

Development & Evaluation of an Animated Video on Healthy Weight Gain and Energy Intake During Pregnancy for Stunting Prevention

Muhammad Abdul Hayei Karbaschi Md Sharizam, B.Sc.

Department of Nutrition Sciences, Kulliyyah of Allied Health Sciences, IIUM, Bandar Indera Mahkota, 25200 Kuantan, Pahang, Malaysia ayie.10987@gmail.com

Muhamad Ashraf Rostam, PhD

¹Food Security & Public Health Nutrition Research Group (FOSTER),

² Department of Nutrition Sciences, Kulliyyah of Allied Health Sciences, IIUM, Bandar Indera Mahkota, 25200 Kuantan, Pahang, Malaysia ashrafrostam@iium.edu.my

Muhamad Sadry Abu Seman, PhD

Department of Information Systems, Kulliyyah of Information and Communication Technology, IIUM, 53100 Selangor, Malaysia sadry@iium.edu.my

* Nor Azwani Mohd Shukri, PhD

¹Food Security & Public Health Nutrition Research Group (FOSTER),

² Department of Nutrition Sciences, Kulliyyah of Allied Health Sciences, IIUM, Bandar Indera Mahkota, 25200 Kuantan, Pahang, Malaysia norazwani@iium.edu.my

Muhammad Farhan Hanif Norman, B.Sc.

Department of Nutrition Sciences, Kulliyyah of Allied Health Sciences, IIUM, Bandar Indera Mahkota, 25200 Kuantan, Pahang, Malaysia farhanhanifnorman@gmail.com

Mohd Ramadan Ab Hamid, PhD

Centre of Nutrition & Dietetics, Faculty of Health Sciences, Universiti Teknologi Mara, 42300 Bandar Puncak Alam, Selangor, Malaysia ramadan7230@uitm.edu.my

Rahiwan Nazar Romli

Faculty Of Computing, College of Computing & Applied Sciences, Universiti Malaysia Pahang Al-Sultan Abdullah, 26300 Gambang, Pahang, Malaysia

rahiwan@ump.edu.my

*Corresponding author: Nor Azwani Mohd Shukri, norazwani@iium.edu.my

Article History:

Received on June 29, 2024 Accepted on July 26, 2024 Published on July 31, 2024

Abstract:

Introduction: Maternal nutrition during pregnancy is crucial for foetal growth, infant health, and survival. Undernutrition in expectant mothers can cause foetal intrauterine growth retardation, low birth weight, and child stunting. As such, effective communication of nutritional information is essential for promoting healthy behaviours among pregnant women. However, despite the worrying prevalence of stunting in Malaysia and the important role of maternal nutrition during the first thousand days of life, there are limited education tools available regarding the recommended maternal nutrition for stunting prevention. Therefore, this study aimed to develop and evaluate an animated video on healthy weight gain and the recommended total calorie intake during pregnancy to prevent stunting. **Methodology:** A design-and-development research method was employed to create the video, incorporating expert reviews and systematic evaluation processes. The video content was derived from established guidelines and refined through expert workshops. The Suitability Assessment of Materials (SAM) tool and the Patient Education Materials Assessment Tool for Audiovisual Materials (PEMAT-A/V) were used to evaluate the video's suitability, understandability, and actionability. This was conducted among a panel of six experts and a subsample of target viewers, comprising 30 women who were pregnant or had been pregnant within the previous 12 months. **Results:** The video received a 72%

suitability score, categorising it as superior material. Experts rated the video's understandability at 80% and actionability at 92%, while the target viewers rated understandability at 92% and actionability at 93%. The video effectively communicated the importance of healthy weight gain during pregnancy and adequate energy intake, providing actionable steps for women to follow. **Conclusion:** The newly developed animated video was demonstrated to have desirable levels of suitability, understandability, and actionability. This indicates the animated video's potential as a nutrition education tool to deliver nutritional knowledge to pregnant mothers and prevent stunting prevalence in their children.

Keywords: Child stunting, Education tools, Exclusive breastfeeding, Maternal nutrition, Pregnancy, Videos

Introduction:

Maternal undernutrition during pregnancy has been identified as a major determinant of foetal intrauterine growth retardation, infant low birth weight, and child stunting during growing up (Black et al., 2013). 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). Stunting, or short-forage, is due to inadequate nutrient intake and absorption compared to needs. According to the World Health Organization (WHO), children are defined as stunted if their height-for-age is more than two standard deviations below the WHO Child Growth Standards median (WHO, 2015). In Malaysia, the National Health and Morbidity Survey 2019 reported that the prevalence of stunted children increased to 21.8 percent compared to 20.7 percent in 2016 (Institute for Public Health, 2020).

