DEVELOPMENT AND EVALUATION OF EDUCATIONAL VIDEO ON HEALTHY MATERNAL DIET TO PREVENT CHILD STUNTING

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Abstract: This study aimed to develop an animated educational video on healthy dietary intake during pregnancy to prevent child stunting and evaluate its suitability, understandability, and actionability. An animated video draft on recommended maternal total energy, carbohydrate, protein, and fat intakes during pregnancy was developed based on a review of available guidelines. The video content and features were evaluated by six field experts and 33 reproductive-aged women (target viewers). The evaluation was conducted using the Suitability Assessment of Materials and Patient Education Materials Assessment Tool for Audiovisual Materials tools. The video was suitable for use, with an 85% score indicating superior content. It has acceptable levels of understandability (83%) and actionability (72%), as evaluated by experts. The improved video received better ratings of understandability (97%) and actionability (98%) from the intended viewers. The newly developed animated video on healthy maternal nutrition during pregnancy has demonstrated its acceptability among the target viewers. The video has desirable levels of suitability, understandability, and actionability and thus, has the potential as a nutrition education tool to impart knowledge and increase the understanding of mothers regarding healthy dietary intakes during pregnancy to prevent further cases of child stunting in Malaysia.

Keywords: Child stunting, maternal nutrition, pregnancy, nutrition education, animated video.

Introduction

Maternal nutrition during pregnancy has a significant impact on the health of the mother as well as her fetus. Inadequate intake of nutrients of good quality and quantity would lead to health problems for both the mother and the fetus. The risk of gestational anaemia, hypertension, miscarriage, preterm delivery, and maternal mortality increases among pregnant mothers with malnutrition (Vaivada *et al.*, 2020). While the mother's health faces numerous consequences, the baby may experience neurodevelopmental impairments such as altered memory, cognitive function, and motor skills (Cortés-Albornoz *et al.*, 2021). Maternal nutrition practices have also been shown to affect the weight-for-age index in children negatively, indicating malnutrition and potentially resulting in stunting (Saleh *et al.*, 2021).

The World Health Organisation (WHO) defines stunting as impaired growth and development caused by poor nutrition, repeated infections, and insufficient psychosocial stimulation experienced by children. They are considered stunted if their height-for-age is below average, which is more than two standard deviations according to the WHO Child Growth

Standards median (WHO, 2015). According to the Food and Agriculture Organisation of the United Nations (FAO), as of 2022, the global prevalence of stunting is 22.3%. In Southeast Asia, it has been found that 26.4% of children are considered stunted. The prevalence of stunting is 21.9% among Malaysians while the stunting rate is 31% among Indonesians. Thailand and the Philippines reported their stunting cases at 11.8% and 28.8%, respectively. The highest prevalence of stunting in Southeast Asia is 45.1% among Timorese, whereas Singaporeans had the lowest percentage of stunting cases at only 3.0% (FAO, 2023). Locally, our National Health and Morbidity Survey (Maternal and Child Health) conducted in 2022 reported that the prevalence of stunted children among those aged up to five years increased to 21.2% compared to 20.7% in 2016 (Institute for Public Health, 2023). Child stunting is a form of malnutrition that is chronic and cannot be reversed. Many factors may contribute to this nutritional issue and it may lead to more serious implications if measures are not taken to prevent it promptly (WHO, 2015).

The WHO estimates that maternal undernutrition is associated with 20% of child stunting (WHO, 2015). This includes an unhealthy diet by the mother before, during, and after pregnancy, which could hinder the early growth of the child starting from conception (Wong, 2019). Thus, the prevention of stunting should be focused on the first 1,000 days of human life, which start from conception until the second birthday of the child. Both the mother and the child should be ensured that they receive enough proper nutrition during and after pregnancy since it is a crucial period of growth and development for the child. Macronutrients are converted and used to supply energy to the metabolic system. Since the nutrient requirements of pregnant women are high to support foetal growth, inadequate intake of energy and nutrients for pregnant mothers would lead to child stunting (National Coordinating Committee on Food and Nutrition (NCCFN), 2017).

