

# The extended Theory of Planned Behavior in explaining exclusive breastfeeding intention and behavior among women in Kelantan, Malaysia

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**BACKGROUND/OBJECTIVES:** The purpose of this study is to utilize an extended Theory of Planned Behavior in identifying predictors of exclusive breastfeeding intention and behavior among women in Kelantan, Malaysia.

**SUBJECTS/METHODS:** A prospective cohort study was conducted, recruiting pregnant women through two-stage cluster sampling. Their exclusive breastfeeding intention, attitude, perceived norm, perceived behavioral control and past behavior were obtained at baseline through interviewer-guided questionnaire. At one month after delivery, another interview was conducted to determine the two additional variables in the extended theory, which were their postpartum support and breastfeeding difficulty. The behavior, which was the actual duration of exclusive breastfeeding, was obtained from the second follow-up at six months. Pearson correlation and two hierarchical regression analyses were conducted.

**RESULTS:** A total of 200 women completed the study follow-up. Their median intended exclusive breastfeeding duration was 4.0 (IQR 5) months, and the median actual duration was 1.0 (IQR 4) month. The Theory of Planned Behavior explained 51.0% of the variance in intention, with perceived behavioral control and attitude were the significant predictors. It also explained 10.0% of the variance in behavior, but the addition of postpartum support and breastfeeding difficulty increased the amount of explained variance in behavior by 6.0%. The significant predictors of exclusive breastfeeding behavior were intention, postpartum support and breastfeeding difficulty.

**CONCLUSION:** The extended Theory of Planned Behavior had a good predictive ability in explaining exclusive breastfeeding intention and behavior. The women's intention to practice exclusive breastfeeding may be improved by improving their perceived behavioral control and attitude. Providing correct postpartum support and skills to handle breastfeeding difficulties after delivery will improve their exclusive breastfeeding behavior.

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**Keywords:** Exclusive breastfeeding, Theory of Planned Behavior, postpartum support, breastfeeding difficulty

## INTRODUCTION

Malaysia adopted the World Health Organization recommendation of exclusive breastfeeding, and mothers are encouraged to breastfeed their infants with breast milk only from birth until six months, and continue until two years or beyond [1]. Breastfeeding initiation rate has improved but not exclusive breastfeeding. In 2006, the national prevalence of ever breastfeeding was 94.7%, but the prevalence of exclusive breastfeeding among infants below six months was only 14.5% [2]. It is important to understand why majority of mothers choose not to exclusively breastfeed their infants or exclusively breastfeed for shorter duration. There was a lack of local studies on exclusive breastfeeding, which were guided by underlying theoretical frameworks. The studies commonly identified factors including ethnicity, occupational status, income and area of

residence which offer little opportunity for modification [3,4].

Theory of Planned Behavior is a theory that focuses on cognitive factors influencing behavior. It recognizes intention and perceived behavioral control as immediate determinants of behavior [5]. Intention is influenced by attitude, perceived norm and perceived behavioral control. Attitude refers to the overall evaluation of performing the behavior. Perceived norm is perceived social pressure to perform or not to perform the behavior, and it composed of injunctive norm and descriptive norm. Injunctive norm refers to perception that people's significant others would support or oppose them to perform the behavior while descriptive norm is the perception that their significant others themselves performed or not performed the behavior. Perceived behavioral control is the extent to which people believe that they are capable of performing the behavior, and that they have control over its performance.

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The criteria that contribute to the strength of Theory of Planned Behavior include: (1) the presence of a measure of intention that mediates the relationship between other cognitive factors with behavior, (2) it explicitly covers the normative influences on behavior, (3) the definitions and measures of the constructs are clear and parsimony, and (4) it includes the temporal relationship between the cognitive variables and distinguish between proximal and distal determinants of behavior [6]. The theory is widely used across various social behaviors and is gaining popularity to guide studies on breastfeeding [7-11]. However, the ability of the theory in predicting continuous behavior such as exclusive breastfeeding has been challenged. Other variables were added into the theory to improve its predictive ability, including initial breastfeeding experiences [12,13]. Exclusive breastfeeding involves initiation and maintenance of the behavior. Postpartum support and breastfeeding difficulty experienced after the initiation of exclusive breastfeeding may improve the prediction of its maintenance.

