

ORIGINAL ARTICLE

Development and Validation of an Educational Booklet on Nutrition and Physical Activity for Postpartum Mothers

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ABSTRACT

Introduction: An educational booklet may guide mothers in maintaining healthy lifestyle through proper maternal nutrition and physical activity, improving their well-being. This study aims to develop and validate an educational booklet on nutritional and physical activity for postpartum mothers. **Materials and methods:** This validation study comprises two phases: Phase I involved the booklet's development, and Phase II focused on content and face validation. Content validation was performed by 10 expert panels, while face validation involved both experts and postpartum mothers (n= 21). The content validity index and face validity were assessed descriptively. **Results:** The booklet, consisting of 42 pages, includes five key messages focused on healthy eating, increasing iron and folic acid intake, omega-3 foods, physical activity, and enhancing flexibility and strength. The Content Validity Index (CVI) analysis yields an excellent value of more than 0.8 for each item (I-CVI), score of S-CVI/AVE of 0.97 and 0.98 for key message 1 and 5, and the rest is score 1, whereas score of S-CVI/UA 0.83 to 1.00 for all key messages. Face validation showed a 97.6% positive response rate, above the 75% threshold. **Conclusion:** The findings suggest that this validated booklet can effectively guide postpartum mothers in maintaining optimal health through proper nutrition and physical activity. Future research may consider intervention studies to assess its impact on improving health outcomes for postpartum mothers.

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INTRODUCTION

The period following birth holds great significance for a mother and her infant, as it determines their overall health and well-being in the long run. Postpartum care should not be treated as a single event but rather as a continuous and individualized process [1]. According to World Health Organization [2], the postpartum period is the time that commences immediately after childbirth and continues for up to 6 weeks after giving birth. However, the American College of Obstetricians and Gynaecologists (ACOG) defines postpartum care to encompass the period from childbirth and can extend up to 12 weeks, especially for mothers who require a longer duration for their organ systems to return to their pre-pregnancy state [1].

In South East Asia, postpartum confinement is deeply rooted in cultural practice, with each country having its

own traditions and customs. This practice is particularly prevalent in countries like Malaysia, where the period following childbirth is known as the confinement period. The primary groups in Malaysia; namely the Malay, Chinese, and Indian populations, observe varying durations of confinement period. Malays typically follow a confinement period of 44 days, although some extend this to 60 or even 100 days. In contrast, the Chinese and Indian communities generally adhere to a confinement duration of one month (30 days), with some following the Malay practice of up to 44 days [3]. During the confinement period, new mothers are advised to observe specific food restrictions, a practice that contrasts with the principles of dietary diversification, where consuming a variety of foods is encouraged to ensure the intake of essential nutrients [4]. This adherence to food taboos is commonly observed not only in Malaysia but also in neighbouring countries such as Singapore, Indonesia, Thailand, Vietnam and Myanmar, particularly during the vulnerable stages of postpartum recovery and breastfeeding [4–6].

In Malaysia, for example, carbohydrate-rich foods like flavoured rice, corn, pumpkin, and potato are

restricted due to their potential gastrointestinal effects [7]. Protein sources, such as certain fish and seafood, are commonly avoided in Malaysia [7], Cambodia [8], Lao PDR [9], Indonesia, and Thailand, due to concerns over itching or the belief that fish can cause leprosy, particularly in Myanmar [4]. Beef, chicken, egg and other meats are also restricted in some regions due to their association with skin reactions [4]. Whereas for vegetables, postpartum women in countries such as Indonesia, Lao PDR, Malaysia, Myanmar, Thailand, and Vietnam are restricted from consuming various types, including leafy greens, bitter varieties, and specific items like chili, pumpkin, and mushrooms, aimed at preventing postpartum illness and promoting health [5]. Fruit consumption is also limited, with taboos on pineapple, papaya, watermelon, and mango in several of these countries [5,7]. These taboos reflect a broader cultural perception of food's role in either causing harm or promoting recovery after childbirth.