It is crucial for pregnant women to be aware of and educated on the significance of macronutrients in their diet. This is because optimal maternal nutrition can reduce the prevalence of stunted children at birth (Islam Khan, 2013; Geraghty *et al.*, 2018). Nutrition education is important in disseminating knowledge and attracting target audiences when addressing malnutrition issues among children. The use of graphics helps the audience clearly understand nutrition education materials (Clayton, 2010). It has been demonstrated that video-based educational methods can potentially encourage behaviour change (Tuong *et al.*, 2014).

Antenatal care visits at the local government clinics are the main method to educate pregnant women in Malaysia (Institute for Public Health, 2023). The doctors and nurses educate them about their pregnancy progress, possible complications, and whether there is a need for lifestyle changes during these visits; however, this commonly does not include nutritional advice to prevent stunting. In addition, pamphlets and brochures on pregnancy-related topics are available at some clinics and hospitals to assist with these interventions. Despite the potential benefits of these resources, people are increasingly favouring and using online platforms like social media or videos due to their ease of understanding and increased engagement. The video has advantages over other media as it can be watched with other people, standardised in terms of information, repeatedly viewed at one's convenience, and used to explain concepts that are difficult to communicate in writing. An animated video format has key advantages such as not requiring actors or camera equipment. Furthermore, it allows for relatively easy content addition, removal, or modification, and this flexibility is critical to accommodate the dynamism of health information (Dahodwala *et al.*, 2018). The use of videos as a tool to facilitate nutrition counselling for maternal and infant health education has produced positive outcomes and was deemed acceptable by the participants and health stakeholders in a study (Godana Boynito *et al.*, 2023). The acceptability was measured by adherence to the intervention, including attendance at video sessions and

readiness to implement the messages from the video.

In assessing the suitability of health education materials, it is essential that they are thoroughly understood and accepted by the target audience, which is important for stimulating and motivating learning (Okuhara *et al.*, 2015). There are many factors to be considered to evaluate the suitability of materials such as content, literacy demand, graphics, layout, learning stimulation or motivation, and the culture of the intended viewers (Doak *et al.*, 1996). It should be comprehensible to the population, considering their literacy level for grasping the content. Additionally, visually appealing graphics can help understand the key points and foster motivation for learning.

There have been several initiatives by the government to combat child stunting issues through the National Plan of Action for Nutrition of Malaysia III (2016-2025). These include the Rehabilitation Programme for Malnourished Children and the Community Feeding Programme, both of which aim to improve the nutritional status of children aged six months to six years, particularly those from severely underprivileged families and marginalised groups such as Orang Asli and the Peribumi of Sarawak (NCCFN, 2016). Nonetheless, stunting is a complex issue that is influenced by various factors and the WHO recommends health education and promotion programmes targeting parents, caregivers, and communities to raise awareness, including about the importance of proper nutrition during pregnancy and the early years of a child's life (WHO, 2018). The Ministry of Health Malaysia's MyHealth portal provides the public with nutritional education materials. In addition, a comprehensive resource for recommended nutritional intake for Malaysians, including during pregnancy is presented in PDF documents available on the Internet. Despite these, there is still a lack of nutritional education materials on maternal diet specifically developed to prevent stunting for Malaysians, particularly in a digital format. Therefore, it is important to fill the gap by developing an educational animated video with acceptable levels of suitability, understandability, and actionability to disseminate nutrition knowledge among pregnant mothers to minimise child stunting in this country.

Materials and Methods

Part 1: Development of Video

An animated nutritional education video was developed using a design and developmental research method. The video was created as part of nutrition education and health promotion modules to educate pregnant women about the importance of healthy nutrition in reducing the prevalence of child stunting in Malaysia. The video features is one of the topics under the theme of healthy nutrition during pregnancy. The content outline of the video was deliberated on by six dietetics and nutrition sciences experts. This comprises the definition of stunting, the importance of sufficient total energy and macronutrients (carbohydrate, protein, and fat) intake in maternal nutrition during pregnancy for stunting prevention, the functions, recommended amounts, and food sources of each macronutrient. The content featured in the video was created based on a review of available guidelines and online resources (Kusiar, 2011; NCCFN, 2017; 2020; Nutrition Division, 2020; WHO, 2021). A storyboard and a script for the video were drafted based on the gathered information. These were then evaluated by the research team. Based on this, a draft video was created and assessed regarding suitability, understandability, and actionability.

