

Original Research



Translation, adaptation and validation of the Sinhala Version of Weight Efficacy Lifestyle Questionnaire Short Form (WEL-SF) for women

Deshani Herath^{1*} & Anuradhani Kasturiratne²

¹Health Promotion Bureau, Ministry of Health, Sri Lanka; ²Department of Public Health, Faculty of Medicine, University of Kelaniya, Sri Lanka

*Correspondence: chandishani11@yahoo.com

 <https://orcid.org/0000-0001-7625-2392>

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Abstract

Introduction: The global obesity burden is rising alarmingly due to unhealthy lifestyle behaviours and environmental factors. To date, prevention and treatment efforts to combat obesity mainly focus on lifestyle modifications through diet and physical activity. Eating self-efficacy has been related to weight loss and is considered a significant predictor of weight loss in an individual. The Weight Efficacy Lifestyle Questionnaire Short Form (WEL-SF) is an American instrument used for research and clinical purposes to measure self-efficacy for controlling eating in specific situations.

Objectives: Translation, cultural adaptation and validation of the WEL-SF

Methods: A sample of 100 women aged ≥ 18 years who were attempting to reduce their weight through self-monitored non-therapeutic diet control in Panadura Medical Officer of Health (MOH) Area, Sri Lanka was recruited using a purposive sampling method. Data were collected using a self-administered questionnaire with socio-demographic information and Sinhala version of the WEL-SF. The construct validity was evaluated by Exploratory Factor Analysis (EFA) using Principal Component Analysis (PCA), while the reliability of the scale was determined by Cronbach's alpha.

Results: The eight-item WEL-SF showed a one-factor solution by EFA. All the items on the scale were retained. The model explained a total variance of 59.35%. The internal consistency of WEL-SF was 0.905 using Cronbach's alpha. The test-retest reliability of the instrument had a high Spearman's correlation of more than 0.7.

Conclusions & Recommendations: The Sinhala version of WEL-SF for women to assess self-efficacy levels in overeating appears to be psychometrically valid with high reliability. This instrument can be recommended as a screening tool to assess self-efficacy levels in women striving for a healthy weight.

Keywords: validation, overeating, Weight Efficacy Lifestyle Questionnaire Short Form, women, Sri Lanka

Introduction

The global prevalence of obesity has shown a concerning upward trend, with rates nearly tripling since 1975 (1). As of 2016, approximately two billion adults aged 18 years and older, were identified as overweight, highlighting the gravity of the issue (1). Sri Lanka, situated in South Asia and classified as a lower-middle-income country, is not immune to the escalating burden of overweight and obesity. According to data from the 2015 STEPS, approximately 30% of adults in Sri Lanka were either overweight or obese, with notable gender differences observed, as 35% of women and 25% of men were affected (2). In the WHO regions of Southeast Asia, the Eastern Mediterranean, and Africa, the prevalence of obesity is higher among women when compared to their male counterparts (3).

The escalating prevalence of obesity in Sri Lanka poses significant health consequences as a risk factor for non-communicable diseases, with approximately 20% of the adult population suffering from dysglycaemia and 11% from type II diabetes (4). To address the challenges of overweight and obesity in the country, an essential approach is to target lifestyle modification, while considering the underlying social determinants (5-6). Early intervention in the form of lifestyle modifications holds promise in delaying or preventing obesity among at-risk populations (6). However, achieving and maintaining ideal weight is often challenging due to various predictors, one of which is self-efficacy.

Self-efficacy, a psychological construct, refers to an individual's belief in their abilities to develop and implement strategies necessary to manage the situations they encounter or may encounter (7). It plays a crucial role in determining the extent to which individuals can effectively engage in and sustain lifestyle changes. Numerous studies have reported a positive association between high levels of self-efficacy and successful weight management (8-9).

The WEL-SF is a commonly used measure in primary care settings to assess levels of self-efficacy concerning weight loss treatment interventions. It consists of 20 items and five factors (10). To address the need for a concise measure of eating self-efficacy, Ames et al. modified the original version of the WEL, condensing the assessment to eight-items (11). The selected scenarios in the WEL-SF primarily revolve around challenges encountered when resisting eating urges in the presence of increased food availability, negative emotions or social pressures (11). The utility and adaptability of the WEL-SF have been recognized beyond its original development, leading to its translation into various languages such as Persian, Turkish and Norwegian (12-14). The availability of the WEL-SF facilitates cross-cultural research and enables a broader understanding of self-efficacy in managing eating behaviours across diverse populations. The present study aimed to translate and culturally adapt the WEL-SF into Sinhala language, with the aim of evaluating the psychometric properties of this adapted version among women engaged in weight reduction through self-monitored non-therapeutic diet control.

Methods

This study was conducted in Panadura MOH Area in Kalutara District, Sri Lanka, from January to March 2018. A purposively selected sample of women aged 18 years or older who were engaged in weight reduction through self-monitored non-therapeutic diet control was recruited. Participants were excluded if they were pregnant or lactating within six months of childbirth at the time of the survey or if they were severely ill or diagnosed with a psychiatric illness.

