Validation of a Questionnaire on Knowledge and Barriers of Breast Milk Expression among Mothers of Premature Infants

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ABSTRACT

This study aimed to develop and validate a Malay language questionnaire to assess mothers' knowledge in providing breast milk for premature infants, and barriers to breast milk expression while the infants are in the Neonatal Intensive Care Unit (NICU). Two tertiary hospitals in Kelantan, Malaysia participated in this cross-sectional study. Relevant items of knowledge and barriers were identified through a literature search, clinical observations, and expert opinion. Ten breastfeeding experts validated the content of the knowledge and barriers to breast milk expression questionnaire.The effectiveness of the questionnaires was tested for face validity among ten mothers, followed by reliability tests comprising 50 mothers who gave birth prematurely. The 20 knowledge items and 16 barrier items have an Item-level Content Validity Index (I-CVI) of 0.99, indicating good relevance of the knowledge and barrier items. The knowledge and barrier questionnaires had Item-level Face Validity Indexes (I-FVIs) of 1.00 and 0.99, respectively, suggesting clear and comprehensible items. The questionnaires obtained a Cronbach alpha score of 0.726 for knowledge and 0.736 for barriers, showing that they are reliable tools for assessing knowledge and breast milk expression barriers. The validity and reliability of the newly developed Malay version of the questionnaire have been established for evaluating breastfeeding knowledge and barriers to expressing breast milk among mothers with premature infants.

Keywords: breast milk expression, content validity, face validity, premature infants, questionnaire

INTRODUCTION

Infants delivered before 37 completed weeks of gestation are considered premature and require close monitoring and intensive care (World Health Organization (WHO) 2018). The estimated worldwide premature birth rate for 2014 was 10.6%, or roughly 14.8 million live preterm births (Chawanpaiboon *et al.* 2019). Premature birth rates in Malaysia were 6.63% in 2020, with *Orang Asli*, Indian, and women over 40 having the highest rates (Jeganathan & Karalasingam 2021).

Infants born prematurely have a variety of nutritional and immune protection needs. Breast milk from preterm mothers has higher protein and bioactive molecules levels than milk from term mothers (Underwood 2013). Therefore, the American Academy of Paediatrics encourages all premature neonates to be fed with breast milk. If the mother's milk supply is insufficient, pasteurised donor milk should be supplemented instead of premature infant formula (Eidelman *et al.* 2012).

Even with these benefits, premature babies have lower breastfeeding rates than term newborns. This is supported by a study conducted in Pennsylvania which revealed that the proportion of late preterm infants who were breastfed at one month was 63.8%, as opposed to term newborns had a breastfeeding rate of 72.6% and post-term infants had a rate of 76.5% (Hackman *et al.* 2016). A study in Indonesia also found that children with normal birth weight

were more likely to be breastfed than those with low birth weight (Prasetyo *et al.* 2023). Another study found that, 52% of Malaysian premature infants were exclusively breastfed at discharge, compared to 32% of premature UK infants (Hamid *et al.* 2021).

Having their infants admitted to the NICU for an extended period, i.e., weeks or months, can be stressful for the mothers of premature infants (Ong *et al.* 2019). NICU admission of a premature neonate shortly following delivery results in separation from the mother, and it is necessary to practice Express Breast Milk (EBM) because breast milk is often regarded as the optimal dietary choice for premature newborns (Namusoke *et al.* 2021). In addition, due to immaturity, poor sucking of the infants and respiratory support received by the infant impede the direct breastfeeding. Therefore, before the newborns can be nursed directly, the process of expressing breast milk is necessary for a duration of many weeks (Heller *et al.* 2021).

Besides that, premature newborns typically exhibit insufficient weight or compromised health conditions that hinder their ability to engage in direct breastfeeding. Thus, it is necessary to initiate milk expression to maintain the mother's milk supply. Consequently, preterm mothers face physical and psychological obstacles, which may negatively impact breastfeeding (Hahn-Holbrook 2018).