Part 2: Evaluation of Video

Evaluation of Suitability

The suitability of healthcare materials for the target population was evaluated systematically. In determining the suitability of the video, the Suitability Assessment of Materials (SAM) tool was used using an online survey (Doak *et al.*, 1996). This consists of four areas: (i) Content; (ii) Literacy demand; (iii) Graphics; and (iv) Cultural appropriateness. There are three

categories where each material's numerical score (in percent) may fall: Superior, adequate, or not suitable. Two points were awarded for the superior rating, one for the adequate rating and zero for the not suitable rating. The scores were added up to obtain a total score, which would be converted into a percentage. The suitability assessment material percentage ratings were interpreted as 0-39% (not suitable material), 40-69% (adequate material), and 70-100% (superior material) (Doak *et al.*, 1996).

The suitability assessment was conducted by a panel of six experts in nutrition and dietetics. These included a nutritionist, two nutrition lecturers, two dietitians, and a dietetic lecturer who are attached to a public university or university hospital. They were selected based on their academic background and at least five years of working experience. The assessment process is recommended to involve a minimum of six but at most, 10 specialists (Yusoff, 2019). Each expert was sent an email containing the video, the link to the questionnaire (in Google Forms), and the instructions.

Evaluation of Understandability and Actionability

The evaluation of understandability and actionability is done to gauge whether viewers understand and would act on the information delivered through a nutrition education tool (Shoemaker *et al.*, 2014). These were assessed by a panel of six experts (who were also involved with the evaluation of suitability) using the Patient Education Materials Assessment Tool for Audiovisual Materials (PEMAT-A/V) tool in English (Shoemaker *et al.*, 2014). The answer to each question could either be "disagree" (zero point) or "agree" (one point). The points obtained for understandability were summed up, divided by the total possible points, and converted into percentages. The higher the percentage, the more understandable the material is. The same method was applied for actionability. In this case, the higher the percentage indicates the more actionable the material is (Shoemaker *et al.*, 2014).

In addition, an evaluation of the understandability and actionability of the nutrition education video was also conducted among a subpopulation of the intended viewers (N = 33). They were recruited using a convenient sampling method, as the review by subjects drawn from the target population is as important as the experts'. There is no specific recommended number to evaluate educational videos, although previous studies assessing newly developed health educational videos involved between 22 and 50 respondents (Brown *et al.*, 2017; Koss *et al.*, 2018; Kayler *et al.*, 2019). The inclusion criteria included women of reproductive age (18 to 49 years old) who were pregnant or planning to get pregnant. This would allow a broader understanding of the potential audience for the nutritional education video. It is also expected that the perceptions and needs of individuals planning to get pregnant can be gathered and they would benefit from the information provided in the video. This ensures that the video is relevant and useful to pregnant women and those planning to get pregnant. The evaluation was conducted using the PEMAT-A/V tool translated into Malay (Wong *et al.*, 2018) and disseminated as an online survey using the Google Forms application. An online invitation with a clickable link to the survey was disseminated through a local community Facebook® page and shared via WhatsApp Messenger groups to recruit the study respondents. The data collection was conducted from March to April 2021.

Ethical Approval and Participant Consent

Prior to conduct this research, ethical approval from the University Research and Ethics Committee was obtained (IIUM/504/14/11/2/IREC2021-KAHS/DNS). An informed consent description was also attached to the online questionnaire. The respondents were duly informed that answering the questionnaire would indicate their agreement with voluntary participation in the study.

Results

Development of Video

Based on a storyboard (Table 1), a script containing information obtained from a review of available guidelines was written. A four-minutes draft video was then produced using the Final Cut Pro® 10.6.3 (Apple Inc., California, United States) video editing software. The video featured animations with a conversational voiceover narration of the content in the Malay language with a written English subtitle included.

