Development and Validation of Postnatal Diet, Lactation, and Emotion Management (LEDies) Module

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ABSTRACT

This study aims to develop and validate a module on managing diet, lactation, and emotion for postnatal mothers. This cross-sectional study involves three phases: needs assessment, module development, and module validation. About 37 mothers aged 18 to 49 years old with infants less than 6 months were recruited, and information on postnatal care practices, lactation knowledge, and emotion were obtained for module development. The guidelines from the Ministry of Health Malaysia and literature served as the foundation for the module that was developed following the requirements assessment utilizing the Health Belief Model (HBM). Content and face validity of the module is carried out to validate the developed module. The validation form used was adapted from Silveira de Castro (2007) which consists of seven criteria, two criteria related to content validity and another five criteria related to face validity. The content validity was assessed using a Content Validity Index (CVI). CVI was calculated using two different formulas: I-CVI and S-CVI. Meanwhile, a level of agreement was used in the data for the module's face. From the need assessment, most mothers with restricted seafood and nuts intake struggled to breastfeed and about 21.6% of them experienced postpartum depression. The developed module has been validated with both mean I-CVI and S-CVI more than 0.78 and 0.80, respectively. Meanwhile, five face validation components achieved 75% agreement, confirming the validity. In conclusion, the developed module named The LEDies has good validity and can serve as teaching material for postnatal mothers caring for themselves and their infants during the postpartum period.

Keywords: emotion, lactation, postnatal diet, traditional practices

INTRODUCTION

A postpartum period usually lasts six weeks after giving birth, mothers experience physiological, psychological, and social changes. The Malaysian postpartum period involves formalities, ceremonies, and cultural habits. Traditional practices, particularly dietary, can harm postpartum mothers, restricting nutritious food intake (Jusoh & Tengku Ismail 2022). Food restrictions may reduce the source of protein and other essential nutrients needed for healing.

The mother's health could suffer from the reduction of various key nutrients. According to Recommended Nutrient Intake Malaysia 2017, breastfeeding mothers need an additional 500 calories, but traditional practices may not meet postpartum needs. Maternal vitamin insufficiency decreases breast milk's fat and water-soluble vitamin levels, and cultural practices impact intake (Nurrachmawati *et al.* 2019). Mother needs adequate water during breastfeeding to produce sufficient milk. Meanwhile, postpartum depression can be avoided with a healthy diet that includes enough Docosahexaenoic Acid (DHA). Depression can also be impacted by low Polyunsaturated Fatty Acid (PUFA) consumption, insufficient folate, and vitamin B12 intake, and decreased mother-child bonds (Mughal *et al.* 2022).

Studies on the effects of nutrient insufficiency on postpartum mothers which may impact breastfeeding outcomes and contribute to postpartum depression are lacking in Malaysia. Thus, this study is conducted to develop a module that will serve as a medium for mothers

to manage their dietary intake, lactation practices, and emotion control. Moreover, developing a postnatal management module is crucial as it may reduce malnutrition, enhance the health of mothers, and avert future problems.

METHODS

Design, location, and time

Module design, development, and validation began from December 2022 until August 2023. There were three phases in conducting this study: Phase 1: needs assessment, Phase 2: module development, and Phase 3: module validation. In Phase 1, 37 mothers aged 18 to 49 years old with infants less than 6 months were recruited to observe the postnatal care practices, lactation knowledge, and emotional control obtained for module development purposes. Meanwhile, in Phase 2, The LEDies module developed using the Health Belief Model (HBM), was based on guidelines from the Ministry of Health Malaysia, literature, and needs assessments. Phase 3 involved an expert team comprised of a lecturer from Center for Dietetics Studies, a dietitian from the Diet Care Centre at UiTM Puncak Alam, and a dietitian from Hospital Melaka. The experts were consulted through email and the questionnaire needs to be answered in Google Forms. The needs assessment was conducted in a health facility which is in Klinik Kesihatan Meru, Klang, Selangor while the validation process that involved both expert and target users was conducted online through Google Forms. The Medical Research & Ethics Committee approved this study with reference number NNMR-19-4204-52471 (IIR).