This study aims to utilize an extended Theory of Planned Behavior in identifying predictors of exclusive breastfeeding intention and behavior among women in Kelantan, Malaysia. The specific study hypotheses included the following:

Hypothesis 1: Women's attitude, perceived norm and perceived behavioral control are significant predictors of their intention to practice exclusive breastfeeding.

Hypothesis 2: Women's intention, perceived behavioral control, postpartum support and breastfeeding difficulty are significant predictors of their exclusive breastfeeding behavior.

Hypothesis 3: Postpartum support and breastfeeding difficulty will explain a significant amount of additional variance beyond the original theory constructs in the prediction of exclusive breastfeeding behavior.

## SUBJECTS AND METHODS

### *Study design and participants*

This study was a prospective cohort study, conducted from September 2011 to December 2012. Pregnant women from governmental health clinics in two districts in Kelantan were recruited to participate at baseline and followed until six months postpartum. Kelantan is located at the northeast part of Peninsular Malaysia. Two out of 10 districts in the state of Kelantan were chosen, which were Kota Bharu and Pasir Mas. Almost half of Kelantan population (43.0%) resided in both districts [14] and the districts recorded the lowest percentage of exclusive breastfeeding among infants aged six months [15]. The Research Ethics Committee at our institution and Ministry of Health Malaysia approved this study.

Inclusion criteria for the study consisted of pregnant women at 32 weeks of gestation or above with no serious medical or obstetrical conditions. Those who were medically contraindicated to breastfeeding were excluded from the study. The sample size was calculated using the Power and Sample Size (PS) Software for regression analysis. Design effect was used to determine how much larger the sample size needed to be, as an adjustment used for a cluster sampling. After multiplying with the design effect of 2 and considering for 30% non-

response, the required sample size was 210.

A two-stage cluster sampling was applied. The first stage was a simple random sampling to choose five health clinics from each district. All 12 health clinics in Kota Bharu district were numbered and 5 of them were chosen using random number generator. Using similar method, 5 out of 7 health clinics in Pasir Mas districts were chosen. Then, the researcher visited all the 10 health clinics to get the number of pregnant women under their follow-ups. A list of women with gestational age of 32 weeks and above was produced by reviewing all the copies of antenatal cards in those health clinics. A total of 21 participants per health clinic were needed in order to get a sample size of 210 from 10 health clinics. Thus, the second stage involved simple random sampling using random number generator to choose 21 eligible respondents from every health clinic chosen in the first stage. The recruitment of participants into the study was completed in each health clinic before starting at other health clinics.

### *Data collection*

During each visit to the health clinics, the selected respondents were approached, explained about the study, and their written informed consent were obtained. At baseline, a newly developed Exclusive Breastfeeding - Theory of Planned Behavior Questionnaire (EBF-TPB Questionnaire) was read to them by a single researcher and their responses were recorded. Follow-up interviews were conducted at one month after delivery. The follow-ups were done using a modified Exclusive Breastfeeding - Early Experience Questionnaire (EBF-Experience Questionnaire), through direct interviewing at the health clinics during their infants' immunization appointments. Those who did not come on their appointment dates were approached through home visits or telephone interviews. Then, another follow-up was conducted at six months after delivery. The respondents were contacted by telephone to obtain their infant feeding behavior from birth until six months. The six months duration was chosen because women are recommended to practice exclusive breastfeeding until six months, and complementary food should be introduced after that age.

### *Survey questionnaire*

The EBF-TPB Questionnaire composed of items assessing attitude towards practicing exclusive breastfeeding for six months, perceived norm, perceived behavioral control, and intention. It was newly developed based on the instructions for constructing Theory of Planned Behavior questionnaire [7,16,17]. This study adopted the definition of exclusive breastfeeding by the World Health Organization as feeding the infant with breast milk, and not giving anything else, with the exception of oral rehydration solution, drops or syrups consisting of vitamins, mineral supplements or medicines [18]. Intention was measured using a single open-ended question on the duration the participants intended to give exclusive breastfeeding to their infants after delivery, recorded in months. In addition, there was an item assessing past behavior, referred to history of practicing exclusive breastfeeding for six months to any of their previous infants.