Mothers' most common reasons for stopping breastfeeding early for late premature infants admitted to the NICU were not having enough milk or breastfeeding challenges (Kair & Colaizy 2016). Evidence found that knowledge is one factor that can be altered to increase exclusive breastfeeding practices (Che'Muda *et al.* 2016). A study conducted in Poland found that exclusive breastfeeding mothers had a higher mean breastfeeding knowledge score than non-exclusive breastfeeding mothers (Zielinska *et al.* 2017).

Thus, having a valid and reliable questionnaire suited to the local culture is crucial to evaluate the knowledge on feeding breast milk and barriers to breast milk expression among mothers with premature infants. Up until now, there are limited assessment tools for this purpose. Therefore, a Malay language version of a questionnaire to evaluate the understanding of mothers with premature infants regarding knowledge of feeding breast milk and barriers to breast milk expression needs to be developed and validated.

METHODS

Design, location, and time

The cross-sectional research was carried out at two tertiary hospitals in Kelantan, Malaysia. Data was collected from September to October 2021 for content and face validity. Reliability testing was conducted from November to December 2021. The ethical endorsement was given by the Human Research Ethics Committee of Universiti Sains Malaysia (USM/JEPeM/20120677) on the 18th April 2021 and the Ministry of Health Malaysia Medical Research and Ethics Committee (NMRR-20-2817-57640 [IIR]) on 18 May 2021.

Sampling

The study involved two phases, namely the development of the questionnaire, followed by the validation of the developed questionnaire. The validation process involved content validity, face validity, and reliability testing. During the development phase, multiple methods were employed to create a new and comprehensive instrument. Information regarding the knowledge on breastfeeding and the barriers to expression among women with premature infants was identified, created, organized, and documented into a useful tool. Literature searches, professional expert opinions, and clinical observations constituted most of the information sources. The items knowledge of feeding breast milk and barriers to breast milk expression among premature infants were developed using reviews of previous literature. The initial/pre-validated questionnaire consisted of 21 items regarding knowledge of feeding breast milk to premature infants. The questionnaire was divided into 3 sections/domains; 1) general knowledge on feeding breast milk to premature infants (7 items) (Bertino *et al.* 2012; Eidelman *et al.* 2012; Underwood 2013); 2) knowledge on breastmilk expression and transportation to NICU (10 items) (Che'Muda *et al.* 2016; Parker *et al.* 2012; The Royal Women's Hospital 2015); 3) knowledge of breast milk storage for ill infants (4 items) (Che'Muda *et al.* 2016; WHO 2006). Meanwhile, the initial/pre-validated questionnaire on barriers

to breast milk expression consisted of 16 items (Alves *et al.* 2013; Gianni *et al.* 2018; Sisk *et al.* 2010).

The initial developed and drafted questionnaire was based on literature reviews. Then, three meetings were scheduled with a panel of experts, consisting of a lactation consultant, neonatologist, and family medicine specialist, to collect feedback, identify other significant information that was required but missing, and eliminate irrelevant information based on their expertise in instrument development. The collected remarks and responses were used to revise the questionnaire. The original questionnaire was created in Malay and discussed with the experts. Then, a final questionnaire draft in the source language (Malay) was produced for questionnaire validation. The questionnaire's final draft comprised of 20 items on the knowledge of feeding breast milk to premature infants and 16 items on barriers to breast milk expression.

Data collection

As part of the validation procedure, the content validity, face validity, and reliability (internal consistency) of the questionnaire were assessed by a panel of experts. The verification process revealed that each item was relevant and accurately represented a particular domain. The items and domain of knowledge and attitude part were explained above.

To verify the content validity of the questionnaire, ten panels consisting of two lactation consultants, two obstetrics and gynaecology specialists, two neonatologists, two family medicine specialists, and two lactation nurses were invited to validate the content of the questionnaire. Validators who agreed to rate the survey's items received the questionnaires through email. The validators weren't from the same hospital or institution and were instructed to rate the questionnaire based on their expertise individually.