Evaluation of Suitability

The animated video received an overall suitability score of 85%, indicating superior material in terms of its suitability (Doak *et al.*, 1996). Table 2 shows the detailed scoring of the nutritional education video suitability assessment. More than half of the six experts who participated in this study (66.7%) agreed that the purpose of the video was not explicit. This was either implied or stated more than once. Five out of six respondents (83.3%) agreed that the essence of the video was the application of knowledge or skills aimed at desirable viewer behaviour rather than non-behaviour facts. A similar number also thought that the scope of the nutritional education video was limited to and focused on essential information directly related to the purpose. Two-thirds of the respondents agreed to all three criteria of the videos: (i) Common words were used nearly all the time; (ii) Technical, concept, and category value judgement (CCVJ) words were explained by examples; and (iii) Imagery words were appropriately used for the content of the nutritional education video.

Most of the respondents (83.3%) agreed that the graphics used in the nutritional education video were: (i) Simple, adult-appropriate, and using line drawings or sketches; and (ii) Likely to be familiar to the viewers. Nearly all the respondents agreed that the illustrations in the video presented key messages visually so that the viewers could grasp the key ideas from the illustrations alone with no distractions. Two-thirds of the respondents (66.7%) agreed that the captions used for graphics in the video were

Table 1: Storyboard for the development of the educational video on total energy and macronutrient requirements during pregnancy towards prevention of child stunting

Learning Objectives	Learning Approach	Content
After watching the video, viewers should be able to: 1. Indicate the implications of stunting in children. 2. Describe the total energy and macronutrient requirements during pregnancy. 3. Discover the sources of macronutrients in foods.	• A brief introduction on definition, prevalence, and risk of stunting in Malaysia. • Explanation about the recommended total energy and macronutrient intakes during pregnancy.	• A brief objective and outline of content. • Definition of stunting according to the WHO. • Prevalence of stunting in Malaysia. • Implications of stunting. • Recommended values of total energy and macronutrients during pregnancy. • Images of the foods and portions to be taken for each macronutrient. • Examples of food portions that may be consumed to meet increased requirements. • Summary of content.

Table 2: Score of the suitability assessment of nutritional education video (N = 6)

Question	Score	Frequency (%)
Purpose of the video		
- The purpose is explicitly stated in title, cover illustration, or introduction.	2	1 (16.7%)
- The purpose is not explicit. It is implied or multiple purposes are stated.	1	4 (66.7%)
- No purpose is stated in the title, cover illustration, or introduction.	0	1 (16.7%)
Content about behaviours		
- The essence of the material is application of knowledge or skills aimed at desirable reader behaviours rather than non-behaviour facts.	2	5 (83.3%)
- At least 40% of content topics focus on desirable behaviours or actions.	1	1 (16.7%)
- Nearly all topics are focused on non-behaviour facts.	0	0 (0%)
Scope of the video		
- The scope is limited to and focused on essential information directly related to the purpose. Experience shows it can be learned in time allowed.	2	5 (83.3%)
- The scope is expanded beyond the purpose, not more than 40% is non-essential information. Key points can be learned in time allowed.	1	1 (16.7%)
- The scope is far out of proportion to the purpose and time allowed.	0	0 (0%)
Vocabulary used		
- All three factors: (i) Common words are used nearly all the time; (ii) Technical, concept, category, value judgement (CCVJ) words are explained by examples; and (iii) Imagery words are used as appropriate for content.	2	4 (66.7%)
- (i) Common words are frequently used; (ii) Technical and CCVJ words are sometimes explained by examples; and (iii) Some jargon or math symbols are included.	1	2 (33.3%)
- Two or more factors: (i) Uncommon words are frequently used in lieu of common words; (ii) No examples are given for technical and CCVJ words; and (iii) Extensive jargon.	0	0 (0%)
Type of graphics		
- Both factors: (i) Simple, adult-appropriate, line drawings, or sketches are used; and (ii) Illustrations are likely to be familiar to the viewers.	2	5 (83.3%)
- One of the superior factors is missing.	1	1 (16.7%)
- None of the superior factors are present.	0	0 (0%)