The items on attitude covered the mothers' evaluations

whether practicing exclusive breastfeeding for six months have positive or negative consequences (instrumental attitude), and their feelings associated with the behavior (experiential attitude). All the items started with the statement of 'Breastfeeding my infants with breast milk only for six months is ...', and followed by adjective pairs of possible outcomes, for example 'very comfortable - very uncomfortable' and 'very beneficial - very unbeneficial'. The items on perceived norm addressed what the mothers thought their significant others expected them to do (injunctive norm), or what was practiced by those people (descriptive norm), in relation to exclusive breastfeeding for six months. 'People whom I appreciate their opinions think that it suits me to breastfeed my infants with breast milk only for six months' and 'most mothers whom I know breastfeed their infants with breast milk only for six months' were examples of the items used. The items on perceived behavioral control elicited their perceived capacity and perceived autonomy in relation to practicing exclusive breastfeeding for six months. An example of the items was 'For me to breastfeed my infants with breast milk only for six months would be ...', and followed by the option of 'completely beyond my control - completely under my control'. Another item was stated as 'If I wanted to, I could easily breastfeed my infants with breast milk only for six months'. The responses for the items were arranged from 'strongly agree' to 'strongly disagree'.

All the four items on attitude, five items on perceived norm, and six items on perceived behavioral control were mixed throughout the questionnaire. Items on attitude were assessed through seven-point bipolar semantic differential scales, from -3 to +3. Attitude is an evaluative in nature, thus best be scored in bipolar fashion. A seven-point Likert scale was used for items assessing perceived norm and perceived behavioral control, ranging from 1 to 7. The questionnaire had undergone testing for face validity among five pregnant women, and a reliability and validity study among 100 pregnant women. The Cronbach's alpha values were 0.76 for attitude, 0.84 for perceived norm, and 0.85 for perceived behavioral control.

The other questionnaire, the EBF-Experience Questionnaire, assessed the two additional predictors in the extended theory. It composed of 10 items assessing postpartum support and seven items assessing breastfeeding difficulty. Postpartum support referred to the physical, emotional and informational support that the women perceived to have received within the first one month after delivery. The items were developed by referring to the Hughes Breastfeeding Support Scale and review of literature [19]. Each item had four-point Likert scale, ranging from 1 (no support), 2 (some support), 3 (many support), and 4 (full support). Breastfeeding difficulty was difficulties that were related to the diseases or disorders that may influence breastfeeding practice. They were selected based on Breastfeeding Experience Scale and review of literature [20,21]. Among the symptoms assessed included sore nipple, cracked nipple, and breast engorgement. A five-point Likert scale was used, ranging from 1 (no difficulty), 2 (mild), 3 (moderate), 4 (severe), and 5 (unbearable). Assessed among 100 women with infants aged three months and below, the Cronbach's alpha values were 0.85 for postpartum support and 0.78 for breastfeeding difficulty.

### Statistical analysis

Each mean score of attitude, perceived norm and perceived behavioral control in the EBF-TPB Questionnaire was calculated. The scores for postpartum support and breastfeeding difficulty in the EBF-Experience Questionnaire were summated to get the total score for each construct. Exclusive breastfeeding behavior was measured as a magnitude criterion, referring to the duration of exclusive breastfeeding. It was calculated as the duration from starting exclusive breastfeeding until discontinuing it, either because of adding infant formula, water, other food or completely stopping breastfeeding. The duration was obtained from the first and second follow-up. As for those who were still practicing exclusive breastfeeding at six months, the duration was recorded as six months. They were contacted again at seven months to determine if they had discontinued exclusive breastfeeding.

Descriptive statistics and Pearson correlation matrix were performed to examine the distributions and interrelationships between all variables. Two hierarchical regression analyses were conducted. In the first hierarchical regression analysis, intention was regressed on age, education and occupation (Step 1). Thereafter, past behavior (Step 2), and attitude, perceived norm and perceived behavioral control (Step 3) were included. To remain in the final regression equation, the predictor variable had to reach the standard statistical significance level ( $P < 0.05$ ) and, based on the squared semi-partial correlation, its additional contribution explained the variance in intention needed to account for at least 1.0% of variance [22].

The second hierarchical regression analysis was performed to regress exclusive breastfeeding behavior on intention, and perceived behavioral control (Step 1), followed by postpartum support and breastfeeding difficulty (Step 2). Interaction terms, multicollinearity problems, and all the assumptions were checked. From the final regression models,  $R^2$  or the percentages of variances in intention and exclusive breastfeeding behavior explained by their predictor variables were determined. The significance level and regression coefficients ( $b$ ) of each predictor variable were identified to reflect their individual contributions.

