ORIGINAL ARTICLE

Development and Validation of A Weight Management Program Model for Overweight and Obese Individuals

Suhaimi T[a,b], Mohd Rasdi HF[c], Abd. Talib R[a]

[a]Nutritional Sciences Program & Center for Community Health Studies (ReaCH), Faculty of Health Sciences, Universiti Kebangsaan Malaysia
[b]Department of Resource Management & Consumer Studies, Faculty of Human Ecology, Universiti Putra Malaysia
[c]Occupational Therapy Program & Center for Rehabilitation & Special Needs Studies (ICaRehab), Faculty of Health Sciences, University Kebangsaan Malaysia

ABSTRACT

INTRODUCTION: Developing a structured and theory-based model can enhance the effectiveness of weight management program. However, the underlying model requires validation to ensure its accuracy and applicability. Therefore, this study aimed to demonstrate the development and validation process of a weight management program model for overweight and obese individuals. **MATERIALS AND METHODS:** A weight management program model was previously developed using thematic analysis and scoping review by utilizing Theory of Change as the framework. Seven experts were invited to evaluated using the content validity index through online questionnaire, comprising 42 items, and provided feedback on its features for face validity. **RESULTS:** The developed model structured with 6 domains, 6 constructs, and 23 sub-constructs. More than 85.71% of the experts agreed on the face validity of the developed model. The content validity result indicated that the experts reached a consensus on all 6 domains. The modified kappa represented excellence in all 6 domains, with a k* value of 0.97-1.00. Meanwhile, the S-CVI/Ave and S-CVI/UA values ranged from 0.97-1.00 and 0.80-1.00, respectively. Several experts suggested ideas and recommendations for improvement. The validation led to all items being accepted without elimination. **CONCLUSION**: The weight management program model has been validated, and all 6 domains were retained following expert validation. This model is expected to provide insightful and valuable guidance for future practitioners in planning and executing weight management programs among individuals with overweight and obesity issues

Keywords
Content validity index, validation, model, obesity, weight management program

Corresponding Author
Prof. Dr. Ruzita Abd. Talib
Nutritional Sciences Program & Center for Community Health Studies (ReaCH), Faculty of Health Sciences, Universiti Kebangsaan Malaysia,
E-mail: rzt@ukm.edu.my

Received: 12th February 2025; Accepted: 2nd December 2025

Doi: https://doi.org/10.31436/imjm.v25i01/2857

INTRODUCTION

The increasing prevalence of overweight and obesity has become a worldwide concern. In 2022, approximately 43.0% and 16.0% of adults aged 18 years old and above were classified as overweight and obese, respectively.[1] This figure has doubled since 1990.[1] In Malaysia, the latest findings by the National Health and Morbidity Survey (NHMS) in 2024 revealed that 32.6% of the population was overweight, while 21.8% were obese. There has been a significant rise of almost 10.0% in the rates of overweight and obesity between 2011 and 2023.[2] Being overweight and obese may increase the likelihood of having various types of non-communicable diseases such as high blood pressure,[3,4] diabetes,[5] cardiovascular disease,[6,7] colorectal cancer,[7,8] and dementia.[9] Being overweight and obese also impacts the individual's social life and well-being[10] as well as affects the individuals' cost of living and socioeconomic status.[11]

Many strategies can be used to overcome this issue, such as implementing a weight management program. A weight management program serves as a strategy to assist individuals in losing weight, maintaining ideal weight, and avoiding unnecessary or uncontrollable weight gain.[12] This program generally promotes physical activity and healthy dietary practices to empower participants to manage their health. Organizations have been encouraged to collaborate and produce health interventions and activities to promote a healthy lifestyle.[13]

Theoretical frameworks provide an important foundation for behavioural changes within participants in weight management programs.[14] Previous studies have demonstrated that the theoretical and model-based weight management programs provide a reliable structure in achieving desired weight loss outcomes.[15,16] Additionally, participants also showed improvement in healthier dietary intake,[17] increased physical activity,[18] and reduced high calorie food consumption.[16] Therefore, developing a well-structured program to enhance its effectiveness to the target population is crucial, such as incorporating the program development with theory and model.