Relevance of illustrations		
- Illustrations present key messages visually, so, the reader or viewer can grasp the key ideas from the illustrations alone. No distractions.	2	5 (83.3%)
- (i) Illustrations include some distractions; and (ii) Insufficient use of illustrations.	1	1 (16.7%)
- One factor: (i) Confusing or technical illustrations (non-behaviour-related); and (ii) No illustrations or an overload of illustrations.	0	0 (0%)
Captions used for graphics		
- Explanatory captions with all or nearly all illustrations and graphics.	2	4 (66.7%)
- Brief captions used for some illustrations and graphics.	1	2 (33.3%)
- Captions are not used.	0	0 (0%)
Match in logic, language, and experience (LLE)		
- Central concepts or ideas of the material appear to be culturally similar to the LLE of the target audience's culture.	2	6 (100%)
- Significant match in LLE for 50% of the central concepts.	1	0 (0%)
- Clearly a cultural mismatch in LLE.	0	0 (0%)

explanatory, with all or nearly all illustrations and graphics. All respondents agreed that the central concepts and ideas of the nutritional education video appeared to be culturally similar to the logic, language, and experience (LLE) of the target audience's culture. The experts also commented on the purpose of the video, which should be stated more explicitly and noted that the use of illustrations should not feature brand names.

Evaluation of Understandability and Actionability among Experts

Two-thirds (66.7%) of the experts agreed that the nutritional education video makes its purpose completely evident (Table 3). Most of them (83.3%) also believed that the video uses common everyday language, the video sections have informative headers, and the video presents information in a logical sequence. The experts agreed that the video uses medical terms only to familiarise the audience with the terms, uses the active voice, and breaks information into short sections. Next, only a few respondents (16.7%) agreed that the video provided a summary while others disagreed. A large proportion (83.3%) agreed that the nutritional education video uses visual cues to draw attention to key points and the texts on the screen are easy to read. All respondents also agreed that the video allowed them to hear the words clearly and it uses clear and uncluttered illustrations and photographs. Most respondents (83.3%) agreed that the video identifies at least one action the viewers could take. Two-thirds agreed that the video directly addresses the viewers when describing actions, breaking down any action into manageable, explicit steps. The experts also recommended enhancing the video by incorporating more Malay terms and illustrating the given examples.

The maximum possible score of the understandability evaluation is 72 points out of which the nutritional education video scored 60 points (83%). Out of the maximum score of 18 points, the actionability score of the video was 13 points (72%).

Table 3: Understandability and actionability assessment by experts (N = 6) and a subgroup of target population (N = 33)

Understandability	Experts (N = 6) Frequency (%)	Subgroup of Target Population (N = 33) Frequency (%)
This video makes its purpose completely evident.		
- Agree	4 (66.7%)	33 (100%)
- Disagree	2 (33.3%)	0 (0%)
This video uses common everyday language.		
- Agree	5 (83.3%)	32 (97%)
- Disagree	1 (16.7%)	1 (3%)
Medical terms are used only to familiarise audience with the terms. When used, medical terms are defined.		
- Agree	6 (100%)	32 (97%)
- Disagree	0 (0%)	1 (3%)
This video uses the active voice.		
- Agree	6 (100%)	31 (93.9%)
- Disagree	0 (0%)	2 (6.1%)
This video breaks or "chunks" information into short sections.		
- Agree	6 (100%)	33 (100%)
- Disagree	0 (0%)	0 (0%)
This video's sections have informative headers.		
- Agree	5 (83.3%)	33 (100%)
- Disagree	1 (16.7%)	0 (0%)
This video presents information in a logical sequence.		
- Agree	5 (83.3%)	32 (97%)
- Disagree	1 (16.7%)	1 (3%)
This video provides a summary.		
- Agree	1 (16.7%)	31 (93.9%)
- Disagree	5 (83.3%)	2 (6.1%)
This video uses visual cues (e.g., arrows, boxes, bullets, bolds, larger font, and highlighting) to draw attention to key points.		
- Agree	5 (83.3%)	32 (97%)
- Disagree	1 (16.7%)	1 (3%)
The texts on the screen is easy to read.		
- Agree	5 (83.3%)	32 (97%)
- Disagree	1 (16.7%)	1 (3%)
This video allows the user to hear the words clearly (e.g., not too fast and not garbled).		
- Agree	6 (100%)	32 (97%)
- Disagree	0 (0%)	1 (3%)
This video uses illustrations and photographs that are clear and uncluttered.		
- Agree	6 (100%)	31 (93.9%)
- Disagree	0 (0%)	2 (6.1%)