## RESULTS

### Description of the participants

A total of 222 eligible women were invited to participate, and 210 agreed at baseline, with 94.6% participation rate. At six months postpartum, 200 participants completed the second follow-up, thus leading to the study completion rate of 95.2%. There were no significant differences in demographic characteristics and the Theory of Planned Behavior constructs between mothers who completed and those lost to follow-up. The characteristics of 200 respondents at baseline and during first follow-up were presented in Table 1.

Table 2 shows the descriptive statistics for the extended Theory of Planned Behavior constructs, intention and behavior. The participants had on average a weak positive attitude towards practicing exclusive breastfeeding for six months (scale range: -3 to +3, mean = 0.8). Their perceived norm, or perceived social pressure to perform the behavior was neither positive nor negative (scale range: 1 to 7, mean = 4.2). They also had

**Table 1.** Socio-demographic and obstetric characteristics (n = 200)

Variable	Frequency (%)	Mean (SD)
Age (yrs)		29.4 (6.56)
Education (yrs)		11.7 (2.58)
Occupation		
Not working	117 (58.5)	
Working	83 (41.5)	
Past exclusive breastfeeding behavior		
No	188 (94.0)	
Yes	12 (6.0)	
Place of delivery		
Non-Baby-friendly hospital	8 (4.0)	
Baby-friendly hospital	192 (96.0)	
Type of delivery		
Caesarian section	30 (15.0)	
Vaginal delivery	170 (85.0)	

a weak but positive perceived behavioral control in practicing exclusive breastfeeding for six months (scale range: 1 to 7, mean = 4.8). Their median intended duration of exclusive breastfeeding was 4.0 (IQR 5) months. In the first one month after delivery, they had received a moderate level of postpartum support (scale range: 10 to 40, mean = 28.6). After delivery, the median duration of exclusive breastfeeding was 1.0 (IQR 4) month.

Only less than half, 87(43.5%) of the participants intended to practice exclusive breastfeeding for six months. Breastfeeding difficulty score was not normally distributed, thus it was categorized based on the scoring system in the questionnaire, which was 'none or mild' for those with average score of less than 3, and 'moderate to unbearable' for those who scored 3 and above. Fifteen (7.5%) of the respondents had moderate to unbearable breastfeeding difficulty. The percentages of respondents who practiced exclusive breastfeeding until one month and six months after delivery were 53.0% and 13.0%, respectively. All of them had discontinued exclusive breastfeeding after six months. Prior to six months after delivery, 169 (84.5%) had given water to their infants, and 135 (67.5%) had started complementary feeding. Forty-two respondents (21.0%) had discontinued any breastfeeding to their infants and replaced with formula feeding.

#### Predicting exclusive breastfeeding intention

The first hierarchical regression analysis was shown in Table 3. Age, education and occupation explained 6.0% of the

**Table 3.** Hierarchical regression analysis predicting intention to practice exclusive breastfeeding

Variables	b (95% CI)	$\beta$	P-value	R <sup>2</sup>
Step 1				
Constant	1.38 (-0.87, 3.62)		0.228	0.06
Age	-0.02 (-0.08, 0.03)	-0.06	0.398	
Education	0.26 (0.11, 0.41)	0.27	0.001	
Occupation	-0.45 (-1.22, 0.31)	-0.09	0.241	
Step 2				
Constant	1.48 (-0.71, 3.67)		0.185	0.11
Age	-0.03 (-0.08, 0.03)	-0.07	0.332	
Education	0.24 (0.10, 0.38)	0.25	0.001	
Occupation	-0.32 (-1.06, 0.43)	-0.06	0.406	
Past behavior	2.38 (0.95, 3.80)	0.22	0.001	
Step 3				
Constant	-1.97 (-3.87, -0.07)		0.042	0.51
Age	-0.02 (-0.06, 0.02)	-0.04	0.422	
Education	0.10 (-0.01, 0.21)	0.10	0.076	
Occupation	-0.18 (-0.74, 0.40)	-0.03	0.546	
Past behavior	0.59 (-0.52, 1.70)	0.06	0.297	
Attitude	0.43 (0.17, 0.69)	0.22	0.001	
Perceived norm	0.23 (-0.01, 0.47)	0.14	0.056	
Perceived behavioral control	0.73 (0.45, 1.01)	0.40	< 0.001	