Impaired nutritional status of mothers during pregnancy also determines long-term child health and development (Black et al., 2013). The first 1000 days of life span (from conception until a child reaches the age of two) are the most critical. During the first half of this period, the developing child relies on the mother as the sole source of nutrition, both in utero and during the first six months of life, when exclusive breastfeeding is recommended (Mason et al., 2014). Therefore, adequate energy intake and healthy weight gain during pregnancy are essential for optimal foetal development and the prevention of birth weight and stunting (National Coordinating Committee on Food and Nutrition (NCCFN), 2017).

Patient education is essential for improving patients' health literacy, empowerment, and participation in disease management (WHO, 2006). In line with the WHO's global strategy to improve health for everyone, everywhere, by accelerating the development and adoption of accessible, affordable,

and sustainable digital health solutions, the use of information and communications technologies (ICT) is becoming essential to enable more people to enjoy better health and well-being (WHO, 2020). Technology advancement has enabled health professionals to innovate ways of communicating knowledge with the public. In fact, the transition towards digital technologies has been expedited by the COVID-19 pandemic, highlighting the significance of inventive health communication techniques (Doraiswamy et al., 2020).

Effective communication of nutritional information is crucial for promoting healthy behaviours among pregnant women. However, despite the alarming prevalence of stunting in Malaysia and the critical role of maternal nutrition during the first thousand days of life, there are only a limited number of nutrition education tools available here on the recommended maternal nutrition to prevent stunting, particularly in a digital format. Digital platforms have the potential to disseminate health information rapidly to many people and are strongly advocated by the WHO. Animated videos offer a promising solution by providing engaging, accessible, and culturally appropriate educational content. These videos can enhance understanding and retention of information, making them a valuable tool for health education. As such, this study aimed to develop and evaluate an animated video to educate women on the recommended total calorie intake and healthy weight gain during pregnancy to minimise stunting development among their babies.

Materials and Methods:

Study Design

This study utilised the design and development research method to develop and evaluate an animated nutritional education video on healthy total calorie intake and the recommended weight gain for women during pregnancy. This study design establishes a systematic method for design, development, and evaluation processes to create instructional and non-instructional tools (Richey and Klein, 2007).

Part 1: Development of Video

The contents of the video were determined through a review of available guidelines and deliberated in a series of workshops for a bigger research project, which was attended by experts in nutrition and dietetics at the International Islamic University Malaysia (IIUM). The video's current topic was one of the subtopics for the healthy maternal nutrition during pregnancy module.

A storyboard and script for the video were drafted and evaluated by an expert (research supervisor). Based on this, a video draft was created and underwent evaluation in terms of suitability, understandability, and actionability.

Part 2: Evaluation of Video

Evaluation of Suitability

The evaluation of suitability was originally done to systematically assess the suitability of healthcare materials for patient populations. There are many factors that need 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). In assessing the suitability of the video, the Suitability Assessment of Materials (SAM) tool (Doak et al., 1996) was used using an online survey. 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 would be given for the superior rating, one point for adequate rating, and zero points for the not-suitable rating. The scores would be added up to obtain a total score, which would be converted into a The interpretation of suitability percentage. assessment material percentage ratings is: 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. They were selected based on their academic background and a minimum of five years' working experience. It is recommended that the assessment process involve a minimum of six but not more than ten specialists (Yusoff, 2019).

Evaluation of Understandability and Actionability

understandability evaluation of actionability was done to help viewers determine whether they were able to understand and act on the information (Shoemaker et al., 2014). The evaluation consisted of two factors: understandability and actionability. The answers for each question were either "disagree" (awarded zero points) or "agree" (one point). The total points for understandability were summed up, divided by the total possible points, and converted into a percentage. The higher the percentage, the more understandable the material is. The same method was applied for actionability, where the points were summed up, divided by the total possible points, and converted into percentages. In this case, the higher the percentage, the more actionable the material (Shoemaker et al., 2014).