In this study, a weight management program model was constructed by incorporating several theories and models, such as i) Theory of Change (TOC), ii) Transtheoretical Model (TTM), iii) Social Cognitive Theory (SCT), and iv) Health Belief Model (HBM). Previous studies have demonstrated that integrating theories and models into a health-related program can increase the probability of positive outcomes.[18,19] In addition, a qualitative approach was utilized, which involved an in-depth interview with practitioners experienced in managing weight management programs.[20] This model was developed after combining themes from interviews and constructs of the existing theories and models. It comprised 6 domains, with 6 constructs and 22 sub-constructs and was written in the Malay language. However, a comprehensive evaluation was conducted for validation.

Validity refers to how a method accurately evaluates a variable to its intended measurement. It is advisable to conduct a validation test before data collection to ensure that the scales or scores can measure and reflect the variables precisely.[21] Among the types of validity are face validity and content validity. Some studies categorized these two as translation validity due to their primary purpose of determining the meaning of the construct by translating it into operationalization through subjective judgement (face validity) and assessment of the content domain (content validity).[22] The content validity index (CVI) and modified kappa can be applied as quantifiable methods to assess and evaluate consensus from experts.[23] Therefore, this study aimed to demonstrate the development and validation process of a weight management program model for overweight and obese individuals by obtaining expert agreement through the face and content validity scores.

MATERIALS AND METHODS

Study Design

This study employed a quantitative survey approach through an online questionnaire. The questionnaire validation process was conducted from July-August 2023. The research received ethical approval from the Secretariat of Research and Innovation at Universiti Kebangsaan Malaysia, with the reference number UKM PPI/111/8/JEP-2020-516. Before beginning the data collection, participants were provided with information sheets and signed a formal consent form.

Weight Management Program Model Development Process

To develop the model, the researchers used Theory of Change as a framework and its components, such as domain, construct, and sub-construct due to its suitability as guidance in planning a program and intervention.[24] Several suggestions from previous studies were used to determine the domains and constructs of this model, such as the input, activity, output, outcome, impact, and assumption.[25-27] Meanwhile, a sub-construct was built based on the themes acquired during the in-depth interview[20] and scoping review[28] from the previous phase of the study. Thematic analysis was obtained after conducting in-depth interview with practitioners who were experienced in handling the weight management program. Semi-structured questions were used as guidance to probe information such as activities that were helpful to modify behaviour and the outcomes of the program.[20] In the meantime, a scoping review was employed to identify health program in the existing literature which were guided by models and theories.[29] The scoping review synthesis found that the components from Transtheoretical Model (TTM), Social Cognitive Theory (SCT), and Health Belief Model (HBM) were frequently utilised in a successful health program especially among adults with overweight and obese. By

gathering information from the Theory of Change, thematic analysis and scoping review, the weight management program model comprised 6 domains, 6 constructs, and 23 sub-constructs was drafted, as shown in Figure 1.

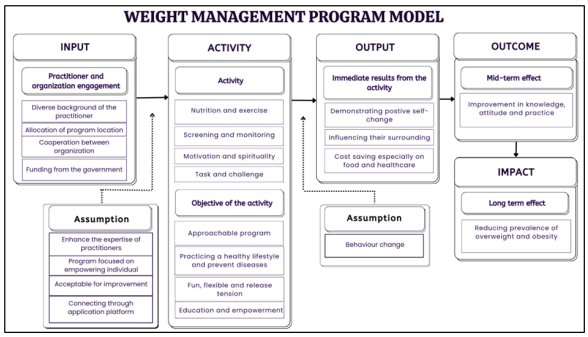

Figure 1: The weight management program model before validation

Face and Content Validity Assessment

A questionnaire was prepared based on the constructs and sub-constructs to validate the model. The questions were derived and elaborated based on the previous interview sessions with the practitioners, which came from coding, sub-themes, and themes. Two academicians specializing in health education and statistical analysis reviewed and refined the questionnaire before proceeding with face and content validity assessment. The face validity was assessed descriptively on various aspects, including the size and formatting, the ease of understanding the model, the appropriateness of the graphic used, overall neatness and layout of the model. Next, several questions were utilized to evaluate the content validity. Table I provides information regarding the domain, construct, and number of questions or items in the weight management program model.