As per the rule of thumb, it is recommended to use at least 10 subjects per item of the given instrument or scale for item analysis and EFA (15). The original WEL-SF comprised eight self-administered items, leading to the determination of a final sample size

calculated at 1:10 ratio per item, with an additional 20% allowance for potential non-response rates. Consequently, the total sample size was determined as 100, considering the feasibility and availability of resources. Data collection was facilitated by two trained data collectors, under the guidance of an area public health midwife, who assisted in locating eligible participants. In instances where more than one eligible participant resided within the same household, a random selection process was applied to ensure unbiased representation. The recruitment of study participants continued until the desired sample size was attained.

The data collection instrument consisted of two components. The first component gathered socio-demographic information and the second component consisted of the Sinhala version of the 100-point Likert-type WEL-SF scale, with response options ranging from 0 (Not confident at all) to 100 (Very confident). The scale's total score could reach a maximum of 800 (8 x 100) and encompassed eight questions, where in participants were asked to assess their level of confidence in resisting overeating across various situations. A higher score indicated greater resistance to overeating behaviour in the given situations (11).

Two independent bilingual experts were involved in the forward and backward translations of the questionnaire. The final Sinhala translation was back translated to English by a third bilingual expert. Face and content validity were assessed by a group of six experts in the fields of public health and psychology. The modified Delphi technique was used to gather the individual assessments of each reviewer. Each reviewer evaluated the translated questionnaire along with the original version, assessing item suitability for content, cultural appropriateness, and equivalent meaning on a five-point ordinal scale, where 1 represented "not appropriate" and 5 indicated "highly appropriate". Items rated 4 or above were considered acceptable, while those rated below 4 were subjected to modification or elimination. The scoring scale was

suggested to use 0-100 rather than 0-10 as in the original scale to enhance the user-friendliness of the questionnaire.

Data analysis

Data were analysed using Statistical Package for Social Sciences (SPSS) version 22.0. The construct validity of the questionnaire was assessed using EFA. Exploratory PCA was conducted using the Kaiser criterion and scree plot. Internal consistency of the WEL-SF was evaluated using Cronbach's alpha, while test-retest reliability was measured using Kappa, after administering the questionnaire to 20 participants and re-administering it two weeks later for comparison.

Results

All eight items in the tool were rated as appropriate for measuring the self-efficacy of the target population. The results indicated a high level of agreement among the panel, and the items were found to be in line with the Sri Lankan culture. The wording of the WEL-SF was slightly modified from the original version to make it more suitable for the local context. Translating Item 1 of the original WEL-SF ("I can resist overeating when I am anxious or nervous") into Sinhala while preserving its precise meaning posed a considerable challenge. This difficulty arose from the realization that an exact translation might not be readily familiar to the general population in Sri Lanka. Consequently, the expert panel recommended the inclusion of specific examples illustrating situations in which participants commonly experience anxiety. Furthermore, the Likert scale underwent modification, now featuring a 0-100 range. Within this scale, a rating of zero signified "Not confident at all to resist the desire to eat", while the highest rating of 100 indicated "Having very high confidence to resist the desire to overeat".

A total of 100 women were interviewed for the study, resulting in 100% response rate. The majority of the

participants were Sinhalese (95.0%), married (80.0%) and housewives (66%), signifying the inclusion of a substantial number of individuals

primarily engaged in domestic duties Less than 50% had completed their high school education (48.0%) and in better-paid employment (48%) (Table 1).

Table 1: Distribution of the participants by socio demographic characteristics (N=100)

Socio demographic characteristics		No.	%
Age categories (Years)	25-29	5	5.0
	30-34	22	22.0
	35-39	29	29.0
	40-44	34	34.0
	45-49	9	9.0
	50-54	1	1.0
Ethnicity	Sinhala	95	95.0
	Tamil	4	4.0
Religion	Buddhist	87	87.0
	Hindu	4	4.0
	Roman Catholic	8	8.0
Marital status	Unmarried	15	15.0
	Married	80	80.0
	Divorced	2	2.0
	Separated	3	3.0
Level of education	*Up to GCE O/L	43	43.0
	**Up to GCE A/L	48	48.0
	Technical/Professional education	9	9.0
Monthly income (LKR)	<14,999	29	29.0
	15,000-49,999	48	48.0
	≥ 50,000.00	23	23.0
Occupational status	Currently employed	34	34.0
	Housewife	66	66.0

*General Certificate of Education-Ordinary Level; **General Certificate of Education-Advanced Level

In the context of EFA, both the Kaiser-Meyer-Olkin Measure (KMO) and Bartlett's test of sphericity yielded statistically significant results ($X^2=438.04$; $df=28$; $p=0.001$), affirming the sample adequacy. The factor structure was explored through PCA, wherein items with loading factors exceeding 0.4 were retained in the factor structure. Eigenvalues greater than 1.0 were extracted, and subsequently, a single factor exhibiting an Eigenvalue >1 was selected (Table 2). The scree plot for Eigenvalue of each component of the WEL-SF is in Figure 1. The

total amount of variance explained by these factors was 59.3%. The communalities extracted for the domain were moderately high (ranging from 0.498 to 0.688), indicating that the extracted components adequately represented the variables (Table 3).