The range of scores for each domain was 1 (irrelevant) to 4 (highly relevant). Following the scoring given by validators, the scores were categorized and classified. Items with a score of 3 or 4 were categorized as 1 (relevant), whereas those with a score of 1 or 2 were categorized as 0 (not relevant). Following the initial meeting, items were modified in accordance with the panel's advice.

Two different types of Content Validity Index (CVI), CVI for Item-level Content Validity Index (I-CVI) and CVI for Scale-level Content Validity Index (S-CVI) were identified. Two methods were employed for calculating S-CVI. The first method was scale-level content validity index, averaging calculation method (S-CVI/Ave). The S-CVI/Ave was measured by obtained I-CVI values through formula (1) then using a formula (2), the sum of all I-CVI values was divided by the number of items.
(1) I-CVI = (agreed item) / (number of rater)
(2) S-CVI/Ave = (summation all I-CVI) / (number of item)

The second method of S-CVI obtained the average score of each rater by using universal agreement calculation method (S-CVI/UA). Score '1' was assigned to the item that achieved 100% experts in agreement. To obtain the value of S-CVI/ UA of a specific domain, the total number of items with 100% in agreement was divided by the total number of items in that domain (Yusoff 2019a).

Item-level Content Validity Index (I-CVI), Scale-level Content Validity Index (S-CVI), Scale-level Content Validity Index, Averaging Calculation method (S-CVI/Ave and Universal Agreement calculation method (S-CVI/UA)) were manually calculated. The evaluation of each item individually and its average were considered during the data presentation.

Then, the face validity process was conducted. The face validation test evaluates the clarity and comprehension of each item. The self-administered questionnaire was administered to ten mothers who delivered premature infants and whose babies were admitted to the NICU. The mothers were selected conveniently, and each mother had to provide a written consent before the evaluation.

The mothers were asked to rate each item on the knowledge and barrier questionnaire from 1 (unclear and incomprehensible) to 4 (item is very clear and comprehensible). Following a review of the responses, the ratings of 1 and 2 were reclassified as 0 (unclear and incomprehensible), while the ratings of 3 and 4 were reclassified as 1 (clear and comprehensible) (Yusoff 2019b). The Face Validity Index (FVI) was computed using the raw scores entered in Microsoft Excel. There are two forms of FVI: the Item-level Face Validity Index (I-FVI) and the

Scale-level Face Validity Index (S-FVI). S-FVI is calculated using two different methods: the average of the I-FVI scores for each item on the scale (S-FVI/Ave), and the percentage of items on the scale that receive a score of 3 or 4 on the clarity and comprehension scale from all raters (S-FVI/UA). The item received a score of "1" for Universal Agreement (UA) if all raters agreed on it at 100%; otherwise, a score of "0" was assigned (Yusoff 2019b).

The following formulas are used to determine FVI:
(3) I-FVI (item-level face validity index) = agreed item/number of rater
(4) S-FVI/Ave (scale-level face validity index based on the average method) = (sum of I-FVI scores)/(number of item)
(5) S-FVI/UA(scale-level face validity index based on the universal agreement method) = sum of UA scores/number of item

Following this, improvements were made to the questionnaire. The items were revised to construct a questionnaire that is easy to understand. The mothers were prompted to submit written feedback upon completion of the questionnaire to contribute to the refinement of the items' clarity. However, there was no feedback received from the mothers.

Data analysis

Data analysis for the second phase involved validating the developed questionnaire consisting of content validity, face validity, and reliability testing. It started with content validity measurement. The raw ratings of content validity from 10 panels were collected, and the data was then put into Microsoft Excel to be analyzed. A score of "1" indicating the items were relevant and a score of "0" indicating the items were irrelevant. The agreement must reach 80% or higher for a tool to be accepted for content validity (Davis 1992).

For face validity, the raw scores of 10 mothers were inserted into Microsoft Excel to calculate the Item-level Face Validity Index (I-FVI); "1" indicates that the items were clear and comprehensible and "0" indicates that the items were unclear and incomprehensible. An FVI of 0.8 or higher was recommended (Pelet *et al.* 2012).

Then, reliability testing was performed to evaluate the questionnaires' internal consistency.