Sampling

This study used purposive sampling with inclusion criteria which are the mothers of infants under the age six months who are between the ages of 18 and 49, have a singleton baby, are healthy, can communicate in English and Bahasa Melayu effectively, and live in the Klang areas. A study by Nurrachmawati *et al.* (2019) utilized 27 samples for the needs assessment, therefore, with additional of 40% for attrition rate, this study recruited 37 respondents for needs assessment. The needs assessment required the respondents to answer socio-demographic information, confinement practices knowledge, lactation

practice and knowledge, and the Edinburgh Postnatal Depression Scale (EPDS). Three experts were chose to validate the content of this module. According to Polit *et al.* (2007), the involvement of three or more experts is indicative of significant content validity. The panelists provided diverse suggestions from various specializations (Lau *et al.* 2019). Meanwhile, a study by Shuhaimi *et al.* (2023) demonstrates 16 samples of the target audience were used for face validation while Hazaha *et al.* (2023) used 30 samples. Thus, this study recruited 18 postnatal mothers who have been followed up from the Needs Assessment conducted in Klinik Kesihatan Meru.

Data collection

The sample collected from the mothers who visited public health facility, Klinik Kesihatan Meru, and passed the inclusion criteria. The study permission and an informed consent were obtained from the participants. The needs assessment questionnaire was categorized into four categories which were socio-demographic information, confinement practices knowledge, lactation practice and knowledge, and Edinburgh Postnatal Depression Scale (EPDS). The postnatal care practices questionnaire was adapted from (Ghani & Salehudin *et al.* 2018) which consists of 13 questions assessing food restriction during confinement using dichotomous and open-ended methods. Meanwhile, the CDC Postnatal Questionnaire used the Likert scale and 9 multiple-choice questions to assess breastfeeding and infant formula feeding practices (CDC 2023). Lastly, the validated Malay version of EPDS consisting of 10 questions was used to screen postnatal depression among the mothers. A score of 12 or higher was used as the cut-off point for positive screening of depression (Kadir *et al.* 2004).

The validation form derived from an instrument proposed by Silveira de Castro *et al.* (2007) was used in this study. It consists of 7 criteria where two criteria (scientific accuracy and content) are related to content validity and another five criteria (literary presentation, illustrations, sufficiently specific and understandable material, legibility and printing characteristics, and quality information) related to face validity. The validation form consists both of closed and open-ended questions. The content validity requires the experts to rate the items based on relevance using

a scale of 1 (no relevance), 2 (revision needed), 3 (relevant but minor revision), and 4 (very relevant). Meanwhile, face validity requires both the experts and the target user to answer "yes" or "no" since it uses close-ended dichotomous questions.

Data analysis

The analysis of the need assessment was performed using the statistical program International Business Machines (IBM) Statistical Package for the Social Sciences (SPSS) version 27. Descriptive statistics are used to present the results, which include mean or average, standard deviation, frequency, and percentages of data obtained.

The content validity was calculated using Content Validity Index (CVI) which is divided into I-CVI (Item-Level Content Validity Index) and S-CVI (Scale-Level Content Validity Index). In this study, there were three experts validated the module content validity. A score of I-CVI must be at least 0.78 and S-CVI must be at least 0.80 in a study with three to five experts to demonstrate good content validity (Polit *et al.* 2007). Next, face validity implies the level of agreement based on the five criteria which include literary presentation, illustrations, sufficiently specific and comprehensive material, legibility, printing characteristics, and quality of information. Items were considered validated if they had at least 75% positive responses (Lau *et al.* 2019).

RESULTS AND DISCUSSION

Phase 1: Needs assessment

Figure 1 demonstrates that most mothers restrict seafood intake, with 45.9% agreement, as it may cause itchiness, pus, and slow wound recovery. Besides, they also strongly agreed (27%) to restrict bean and nuts consumption due to gassy, discomfort, allergies, and itchiness concerns during the confinement. Meanwhile, most mothers breastfeed their babies from both breasts in the first week, lasting 20–29 minutes. About 23 (62.2%) of the mothers feed their children with formula milk or other foods in less than 1 month, 6 (16.2%) at 1 to 2 months, 1 (2.7%) at 3–4 months, 3 (8.1%) at 5–6 months, and 1 (2.7%) at 9 months, respectively (Table 1). This suggests that most mothers faced difficulties in meeting the six-month exclusive breastfeeding recommendation by WHO. Next, the mean EPDS score of postnatal women participating in the study was 6.86±5.21. This study finds that 21.6% (n=37) of mothers have experienced postnatal depression which suggests that there is a need to develop an educational module for the purpose of providing knowledge on healthy postnatal diet, lactation, and stress management.