Long-standing practices still influence new mothers' dietary habits and postpartum care, with many continuing to follow traditional restrictions despite advances in medicine and nutrition [10]. These restrictions often result in a lack of dietary diversity, contributing to micronutrient deficiencies despite increased nutritional needs during the postpartum period [11]. A study in China found that greater food diversity was linked to a lower risk of depression [12]. This highlights the importance of a varied diet in meeting nutritional needs, especially for key micronutrients like iron, riboflavin, vitamin B12, and omega-3 fatty acids, all of which play a crucial role in preventing or alleviating depression symptoms [13–15]. In addition to dietary restrictions, limited physical activity during confinement period has been associated with poor physical health outcomes, including decreased aerobic endurance and increased risk of postpartum depression [16]. Postpartum depression not only adversely affects the health of mothers but can also have significant implications for the infants' health [17].

While traditional practices still play a significant role in shaping postpartum care, some research shows that new mothers are beginning to adopt these practices alongside medically recommended guidelines [18,19]. In some cases, mothers prioritize healthy practices recommended by healthcare professionals over cultural practices, as they are informed about which options are more beneficial and impactful, even though they may face isolation from their families for not adhering to traditional practices [19]. This blending of traditional and modern practices demonstrates a shift towards a more balanced approach to postpartum care.

Postpartum mothers' health is strongly influenced by their self-care practices. Several studies have shown that educational booklets can effectively promote health by increasing knowledge and coping skills [20–22].

While many mothers report needing expert nutritional support [23], educational booklets can serve as valuable resources to guide them during postpartum period [24]. Previous research has found that educational booklets improve understanding of anemia and its management [25], increase breastfeeding adherence [26], and enhance general self-care [24]. However, no studies have specifically focused on using educational booklets to improve postpartum mental well-being through nutrition and physical activity education. This gap highlights the need for targeted research in this area. The research question explores whether the booklet is successfully validated as an effective resource for this target group. Therefore, our current study aims to develop and validate an educational booklet on nutrition and physical activity for postpartum mothers.

MATERIALS AND METHODS

Study design

The educational booklet development and validation were started in June 2020 and completed in June 2022. Overall, this study consisted of two phases, Phase I involved the development of the booklet and Phase II focused on the booklet's validation. This study has complied with the guidelines of the Declaration of Helsinki and the study protocol was approved by the Medical Research & Ethics Committee, Ministry of Health Malaysia (NMRR-19-2583-50571[IIR]), and Universiti Teknologi MARA Research Ethics Committee (REC/729/19). All the participants were given an information sheet and only those who provided written consent were included in this study. The confidentiality of information provided by the participants was assured and have the right to withdraw at any time.

Phase I: Development of the Educational Booklet on Nutrition and Physical Activity for Postpartum Mothers.

According to Wizowski et al. [27], the development of educational material should follow a specific procedure to ensure that the information given is accurate, understandable, and usable. Thus, this will help the readers manage their health and well-being more effectively. The first step is to establish a planning team that is accountable and capable of cooperating closely throughout the development phase [27]. The team comprised nutritionists, dietitians, and physiotherapists, who were responsible for discussing the appropriate input of the educational material. This group was also formed to gather ideas from different experts.

The second step is to identify the purpose of the educational material and the intended audience [27]. The booklet's purpose is to provide a suitable guideline on healthy eating and active lifestyle for postpartum mothers. Since mothers after childbirth tend to follow restrictive dietary habits and are encouraged to be less active, this guideline helps mothers implement a healthy lifestyle by adopting a suitable practice during

the postpartum period. The intended audience was to be among mothers who have given birth to a child within the last two years.

Third, a scoping review was performed to determine the suitable contents in the nutrition booklet, in which the details had been reported by Yahya et al. [28]. The information should be understandable and practical to adults [27]. The guidelines for nutrition intake and exercise were chosen based on their applicability to Malaysians.

The fourth step is to prepare the first draft [27]. All of the information was written in our own words to maintain the originality of the booklet. Simple language and layman's terms were used to ensure the readers could read and understand the guidelines [27]. The Malay language was used in this booklet as it is the primary language in the country. In this study, an A5 size was considered for the booklet size as it is handy to carry and view by the reader as a daily guideline.

Finally, the professional designer designed and illustrated the booklet to ensure the messages and overall style look attractive and presentable. The content and design of the nutrition and physical activity booklet were finalized through a series of meetings with the research team until the finalized booklet was produced.

Phase II: Validation of the Educational Booklet on Nutrition and Physical Activity for Postpartum Mothers

Validating these materials was crucial for the researchers to make the material more scientifically rigorous and practical for postpartum mothers [29]. In this study, a comprehensive validation process was undertaken, encompassing both content and face validity.

