

Development and Validation of a Survey questionnaire to assess the public's attitude towards breastfeeding for BFCITY

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ABSTRACT

Introduction: Public opinion influences breastfeeding behaviours, particularly in public settings where negative attitudes can create stigma and pressure to wean early. BFCITY is a novel indicator set of a breastfeeding-friendly city, including an indicator of welcoming community attitude. No validated tool exists to measure public attitudes within this framework.

Objective: To develop, validate, and test a questionnaire to measure the public's attitude towards breastfeeding.

Methods: A two-stage mixed-methods study was conducted. Stage 1 involved questionnaire development through focus group discussions and experts content validation. Stage 2 involved pilot testing among the general public in three languages. Participants completed the questionnaire at baseline and after one week. Content validity was evaluated using content validity index(CVI), internal reliability using Cronbach's alpha, and test-retest reliability using the Intraclass Correlation Coefficient(ICC) and Cohen's kappa.

Results: The 6-item questionnaire assessed knowledge(n=2), attitude(n=3) and practice(n=1). Following expert review(n=10), it achieved an S-CVI/Average of 0.94 and CVI/UA of 0.60. The pilot testing had 130 participants, with 103 completing the second round. Internal consistency for attitude was Cronbach's $\alpha=0.56$. Test-retest reliability was good across all domains: knowledge(ICC=0.89), attitude(ICC=0.87), and practice($\kappa=0.486$).

Discussion: The strong test-retest reliability confirms the questionnaire's consistency over time and across languages. The limited internal consistency assessment is expected due to the small number of questions.

Conclusion: This questionnaire demonstrates acceptable validity and reliability. As the survey is intended to be short, content validation will be used as the main supporting evidence of validity. This questionnaire provides the first practical metric to measure the welcoming community attitude within the BFCITY framework.

Keywords: Breastfeeding, Maternal and child health, Public attitudes, Questionnaire validation

1. INTRODUCTION

Breastfeeding is key to the health and well-being of women and children. Throughout the breastfeeding period, the mother-infant dyad interacts within three primary sectors: healthcare, workplace, and community. This continuous network of support is referred to as the "warm chain" of breastfeeding support [1]. The concept of a breastfeeding-friendly city embodies and exemplifies the ideals of the warm chain. Despite the numerous benefits of breastfeeding, global breastfeeding rates currently stand at approximately 40%, which falls significantly short of the WHO's target of achieving 70% of infants under 6 months exclusively breastfeeding by the year 2030 [2]. This gap highlights that the success of breastfeeding does not depend on workplace and healthcare policies alone, but also on the attitudes of the public.

BFCITY is a newly developed tool which aims to measure the breastfeeding friendliness of a city. This evidence-based tool was developed by an international team from Malaysia, Ireland and Sweden. BFCITY is divided into 5 sectors (city administration, healthcare, community, workplace, and collaboration) with a total of 16 indicators. Each indicator is subject to its unique method of measurement. To measure the Community Sector indicator for "A welcoming attitude", a survey of the residents of the city is needed. However, we do not have a ready-made survey for this purpose.

A literature review identified several existing questionnaires that could potentially be adapted (which broadly fall into two categories: those targeting the general public and those targeting breastfeeding mothers [3-9]). The limitation of these questionnaires is their length. Therefore, we decided to develop a concise questionnaire tailored to fit the BFCITY framework.

2. OBJECTIVES

To develop, validate, and test a questionnaire to measure the public's attitude towards breastfeeding.

3. METHODOLOGY

We conducted a two-stage mixed-method study from July to August 2025. Stage 1 involved focus-group discussions (FGD) with breastfeeding mothers and expert content validation of the draft questionnaire. Stage 2 (quantitative) involved a pilot study to assess feasibility and reliability of the final questionnaire.

Mothers with sufficient personal experience with breastfeeding (currently breastfeeding a child aged one year or older or having breastfed an infant for at least one year within the past three years) were invited to participate in the FGD. During the FGD they were asked: "What are the most important actions or gestures by a member of the public to show that they support or welcome you as a breastfeeding mother?" "What are the negative actions or gestures that made you feel otherwise?". They were also shown a list of potential items obtained from prior literature reviews and asked for their comments or thoughts on whether they would demonstrate a welcoming attitude towards breastfeeding.

The findings informed which questions to be included in the new questionnaire, which was then presented to a group of 10 breastfeeding experts. They included lactation consultants, active researchers in breastfeeding, breastfeeding advocates or formally trained medical healthcare professionals. The experts were asked to evaluate the content validity by rating each item on a scale of 1-4.

The final questionnaire was then translated into Malay and Chinese.

In Stage 2, adults aged 18 years old and living in Georgetown, Penang were invited to participate. Recruitment was done using a purposive and snowball sampling method. A sample size of 30 participants per language was used [10]. Participants completed the questionnaire in the language of their choice. After 1 week, the participants were presented with the same questionnaire again. At the end of the second survey, they were asked an additional question regarding how easy/difficult it was to understand and answer the questions.

Data Analysis

Exploratory qualitative analysis of the focus group discussion (FGD) meeting notes was used to identify and refine items for inclusion in the questionnaire. Content validity was evaluated using the Content Validity Index (CVI). For each item, an Item-level CVI (I-CVI) was calculated as the proportion of experts rating the item as either 3 or 4 on a four-point Likert scale, indicating relevance. An overall Scale-level CVI was also calculated using the average of the I-CVI values across all items (S-CVI/Average). Given the involvement of 10 experts, a minimum acceptable I-CVI threshold of 0.78 was applied to guide item retention.