Phase 2: Module development

This module is named "The LEDies" (pronounced as ladies). Lactation, emotion, and diet were denoted by capital letters L, E, and D, respectively. It was designed using Canva, a graphic design software that allows anyone to design anything. This module consists of 42 pages including the covers, and is written in English to allow postnatal mothers of all ethnicities to understand this module easily. The content and pages are used in a variety of color pallets to enhance the visual search of the mothers. Besides, infographics and diagrams were also implied to convey the information effectively. This module includes three main chapters:
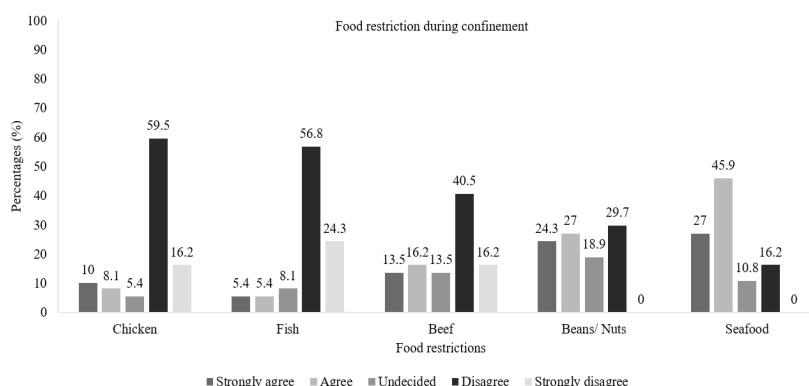

Figure 1. Level of agreement on food restriction during confinement among the study population

Table 1. Lactation practice and knowledge (n=37)

Lactation practice & knowledge	Number (n)	Percentage (%)
Method of breastfeeding a newborn baby in the first weeks		
Breastfeed only	27	73.0
Formula feed only	1	2.7
Both breast and formula feed	9	24.3
Baby typically feeds from both breasts		
Yes	32	86.5
No	5	13.5
Baby typically releases breasts after feeding		
Both breast	30	81.1
First breast only	4	10.8
No	3	8.1
Average duration of breastfeeding		
<10 minutes	8	21.6
10–19 minutes	8	21.6
20–29 minutes	13	35.1
30–39 minutes	8	21.6
Baby's age when first feeding formula or other foods		
<1 month	23	62.2
1–2 months	6	16.2
3–4 months	1	2.7
5–6 months	3	8.1
7–9 months	3	8.1
>9 months	1	2.7
Frequency with which babies finish formula bottles		
Never	13	35.2
Rarely	2	5.4
Sometimes	8	21.6
Most of the time	7	18.9
Always	7	18.9
Baby's age to stop breastfeeding		
<1 year old	15	13.5
1–2 years old	19	51.4
2–3 years old	12	32.4
Depends on the milk supply	1	2.7
The best method to feed a baby		
Breastfeeding	32	86.5
Both breastfeeding and formula feeding	3	8.1
Breastfeeding and formula are equally good	2	5.4

Diet Management, Lactation Management, and Emotion Management, each with a message, overview, content, and expected output. In Diet Management, it covers on educating the importance of healthy diet management for postnatal mothers, together with suggestion menu for breastfeeding mothers. Meanwhile, mothers will be exposed on the benefits of breastfeeding for both babies and mothers, techniques, and tips in ensuring a successful breastfeeding in Lactation Management. Finally, in Emotion Management, special topics on educating mothers on stress management during postpartum.

Phase 3: Module validation

Based on Table 2, "Scientific Accuracy" received an I-CVI of 1.00 for each item in the module's content, whereas "Content" received an I-CVI of 1.00. Moreover, experts highly agree on content validity using the S-CVI formula, where the score obtained is 1.00. The I-CVI and

S-CVI results show more than 0.78 and 0.80 respectively, thus, this module is declared content validated. Meanwhile, for face validity, five evaluation criteria including literary presentation, illustration, the material is sufficiently specific and understandable, legibility and printing characteristics, and quality of information, were calculated by the level of agreement. Figure 2 revealed the experts agree on the module's face validity, with 93% to 100% agreement, exceeding 75%. They recommend improving content with graphics and sentences. Meanwhile, Figure 3 demonstrates the target user which involved the postnatal mothers from the need assessment had a strong agreement on face validity criteria, with range percentages of 96% to 100%. Thus, the module achieved face validity for postnatal mothers.