Content Validation

Content validation is conducted to evaluate the content of the booklet and whether it is relevant and representative of the targeted objective [30]. According to Yusoff et al. [30], the number of experts for content validation should be at least six and does not exceed 10. Hence, this study has recruited about 10 health professionals from various fields, including nutrition, dietetics, and physiotherapy. Selecting appropriate experts is essential to ensure a comprehensive evaluation of content validity. The inclusion criteria required participants to be health or academic professionals in the fields of Nutrition, Dietetic or Physiotherapy, with at least 2 years of experience in their respective field [31]. Experts were selected based on their specialization in maternal health, particularly in nutrition, as well as their expertise in developing exercise programs for postpartum mothers. The experts were also aged between 19 and 55 years, as cognitive function is generally optimal within this age range [32]. Exclusion criteria included individuals with mental disabilities, as they may be unable to assess the module objectively.

Evaluation for content validity is made based on the principles and criteria of Printed Education Materials (EVALPAM) [33]. There were two criteria for content validity, specifically on scientific accuracy and content [33]. Content validity index (CVI) is the usual method the researcher uses when conducting content validity. Two CVI categories, CVI for item (I-CVI) and for scale (S-CVI), were calculated. The purpose of I-CVI was to rate the relevance of each item by the expert panel, whereas the S-CVI is used to rate the content validity for the overall scale. S-CVI can be calculated by the Universal Agreement among experts (S-CVI/UA) or the average of S-CVI (S-CVI/Ave).

Face Validation

Following revisions to the content of the nutrition and physical activity booklet, face validation was further performed among experts and mothers who live in Selangor. Acceptance analysis was used in this face validation phase to measure the booklet's overall content, graphics, and design, as Hawe et al. [34] suggested. Initially, the booklet underwent a review process by experts, and valuable comments and suggestions were obtained. Following the discussions and agreement between the researchers and the experts, necessary improvements were implemented based on their feedback. Subsequently, the booklet was evaluated for its acceptability among mothers residing in the community. In order to identify potential participants for this face validation, purposive sampling was employed, specifically targeting mothers who had recently given birth.

A total of 21 mothers were recruited for face validation. While the minimum acceptable number of participants for face validation is 10 [35], this study included 21 participants to ensure a more reliable outcome. The inclusion criteria for postpartum mothers in this study were as follows: mothers who have given birth within the past two years, aged between 19 and 45 years (considered the optimal childbearing age) [36], and able to read and write. In contrast, mothers who have mental disabilities due to the possibility of being unable to evaluate the booklet rationally were excluded from this study. The inclusion criteria for experts in this study are similar to those for content validation: health or academic professionals in the fields of Nutrition, Dietetic or Physiotherapy, with at least 2 years of experience in their respective field, and aged between 19 and 55 years, as cognitive function is generally optimal within this age range [32]. The exclusion criteria included individuals with mental disabilities, as they may be unable to assess the module objectively. In addition, all the participants were invited to give any comments and ideas for improvement of the booklet.

Statistical Analysis

Content validation by experts were calculated manually, performing the value of I-CVI, S-CVI/AVE and S-CVI/UA.

The I-CVI score system is determined using a 4-point Likert scale (1= totally disagree, 2= partially agree, 3= agree, and 4= totally agree). If the expert rating score is 1-2, the I-CVI score will be 0, whereas if the expert rating is 3-4, the I-CVI score will be 1. The total score of I-CVI is aggregated and divided by the total number of experts who participated [37]. The item is considered relevant if the value exceeds 0.78 [29]. Meanwhile, the S-CVI/UA is determined when all the I-CVI (score=1) are added together and divided by the total items. In contrast, the S-CVI/Ave is the average score of I-CVI. Excellent content validity is considered if the values are S-CVI/UA ≥ 0.80 and S-CVI/Ave ≥ 0.90 [37].

For the face validation phase, acceptance analysis from postpartum mothers were analysed using descriptive statistical methods. Items were validated when at least 75% of positive responses were achieved during face validity assessment [38]. Mean and standard deviation were used to display all the numerical data. The data were analyzed descriptively using version 29.0 of the Statistical Package for Social Sciences (SPSS) (SPSS Inc., Chicago, IL, USA).

RESULTS

Phase I: Development of the Educational Booklet on Nutrition and Physical Activity for Postpartum Mothers.