It was conducted by giving a final set of the questionnaires to 50 mothers who delivered premature infants at two tertiary hospitals in Kelantan. The mothers were conveniently selected.

RESULTS AND DISCUSSION

Content validity

The result of the content validity reveals that the overall index is higher than 0.80. The Universal Agreement Index (S-CVI/UA) was 0.9 for knowledge of feeding breast milk to preterm newborns and 0.93 for barriers to breastmilk expression. Apart from that, an Average Index (S-CVI/Ave) of 0.99 was found for both knowledge and barriers to expressing while newborn were in the NICU (refer to Table 1 and Table 2). In the present study, the overall CVI for knowledge on feeding breast milk to premature infants and barriers to breast milk expression was higher than 0.95. This means that the 20 items used to measure knowledge and the 16 items used to measure barriers to breast milk expression were relevant. A content validity index of 0.8 or higher is considered appropriate and applicable for a new instrument (Davis 1992; Polit *et al.* 2007). The content validation result shows the language is clear, appropriate, and culturally valid for the intended population, i.e. the Kelantanese population. Suitable and valid instruments or questionnaires necessitate a number of essential steps. The instrument must be adaptable to diverse populations with diverse linguistic and cultural backgrounds (Lau *et al.* 2018).

This new validated questionnaire was designed to accommodate the local culture norm, provide a more accurate measurement of breastfeeding knowledge, and identify the obstacles to perform expression by premature infants' mothers. The newly developed questionnaire evaluates the general breastfeeding knowledge of premature infants, including the duration of the mother's need to supply exclusive breast milk feeding and the advantages of breast milk to premature infants. Apart from that, knowledge of breastmilk expression, breast milk transportation to NICU, and storage of breast milk in ill infants was evaluated. This fundamental knowledge is crucial to ensure the success of exclusive breastfeeding practices among premature infants. The newly developed

Table 1. Ratings on the knowledge of feeding breast milk to premature infants by the 10 experts

Item	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Expert 6	Expert 7	Expert 8	Expert 9	Expert 10	Expert in agreement	I-CVI	UA
K1	1	1	1	1	1	1	1	1	1	1	10	1	1
K2	1	1	1	1	1	1	1	1	1	1	10	1	1
K3	1	1	1	1	1	1	1	1	1	1	10	1	1
K4	1	1	1	1	1	1	1	1	1	1	10	1	1
K5	1	1	1	1	1	1	1	1	1	1	10	1	1
K6	1	1	1	1	1	1	1	1	1	1	10	1	1
K7	1	1	1	1	1	1	1	1	1	1	10	1	1
K8	1	1	1	1	0	1	1	1	1	1	9	0.9	0
K9	1	1	1	1	1	1	1	1	1	1	10	1	1
K10	1	1	1	1	1	1	1	1	1	1	10	1	1
K11	1	1	1	1	1	1	1	1	1	1	10	1	1
K12	1	1	1	1	1	1	0	1	1	1	9	0.9	0
K13	1	1	1	1	1	1	1	1	1	1	10	1	1
K14	1	1	1	1	1	1	1	1	1	1	10	1	1
K15	1	1	1	1	1	1	1	1	1	1	10	1	1
K16	1	1	1	1	1	1	1	1	1	1	10	1	1
K17	1	1	1	1	1	1	1	1	1	1	10	1	1
K18	1	1	1	1	1	1	1	1	1	1	10	1	1
K19	1	1	1	1	1	1	1	1	1	1	10	1	1
K20	1	1	1	1	1	1	1	1	1	1	10	1	1
											S-CVI/Ave	0.99	
	1	1	1	1	0.95	1	0.95	1	1	1	S-CVI/UA		0.9
	Average proportion of items judged as relevance across the 10 experts=0.99												

I-CVI: Item-level Content Validity Index; UA: Universal Agreement calculation method; Ave: Averaging calculation method; S-CVI/UA: Scale-level Content Validity Index, Universal Agreement calculation method; S-CVI/Ave: Scale-level Content Validity Index, Averaging calculation method

questionnaire also assessed barriers to breast milk expression while infants were admitted to NICU. The barrier factors for the mother to initiate and practice breast milk expression need to be investigated as they will be a contributing factor for women not to breastfeed in the future exclusively.