Table I: Domain, construct, and number of questions or item in the model

Domain	Construct	Number of questions or items
A (Input)	Practitioner and organization engagement	5
B (Activity)	Activity Objective of the activity	23
C (Output)	Immediate results from the activity	4
D (Outcome)	Mid-term effect e.g., behavioural change effect from the output	3
E (Impact)	Long term effect	1
F (Assumption)	Condition that may affect the result	6
Total		42

The face validity and content validity data were collected from a panel of 7 experts. The term constructs the specific concept, properties, attributes, and variables being measured or studied.[28] Content validity can be used to measure the degree of agreement of an item that represents the content to validate the relevance of the constructs.[23] Hence, the constructs established in this study were measured using content validity according to the following six steps recommended by several studies[28,30] as shown in Figure 2.

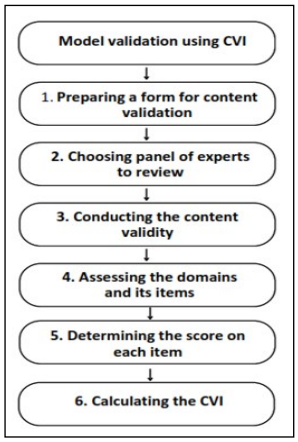

Figure 2: Validation steps using content validity index CVI

Preparation for content validation

The form was prepared with clear instructions and a summary of the model. The experts were provided with detailed explanations about the model's domain, construction, and items to ensure their understanding. Past research has recommended four main criteria be included in the measuring scores: i) Relevance, ii) Clarity, iii) Simplicity, and iv) Ambiguity (Table II).

Table II: Score for content validity evaluation[24,25]

Score	1	2	3	4
Relevance	Not relevant	Item need some revision	Relevant but need minor revision	Very relevant
Clarity	Not clear	Item need some revision	Clear but need minor revision	Very clear
Simplicity	Not simple	Item need some revision	Simple but need minor revision	Very simple
Ambiguity	Doubtful	Item need some revision	No doubt but need minor revision	Meaning is clear

Panel of experts to review

Experts were usually selected based on their positions in the public health system,[31] academic qualifications, years of experience, and field of expertise.[30] The experts in this study were chosen based on several criteria, such as having more than five years of working experience,[32] having qualifications and knowledge in the respective field, and having excellent communication skills.[33] Therefore, purposive sampling was used to seek experts from relevant fields, such as nutrition, sports science, and models or statistics. Recruiting six to ten experts was recommended to achieve a CVI value of 0.78.[34]

Hence, 7 experts were invited to participate in this study. They were; nutritionist (n=3), sports science (n=3), and statistician (n=1).

Conducting the content validity

Content validity can be conducted face-to-face or online.[28] The face-to-face approach involves scheduling a physical meeting with the expert, while an online approach requires the researcher to provide explicit instruction to facilitate the validation process.[28] Both methods have advantages and disadvantages, such as cost, response rate, and evaluation duration. The primary factor for using the online approach in this study was the duration of the evaluation. Coordinating the experts simultaneously due to their work schedule was a challenge. Therefore, an email containing information regarding the model, the model's figure, and the validation form was sent to all 7 experts. The experts were asked to evaluate the model using a Google Form provided in the email. They were given approximately one week to validate the model. However, some experts responded more than a week due to work and research commitments.

Assessing the domains and its items

The fourth step involved providing comprehensive information about the domains and items to facilitate the expert's comprehension of the model. Experts were encouraged to submit verbal and written opinions to improve the relevancy of the domains and their items.[28] In this study, all opinions were attentively considered for improvement.

Determining the score on each item

After reviewing the domains and items, the experts were asked to rate each item independently based on the scoring scale provided in Table II. They were also asked to complete the form in order to compute the CVI.[28] Hence, the validation form was created using Google Forms to ensure the experts rated all items.