The understandability and actionability of the video were assessed by the six panel of experts (the same individuals who were 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). In addition, the evaluation of the understandability and actionability of the nutrition education video was also conducted among a subpopulation of the intended viewers (N=33) recruited using a convenient sampling method, as the review by subjects drawn from the target population is as important as the experts' (Zamanzadeh et al., 2015). This includes women aged 18 to 45 who were pregnant or were trying to get pregnant. The evaluation was conducted using the PEMAT-A/V tool, which has been translated into Malay (Saddki et al., 2018).

Statistical Analysis

Descriptive statistics were performed with the presentation of continuous data through the mean and standard deviation and categorical data through the absolute number and percentage.

Ethical Approval and Participant Consent

The current study obtained its ethical approval from the International Islamic University Malaysia Research Ethics Committee (Reference No.: IIUM/504/14/11/2/IREC2021-KAHS/DNS). All the participants provided informed consent prior to their participation in the study. The online questionnaire began with a disclaimer, informing the **Results:**

Development of video

A nutritional education video draft was produced with a total length of three minutes using the Powtoon® (Powtoon Ltd., London, UK) animation software and edited using an open-source video editing software, Shotcut® (Mellytech, LLC). The video featured animations with a Malay voiceover explanation. It described the importance of sufficient energy intake and maintenance of a healthy weight gain during pregnancy for stunting prevention, as well as the recommended total energy intakes for each pregnancy trimester according to maternal prepregnancy BMI categories.

Evaluation of Suitability

Annexure 1 displays the SAM score ratings for the nutritional education video by a panel of six experts. There are four categories that divide the factors: content, literacy demand, graphics, and cultural appropriateness. Most of the experts (66.7%) rated 1 for the 'purpose of the video' factor, which indicates that the purpose of the video was not explicit and was either implied or stated for multiple purposes. All the experts agreed that the essence of the video is the application of knowledge or skills aimed at desirable reader behaviour rather than non-behaviour facts. They also unanimously indicated that the scope of the video is limited to and focused on essential information directly related to the purpose. Experience demonstrates that one can acquire it within the allotted time. Four experts (66.7%) gave a score of 1 for reviewing some key ideas in the video summary.

Only one-third of the respondents rated the vocabulary used as having all three factors: i) the frequent use of common words; ii) the explanation of technical, concept, category, and value judgement (CCVJ) words through examples; and iii) the appropriate use of imagery words in the content. In contrast, all of them agreed that the type of graphics used was simple, adult-appropriate, using line drawings or sketches, and likely to be familiar to the viewers. For relevance of illustrations, two-thirds of the experts rated the video with 2 points because illustrations present key messages visually, so the reader or viewer can grasp the key ideas from the

respondents that their response signifies their voluntary participation in the study.

illustrations alone and has no distractions. Regarding the 'lists and tables explained' factor, only two experts (33.3%) agree that step-by-step directions are provided. Two-thirds of the respondents (66.7%) agreed that in the video, there were brief captions used for some illustrations and graphics. Two of them (33.3%) 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 maximum possible score for this evaluation is 96 points (100 percent). The suitability score of the video was 69 points (72%), which is interpreted as superior material for the suitability assessment of material (Doak et al., 1996).

Evaluation of Understandability and Actionability

Regarding understandability, all the experts agreed that the video makes its purpose completely evident, while 83.3% said that the video uses common and everyday language, as shown in Annexure 2. Furthermore, all the experts concurred that the video solely employs medical terms to acquaint the audience with them. When used, medical terms are defined. The six experts also agreed that the video uses active voice. Two-thirds of them said that the video breaks or "chunks" information into short sections. However, only 33.3% said that the video's sections have informative headers. All the experts agreed that the video presents information in a logical sequence and allows the user to hear the words clearly (not too fast or garbled). A total of 83.3% said that the video uses visual cues (arrows, boxes, bullets, bolds, a larger font, and highlighting) to draw attention to key points, and the text on the screen is easy to read. Twothirds said that the video provides a summary, uses illustrations and photographs that are clear and uncluttered, and uses simple tables with short and clear row and column headings.

For actionability evaluation, all the experts agreed that the video clearly identifies at least one action the user can take, addresses the user directly when describing actions, and breaks down any action into manageable, explicit steps. Only 66.7% said that the video explains how to use charts, graphs, tables, or diagrams to take actions. This shows that both understandability and actionability are in the acceptable range.