Face validity

Similar to the calculation of content validity, the calculation of face validity includes the Item-level Face Validity Index (I-FVI), the Scale-level Face Validity Index (S-FVI), which comprised the Universal Agreement Face Validity Index (S-FVI/UA) and the Averaging Index (S-FVI/Ave) among 10 respondents. The Face Validity Index of Universal Agreement (S-FVI/UA) for knowledge is 1.00 and the barrier of feeding breast milk to premature infants is 0.94. The results also revealed Average Knowledge (S-FVI/Ave) of 1.00 and an average barrier of feeding breast milk to premature infants (S-FVI/Ave) is 0.99 (Table 3).

In this study, the high face validity score in terms of clarity and comprehensibility shows a good response process (DeVon *et al.* 2007). However, one respondent thought that item B2 on "Feelings of stress with premature delivery prevented me from expressing breast milk" was unclear and understandable. The other nine respondents thought that all the items were clear and understandable. This item is important to be evaluated because a study found that women did not express breast milk regularly as they should have because they were not ready for a premature birth and were worried about their baby's health, job, and money (Sisk *et al.* 2010). Thus, no items were removed during the validation procedure.

Internal consistency

The respondents' Mean (SD) age was 31.50 (SD 5.91) years. About half of the respondents

Table 2. Ratings on the barrier of feeding breast milk to premature infants by the 10 experts

Item	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Expert 6	Expert 7	Expert 8	Expert 9	Expert 10	Expert in agreement	I-CVI	UA
B1	1	1	1	1	1	1	1	1	1	1	10	1	1
B2	1	1	1	1	1	1	0	1	1	1	9	0.9	0
B3	1	1	1	1	1	1	1	1	1	1	10	1	1
B4	1	1	1	1	1	1	1	1	1	1	10	1	1
B5	1	1	1	1	1	1	1	1	1	1	10	1	1
B6	1	1	1	1	1	1	1	1	1	1	10	1	1
B7	1	1	1	1	1	1	1	1	1	1	10	1	1
B8	1	1	1	1	0	1	1	1	1	1	9	1	1
B9	1	1	1	1	1	1	1	1	1	1	10	1	1
B10	1	1	1	1	1	1	1	1	1	1	10	1	1
K11	1	1	1	1	1	1	1	1	1	1	10	1	1
B12	1	1	1	1	1	1	0	1	1	1	9	1	1
B13	1	1	1	1	1	1	1	1	1	1	10	1	1
B14	1	1	1	1	1	1	1	1	1	1	10	1	1
B15	1	1	1	1	1	1	1	1	1	1	10	1	1
B16	1	1	1	1	1	1	1	1	1	1	10	1	1
B17	1	1	1	1	1	1	1	1	1	1	10	1	1
B18	1	1	1	1	1	1	1	1	1	1	10	1	1
B19	1	1	1	1	1	1	1	1	1	1	10	1	1
B20	1	1	1	1	1	1	1	1	1	1	10	1	1
											S-CVI/Ave	0.99	
	1	1	1	1	0.95	1	0.95	1	1	1	S-CVI/UA		0.93

Average proportion of items judged as relevance across the 10 experts=0.99

I-CVI: Item-level Content Validity Index; UA: Universal Agreement calculation method; Ave: Averaging calculation method; S-CVI/UA: Scale-level Content Validity Index, Universal Agreement calculation method; S-CVI/Ave: Scale-level Content Validity Index, Averaging calculation method

had completed secondary school (42%) and post-secondary education (58%), and 48% of them were employed.