This booklet consists of 42 pages, available in printed and digital version, and it was entitled ‘Mommies can Eat & Exercise with no Stress (MomEENS): *Panduan Pemakanan & Aktiviti Fizikal untuk Ibu Selepas Bersalin* (Nutrition and Physical Activity Guideline for Postpartum Mothers)’ (Fig 1). Five key messages were emphasised in this booklet, based on the findings from the scoping review [28], while integrating the traditional confinement practices followed by Malaysian mothers. The messages aimed to empower mothers with knowledge on maintaining a balanced diet for breastfeeding and staying physically active during this crucial period. The guideline was designed to help reduce postpartum depression by analyzing how dietary intake affects it and exploring nutrition and physical activities to prevent depression [28,39]. The key messages are shown in Table I.

Table I: Key messages of the booklet

Booklet (5 messages)	Justification
Message 1 Eat healthily.	The first key message is emphasizing following food pyramid guidelines during the postpartum period. Evidence shows that a diverse diet can help mitigate depression, supporting better mental health for postpartum mothers [12].

CONTINUE

Table I: Key messages of the booklet. (CONT.)

Booklet (5 messages)	Justification
Message 2 Increase intake of foods rich in iron and folic acid.	Iron and folic acid deficiencies have been linked to postpartum depression [14,50]. Therefore, it is recommended to ensure adequate intake of these nutrients to help prevent the occurrence of postpartum depression.
Message 3 Increase intake of foods rich in omega-3.	Consumption of omega-3 has been shown to improve cognitive function, memory, and alleviate postpartum depression [51]. Therefore, the recommendation to include omega-3 in the diet aims to enhance maternal mental health.
Message 4 Be active with creative steps.	Various studies have shown that regular physical activity can significantly reduce depression symptoms in postpartum mothers [52,53]. Therefore, increasing daily steps is recommended, as brisk walking has been proven to improve maternal mental health [54]. Additionally, alternative exercises such as dancing are suggested to help mothers achieve more daily steps and stay active [55].
Message 5 Increase the body's flexibility and strength.	Experts have recommended pelvic floor and core abdominal exercises as suitable for postpartum mothers [56]. These exercises play a key role in improving aerobic endurance and muscle strength, with evidence also supporting their effectiveness in alleviating depression symptoms [57,58]

Colourful images and tables highlighted each of the booklet’s five messages. The significance of every message was outlined in bullet form, followed by recommendations or suggestions for adhering to the messages. This booklet was written in the Malay language as this is the language that is used and conversed by the targeted reader. The researcher also incorporated plain language in explaining the messages to ensure that the readers can read easily, understand the information, and apply the message provided [27]. The type and size of the font used were adjusted according to the recommendation by Wizowski et al.,[27] in which at least 12 points of size were used in the body text to enhance the readers’ comprehension.

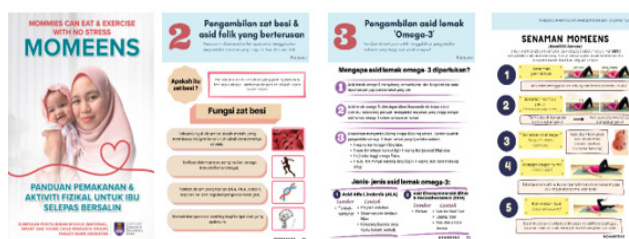


Fig. 1: Booklet on Nutrition and Physical Activity Guideline for Postpartum Mothers

The booklets provided nutrition guidelines includes the Malaysian food pyramid and plate [40], and a three-day menu based on the foods recommended in the booklet (Key message one). Besides, various foods containing iron, folic acid, and omega-3 (Key messages two and three) were introduced as these nutrients can improve mothers' mental health [28]. Furthermore, the booklet featured practical tips on increasing daily steps (5000 steps per day), dancing, and suggestions for low-intensity exercises suitable for postpartum mothers (key message four and five) [41].

Phase II: Validation of the Educational Booklet on Nutrition and Physical Activity for Postpartum Mothers.

Content Validation

Table II presents the demographic data of participants involved in the content validation. A team of 10 experts, including 6 Nutritionists, 3 Dietitians, and 1 Physiotherapist were involved in the content validation process. Most of the experts were between 18-34 years old (70%) (mean age 34.60 ±4.27 years), and all of them were Malay (n=100%), Muslim (n=100%), and a degree holder (100%). The majority of the experts were government servants (80%), and only 2 of them worked in the private sector (20%). All participants had more than two years of experience in their respective fields (data not shown), indicating that they were competent to evaluate the module. Their expertise and in-depth knowledge in their areas of specialization made them capable, qualified, and well-suited to assess the content [31].