The understandability evaluation has a maximum possible score of 78 points (100%). The video received 63 points (80%) for understandability. On the other hand, the maximum score for the actionability evaluation is 24 points (100%). The nutritional education video receives an actionability score of 22 (92%).

A subsample of the target viewers was invited to watch the newly developed video and answer an online survey which consisted of the Malay version of the PEMAT-A/V tool (Saddki et al., 2018). A total of 30 women aged 18 to 45 years, all of whom were Malay, participated in the study. Annexure 3 depicts their responses regarding the understandability and actionability of the video.

Regarding understandability, all participants said that the video makes its purpose completely evident, breaks or "chunks" information into short sections, and allows the user to hear the words clearly (not too fast, not garbled). On the other hand, 93.3% agreed that the video presents information in a logical sequence, the text on the screen is easy to read, and it uses illustrations and photographs that are clear and uncluttered. The same 93.3% also said that the video provides a summary, the text on the screen is easy to read, and this video uses illustrations and

Discussion:

The current study aimed to develop and evaluate an animated video on the recommended total calorie intake and healthy weight gain during pregnancy to minimise child stunting prevalence in this country. Maternal nutrition during pregnancy has a big impact on the health of the mother as well as her foetus. Inadequate intake of nutrients of good quality and quantity would lead to health problems for both the mother and the baby. While there are many consequences to the health of the mother, the baby could be affected by low birth weight, intrauterine growth retardation, and stunting while growing up (Salem et al., 2016).

Ensuring the healthy development of the foetus and maintaining the mother's health during pregnancy requires healthy nutrition, which provides adequate calories to allow for appropriate weight gain. According to the Ministry of Health Malaysia, underweight mothers should gain between 12 and 18 kg, normal-weight mothers should gain between 11 and 16 kg, and overweight mothers should gain between 7 and 11 kg (Kusiar, 2017). During pregnancy, energy requirements are increased due to

photographs that are clear and uncluttered. In addition, 90% said that the video uses common, everyday language, that the video's sections have informative headers, and that the video provides a summary. A total of 86.7% of them concurred that the video primarily uses medical terms to acquaint the audience with their definitions, employs visual cues such as arrows, boxes, bullets, bolds, larger fonts, and highlighting to highlight key points, and employs simple tables with concise and clear row and column headings. Lastly, 83.3% said that the video uses active voice

In terms of actionability, 100% agreed that the video clearly identifies at least one action the user can take and addresses the user directly when describing actions. 96.7% said that the video breaks down any action into manageable, explicit steps. Only 76.7% said that the video explains how to use charts, graphs, tables, or diagrams to take actions.

The maximum possible score for the understandability evaluation is 390 points (100%). The nutritional education video achieved a score of 358 points (92%). Out of the 120 points, which is the maximum possible score for actionability, the video obtained 112 points (93%).

the increase in tissue masses in the foetus and placenta, basal metabolic rates, and changes in the energy cost of physical activity (NCCFN, 2017). The first trimester requires an extra 80 kcal per day, the

second trimester requires an extra 280 kcal per day, and the third trimester requires an extra 470 kcal per day (NCCFN, 2017).

With the introduction of new technologies, healthcare professionals can now share knowledge with the public in novel ways that spark interest and improve learning. There is also evidence that the use of different formats to communicate health information to patients, including the Internet, CD-ROM, video, audio recordings, and text messages, is often more effective than conventional health communication. Although traditional written information might improve health knowledge and information recall, alternative format resources have been shown to produce better health knowledge, user satisfaction, self-efficacy, and health behaviour (Berkman et al., 2004).

Systematic reviews have demonstrated that videobased educational methods are potentially effective for encouraging behaviour change (Weidmann et al., 2023; Tuong, Larsen & Armstrong, 2014). Compared to other media, video offers advantages such as facilitating group viewing, standardising information, allowing for repeated viewing at one's convenience, and effectively explaining concepts that are challenging to convey in written form. There are three types of video-based different educational intervention formats: animated presentations, professionals in practice, and patient narratives (Dahodwala et al., 2018). Among these, the animated format has some advantages compared to others, as it does not require actors or camera equipment. It also allows the addition, removal, or modification of content relatively easily, and this flexibility is central accommodating the dynamism of health information (Dahodwala et al., 2018).