variance in intention. Past behavior in Step 2 significantly accounted for an additional 5.0% of the variance. In Step 3, attitude, perceived norm and perceived behavioral control significantly explained another 40.0% of the variance. There were no significant interactions between all the predictor variables. There were no multicollinearity problems between the predictor variables, demonstrated by variance inflation factor (VIF) of less than 10 and tolerance above 0.2. All the assumptions were met, and no influential outliers. The final model partially supported the hypothesis 1, in which only attitude and perceived behavioral control were significant independent predictors of intention. The model explained 51.0% of the variance in intention ( $R^2 = 0.51$ ).

#### Predicting exclusive breastfeeding behavior

The second hierarchical regression analysis was shown in Table 4. The two predictor variables in the Theory of Planned Behavior, which were intention and perceived behavioral control, explained 10.0% of the variance in behavior. The new predictor variables in the extended theory, which were postpartum support and breastfeeding difficulty, accounted for an

**Table 2.** Descriptive statistics for the extended Theory of Planned Behavior, intention and behavior (mean, standard deviation and bivariate correlations)

Variable	Mean (SD)	1	2	3	4	5	6
Attitude	0.8 (1.28)	-	0.56***	0.61***	0.56***	-0.07	0.15*
Perceived norm	4.2 (1.55)		-	0.69***	0.58***	-0.03	0.19**
Perceived behavioral control	4.8 (1.38)			-	0.67***	0.01	0.29***
Intention (month)	4.0 <sup>1)</sup> (5) <sup>2)</sup>				-	0.09	0.29***
Postpartum support	28.6 (6.09)					-	-0.15*
Behavior (month)	1.0 <sup>a</sup> (4) <sup>b</sup>						-

<sup>1)</sup> Eedian

<sup>2)</sup> Interquartile-range

\*  $P < 0,05$ , \*\*  $P < 0,01$ , \*\*\*  $P < 0,001$

**Table 4.** Hierarchical regression analysis predicting exclusive breastfeeding behavior

Variables	B (95% CI)	$\beta$	P-value	R <sup>2</sup>
Step 1				
Constant	0.15 (-1.02,1.32)		0.800	0.10
Intention	0.16 (0.01, 0.33)	0.18	0.047	
Perceived behavioral control	0.28 (-0.02, 0.57)	0.17	0.069	
Step 2				
Constant	2.15 (0.32, 3.97)		0.021	0.16
Intention	0.16 (0.01, 0.32)	0.18	0.047	
Perceived behavioral control	0.25 (-0.04, 0.54)	0.15	0.090	
Postpartum support	-0.06 (-0.11, -0.01)	-0.16	0.015	
Breastfeeding difficulty				
None or mild	0			
Moderate to unbearable	-1.56 (-2.70, -0.43)	-0.18	0.007	

additional 6.0% of the variance in behavior. There were no significant interactions, multicollinearity problems or influential outliers. All the assumptions were met.

Intention, postpartum support and breastfeeding difficulty, but not perceived behavioral control, were significant predictors of exclusive breastfeeding behavior. Thus, the final model partially supported the hypothesis 2. The Theory of Planned Behavior (step 1) explained 10.0% of the variance in behavior. The extended theory (step 2) explained 16.0% of the variance in behavior. Hypothesis 3 was supported, in which the addition of postpartum support and breastfeeding difficulty increased the amount of variance explained in behavior by 6.0%. However, there was a significant linear negative relationship between postpartum support and behavior. Women with 1 unit higher in postpartum support were found to have 0.06 months shorter duration of exclusive breastfeeding.

## DISCUSSION

This study confirmed that the Theory of Planned Behavior had a good predictive ability in explaining exclusive breastfeeding intention among our population. It explained 51.0% of the variance in intention. The theory was found to explain 50.2% of the mothers' intention to continue exclusive breastfeeding for six months among those who already initiated it [7], and 58.0% of female adolescents' intention to breastfeed their infants [23]. However, the theory only explained 10.0% of the variance in behavior. The extended theory significantly increased the amount of variance in behavior by 6.0%. Although not much of an increase, it was important considering the low percentage of variance explained by the theory. The predictive ability of the theory in explaining behavior was commonly not as high as that in explaining intention. It explained 21.0% of variance in preparing food hygienically [24] and 26.0% of variance in fruit consumption [25].