Quantitative data from the pilot study were analysed using Stata. Descriptive statistics were used with categorical variables presented as percentages and continuous variables described using means and standard deviations. Internal consistency reliability was assessed using Cronbach's alpha, while test-retest reliability was examined using the Intraclass Correlation Coefficient (ICC) for each language version of the questionnaire.

4. MAIN RESULTS

Ten breastfeeding mothers participated in the focus group discussion (FGD) and confirmed that the selected themes were appropriate for assessing public attitudes toward breastfeeding. Based on these discussions, the final BFCITY public attitudes questionnaire was developed, comprising items assessing knowledge (n = 2), attitude (n = 3), and practice (n = 1).

Content validation was conducted with ten breastfeeding experts, including paediatricians, obstetricians, and lactation consultants. The overall Scale-level Content Validity Index (S-CVI/Average) was 0.94, exceeding the acceptable threshold of 0.8, indicating strong expert agreement on item relevance.

The questionnaire was pilot-tested with 130 participants across three language groups: English (n = 45), Bahasa Melayu (n = 37), and Chinese (n = 48). The median age of respondents was 30–39 years, and 76.2% (n = 99) were female. Following the second round of data collection, a total of 103 responses were received (English n = 39; Bahasa Melayu n = 28; Chinese n = 36). Reliability and test–retest analyses for the questionnaire in each language are presented in Table 1.

Table 1: Summary of the reliability and test-retest analysis results from the pilot study

Reliability Analysis					
	Overall (n=130)	English (n=45)	Malay (n=37)	Chinese (n=48)	Cut-off
Knowledge (ICC)	0.89 (95% CI 0.84–0.93, p < 0.001)	0.87 (95% CI 0.75–0.93, p < 0.001)	0.88 (95% CI 0.74–0.95, p < 0.001)	0.92 (95% CI 0.84–0.96, p < 0.001)	<0.50 (poor) >0.75 (good)
Attitude (Cronbach α)	0.561	0.803	0.317	0.454	<0.60 (poor) >0.70 (Acceptable)
Practice (κ)	0.49 (p < 0.001)	0.30 (p = 0.005)	0.62 (p < 0.001)	0.47 (p = 0.021)	<0.40 (poor) 0.61-0.80 (substantial)
Test-Retest Analysis					
Knowledge (ICC)	0.87 (95% CI 0.81–0.91, p < 0.001)	0.93 (95% CI 0.86–0.96, p < 0.001)	0.86 (95% CI 0.70–0.94, p < 0.001)	0.81 (95% CI 0.63–0.90, p < 0.001)	
Attitude (ICC)	0.87 (95% CI 0.81–0.91, p < 0.001)	0.93 (95% CI 0.86–0.96, p < 0.001)	0.86 (95% CI 0.70–0.94, p < 0.001)	0.81 (95% CI 0.63–0.90, p < 0.001)	
Practice (κ)	0.486 (p<0.001)	0.302 (p=0.005)	0.618 (p<0.001)	0.474 (p=0.021)	

DISCUSSION

This study developed and evaluated a brief questionnaire intended to measure public attitudes toward breastfeeding as part of the BFCITY framework. The mixed-method approach ensured that item generation was grounded in the lived experiences of breastfeeding mothers and guided by expert consensus, consistent with recommendations for questionnaire development in public health tools.

A key finding was the variable psychometric performance of the three domains. Although the knowledge items demonstrated excellent test–retest reliability across all languages, internal consistency was low. This pattern shows high temporal stability but weak inter-item correlation which suggests that the two knowledge items capture stable but distinct aspects of breastfeeding knowledge rather than a single construct.

In contrast, the attitude domain performed more consistently, though with differences among the three languages. The English version demonstrated the strongest internal reliability. Lower internal consistencies in the Bahasa Melayu and Chinese versions likely reflects linguistic or cultural nuances affecting how participants interpret the question. Importantly, test–retest reliability for attitudes remained excellent across all languages, indicating that participants’ views were stable over time even if internal consistency varied.

The practice item showed a fair-to-substantial test–retest reliability but weak convergent validity. This is consistent with the theoretical understanding that “practice” in public breastfeeding contexts represents behavioural tendencies that are influenced by situational, cultural, and environmental factors, and therefore may not correlate strongly with knowledge or attitudes. This supports the view that practice should remain a distinct domain within the questionnaire rather than an expectation of internal convergence.

Ultimately, the determination of whether these items are retained requires returning to qualitative insights from the FGDs and expert CVI ratings, which highlighted their conceptual importance despite low internal coherence.

Overall, the findings reinforce the broader literature showing that public breastfeeding support is multifaceted, culturally mediated, and not reducible to a single metric. The excellent test–retest reliability across all domains suggests that the tool is stable over time and appropriate for repeated community assessments. For policymakers and city administrators, this provides a practical method for monitoring public acceptance, a component that is often challenging to measure.

5. CONCLUSION

This questionnaire demonstrates acceptable validity and reliability. Internal consistency testing was limited by the small number of questions. As the survey is intended to be short, content validation will be used as the main supporting evidence of validity. This questionnaire will be used as part of larger BFCITY, which is in the process of being tested in other cities such as Dublin and Kota Bharu.

6. ACKNOWLEDGEMENT

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