The reliability analysis based on the Cronbach's alpha verified that the final 20 items on knowledge and 16 items on barriers to breast milk expression shown a high degree of internal consistency with a score of 0.726 for knowledge and 0.736 for barriers to breast milk expression

Table 3. Face validity index for knowledge and barriers to feeding breast milk to premature infants by 10 respondents

Section	No of item	S-FVI/Ave	S-FVI/UA
Knowledge	20	1	1
Barrier	16	0.99	0.94

S-FVI: Scale-level Face Validity Index; S-FVI/UA: Universal Agreement calculation method; S-FVI/Ave: Averaging calculation method across 10 respondents

among mothers with premature infants. The reliability analysis programme in SPSS was used to determine the questionnaire's internal consistency (Streiner *et al.* 2015).

A questionnaire's reliability is attributed to its validity and its stability is depicted through the consistency of the received responses. Internal consistency is used to determine the degree of homogeneity among questionnaire items. The Cronbach alpha coefficient is the most commonly used method for determining internal consistency (Bolarinwa 2015). A value between 0.7 and 0.9 suggests that the internal consistency is high, while values between 0.6 and 0.7 are considered satisfactory (Streiner *et al.* 2015). The Cronbach's alpha values of the final 20 items for knowledge and 16 items on barriers to breast milk expression in this study are 0.726 and 0.736, respectively. These values are high, hence signifying that the instrument used, i.e., the newly developed questionnaire, is reliable for

assessing the knowledge on feeding breast milk and barriers to perform expression among these mothers. Table 4 and Table 5 summarize of the final domains and component items.

Table 4. Final items of knowledge on feeding breast milk to premature infants by three components

Item		Component
K1	Premature infants should receive breast milk (*Bayi pramatang perlu diberikan susu ibu*)	General breastfeeding knowledge for premature infants (K1−K6)
K2	Premature infants require special formula milk though expressed breast milk was prepared for the infant (*Bayi pramatang memerlukan susu formula khas walaupun susu ibu yang diperah disediakan untuk bayi*)	
K3	Premature infants should receive other drinks other than breast milk such as plain water (*Bayi pramatang memerlukan minuman lain selain daripada susu ibu seperti air masak*)	
K4	Premature infants should receive exclusive breast milk for the first 6 months (*Bayi pramatang perlu diberikan susu ibu sahaja selama 6 bulan pertama*)	
K5	Breast milk reduces the risks of necrotizing enterocolitis in preterm infants (*Susu ibu mengurangkan risiko radang pada usus bayi pramatang*)	
K6	Breast milk reduces the risks of meningitis in preterm infants (*Susu ibu dapat mengurangkan risiko jangkitan kuman pada selaput otak bayi pramatang*)	
K7	Mothers who are not with their infants should start breast milk expression within the first 6 hours after birth (*Ibu yang tidak bersama bayinya perlu memulakan pemerahan susu ibu dalam tempoh 6 jam pertama selepas kelahiran*)	Knowledge of breastmilk expression and transportation to Neonatal Intensive Care Unit (K7−K16)
K8	Breast milk expression needs to be done every 3 hours if the premature baby is away from the mother (*Ibu yang tidak bersama bayinya, perlu memerah susu setiap 3 jam*)	
K9	Moist heating and massage before breast milk expression can promote milk secretion (*Demahan panas dan urutan sebelum pemerahan susu dapat merangsang pengeluaran susu*)	
K10	Expressed breast milk needs clear labeling of name of infant, date, and time of expression (*Susu perahan perlu dilabel dengan nama bayi, tarikh dan masa susu itu diperah*)	
K11	Breast milk expression can be done simultaneously on both sides of the breast (*Perahan susu boleh dilakukan serentak pada kedua-dua belah payudara*)	
K12	Expressed breast milk may be mixed with previously expressed milk (*Susu perahan boleh dicampur dengan susu perahan sebelumnya*)	
K13	The leftover expressed breast milk that has been used may be stored again (*Lebihan susu perahan yang telah diberikan kepada bayi boleh disimpan semula*)	
K14	Expressed breast milk may be warmed on fire (*Susu perahan boleh dipanaskan di atas api*)	
K15	Expressed breast milk may be warmed in a microwave (*Susu perahan boleh dipanaskan dalam ketuhar gelombang mikro*)	
K16	Expressed breast milk transported to the hospital must be kept chilled in a cool box with ice or cooler pack (*Susu perahan yang dibawa ke hospital mesti disimpan di dalam kotak ais yang berisi ais atau pek sejuk*)	
K17	Expressed breast milk may be stored for 4 hours at room temperature (*Susu perahan boleh disimpan sehingga 4 jam pada suhu bilik*)	Knowledge of breastmilk storage for ill infants (K17−K20)
K18	Expressed breast milk may be stored for 48 in a lower part of a refrigerator (*Susu perahan boleh disimpan sehingga 48 jam di bahagian bawah bagi peti sejuk dua pintu*)	
K19	Expressed breast milk may be stored for 2 weeks in a freezer of a 1-door refrigerator (*Susu perahan boleh disimpan sehingga 2 minggu di bahagian sejuk beku dalam peti sejuk 1 pintu*)	
K20	Expressed breast milk may be stored for 3 months in a freezer of a 2-door refrigerator (*Susu perahan boleh disimpan sehingga 3 bulan di bahagian sejuk beku dalam peti sejuk 2 pintu*)	