The weak predictive ability of the Theory of Planned Behavior might be explained by a few reasons. The women's initial intention, assessed during pregnancy, might have changed throughout the six months period; the intention was expressed while answering a questionnaire and not in a real decision making process; a possibility of lacking in variation in responses

to the measures of each construct; or other circumstances experienced during this period might prevent them from performing what they have intended to perform [26]. Therefore, the two additional variables in the extended theory, which were assessed after the initiation of breastfeeding, improved its predictive ability in explaining maintenance of exclusive breastfeeding behavior.

Perceived behavioral control was the strongest predictor of intention, followed by attitude. Perceived norm was slightly irrelevant in predicting the intention to practice exclusive breastfeeding in our community, similarly noted from other studies in the USA and Canada [21,27]. In predicting exclusive breastfeeding behavior, intention and breastfeeding difficulty carried similar regression weight, followed by postpartum support. The positive role of intention on actual behavior was noted in many kinds of behavior [7,24,28,29]. Therefore, appropriate strategies were needed to improve pregnant women's intention, and subsequently improving their actual behavior. Disseminating correct knowledge may improve their attitude, and specific strategies to eliminate perceived obstacles were important. In addition, their decision-making processes related to exclusive breastfeeding intention should be explored, and researched whether intention could be modified to increase the duration of exclusive breastfeeding until six months [30].

Most of the respondents had poor intention and actual exclusive breastfeeding behavior. The first month after delivery was crucial, and almost half of them had discontinued exclusive breastfeeding during this period. Women who experienced more breastfeeding difficulty within the first one month after delivery had shorter exclusive breastfeeding duration. Most of the difficulties were preventable, and they were caused by improper positioning, incorrect latching on technique during breastfeeding and infrequent feeding [31,32]. Women who are emotionally calm and relaxed would produce more prolactin and oxytocin for the production and excretion of breast milk [33]. Therefore, women who received support during breastfeeding, physically and emotionally, would benefit from these physiological changes in their body.

Contrary to findings from other studies which identified the positive role of support on exclusive breastfeeding behavior, this study noted the opposite [4,34,35]. Postpartum support assessed in this study referred to the women's perception of the support that they received from their husband, parents, in-laws, friends, health care providers or anybody within the first one month after delivery. The most common support during this period was received from their husband and family members since they were together most of the time. While the women might perceive that they receive the physical support that they needed, they might be lacking in adequate and correct emotional and informational support on breastfeeding. Furthermore, perception of personal or social support was determined by personal characteristics and interactions with the social environment [36]. They might receive advices and information that they perceived as supporting them, but those were actually negative and incorrect advices in relation to breastfeeding. Therefore, postpartum support appeared to be negatively associated with exclusive breastfeeding duration.

Background factors of age, education and occupation as well

as past behavior were included in the hierarchical regression analysis to prove the Theory of Planned Behavior that these variables do not have direct influence on the prediction of exclusive breastfeeding intention and behavior. Supporting the theory, this study found that while education and past behavior were initially significant in predicting intention, inclusion of the Theory of Planned Behavior variables at step 3 revealed these variables as no longer significant. Therefore, the influence of socio-demographic variables and past behavior on intention was indirect and was mediated by attitude, perceived norm and perceived behavioral control.

Strictly adhering to the guidelines for conducting Theory of Planned Behavior studies, this study achieved its strength. By carefully wording the question items and defining the behavior, the principle of compatibility among all the theory constructs was maintained. Using interviewer-based questionnaire helped eliminate missing information. The use of multiple follow-up methods had contributed to the high completion rate of the study. Among the limitations of this study was the initial baseline study might have led to changes in the behavior. There was also a possibility of recall bias in providing the exact duration of exclusive breastfeeding.

In conclusion, the women had poor exclusive breastfeeding intention while pregnant and it was translated into their actual behavior after delivery. The extended Theory of Planned Behavior, through the addition of postpartum support and breastfeeding difficulty, had a better predictive ability for exclusive breastfeeding behavior. Intervention and promotion strategies to improve exclusive breastfeeding behavior should focus on providing support especially during the first one month after delivery, since it was the most critical period when many women discontinued exclusive breastfeeding. Important people in the women's life should be informed in order for them to give positive and correct support. Improving the women's perceived behavioral control and attitude were important measures to improve their exclusive breastfeeding intention, which will subsequently improve their actual behavior.