With regards to suitability, most of the respondents in the current study agreed that the purpose of the educational video was not explicit. Providing a title at the beginning of the video could improve the clarity of the purpose for some of the respondents. This is important, as the viewers need to understand the intended purpose of the nutritional education video. Nearly all the respondents agreed that the essence of the video is the application of knowledge or skills aimed at desirable reader behaviours rather than nonbehaviour facts. Adult patients often want to solve their immediate health issue rather than learning the medical facts, and the content of utmost interest and use to patients is likely to be behaviour information in helping them to resolve their problem (Doak et al., 1996). The types of graphics used in the video are agreed upon by most of the respondents to be simple, adult-appropriate, and familiar to the viewers. This is in line with the findings by Clayton (2010) that it is helpful to use graphics as assistance for patients to understand more clearly.

In terms of understandability and actionability, all the respondents agreed that the video allows them to hear the words clearly, and the video uses illustrations and photographs that are clear and uncluttered. It was found that the use of visual aids in nutrition education and intervention increased awareness among the public (Yata & Habib, 2018). A large proportion of the respondents agreed that the video clearly identifies at least one action the user can take. This is in line with a study conducted by Kakunted (2008), which emphasised that the concentration on the practical application of nutrition education material should be increased for effectiveness other than reinforcing and monitoring the adequacy of knowledge. Silk et al. (2008) found that nutrition education plays a crucial role in addressing deficits in nutrition knowledge. In fact, maternal knowledge and attitude can be enhanced with appropriate nutrition education interventions (Guldan et al., 2000).

This is the first animated video to educate mothers regarding healthy total energy intake and gestational weight gain during pregnancy to prevent the prevalence of child stunting ever produced. Its development and evaluation processes were based on a guided study design. Evaluations by experts in nutrition and dietetics, along with a subsample of childbearing-aged women recently pregnant, contributed positively to the study's strength. However, the study was not without its limitations. The COVID-19 pandemic restricted participant recruitment among the target population for the current study. Despite conducting the data collection online for convenience, the response rate remained slow. Constant reminders were needed to urge the respondents to complete the questionnaire.

Conclusion:

This research aimed to develop and evaluate a nutritional education video on recommended total calorie intake and healthy weight gain during pregnancy. Experts and a subsample of the target viewers evaluated the suitability, understandability, and actionability of the newly developed nutritional education video, concluding that it is suitable for use and has an acceptable level of understandability and actionability. This indicates the animated video's potential as a nutrition education tool to deliver nutritional knowledge to pregnant mothers and prevent stunting prevalence in their children.

Acknowledgements:

This study was funded by the IIUM-UMP-UiTM Sustainable Research Collaboration Grant 2020 (SRCG20-005-0005).

References:

Black, R. E., Victora, C. G., Walker, S. P., Bhutta, Z. A., Christian, P., De Onis, M., Ezzati, M., Grantham-Mcgregor, S., Katz, J., Martorell, R., & Uauy, R. (2013). Maternal and child undernutrition and overweight in low-income and middle-income countries. In The Lancet (Vol. 382, Issue 9890, pp. 427–451). Elsevier B.V. https://doi.org/10.1016/S0140-6736(13)60937-X

Clayton, L. H. (2010). Invited Review: Strategies for selecting effective patient nutrition education