Calculating the CVI

The obtained data were analysed by using Microsoft Excel. The calculation of content validity was divided into two categories, i) CVI for item (I-CVI) and ii) CVI for scale (S-CVI).[30] The I-CVI was the item-level validity index, which was the proportion of experts giving evaluation scores between 3-4.[30] A rating score of 3-4 by an expert will be converted into 1 mark. While a rating of 1-2 will be converted into a 0 mark. The formula for calculating I-CVI is to divide the items agreed by the experts by the number of experts (items agreed by the experts/number of experts).[28] Usually, the I-CVI value will exceed 0.78 if the number of experts exceeds 5 persons.[34]

The S-CVI is a scale level for the content validity index, which refers to the average of the I-CVI for all items on the scale.[30] There are two calculation methods for S-CVI, i.e. i) the average I-CVI score for all items in the scale (S-CVI/Ave) and ii) the proportion of items that received a rating score of 3-4 by all experts (S-CVI/UA).[30] S-CVI/UA is more sensitive to the number of experts, where there is a probability that S-CVI will be low when many experts are involved.[35] Therefore, this study follows the recommendation of at least 6 and no more than 10 experts for validation.[28,36] A greater CVI value indicates a greater level of consensus among experts. As suggested by previous studies,[37,38] CVI value of 1.00 indicate excellent, 0.90-0.99 is good, 0.80-0.89 has adequate indicator, and 0.70-0.79 showed an average validity acceptance.

Next, the modified kappa calculation was used to determine the probability of agreement among experts by calculating the index of agreement between experts.[23,39] In addition to CVI, previous studies suggest using kappa statistics because it will provide additional information on the agreement among experts.[39,40] Thus, the calculation of modified kappa is started by determining the probability of agreement (Pc) as follows:

$$Pc = [N! / A! (N-A)!] * .5^N$$

N = number of experts, A = number of experts that agree on the items

Subsequently, the modified kappa value was determined by the following formula:

$$k^* = \frac{(\text{I-CVI} - p_c)}{(1 - p_c)}$$

The results from the calculation will be interpreted using the following indicators: excellent (0.78-1.00), good (0.60-0.74), fair (0.40-0.59) and poor (below 0.39).[23,40,41]

RESULTS

Table III shows the background information of the experts (n=7), with 4 of them being males. The findings show that most of the experts have expertise in sports science (n=3) and nutrition (n=3). While only 1 have more than 11-15 years of experience, the majority have experience ranging between 5–10 years (n=3) and 16-20 years (n=3). Subsequently, the study findings were categorized into two main aspects, i) face validity and ii) content validity.

Table III: Expert's years of experience and field of expertise

Expert ID	Gender	Field of expertise	Experience
Expert 01	Male	Sport science	16 – 20 years
Expert 02	Female	Statistic	5 – 10 years
Expert 03	Male	Sport science	16 – 20 years
Expert 04	Male	Sport science	5 – 10 years
Expert 05	Female	Nutrition	5 – 10 years
Expert 06	Male	Nutrition	16 – 20 years
Expert 07	Female	Nutrition	11 – 15 years

Face validity

For face validity, the percentage of agreement among expert is 100% for two items which are *'the appropriateness of the graphics used'* and *'the layout and arrangement in the model'*; while *'the appropriateness of size and font type'*, and *'the ease of understanding'* are 85.71%. Based on the comment and suggestions, Expert 02 and Expert 03 mentioned that the model has a clear flow and suitable, respectively. Meanwhile Expert 07 noticed a spelling error of the word 'positive', thus it was corrected by the research team.

Content validity

Altogether, 6 domains with 42 items in the weight management program model were scored by relevancy, clarity, simplicity, and ambiguity (Table IV). The S-CVI/Ave results were between 0.97-1.00, followed by S-CVI/UA between 0.80-1.00, and modified kappa between 0.96-1.00. All 42 items were retained with none of the items were eliminated. However, some experts provided feedback regarding grammar mistakes and advised adding certain words to improve the construct.