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## REFERENCES

1. Ministry of Health Malaysia, Institute for Public Health. *Eksklusif, Panduan Penyusuan Susulbu, 6 Bulan Pertama Hanya Susulbu*. Kuala Lumpur: Ministry of Health Malaysia; 2005.
2. Fatimah S Jr, Siti Saadiah HN, Tahir A, Hussain Imam MI, Ahmad Faudzi Y. Breastfeeding in Malaysia: results of the Third National Health and Morbidity Survey (NHMS III) 2006. *Malays J Nutr* 2010;16:195-206.
3. Tan KL Jr. Factors associated with non-exclusive breastfeeding among 4-week postpartum mothers in Klang district, Peninsular Malaysia. *Malays J Nutr* 2009;15:11-8.
4. Tan KL. Factors associated with exclusive breastfeeding among infants under six months of age in Peninsular Malaysia. *Int Breastfeed J* 2011;6:2.
5. Fishbein M, Ajzen I. The reasoned action approach. In: *Predicting and Changing Behavior: the Reasoned Action Approach*. New York (NY): Psychology Press; 2010. p.21-3.
6. Conner M, Norman P. Predicting health behavior: a social cognition approach. In: Conner M, Norman P, editors. *Predicting Health Behavior: Research and Practice with Social Cognition Models*. 2nd ed. Maidenhead: Open University Press; 2005. p.1-27.
7. Bai Y, Middlestadt SE, Peng CY, Fly AD. Predictors of continuation of exclusive breastfeeding for the first six months of life. *J Hum Lact* 2010;26:26-34.
8. Lewallen LP. A review of instruments used to predict early breastfeeding attrition. *J Perinat Educ* 2006;15:26-41.
9. Mutuli LA, Walingo MK. Applicability of theory of planned behavior in understanding breastfeeding intention of postpartum women. *Int J MultidiscipCurr Res* 2014;2:258-66.
10. Cabieses B, Waiblinger D, Santorelli G, McEachan RR. What factors explain pregnant women's feeding intentions in Bradford, England: a multi-methods, multi-ethnic study. *BMC Pregnancy Childbirth* 2014;14:50.
11. Wan H, Tiansawad S, Yimyam S, Sriaporn P. Factors predicting exclusive breastfeeding among the first time Chinese mothers. *Pac Rim Int J Nurs Res Thai* 2015;19:32-44.
12. DiGirolamo A, Thompson N, Martorell R, Fein S, Grummer-Strawn L. Intention or experience? Predictors of continued breastfeeding. *Health Educ Behav* 2005;32:208-26.
13. Dodgson JE, Henly SJ, Duckett L, Tarrant M. Theory of planned behavior-based models for breastfeeding duration among Hong Kong mothers. *Nurs Res*2003;52:148-58.
14. Kota Bharu Municipal Council (MY). *Population Distribution Information: Table 4.1 Total population by ethnic group, local authority area and state, Malaysia, 2010* [Internet]. Kelantan: Kota Bharu Municipal Council; 2013 [cited 2015 November 15]. Available from: [http://www.mpkbbri.gov.my/c/document\\_library/get\\_file?uuid=f069f86e-6738-4bac-b244-d4c6899c3c8d&groupId=20005](http://www.mpkbbri.gov.my/c/document_library/get_file?uuid=f069f86e-6738-4bac-b244-d4c6899c3c8d&groupId=20005)
15. Jabatan Kesihatan Negeri Kelantan (MY). *Laporan Tahunan 2010*. Kota Bharu: Jabatan Kesihatan Negeri Kelantan; 2010.
16. Ajzen I. Constructing a TpB questionnaire: conceptual and methodological considerations[Internet]. Worcester (MA): University of Massachusetts; 2002 [revised 2006 January; cited 2010 March 10]. Available from: <http://www.uni-bielefeld.de/ikg/zick/ajzen%20construction%20a%20tpb%20questionnaire.pdf>.
17. Francis J, Eccles MP, Johnston M, Walker AE, Grimshaw JM, Foy R, Kaner EF, Smith L, Bonetti D. *Constructing questionnaires based on the theory of planned behaviour: a manual for health services researchers* [Internet]. Newcastle upon Tyne: Centre for Health Services Research, University of Newcastle upon Tyne; 2004 [cited 2010 March 6]. Available from: <http://openaccess.city.ac.uk/1735/1/TPB%20Manual%20FINAL%20May2004.pdf>.
18. World Health Organization (CH). *Indicators for assessing infant and young child feeding practices:part 1.definitions*[Internet]. Geneva: World Health Organization; 2008 [cited 2010 March 10]. Available from: [http://whqlibdoc.who.int/publications/2008/9789241596664\\_eng.pdf](http://whqlibdoc.who.int/publications/2008/9789241596664_eng.pdf).
19. Hughes RB. The development of an instrument to measure perceived emotional, instrumental, and informational support in breastfeeding mothers. *Issues Compr Pediatr Nurs* 1984;7:357-62.
20. Wambach KA. A test of a breastfeeding intention and outcome