- materials. In Nutrition in Clinical Practice (Vol. 25, Issue 5, pp. 436–442). John Wiley & Sons, Ltd. https://doi.org/10.1177/0884533610379605
- Dahodwala, M., Geransar, R., Babion, J., de Grood, J., & Sargious, P. (2018). The impact of the use of video-based educational interventions on patient outcomes in hospital settings: A scoping review. Patient education and counseling, 101(12), 2116–2124. https://doi.org/10.1016/j.pec.2018.06.018
- Doak, C. C., Doak, L. G., & Root, J. H. (1996). Teaching Patients with Low Literacy Skills. American Journal of Nursing, 96(12), 16M. https://doi.org/10.1097/00000446-199612000-00022
- Doraiswamy, S., Abraham, A., Mamtani, R., & Cheema, S. (2020). Use of Telehealth During the COVID-19 Pandemic: Scoping Review. Journal of Medical Internet Research, 22(12), e24087. https://doi.org/10.2196/24087
- Guldan, G. S., Fan, H. C., Ma, X., Ni, Z. Z., Xiang, X., & Tang, M. Z. (2000). Culturally appropriate nutrition education improves infant feeding and growth in rural Sichuan, China. Journal of Nutrition, 130(5), 1204–1211. https://doi.org/10.1093/jn/130.5.1204
- Institute for Public Health (2020). National Health and Morbidity Survey (NHMS) 2019: Vol. I: NCDs Non-Communicable Diseases: Risk Factors and other Health Problems. National Institutes of Health, Ministry of Health Malaysia.
- Kakunted, P. (2008). Nutrition education material to address iron deficiency anemia in Kenya. Nutrition. https://doi.org/10.31979/etd.xdx7-hqmm
- Kusiar, Z. (2017). Pemakanan Semasa Hamil PORTAL MyHEALTH. http://www.myhealth.gov.my/pemakanan-semasa-mengandung/ (Accessed June 2023)
- Mason, J. B., Shrimpton, R., Saldanha, L. S., Ramakrishnan, U., Victora, C. G., Girard, A. W., McFarland, D. A., & Martorell, R. (2014). The first 500 days of life: policies to support maternal nutrition. Global health action, 7, 23623. https://doi.org/10.3402/gha.v7.23623
- National Coordinating Committee on Food and Nutrition (NCCFN) (2017). Recommended Nutrient Intakes for Malaysia. Ministry of Health

- Malaysia. Available at https://nutrition.moh.gov.my/wp-content/uploads/2017/05/FA-Buku-RNI.pdf
- Richey, R.C., & Klein, J.D. (2007). Design and Development Research: Methods, Strategies, and Issues (1st ed.). Routledge. https://doi.org/10.4324/9780203826034
- Saddki, N., Arifin, W. N., Mohamad, N. & T.W., S. (2018). (PDF) Alat Penilaian Bahan Pendidikan Pesakit, PEMAT(M) dan Panduan Pengguna. https://www.researchgate.net/publication/3353 38467_Alat_Penilaian_Bahan_Pendidikan_Pesakit_PEMATM_dan_Panduan_Pengguna.
- Salem, S., D, E., & N, S. (2016). Effect of Malnutrition during Pregnancy on Pregnancy Outcomes. Journal of Nursing and Healthcare, 5(10), 4172
- Shoemaker, S., Wolf, M., & Brach, C. (2014). PEMAT Tool for Audiovisual Materials (PEMAT-A/V) | Agency for Healthcare Research and Quality. https://www.ahrq.gov/health-literacy/patient-education/pemat-av.html
- Silk, K. J., Sherry, J., Winn, B., Keesecker, N., Horodynski, M. A., & Sayir, A. (2008). Increasing Nutrition Literacy: Testing the Effectiveness of Print, Web site, and Game Modalities. Journal of Nutrition Education and Behavior, 40(1), 3–10. https://doi.org/10.1016/j.jneb.2007.08.012
- Tuong W, Larsen ER, Armstrong AW. (2014) Videos to influence: a systematic review of effectiveness of video-based education in modifying health behaviors. J Behav Med. 37(2):218–33. doi:10.1007/s10865-012-9480-7.
- Weidmann, A. E., Sonnleitner-Heglmeier, A., & Dartsch, D. C. (2023). Effect of patient education videos on modifying medication-related health behaviours: A systematic review using the behaviour intervention functions. Patient Education and Counseling, 117, 107992. https://doi.org/10.1016/j.pec.2023.107992.
- Wong Jyh Eiin (2019, August 9). Stunting in children still a problem in Malaysia. The Star. https://www.thestar.com.my/lifestyle/family/ 2019/08/09/stunting-in-children-problem-Malaysia
- World Health Organization (2006). Therapeutic education of patients with coronary heart disease: Training guide for general practitioners.

EUR/05/5049635 112 p. http://apps.who.int/iris/handle/10665/107696.

https://www.who.int/nutrition/healthygrowth proj_stunted_videos/en/

World Health Organization (2015). WHO | Stunting in a nutshell. In WHO (Vol. 16, Issue 1).