Domain A (input) comprised 5 items describing the practitioner and organization's involvement in the weight management program. These items emphasized the practitioner's diverse skills, the importance of cooperation, and funding given by various organizations. The S-CVI results ranged from 0.8-1.00, while the modified kappa was 1.00. One of the sub-constructs, "*funding from the government*", was commented on by Expert 06. Expert 06 mentioned that the funding may come from various organizations, not necessarily from the government. Hence, this construct was edited and changed into "*funding from various organizations*".

Domain B (activity) comprised 23 items that outlined the activities and objectives needed in the program. This domain consisted of 2 constructs with 8 sub-constructs. The values of S-CVI and modified kappa were between 0.96-0.99. Expert 05 suggested adjusting 2 sub-constructs in the model. For the sub-construct *"approachable program,"* Expert 05 recommended adding the term "*doable program*" in the sub-construct due to the possibility that an approachable and doable program can enhance respondent participation. For the sub-construct "*fun, flexible, and relieving stress*," the expert suggested changing the phrase "*relieving stress*" to "*reducing stress*" because it is a more achievable objective in the context of a weight management program. Thus, the terms were added and changed as suggested.

Domain C (output) explained the direct outcomes of the activity from the program, such as positive self-changes, how participants can positively impact their surroundings, and how to reduce treatment costs and daily expenses. The results of the CVI value modified kappa were between 0.97-1.00. The word "positive," was wrongly spelt but has been amended.

Domain D (outcome) contained a single construct representing medium-term changes after following the program. Domain E (impact) also comprised a single construct representing long-term changes, such as decreasing the prevalence of overweight and obese adults. The results of both domains were similar, i.e., 1.00 for the CVI and modified kappa values. There was no

Table IV: Results of CVI

Domain	Relevancy			Clarity			Simplicity			Ambiguity			Indicator
	S-CVI / Ave	S-CVI / UA	k*	S-CVI / Ave	S-CVI / UA	k*	S-CVI / Ave	S-CVI / UA	k*	S-CVI / Ave	S-CVI / UA	k*	k*
A (Input)	1	1	1	0.97	0.80	0.97	1	1	1	1	1	1	Excellent
B (Activity)	0.99	0.96	0.99	0.99	0.96	0.98	0.99	0.96	0.99	0.99	0.96	0.98	Excellent
C (Output)	1	1	1	0.97	1	0.96	0.97	1	0.96	0.97	1	0.96	Excellent
D (Outcome)	1	1	1	1	1	1	1	1	1	1	1	1	Excellent
E (Impact)	1	1	1	1	1	1	1	1	1	1	1	1	Excellent
F (Assumption)	1	1	1	1	1	1	0.98	0.83	0.97	1	1	1	Excellent

additional comment for Domain D (outcome). Meanwhile, Expert 05 provided remarks on the sub-construct for Domain E, "*Reducing prevalence of overweight and obesity*." One term was missing, i.e., "*adults*." It was added to the sub-construct of "*Reducing prevalence of overweight and obese adult*." Another expert suggested adding one sub-construct in the domain, i.e., "*Reducing the government's burden in addressing obesity and its associated diseases*." The two comments were considered and added to the model. Lastly, Domain F (assumptions) comprised 5 constructs and was evaluated by 6 items. The CVI and modified kappa results were 0.83–0.98 for simplicity, while the others scored 1.00.

DISCUSSION

This study demonstrated the development and validation process of a weight management program model for overweight and obese individuals by obtaining expert agreement through the face and content validity scores. The weight management program model was previously developed by integrating several sources, such as thematic analysis from in-depth interviews, scoping reviews, and the Theory of Change. The primary purpose of developing this model was to facilitate the practitioners to create, manage, and implement a comprehensive and efficient weight management program. By using this model as guidance, practitioners will be able to cater to all the items needed in a weight management program. Based on recommendations from previous studies, it is crucial to carry out a validation process to validate the product.[42] While CVI is not commonly used for model evaluation, it can still provide a reliable and validated model.[42-44] Prior studies used CVI to evaluate various types of models and frameworks, such as the adoption model for wearable Continuous Glucose Monitoring System (CGMs) device adoption,[43] learning model for basketball passing,[42] pain and disability driver's management model,[44] nursing professionalism evaluation model,[45] and medical education e-professionalism framework.[46] Hence, CVI is deemed appropriate for evaluating a model's domains.