- model [Ph. D. thesis]. Tucson (AZ): University of Arizona; 1993.
21. Wambach KA. Breastfeeding intention and outcome: a test of the theory of planned behavior. *Res Nurs Health* 1997;20:51-9.
  22. Boudreau F, Godin G. Understanding physical activity intentions among French Canadians with type 2 diabetes: an extension of Ajzen's theory of planned behaviour. *Int J Behav Nutr Phys Act* 2009;6:35.
  23. Giles M, Connor S, Mc Clenahan C, Mallett J, Stewart-Knox B, Wright M. Measuring young people's attitudes to breastfeeding using the theory of planned behaviour. *J Public Health (Oxf)* 2007;29:17-26.
  24. Mullan BA, Wong CL. Hygienic food handling behaviours. An application of the theory of planned behaviour. *Appetite* 2009;52:757-61.
  25. de Bruijn GJ. Understanding college students' fruit consumption. Integrating habit strength in the theory of planned behaviour. *Appetite* 2010;54:16-22.
  26. Sutton S. Predicting and explaining intentions and behavior: how well are we doing? *J Appl Soc Psychol* 1998;28:1317-38.
  27. Rempel LA. Factors influencing the breastfeeding decisions of long-term breastfeeders. *J Hum Lact* 2004;20:306-18.
  28. Everson ES, Daley AJ, Ussher M. Brief report: the theory of planned behaviour applied to physical activity in young people who smoke. *J Adolesc* 2007;30:347-51.
  29. Wilhelm SL, Rodehorst TK, Stepanis MB, Hertzog M, Berens C. Influence of intention and self-efficacy levels on duration of breastfeeding for midwest rural mothers. *Appl Nurs Res* 2008;21:123-30.
  30. Blyth RJ, Creedy DK, Dennis CL, Moyle W, Pratt J, De Vries SM, Healy GN. Breastfeeding duration in an Australian population: the influence of modifiable antenatal factors. *J Hum Lact* 2004;20:30-8.
  31. Giugliani ER. Common problems during lactation and their management. *J Pediatr (Rio J)* 2004;80:5147-54.
  32. World Health Organization (CH). Infant and young child feeding: model chapter for textbooks for medical students and allied health professionals [Internet]. Geneva: World Health Organization; 2009 [cited 2011 September 20]. Available from: [http://whqlibdoc.who.int/publications/2009/9789241597494\\_eng.pdf](http://whqlibdoc.who.int/publications/2009/9789241597494_eng.pdf).
  33. Lawrence RA, Lawrence RM. Breastfeeding: a Guide for the Medical Profession. 6th ed. Philadelphia (PA): Elsevier Mosby; 2005.
  34. Al-Sahab B, Lanes A, Feldman M, Tamim H. Prevalence and predictors of 6-month exclusive breastfeeding among Canadian women: a national survey. *BMC Pediatr* 2010;10:20.
  35. Februhartanty J, Bardosono S, Septiari AM. Problems during lactation are associated with exclusive breastfeeding in DKI Jakarta Province: father's potential roles in helping to manage these problems. *Malays J Nutr* 2006;12:167-80.
  36. Göksen F. Normative vs. attitudinal considerations in breastfeeding behavior: multifaceted social influences in a developing country context. *SocSci Med* 2002;54:1743-53.