Actionability	Frequency (%)	Frequency (%)
This video clearly identifies at least one action that the user can take.		
- Agree	5 (83.3%)	33 (100%)
- Disagree	1 (16.7%)	0 (0%)
This video addresses the user directly when describing actions.		
- Agree	4 (66.7%)	32 (97%)
- Disagree	2 (33.3%)	1 (3%)
This video breaks down any action into manageable, explicit steps.		
- Agree	4 (66.7%)	32 (97%)
- Disagree	2 (33.3%)	1 (3%)

Evaluation of Understandability and Actionability among A Subgroup of Target Viewers

A total of 33 women aged 18 to 46 years old (mean ± standard deviation, 25.4 ± 6.5) participated in this study. Table 3 includes the target viewers' feedback on the understandability and actionability of the nutritional education video. The maximum possible score of the understandability evaluation is 396 points (100%). The nutritional education video scored 384 points, representing 97% of the maximum possible score. Out of the 99 points, which is the maximum possible score for actionability, the video obtained 97 points (98%).

Discussions

Lack of knowledge and awareness among the public has made stunting a global issue. This is a major concern given its proven long-term implications on human health. The effects of child stunting can have long-term consequences, including inhibited growth, compromised cognitive progress, and increased susceptibility to illness (Ankalaki *et al.*, 2024). There is abundant research associating stunting in early childhood with obesity as well as non-communicable diseases such as type two diabetes and cardiovascular disease later in life, leading to increase focus on this issue (Sahoo *et al.*, 2015; Shahriar *et al.*, 2019). Understanding the association between child stunting and maternal

nutrition may help clarify the importance of healthy dietary intake among pregnant mothers.

This study created a video to educate mothers about child stunting and how to prevent it in their babies by meeting total energy and macronutrient requirements during pregnancy. The content was based on a review of local guidelines. The video length was kept at four minutes. Keeping it short is the first and most crucial rule to make educational videos more engaging by maximising viewer attention (Dzara *et al.*, 2020). Guo *et al.* (2012) observed that the median engagement time for videos under six minutes was close to 100% after analysing the findings from 6.9 million video-watching sessions. Engagement decreased as videos grew longer; it was 50% on average for those between nine and 12 minutes and 20% on average for those between 12 and 40 minutes. Six minutes was the maximum engagement time for any video, suggesting that longer videos could be unnecessary.

The animated video created in this study obtained a suitability score of 85%, indicating superior material that was readable and suitable for the target viewers, which included women of reproductive age. The suitability assessment of the video is crucial because it indicates the extent to which the intended audience understands

the material. In a study that used a similar tool to assess suitability, 11 newly developed educational videos on dietary management for hypertension in a recent study also obtained average superior scores of 80% to 87% (Ab Hamid *et al.*, 2022).

Most of the respondents in the current study agreed that the purpose of the educational video was not explicit. It was either implied or multiple purposes were stated. Some respondents were unclear about the purpose of the nutritional education video and it could be improved by illustrating it explicitly at the beginning of the video in the form of a content outline. It is critical because the viewers need to understand the intended purpose of the nutritional education video. This is to ensure that the objectives of the nutritional education video can be met and for the intended viewers to fully benefit from its content. Educational videos' presentation style and content quality determine their visual appeal and ease of comprehension (Azam *et al.*, 2022). Enhancing the audience's comprehension and application of the provided information can boost its effectiveness in promoting healthy nutrition practices. Health promotion goes beyond providing facts about a healthy lifestyle and disease prevention, as it involves encouraging behaviours and attitudes (Cloninger & Cloninger, 2015).