According to various research conducted in Malaysia, traditional postpartum practices are frequently followed by mothers after giving

Table 2. Content validity index for "The LEDies" module by expert panels (n=3)

Criteria	Item description	Relevant (Rating 3 or 4)	Not relevant (Rating 1 or 2)	I-CVI[a]	Interpretation[b]
Scientific accuracy	Contents are in agreement with current knowledge	3	0	1.00	Relevant
	Recommendation is necessary and correctly approached	3	0	1.00	
Average CVI				1.00	
Content	There is no unnecessary information	3	0	1.00	Relevant
	Recommendation about the desired behavior is satisfactory	3	0	1.00	Relevant
	There is no unnecessary information	3	0	1.00	Relevant
	Important points are reviewed	3	0	1.00	Relevant
Average CVI				1.00	
S-CVI/Ave[c]				1.00	Excellent

[a]Item-level Content Validity Index (I-CVI); The number of expert panels that agreed with the items by ranking them as relevant (rating 3 or 4) divided by the total number of expert panels (n=3)
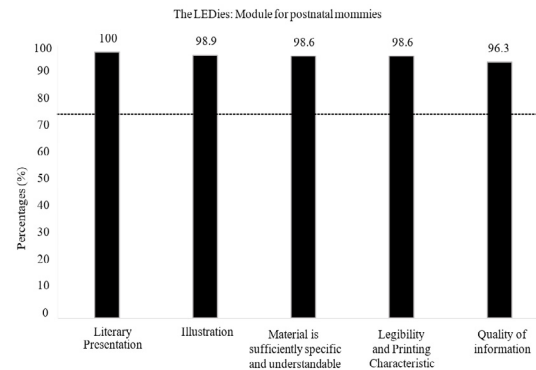[b]I-CVI is greater than 0.78, indicating that the items are relevant
[c]S-CVI/Ave (Scale-level Content Validity) index based on the average method)
The sum of I-CVI scores divided by the number of items; The value of S-CVI is exceed 0.80; Thus, it has an excellent content validity; CVI: Contet Validity Index
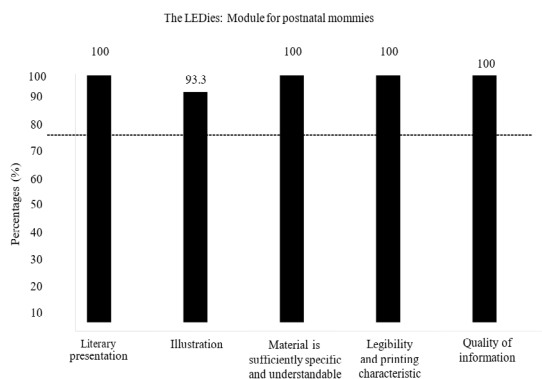
Figure 2. Level of agreement among experts for face validity

Figure 3. Level of agreement among postnatal mothers for face validity

birth. It is well known that Asian cultures have a higher prevalence of confinement practices. Malaysian women use traditional practices to recover postpartum health (Myint *et al.* 2019). Moreover, dietary adjustments help to balance the cold states of pregnancy and delivery (Basir *et al.* 2019). Most mothers in this study restrict seafood and nuts intake during confinement due to concerns about wound healing, itching, and potential allergic reactions in newborns. Based on the study by Basir *et al.* (2019) in Penang, Malaysia also found that mothers restrict nut intake for bloating. Women worldwide avoid certain foods such as coconut milk and yam post-birth due to blood loss during delivery (Poh *et al.* 2005). Thus, the mother needs to follow guidelines to improve health and breastmilk production whether by forbidding or encouraging the consumption of particular foods.