Table II: Demographic data of participants involved in content and face validation analysis

Factors	Expert Panel (n=10) ^a	Mothers (n=11) ^b	Total population, n(%)
Age			
18 – 34	7 (70.0)	7 (63.6)	14 (66.7)
≥ 35	3 (30.0)	4 (36.4)	7 (33.3)
Race			
Malay	10 (100.0)	11 (100.0)	21 (100)
Non-Malay	0 (0.0)	0 (0.0)	0 (0.0)
Religion			
Muslim	10 (100.0)	11 (100.0)	21 (100)
Non-Muslim	0 (0.0)	0 (0.0)	0 (0.0)
Educational level			
Secondary or lower	0 (0.0)	1 (9.1)	1 (4.8)
Tertiary level	10 (100.0)	10 (90.9)	20 (95.2)
Occupation			
Government sector	8 (80.0)	5 (45.5)	13 (61.9)
Private sector	2 (20.0)	2 (18.2)	4 (19.0)
Housewife/ not working	0 (0.0)	4 (36.4)	4 (19.0)

^ainvolved in content and face validation

^binvolved in face validation only

The CVI was employed for each key message (Table III). In general, all the items achieved agreement (I-CVI

more than 0.78), where most items had a value of 1. Only the item 'there is no unnecessary information' for key message one and 'recommendation about the desired behaviour is satisfactory' for key message five are reported to score 0.80 and 0.90, respectively. Recognising the importance of these areas, the researchers actively sought detailed explanations from the experts to understand their concerns better. A few unnecessary pieces of information were identified and removed to streamline the content.

Table III: Content Validity Index by the 10 experts.

	Number of experts	Intro-duc-tion	Key mes-sage 1	Key mes-sage 2	Key mes-sage 3	Key mes-sage 4	Key mes-sage 5
		I-CVI	I-CVI	I-CVI	I-CVI	I-CVI	I-CVI
Contents are in agreement with the current knowledge	10	1	1	1	1	1	1
Recommendations are necessary and are correctly approached	10	1	1	1	1	1	1
Objectives are evident	10	1	1	1	1	1	1
Recommendation about the desired behavior is satisfactory	10	1	1	1	1	1	0.9
There is no unnecessary information	10	1	0.8	1	1	1	1
Important points are reviewed	10	1	1	1	1	1	1
S-CVI/AVE		1	0.966667	1	1	1	0.983333
S-CVI/UA		1	0.833333	1	1	1	0.833333

The overall scale showed that the S-CVI/Ave score surpassed the minimum threshold of 0.90, whereas S-CV/UA also indicates agreement among the experts (S-CVI/UA score > 0.80). The result implies that the CVI values were acceptable, and the booklet's content is validated. After a series of reviews among the research team, all recommendations were considered for amendments, particularly on the content, legibility (size and style of letters, colour combination), and illustration. Table IV summarises experts' suggestions and comments from the

content validation.

Table IV: Summary of the experts' comments and suggestions

Aspects	Recommendations of the experts
Scientific accuracy	Correct a few of the illustration's scientific facts.
Content	Make some adjustments to the information on nutrition recommended and physical exercise.
Literary presentation	Adjust the language used, increase plain language, familiar words, and not jargon to explain the information clearly and meaningfully.
Illustration	Add more attractive illustrations to explain the messages and ensure all the images are copyrighted.
Materials are sufficiently specific and understandable	Explain briefly the terminology used, or add in words glossary.
Legibility and printing characteristics	Choose a suitable color combination, font, and letter size that is easier to read.

Face Validation

Assessment of face validation was participated by 11 mothers and 10 experts. About half of the mothers were between 18 to 34 years old (63.6%) (mean age 35.00 ± 5.74 years), all of them were Malay (100%) and Muslims (100%), and most of them were at the tertiary level of education (90.9%). About half of the mothers (45.5%) work in the government sector, a few of them work in the private sector (18.2%), and approximately one-third of the mothers are housewives (36.4%) (Table II).