A model plays a vital role in offering a structured framework to establish the relationship between variables,[47] which also assists researchers in various phases of research. The weight management program model for overweight and obese individuals was developed to offer a guideline for the practitioner or program developers to follow while implementing a weight management program. The program model comprises 6 domains that could assist the practitioner in preparing a plan before or during the program. Additionally, some domains, such as output, outcome, and impact, are anticipated results after the program has been completed. A model serves as the foundation for identifying the variables, factors, and their relationship that affect the phenomena.[47] Thus, this model is hoped to serve as a reference in identifying essential variables and relationships that may influence the development of a weight management program.

The minimum score of 0.97 that was achieved for S-CVI/ Ave is classified as 'excellent'. It indicates that the item was well understood, the construct was accurately measured, and there was a significant consensus among experts. Hence, no revisions or deletions were needed, as the score exceeded 0.78 by more than 6 experts, as suggested by previous studies.[23,39] Additionally, kappa statistics are a valuable component of CVI because they offer information about the level of consensus. Therefore, the kappa statistic is an indicator of agreement among the inter-raters.[39] The comparison of the kappa statistics results with the indicators in all domains of the weight management program model achieved consensus

among the experts, and all the domains were in the 'excellent' categories.

This study has identified several strengths, such as developing a weight management program model with the foundation by several sources. Using Theory of Change as framework to described the relationship between the domain, construct and sub-construct has significantly increased the model's interpretability. Next, the content validity index (CVI) is a valuable method for obtaining expert validation of the research product, such as a model. The result demonstrated that the expert's agreement is significant for validating the model. Despite thorough validation, this research has some limitation. The number of experts involved was relatively small, which may limit the generalizability of the findings. Although including more experts could improve representativeness, it may also reduce consensus and lower content validity value. Furthermore, gathering the experts was challenging due to their tight schedules. Hence, utilizing a panel of 6-10 experts is reasonably appropriate for validating the model.

CONCLUSION

The weight management program model for overweight and obese individuals was developed, validated, and reached a consensus among 7 experts from various backgrounds. The model was developed as a strategy and guideline for weight management programs, mainly focusing on overweight and obese adults. Upon validation, the model is ready for the next step, such as an acceptance test among practitioners and participants or to be developed into a module that can be used for the weight management program or intervention.

ACKNOWLEDGMENT

The authors are grateful to the experts for dedicating their time to evaluate and provide valuable insights into the model.

REFERENCE

1. World Health Organization. Obesity and overweight [Online]. Available at: https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight. Accessed July 3, 2024.
2. Institute for Public Health. Fact Sheet National Health and Morbidity Survey (NHMS) [online]. Available at: https://iku.nih.gov.my/images/nhms2023/fact-sheet-nhms-2023.pdf. Accessed July 7, 2024.
3. Aniza I, Hayati K, Juhaida MN, Obesity related hypertension - gender specific analysis among adults in Tanjung Karang, Selangor, Malaysia. Malaysian Journal of Public Health Medicine 2015; 15(1): 41-52.
4. Upadhyay J, Farr O, Perakakis N, Ghaly W, Mantzoros C. Obesity as a Disease. Medical Clinics of North America 2018;102(1):13–33.
5. Gupta S, Bansal S. Does a rise in BMI cause an increased risk of diabetes?: Evidence from India. PLoS One 2020;15(4):1–20.
6. Fruh SM. Obesity: Risk factors, complications, and strategies for sustainable long-term weight management. Journal of the American Association of Nurse Practice 2017;29(S1):S3–14.
7. Moghaddam AA, Woodward M, Huxley R. Obesity and risk of colorectal cancer: A meta-analysis of 31 studies with 70,000 events. Cancer Epidemiology Biomarkers and Prevention 2007; a6(12): 2533-2547.
8. Mandic M, Li H, Safizadeh F, et al. Is the association of overweight and obesity with colorectal cancer underestimated? An umbrella review of systematic reviews and meta-analyses. European Journal of Epidemiology 2023;38(2):135–44.
9. Kinlen D, Cody D, O'Shea D. Complications of obesity. QJM: An International Journal of Medicine 2018 Jul 1;111(7):437–43.
10. Hecker J, Freijer K, Hiligsmann M, Evers SMAA. Burden of disease study of overweight and obesity; the societal impact in terms of cost-of-illness and health-related quality of life. BMC Public Health 2022;22(1):1–13.
11. Haththotuwa RN, Wijeyaratne CN, Senarath U. Worldwide epidemic of obesity. In: Obesity and Obstetrics [online]. Available at: http://dx.doi.org/10.1016/B978-0-12-817921-5.00001-1. Accessed on September 9, 2024.
12. Winik CL, Bonham CE. Weight management: A concept analysis. Nursing Forum 2018;53(1):93–9.