This present study demonstrates that most mothers were unable to comply with the WHO recommendations to exclusively breastfeed their infants for at least six months. Many mothers introduce their infants to formula milk or other foods when they are younger than 6 months old. Moreover, even though the percentage of mothers who may be diagnosed with postpartum depression is small, it nevertheless suggests that the mothers need assistance and support in managing their emotions during the critical period of postpartum. According to Schiller *et al.* (2015), Postpartum Depression (PPD) is still a common disorder, and its causes are still unknown, despite decades of research into the disorder. However,

PPD is a treatable, complex mood illness that is frequently misdiagnosed. Numerous studies have shown that various foods and nutrients have antidepressant properties via several pathways (Rupanagunta *et al.* 2023). Increased levels of DHA in breast milk and higher seafood intake have been associated with lower PPD rates (Chatzi *et al.* 2011). Thus, this study aims to develop a tool for mothers to understand a healthy diet's impact on emotions and lactation. Generally, breast milk contains numerous proteins, PUFAs, and a complex microbiome (Kim & Yi 2020). It promotes microbial colonization in infants, aids digestion, protects against pathogens, and increases mucine production, improving intestinal barrier functions. Breast milk provides essential microbiota, immune components, and supports the infant's immune system development (Mikšić *et al.* 2020). Besides, breastfeeding may reduce postpartum depression and improve maternal mood. Comparatively, to mothers who did not exclusively breastfeed, prenatally depressed mothers who breastfed exclusively reported fewer symptoms and reduced rates of postpartum depression (Dias & Figueiredo 2015).

This module was developed using Canva and given the name "The LEDies". It is printed in an A5 format booklet, which reduces eye strain compared to reading online material. Besides, the module was designed for diverse mother learning styles. Graphic representation is believed to cater to most learning styles effectively. Bušljeta (2013) state that the best visual representations are paintings, caricatures, maps, sketches,

timelines, and diagrams. Hence, this module uses a variety of pictures and diagrams to grasp the mother's attention. The LEDies module also implies colorful content and pages which may help the mothers with visual search. Colorful modules enhance reader concentration, enhancing information retention in short- and long-term memory (Diachenko *et al.* 2022) Finally, the module included infographics to convey the information efficiently and improve memory retention. According to Dunlap and Lowenthal (2016), infographics enhance reader comprehension and retention of information through visual appeal.

One of the study's strengths is the developed module's adaptation to the needs of postnatal mothers in Malaysia. The recommendations used in this module were based on the Malaysian Dietary Guidelines 2020 and integrated into Malaysian culture. Besides, the module also has been validated by experts, content improvement enhances effectiveness in the intervention study. However, the study's limitation is the small number of validation experts, with most recommendations of six to ten (Yusoff 2019). Thus, future research requires a larger expert sample size for better control over the chance agreement. The module also recommends being translated into Malay to overcome the language barriers.

CONCLUSION

A module on controlling diet, lactation, and emotions was developed especially for this study to reduce the risk of malnutrition, which can lead to postpartum depression and early nursing cessation. The module has been validated by experts and faces validated by postnatal mothers. All two content validity criteria were successfully obtained, indicating that the module had good content validity. Furthermore, five components of face validation received more than 75% agreement. In conclusion, the module can be used to improve the breastfeeding approaches, emotional control, and nutrition understanding of postpartum women.

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DECLARATION OF CONFLICT OF INTERESTS

The authors have no conflicts of interest.

REFERENCES

Basir SMA, Ghani RA, Ibrahim M, Khan Khattak MMA, Omar MN, Shukri NAM. 2019. Dietary intake of mothers who practised traditional confinement during exclusive breastfeeding period. Malaysian J Med Health Sci 15(2):39−46.

Bušljeta R. 2013. Effectiv use of teaching and learning resources. Czech-Polish Historical and Pedagogical Journal 5(2). https://doi.org/10.2478/cphpj

[CDC] Centers for Disease Control and Preventio. Questionaires: Breastfeeding and infant feeding practices. 2023.. https://www.cdc.gov/breastfeeding/data/ifps/questionnaires.htm

Chatzi L, Melaki V, Sarri K, Apostolaki I, Roumeliotaki T, Georgiou V, Vassilaki M, Koutis A, Bitsios P, Kogevinas M. 2011. Dietary patterns during pregnancy and the risk of postpartum depression: the mother–child 'Rhea' cohort in Crete, Greece. Public Health Nutr 14(9):1663–1670. https://doi.org/10.1017/s1368980010003629

Diachenko I, Kalishchuk S, Zhylin M, Kyyko A, Volkova Y. 2022. Color education: A study on methods of influence on memory. Heliyon 8(11):11607. https://doi.org/10.1016/j.heliyon.2022.e11607

Dias CC, Figueiredo B. 2015. Breastfeeding and depression: A systematic review of the literature. J Affect Disord 171:142–154. https://doi.org/10.1016/j.jad.2014.09.022

Dunlap JC, Lowenthal PR. 2016. Getting graphic about infographics: Design lessons learned from popular infographics. J Vis Lit 35(1):42–59.