Table V demonstrates the result of face validation. The booklet was positively evaluated in terms of understanding the information (100%), aspects that facilitate comprehension (95.2% and above), suitability of figures and illustrations (95.2%), colour combination (90.5%), and font size (95.2%). All participants (100%) agreed that the terminology is easily understood, the sentences are clear, and the recommendation provided is suitable. When the participants were asked about the relevancy of the input in the booklet, most of the subjects agreed that the illustrations and tables presented were relevant to enhance their understanding (100%).

Table V: Analysis of acceptance of the educational booklet among postpartum women and expert panels.

Parameters	Postpartum women (n=11)	Experts (n=10)	Total
Understanding the information			
Understood very much	6 (54.5)	7 (70)	13 (61.9)
Understand	5 (45.5)	3 (30)	8 (38.1)
Do not understand	0 (0)	0 (0)	0 (0)
Aspects that facilitate comprehension			
Terminology easily understood	11 (100)	10 (100)	21 (100)
Sentences uses were clear	11 (100)	10 (100)	21 (100)
Illustration/Table use were clear	11 (100)	9 (90)	20 (95.2)

CONTINUE

Table V: Analysis of acceptance of the educational booklet among postpartum women and expert panels. (CONT.)

Parameters	Postpartum women (n=11)	Experts (n=10)	Total
Aspects that facilitate comprehension			
Suitability of recommendation	11 (100)	10 (100)	21 (100)
Suitability of figures/ illustrations			
Yes	11 (100)	9 (90)	20 (95.2)
No	0 (0)	1 (10)	1 (4.8)
Color combination			
Attractive	11 (100)	8 (80)	19 (90.5)
Less/Not Attractive	0 (0)	2 (20)	2 (9.5)
Font size			
Easy to read	11 (100)	9 (90)	20 (95.2)
Difficult to read	0 (0)	1 (10)	1 (4.8)
Illustrations/tables were necessary to understand the content			
Very relevant	9 (81.8)	5 (50)	14 (66.7)
Relevant	2 (18.2)	5 (50)	7 (33.3)
Not relevant	0 (0)	0 (0)	0 (0)
The illustration/ table motivates the reader to understand			
Very relevant	7 (63.6)	5 (50)	12 (57.1)
Relevant	4 (36.4)	5 (50)	9 (42.9)
Not relevant	0 (0)	0 (0)	0 (0)

The booklet demonstrated good face validity, as evidenced by the average positive response rate of 97.6%, surpassing the minimum criterion of 75% [38]. This high percentage indicates that the participants thoroughly understood the information presented in the booklet. Finally, all suggestions and recommendations provided by the participant were thoroughly reviewed, considering their relevance and significance.

DISCUSSION

In alignment with the Sustainable Development Goals (SDGs), which aim to reduce the global maternal mortality ratio to less than 70 per 100,000 live births [42], Malaysia has made significant progress in maternal health. A key initiative was the introduction of Maternal and Child Health (MCH) programs in health centres and midwife clinics since the 1950s [43], aimed at improving the quality of maternal care and reducing mortality. Building on these efforts, this study develops a tool providing tailored nutrition and physical activity guidelines for postpartum mothers, promoting a healthy lifestyle and further enhancing maternal care during postpartum period.

Following a thorough development and validation process, this guideline has been created in both printed (A5-sized booklet) and digital formats, titled 'Mommies can Eat & Exercise with no Stress (MomeEENS): *Panduan Pemakanan & Aktiviti Fizikal untuk Ibu Selepas Bersalin*

(Nutrition and Physical Activity Guideline for Postpartum Mothers)'. The educational booklet incorporates recommendations for achieving an adequate intake of essential macronutrients and micronutrients, as well as promoting an active lifestyle for postpartum mothers. Unlike existing nutrition resources in Malaysia, this newly developed nutrition educational booklet offers comprehensive content focused specifically on improving maternal mental health and overall well-being. Maternal health is crucial, as a mother's health status directly affects her ability to care for her infant, including breastfeeding, nurturing, and responding to the infant's needs [24].