World Health Organization (2020). Global strategy on digital health 2020–2025. Available at https://www.who.int/docs/default-source/documents/gs4dhdaa2a9f352b0445bafbc79c a799 dce4d.pdf (Accessed June 2023)

at Yusoff, M.S.B. (2019). ABC of Content Validation and Content Validity Index Calculation. Education in Medicine Journal, 11(2), 49–54. doi: 10.21315/eimj2019.11.2.6

Yata, J. S., & Habib, K. (2018). Nutrition education and training interventions for mothers in addressing malnutrition among children in Malakal county/South Sudan: Women and Change Women and Change. The Ahfad Journal, 35(1), 39–51.

https://go.gale.com/ps/i.do?p=AONE&sw=w&issn=02554070&v=2.1&it=r&id=GALE%7CA543612976&sid=googleScholar&linkaccess=fulltext

Zamanzadeh, V., Ghahramanian, A., Rassouli, M., Abbaszadeh, A., Alavi-Majd, H., & Nikanfar, A. R. (2015). Design and Implementation Content Validity Study: Development of an instrument for measuring patient-centered communication. Journal of Caring Sciences, 4(2), 165–178. https://doi.org/10.15171/jcs.2015.017.

Supplementary Document:

Relevance of illustrations

Development & evaluation of an animated video on healthy weight gain and energy intake during pregnancy for stunting prevention

Annexure 1. Suitability evaluation by experts (N=6)

tems	Score	Frequency (%)
Purpose of the video		
- The purpose is explicitly stated in title, or cover illustration, or introduction.	2	2 (33.3%)
- The purpose is not explicit. It is implied, or multiple purposes are stated.	1	4 (66.7%)
 No purpose is stated in the title or cover illustration or introduction. 	0	0 (0%)
Content about behaviours		
- The essence of the material is application of knowledge/ skills aimed at desirable reader behaviours rather than	2	6 (100%)
nonbehaviour facts.At least 40 percent of content topics focus on desirable behaviours or actions.	1	0 (0%)
- Nearly all topics are focused on non-behaviour facts.	0	0 (0%)
cope 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	6 (100%)
- The scope is expanded beyond the purpose; no more than 40 percent is nonessential information. Key points can be learned in time allowed.	1	0 (0%)
 The scope is far out of proportion to the purpose and time allowed. 	0	0 (0%)
ummary of the video included		
 Summary is included and retells the key messages in different words and examples. 	2	0 (0%)
- Some key ideas are reviewed.	1	4 (66.7%)
- No summary or review is included.	0	2 (33.35)
ocabulary used		
- All three factors; i) Common words are used nearly all of the time, ii) Technical, concept, category, value judgement (CCVJ) words are explained by examples, iii) Imagery words are used as appropriate for content.	2	2 (33.3%)
- i) Common words are frequently used, ii) Technical and CCVJ words are sometimes explained by examples, 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, iii) Extensive jargon	0	2 (33.3%)
ype of graphics	•	(4000)
 Both factors; i) Simple, adult-appropriate, line drawings/ sketches are used, ii) Illustrations are likely to be familiar to the viewers. 	2	6 (100%)
- One of the superior factors is missing	1	0 (0%)

 Illustrations present key messages visually so the reader/ viewer can grasp the key ideas from the illustrations alone. No 	2	4 (66.7%)
distractions.		
- i) Illustrations include some distractions, ii) Insufficient use of	1	2 (33.3%)
illustrations		,
- One factor; i) Confusing or technical illustrations (non-	0	0 (0%)
behaviour related), ii) No illustrations, or an overload of		
illustrations.		
Lists and tables explained		
- Step-by-step directions, with an example, are provided that	2	2(33.3%)
will build comprehension and self-efficacy.		
- "How-to" directions are too brief for readers to understand	1	4 (66.7%)
and use the graphics without additional counseling.		0 (0 0 ()
- Graphics are presented without explanation.	0	0(0%)
Captions used for graphics		
- Explanatory captions with all or nearly all illustrations and	2	4 (66.7%)
graphics.		
- Brief captions used for some illustrations and graphics.	1	2 (33.3%)
- Captions are not used.	0	0 (0%)
Match in logic, language, experience (LLE)		
- Central concepts/ ideas of the material appear to be culturally	2	2 (33.3%)
similar to the LLE of the target audience's culture.		
- Significant match in LLE for 50 percent of the central concepts.	1	4 (66.7%)
- Clearly a cultural mismatch in LLE	0	0 (0%)

Annexure 2. Understandability and actionability evaluation by experts (N=6)

Item	Frequency (%)
Understandability	
This video makes its purpose completely evident.	
- Agree	6 (100%)
- Disagree	0 (0%)
This video uses common, everyday language.	
- Agree	5 (83.3%)
- Disagree	1 (16.7%)
Medical terms are used only to familiarize the audience with the terms. When used, medical terms are defined.	
- Agree	6 (100%)
- Disagree	0 (0%)
This video uses the active voice.	
- Agree	6 (100%)
- Disagree	0 (0%)
This video breaks or "chunks" information into short sections.	
- Agree	4 (66.7%)
- Disagree	2 (33.3%)
This video's sections have informative headers.	
- Agree	2 (33.3%)
- Disagree	4 (66.7%)
This video presents information in a logical sequence.	
- Agree	6 (100%)
- Disagree	0 (0%)

This video provides a summary.