Ghani RA, Salehudin S. 2018. Traditional belief and practice on postpartum recovery among mothers in East Coast of Peninsular Malaysia. In MATEC Web of Conferences 150:05067. https://doi.org/10.1051/matecconf/201815005067

Hazaha, Daud, Sulaiman. 2023. Development and validation of an educational module on intimate partner violence for young adults. International Medical Journal Malaysia 22(3). https://doi.org/10.31436/imkm.v22i3

Jusoh NN, Tengku Ismail TA. 2022). A review of dietary intake during postpartum period. IIUM Medical Journal Malaysia 21(1). https://doi.org/10.31436/imjm.v21i1.1943

Kadir AA, Nordin R, Ismail SB, Ismail SB, Yaacob MJ, Mustapha WMRW, Rushidi WM. 2004. Validation of the Malay version of Edinburgh postnatal depression scale for postnatal women in Kelantan, Malaysia. Asia Pacific Fam Med 3(1−2):9−18.

Kim SY, Yi DY. 2020. Components of human breast milk: From macronutrient to microbiome and microRNA. Clin Exp Pediatr 63(8):301–309. https://doi.org/10.3345/cep.2020.00059

Lau XC, Wong YL, Wong JE, Koh D, Sedek R, Jamil AT, Ng ALO, Hazizi AS, Ruzita AT, Poh BK. 2019. Development and validation of a physical activity educational module for overweight and obese adolescents: CERGAS Programme. Int J Environ Res Public Health 16(9):1506. https://doi.org/10.3390/ijerph16091506

Mikšić, Š, Uglešić B, Jakab J, Holik D, Milostić Srb A, Degmečić D. 2020. Positive effect of breastfeeding on child development, anxiety, and postpartum depression. Int J Environ Res Public Health 17(8):2725. https://doi.org/10.3390/ijerph17082725

Mughal S. 2022. Postpartum Depression. Treasure Island (ID): StatPerals Publishing.

Myint MH, Najimudeen M, Rao S, Win MMC. 2019. Traditional practices during postpartum period among women in Ampang, Malaysia. J Manag Sci 17(1):98−105. https://doi.org/10.57002/jms.v17i1.262

Nurrachmawati A, Wattie AM, Hakimi M, Utarini A. 2019. Kamboh: A qualitative study of postpartum care in Kutai ethnic tribe, East Kalimantan, Indonesia. Malaysian J Public Health Med 19(1):25–30. https://doi.org/10.37268/mjphm/vol.19/no.1/art.33

Poh BK, Wong YP, Karim NA. 2005. Postpartum dietary intakes and food taboos among Chinese women attending maternal and child health clinics and maternity hospital, Kuala Lumpur. Malays J Nutr 11(1):1−21.

Polit DF, Beck CT, Owen SV. 2007. Is the CVI an acceptable indicator of content validity? Appraisal and recommendations. Res Nurs Health 30(4):459–467. https://doi.org/10.1002/nur.20199

Rupanagunta GP, Nandave M, Rawat, D, Upadhyay J, Rashid S, Ansari MN. 2023. Postpartum depression: Aetiology, pathogenesis and the role of nutrients and dietary supplements in prevention and management. Saudi Pharm J 31(7):1274–1293. https://doi.org/10.1016/j.jsps.2023.05.008

Schiller C, Meltzer-Brody S, Rubinow D. 2015. The role of reproductive hormones in postpartum depression. CNS Spectrums 20(1):48−59. https://doi.org/10.1017/S1092852914000480

Sein KK. 2013. Beliefs and practices surrounding postpartum period among Myanmar women. Midwifery 29(11):1257–1263. https://doi.org/10.1016/j.midw.2012.11.012

Shuhaimi FA, Hamid SBA, Yazid NAM. 2023. Development and validation of breastfeeding and dietary education package for women with gestational diabetes mellitus. J Educ Health Promot 28(12):71.

Yusoff MSB. 2019. ABC of content validation and content validity index calculation. Educ Med J 11(2):49–54. https://doi.org/10.21315/eimj2019.11.2.6