The utilisation of an A5 size booklet has been supported by various studies [44,45]. Previous studies have reported positive feedback from respondents who found the A5 size handy, convenient to carry, and easy to read [45]. Furthermore, printed educational materials may be more effective for educating postpartum mothers, as they allow for personal copies that can be re-read and studied at their own pace [46]. Additionally, the digital version of the booklet provides easy access via mobile devices, offering convenience for postpartum mothers with limited time or mobility [47]. The booklet also uses plain language and illustration, along with short sentences, to ensure clear communication and facilitate understanding [27]

The newly developed nutrition booklet demonstrated a high level of agreement among experts, as indicated by the CVI values (0.83 – 1.00) and excellent face validity (90% - 100%). The agreement showed a strong consensus on their relevance and appropriateness [30,44]. The data presented in our study aligns with findings from other development and validation studies focusing on nutrition booklets, which achieved CVI scores of 0.83 [44], 0.97 [45], and 0.88 [38]. Using the CVI, adjustments were made iteratively until a validated final version of the material was developed, ensuring its effectiveness through continuous refinement [20]. Additionally, face validity showed the overall content, layout, and design of the booklet were well-received, with participants clearly understanding the information presented [34]. The figures and tables were clear and visually appealing, with the font size and colour choice enhancing readability and attractiveness. This aligns with a previous study on educational booklets for Sunnah Practices among obese adults, where participants also demonstrated a strong understanding of the information [45].

The experts provided key suggestions to improve both the content and presentation of the booklet, all of which were incorporated to enhance the clarity of the educational booklet. They recommended correcting scientific inaccuracies in the illustrations to ensure the booklet reflects up-to-date information [44]. Some adjustments were also made to the booklet content,

such as offering alternative foods like oranges or apples in place of pineapple, to align with dietary restrictions based on cultural practices in the suggested menu. This is especially important as dietary restrictions are an integral part of postpartum care in many cultures, and ensuring that the suggested foods adhere to these norms promotes better adherence to the recommendations. Medical terms were simplified for better understanding, with terms like 'respirasi sel' changed to 'pernafasan sel' in Bahasa, which means cell respiration in English. Additional illustrations were included to improve visual appeal and ensure compliance with copyright regulations. Overall, the comments and recommendations were thoroughly reviewed, resulting in a refined booklet that is both educational and easy to understand [24].

This booklet offers a crucial benefit by addressing the inadequate nutrient intake of postpartum mothers, many of whom may not be fully aware of their specific dietary needs during this period [11]. Additionally, traditional confinement practices often lead these mothers to follow cultural recommendations that may restrict diet and physical activity [10]. Research has shown that nutrient deficiencies and physical inactivity can have detrimental effects on mental health [48]. By providing comprehensive nutrition guidelines and suitable physical exercises tailored to the postpartum period, this booklet aims to support mothers in navigating their postpartum journey with ease and confidence. Empowered with the right knowledge of postpartum care, these mothers will be better equipped to challenge impractical practices and make informed decisions that promote their well-being [26]. Furthermore, the booklets provide knowledge to mothers, complementing the gaps in health education at healthcare institutions, where healthcare providers may overlook teaching about diet and physical health, particularly for postpartum mothers [26].

Adopting this booklet may face challenges, such as resistance from mothers who follow traditional confinement practices [18], limited availability in some areas, or a lack of awareness about the importance of nutrition and physical activity postpartum [49]. To overcome these barriers, strategies like integrating the booklet into healthcare services, offering both physical and digital formats, and encouraging healthcare professionals to promote its use can improve its accessibility and impact. Furthermore, incorporating culturally sensitive language that aligns with traditional practices while introducing evidence-based guidelines is likely to improve acceptance and encourage widespread use of the booklet.

A limitation of our study is that the booklet is only available in Malay, and future versions should include multiple languages to better serve Malaysia's diverse cultures. However, the strength of our study lies in the development of the first postpartum guideline booklet, which provides an informative and culturally sensitive

resource for postpartum mothers. Future research could include intervention studies to evaluate the effectiveness of the nutrition and physical activity guidelines provided in the booklet, as well as explore the impact on the health outcomes of postpartum mothers, given the evidence-based nature of the guidelines.

CONCLUSION

In conclusion, our study reveals that the educational booklet on nutrition and physical activity for postpartum mothers was well accepted by both the expert panel and mothers involved in the validation process. The success of this validation underscores its potential to serve as an effective tool for improving postpartum health. By offering evidence-based guidelines, this booklet can contribute to better health outcomes for postpartum mothers, supporting their nutritional needs and promoting physical activity. Healthcare providers and policymakers can consider incorporating this educational booklet into postpartum care programs and resources.

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