Table 5. Items of barrier to breast milk expression domain by 1 component

Item		Component
B1	I have a problem to express breast milk because I am not prepared for premature delivery (*Saya mempunyai masalah untuk melakukan perahan susu ibu kerana tidak bersedia dengan kelahiran bayi pramatang*)	
B2	Feelings of stress with premature delivery hindered me from expressing breast milk (*Perasaan stres dengan kelahiran bayi pramatang mengganggu saya untuk memerah susu*)	
B3	I feel uncomfortable while exressing breast milk (*Saya berasa tidak selesa semasa memerah susu*)	
B4	I experience a lack of privacy while expressing milk (*Saya mengalami kekurangan privasi semasa memerah susu*)	
B5	I feel embarrassed to express milk using a breast pump (*Saya berasa malu untuk memerah susu menggunakan pam susu*)	
B6	I feel the act of breast milk expression is tiring (*Saya merasakan perbuatan memerah susu adalah memenatkan*)	
B7	My body feels too tired to express breast milk (*Keadaan badan yang keletihan mengganggu saya untuk memerah susu*)	Barriers to breastmilk expression while infants in Neonatal Intensive Care Unit / Nursery
B8	My husband is less supportive of me regarding breast milk expression (*Suami kurang menyokong saya untuk memerah susu*)	
B9	The family is less supportive of me regarding breast milk expression (*Keluarga kurang menyokong saya untuk memerah susu*)	
B10	I felt the hospital staff was less supportive of me about breast milk expression (*Saya merasakan kakitangan hospital kurang menyokong saya untuk memerah susu*)	
B11	I don't have enough time to express breast milk (*Saya tidak mempunyai masa yang cukup untuk memerah susu*)	
B12	I feel that breast milk expression is a waste of time (*Saya berasa membazir masa untuk memerah susu*)	
B13	Expressing breast milk causes pain in my breasts. (*Memerah susu menyebabkan saya berasa sakit pada payudara*)	
B14	Inadequate milk supply interrupted my breast milk expression activity (*Pengeluaran susu yang sedikit mengganggu saya untuk memerah susu*)	
B15	I do not have a breast pump at home (*Saya tidak mempunyai pam susu di rumah*)	
B16	The difficulty in delivering the expressed milk from home to the hospital discourages me from expressing breast milk (*Halangan untuk menghantar susu ke hospital mengganggu saya untuk memerah susu*)	

CONCLUSION

This newly developed and validated questionnaire in Malay language to assess the knowledge of feeding breast milk to premature infants and the barriers to expressing breast milk among mothers in Kelantan has been validated and have shown to be a reliable instrument. This tool is practical simple to comprehend, and applicable to various subject populations with minimal modification. The barrier to breast milk expression items can be revised and expanded by identifying additional factors that may impede mothers from expressing their milk through qualitative research.

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DECLARATION OF INTERESTS

The authors have no conflict of interest.

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