13. Institute for Public Health. National Health and Morbidity Survey (NHMS) 2019: Non-communicable diseases, healthcare demand, and health literacy - Key findings. Vol. 20. 2019. Available at: https://iptk.moh.gov.my/images/technical_report/2020/4_Infographic_Booklet_NHMS_2019_-_English.pdf. Accessed September 1, 2024.
14. Hawkins LK, Burns L, Swancutt D, et al. Which components of behavioral weight management programs are essential for weight loss in people living with obesity? A rapid review of systematic reviews. Obesity Reviews 2024;25(10):e13798.
15. Cherrington AL, Willig AL, Agne AA, Fet al. Development of a theory-based, peer support intervention to promote weight loss among Latina immigrants. BMC Obesity 2015;2(1):1–9.
16. De Freitas PP, De Menezes MC, Dos Santos LC, et al. The transtheoretical model is an effective weight management intervention: A randomized controlled trial. BMC Public Health 2020;20(1).
17. Gorin AA, Powers TA, Gettens K, et al. A Randomized Controlled Trial of a Theory-Based Weight-Loss Program for Couples. Health Psychology 2019;39(2):6269.
18. Sanaeinasab H, Saffari M, Dashtaki M ali, et al. A Theory of Planned Behavior-Based Program to Increase Physical Activity in Overweight/Obese Military Personnel: A Randomised Controlled Trial. Applied Psychology Health Well Being 2020;12 (1):101–24.
19. Martinez DJ, Turner MM, Pratt-Chapman M, et al. The effect of changes in health beliefs among African-American and rural white church congregants enrolled in an obesity intervention: a qualitative evaluation. Journal of Community Health 2016;41(3):518-25.
20. Suhaimi T, Mohd Rasdi HF, Abd Talib R. Practitioner's Perspective on Activities and Outcomes of the Weight Management Program: A Qualitative Study. Jurnal Gizi dan Pangan 2024;19 (3):157–66.
21. Ahmed I, Ishtiaq S. Reliability and validity: Importance in Medical Research. Methods 2021;71 (10):2401–6.
22. Ellen AD. Validity and reliability in social science research. Education Research and Perspectives 2011;38:105–25.
23. Zamanzadeh V, Ghahramanian A, Rassouli M, et al. Design and implementation content validity study: development of an instrument for measuring patient-centered communication. Journal of Caring Science 2015;4(2):165–78.
24. Stotz SA, Nugent NB, Akers M, et al. How the Gus Schumacher Produce Prescription Program Works: An Adaptation of a Nutrition Incentive Theory of Change. Nutrients 2023;15(15).
25. Montague S. Does your implementation fit your theory of change? Canadian Journal of Program Evaluation 2019;33(3):316–335.
26. Sapkota D, Baird K, Saito A, Anderson D. Interventions for reducing and/or controlling domestic violence among pregnant women in low- and middle-income countries: A systematic review. Systematic Review 2019;8(1).
27. Mayne J. Useful theory of change models. Canadian Journal of Program Evaluation 2015;30(2):119–42.
28. Yusoff MSB. ABC of Content Validation and Content Validity Index Calculation. Education in Medicine Journal 2019;11(2):49–54.
29. Suhaimi T, Wafa SWWSST, Rasdi HFM, Talib RA. Models and theories to support health promotion programmes for overweight and obese adults: A scoping review. Malaysian Journal of Nutrition 2022;28(3):335–55.
30. Sudha Rani S, Raja A, Balasubramaniam N. Content Validity of Knowledge Questionnaire on HPV Infections, HPV Vaccination and Cervical Cancer. International Journal of Nursing Care 2021;9(2):30–4
31. Baker J, Lovell K, Harris N. How expert are the experts? An exploration of the concept of "expert" within Delphi panel techniques. Nurse Researcher 2006;14(1):59–70.
32. Akbari R, Yazdanmehr E. A Critical Analysis of the Selection Criteria of Expert Teachers in ELT. Theory and Practice in Language Studies 2014;4(8):1653–8.
33. Ramlan M, Ghazali D. Aplikasi kaedah fuzzy delphi dalam penyelidikan sains sosial. Kuala Lumpur: Penerbit Universiti Malaya; 2018.
34. Polit DF, Beck CT. The Content Validity Index: Are