	1 (66 79/)
- Agree	4 (66.7%)
- Disagree	2 (33.3%)
This video uses visual cues (e.g., arrows, boxes, bullets, bolds, larger for	nt,
highlighting) to draw attention to key points.	- ()
- Agree	5 (83.3%)
- Disagree	1 (16.7%)
The text on the screen is easy to read.	
- Agree	5 (83.3%)
- Disagree	1 (16.7%)
This video allows the user to hear the words clearly (e.g., not too fast, n	ot
garbled).	
- Agree	6 (100%)
- Disagree	0 (0%)
This video uses illustrations and photographs that are clear and unclut	tered.
- Agree	4 (66.7%)
- Disagree	2 (33.3%)
The video uses simple tables with short and clear row and column head	lings.
- Agree	4 (66.7%)
- Disagree	2 (33.3%)
Actionability	
This video clearly identifies at least one action the user can take.	
- Agree	6 (100%)
- Disagree	0 (0%)
This video addresses the user directly when describing actions.	
- Agree	6 (100%)
- Disagree	0 (0%)
This video breaks down any action into manageable, explicit steps.	
- Agree	6 (100%)
- Disagree	0 (0%)
The video explains how to use the charts, graphs, tables, or diagrams to	take actions.
- Agree	4 (66.7%)
- Disagree	2 (33.3%)

$\textbf{Annexure 3} \ \textbf{Understandability and actionability evaluation among a target population (N=30)}$

Item	Frequency (%)
Understandability	
This video makes its purpose completely evident.	
- Agree	30 (100%)
- Disagree	0 (0%)
This video uses common, everyday language.	
- Agree	27 (90%)
- Disagree	3(10%)
Medical terms are used only to familiarize audience with the terms. When	
used, medical terms are defined.	
- Agree	26 (86.7%)
- Disagree	4 (13.3%)
This video uses the active voice.	
- Agree	25 (83.3%)
- Disagree	5(16.7%)

This video breaks or "chunks" information into short sections.	
	30 (100%)
- Agree	0 (0%)
- Disagree This video's sections have informative headers.	0 (0 70)
	27 (00%)
- Agree	27 (90%) 3(10%)
- Disagree	3(1070)
This video presents information in a logical sequence.	28 (02 29/)
- Agree	28 (93.3%) 2 (6.7%)
- Disagree	2 (6.7%)
This video provides a summary.	27 (00%)
- Agree	27 (90%)
- Disagree	3(10%)
This video uses visual cues (e.g., arrows, boxes, bullets, bolds, larg	ger font,
highlighting) to draw attention to key points.	26 (06 70)
- Agree	26 (86.7%)
- Disagree	4 (13.3%)
The text on the screen is easy to read.	20 (02 20)
- Agree	28 (93.3%)
- Disagree	2 (6.7%)
This video allows the user to hear the words clearly (e.g., not too fa	ast, not
garbled).	22 (1220)
- Agree	30 (100%)
- Disagree	0 (0%)
This video uses illustrations and photographs that are clear and un	
- Agree	28 (93.3%)
- Disagree	2 (6.7%)
The video uses simple tables with short and clear row and column	headings.
- Agree	26 (86.7%)
- Disagree	4 (13.3%)
Actionability	
This video clearly identifies at least one action the user can take.	
- Agree	30 (100%)
- Disagree	0 (0%)
This video addresses the user directly when describing actions.	
- Agree	30 (100%)
- Disagree	0 (0%)
This video breaks down any action into manageable, explicit steps	5.
- Agree	29 (96.7%)
- Disagree	1 (3.3%)
The video explains how to use the charts, graphs, tables, or di	iagrams to take
actions.	20 (7: 7:1)
- Agree	23 (76.7%)
- Disagree	7 (23.3%)