and may adopt breastfeeding behaviors to meet social expectations. This study only investigated fathers' attitudes towards breastfeeding. Future studies may include father demographic data and other relevant variables to explore their impact on breastfeeding attitudes in more depth.

6. Conclusions

This is the first use of a Chinese version of IIFAS in Taiwan to administer the IIFAS simultaneously to mothers and her spouse. The IIFAS had good reliability in this population.

Maternal breastfeeding attitudes and spousal breastfeeding attitudes were significantly correlated with breastfeeding behaviors, and mother and father scores were highly correlated. In addition, spousal support has an important influence on maternal breastfeeding attitude. The IIFAS tool can be used to understand modifiable characteristics, such as negative attitudes in spouses. Attention should be paid to paternal attitudes and influence on breastfeeding so fathers can better support mothers while breastfeeding. The IIFAS can also be used to identify those fathers with negative attitudes who might benefit from interventions. Finally, it helps to develop interventions to address misconceptions about infant feeding and encourage more spouses to support mothers in breastfeeding initiation, duration, and exclusivity.

Author contribution statement

Fu-Lien Han: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Yen Ju Ho: Conceived and designed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Jacqueline M. McGrath: Conceived and designed the experiments; Analyzed and interpreted the data.

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Data availability statement

Data will be made available on request.

Declaration of interest's statement

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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