You Sure You Know What's Being Reported? Critique and Recommendations. Research in Nursing & Health 2006;29(5):489–97.
35. Halek M, Holle D, Bartholomeyczik S. Development and evaluation of the content validity, practicability and feasibility of the Innovative dementia-oriented Assessment system for challenging behaviour in residents with dementia. BMC Health Services Research 2017;17(1):1–26.
36. Lynn MR. Determination and quantification of content validity. Nursing Research 1986;35(6):382–6.
37. Mahfuzah Z. Pembangunan Garis Panduan Intervensi Kemahiran Tulisan Tangan untuk Kanak-kanak. Universiti Kebangsaan Malaysia; Kuala Lumpur, 2022.
38. Sirajudeen MS, Shah UN, Mohan N, Pillai PS. Content validity of a questionniare to assess the ergonomic knowledge of computer professionals. International Journal of Current Research and Review 2012;04(11):114–21.
39. Polit DF, Beck CT, Owen SV. Is the CVI an Acceptable Indicator of Content Validity? Appraisal and Recommendations. Research in Nursing & Health 2007;30(4):459–67.
40. Wynd CA, Schmidt B, Schaefer MA. Two quantitative approaches for estimating content validity. Western Journal of Nursing Research 2003;25(5):508–18.
41. Cicchetti D, Sparrow S. Developing criteria for establishing interrater reliability of specific items: applications to assessment of adaptive behavior. American Journal of Mental Deficiency 1981;86 (2):127–37.
42. Yusfi H, Solahuddin S, Syamsuramel S, Bayu WI, Destriani D. Content validity index: development of learning model for basic skills of basketball passing. Kinestetik: Jurnal Ilmiah Pendidikan Jasmani 2021;5 (3):571–9.
43. Hossain MI, Yusof AF, Hussin ARC, Billah M, Shanmugam M. The Content and Construct Development of CGMs Device Adoption Model. In: Sriwijaya International Conference on Information Technology and Its Applications. [online]. Available at https://www.atlantis-press.com/proceedings/ siconian-19/125939941. Accessed at September 9, 2024.
44. Naye F, Décary S, Tousignant-Laflamme Y. Development and content validity of a rating scale for the pain and disability drivers management model. Archives of Physiotherapy 2022;12(1).
45. Kim YH, Jung YS, Min J, et al. Development and validation of a nursing professionalism evaluation model in a career ladder system. PLoS One 2017;12 (10):1–14.
46. Guraya SS, Yusoff MSB, Mat Nor MZ, et al. Validating the Medical Education e-Professionalism Framework Using the Content Validity Index. Education in Medicine Journal 2022: 14(3):25–47.
47. Aithal A, Aithal PS. Development and Validation of Survey Questionnaire & Experimental Data-A Systematical Review-based Statistical Approach. International Journal of Management, Technology, and Social Sciences (IJMTS) 2020;5(2):2581–6012.