Eight out of 10 of the respondents agreed that the essence of the video was the application of knowledge or skills aimed at desirable reader behaviours rather than non-behaviour facts. Many respondents agreed that the video's graphics were simple and appropriate for adult populations. The animated illustrations in this video translate scientific information into a visual language that allows viewers to understand it more easily. Furthermore, the use of tables to describe information such as the recommended amounts of each macronutrient according to pregnancy trimester, makes the information easier to focus on, comprehend, and retain. Indeed, educational videos should be interactive, relevant, and clear to convey the intended nutritional knowledge (Azam *et al.*, 2022).

In terms of understandability and actionability, the educational video in this study was highly rated for understandability (97%) and actionability (98%) by the viewers. This was comparable to other similar studies. A video series on dietary recommendations for hypertensive patients scored between 85% and 99% for understandability and actionability, respectively (Ab Hamid *et al.*, 2022). The authors reported that the lowest scores were associated with the lack of visual cues such as arrows, boxes, and bullets in some of the videos, as commented by the reviewers. Another study of 13 videos on nutrition for diabetes-periodontitis obtained between 90% and 100% scores for understandability and actionability, respectively (Jamil *et al.*, 2021). This was attributed to the modules being easy to understand and having clear and comprehensible content.

In the current study, all the respondents universally agreed that the video allowed them to hear the words pronounced clearly and used clear and uncluttered illustrations. The use of simple layman terms and conversational rather than formal language in the video appeared to be useful to cater viewers' diverse literacy levels and different educational backgrounds. Additionally, the video's use of local food as an example to explain the sources of each macronutrient was culturally relevant, given the close relationship between dietary intake and culture, especially in a multi-ethnic country like Malaysia. These are among the strategies that could enhance viewers' engagement (Brame, 2016).

Many respondents agreed that the video identified at least one action the viewers could take. Understanding the concepts of nutrition is crucial but having the capacity to apply this knowledge is equally important in making informed decisions about food choices. This aligns with a study's suggestion that an effective approach is required to increase knowledge and focus on practical application in nutrition education interventions (Silva, 2023). The video also used visual cues such as highlighted keywords to draw attention to key points, allowing the viewers to easily focus on the texts on-screen. Segmenting the video content into

subtopics of total energy and macronutrients (carbohydrate, protein, and fat) allowed the viewers to engage with small pieces of new information at a time, thereby controlling its flow for processing. These features play a crucial role in piquing the viewers' interest, encouraging them to watch and listen, comprehend, and implement the health messages presented (Rubin, 2009).

The development of this nutritional education video to promote healthy dietary intake among pregnant mothers to minimise child stunting was a first of its kind. Furthermore, the video has been evaluated by nutrition and dietetics experts and a subsample of the target viewers' population. However, as with many other studies conducted recently, the data collection phase for the current study was affected by the COVID-19 pandemic. The national movement control order at that time, limited the data collection to disseminate the questionnaires online. Despite the potential convenience of reducing physical contact, the response rate was quite slow, necessitating constant reminders to encourage respondents to complete the questionnaire.

Conclusions

A four-minutes educational animated video on healthy maternal intakes during pregnancy to prevent child stunting was developed. The content was created based on a review of available guidelines. The information regarding the recommended intakes of total energy and macronutrients was narrated in Malay with an English subtitle. Based on the evaluation by experts and potential viewers, the newly developed video was found to have acceptable levels of suitability, understandability, and actionability. By effectively conveying essential information on maternal diet in a manner that is suitable, understandable, and actionable, the video has the potential to impart knowledge and increase the understanding of mothers-to-be regarding healthy nutritional intake during pregnancy to minimise the prevalence of child stunting.

Conflict of Interest Statement

The authors declare that they have no conflict of interest.

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