The internal consistency of the Sinhala version of WEL-SF was 0.905. The test-retest reliability indicated that all items had a Spearman's correlation of more than 0.7.

Discussion

This study aimed to assess the validity and reliability of the eight-item WEL-SF in its Sinhala translation among women aged ≥ 18 years. The instrument underwent a comprehensive translation process, adhering to standard guidelines for cross-cultural

adaptation, and incorporating expert consensus. Utilizing EFA, the WEL-SF scale yielded a one-factor solution, explaining a substantial total variance of 59.3%. The findings confirmed that the Sinhala translation of WEL-SF demonstrated validity and reliability as an instrument to evaluate self-efficacy related to overeating behaviour.

Table 2: Factor structure and exploratory factor loading of the items in the Sinhala version of the WEL-SF questionnaire

Factor	Items	Factor loading
I	1. I am confident that I can resist overeating when I am anxious (or nervous)	0.624
	2. I am confident that I can resist overeating on the weekend	0.647
	3. I am confident that I can resist overeating when I am tired	0.688
	4. I am confident that I can resist overeating when I am watching TV	0.624
	5. I am confident that I can resist overeating when I am depressed (or down)	0.655
	6. I am confident that I can resist overeating when I am in a social setting	0.489
	7. I am confident that I can resist overeating when I am angry (or irritable)	0.498
	8. I am confident that I can resist overeating when others are pressuring me to eat	0.519

Table 3: Total variance explained by the model in the WEL-SF

Component	Initial Eigenvalues			*Extraction sums of squared loadings		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	4.744	59.299	59.299	4.744	59.299	59.299
2	.969	12.112	71.411			
3	.648	8.105	79.516			
4	.404	5.049	84.565			
5	.385	4.810	89.375			
6	.342	4.277	93.652			
7	.269	3.358	97.010			
8	.239	2.990	100.000			

*Extraction method: Principal Component Analysis

The instrument was validated using both judgmental and constructive methods and subjected to a modified Delphi technique. A panel of experts with different professional qualifications contributed to the judgmental validity of the present study. This

multi-perspective approach to content assessment constitutes a notable strength of the present study. In order to enhance participants’ comprehension and ease of interpretation, the Likert scale in the instrument was modified to encompass a range from

'0' to '100'. This modification was grounded in previous research demonstrating that self-efficacy scales utilizing a 0-100 response format exhibited stronger psychometric properties compared to traditional Likert scales (16).

The study participants predominantly fell within the age range of 25 to 54 years, even though the eligibility criteria encompassed individuals aged 18 years and older. This age distribution aligns with the recruitment approach utilized during the development of the original version of WEL-SF, where participants aged over 18 years were recruited (11). Specifically, in the American study, the median age of the study group was 49 years, with an age range spanning from 18 to 80 years, and the female participants constituted 74.2% of the total sample (n=751). In contrast, the Persian version recruited women with a mean age of 35.01 years (12), while the Norwegian version focused on a Caucasian population, primarily comprising women (69.3%) (14). Distinctively, the Turkish version of the instrument diverged from the others, as it was validated among adolescents aged 14 to 28 years, representing a unique instance where adolescence and young adulthood were considered for the validation of this instrument within a non-clinical setting (13).

In psychometric testing, WEL-SF demonstrated a single factor with high internal consistency (Cronbach's $\alpha=0.905$). This result was comparable to the original study (Cronbach's $\alpha=0.95$) (11) and the internal consistency of the Norwegian version (0.92) (14). The internal validity was further assessed by determining the percentage of ceiling and floor effects. For an instrument, the optimal ceiling and floor effects should fall between 1% and 15% (17). In the present study, the ceiling effect ranged from 8% to 13%, while the floor effect ranged between 3% and 14%, indicating good internal validity of the instrument. However, these values could not be compared with the original study as they were not provided in the original study (11).

In the context of EFA, the KMO measure was 0.885, indicating a high level of sampling adequacy. Moreover, the significance of Bartlett's test of sphericity at the 95% confidence level ($p=0.001$) further substantiates the suitability of employing factor analysis for the data. It is noteworthy that previous investigations conducted in America, Iran, Turkey, and Norway exhibited a higher number of recruitments in comparison to the current study (11-14). Nevertheless, the relatively high value of KMO in our study suggests that the sample size did not significantly influence the study's outcomes.

In the present study, having a one-factor solution, the PCA successfully accounted for 59.3% of the total variance, as indicated by an eigenvalue of 4.744. In contrast, the original instrument developed by Ames et al, accounted for only 49 % of the variance with a one-factor solution, slightly lower than the findings of the current study (11). Notably, the Turkish adapted scale for adolescents exhibited a comparable total variance (49.1%) to the original version (13). Nonetheless, these results suggest that the properties of the original version are largely preserved in the Sinhala version of WEL-SF. The minor variations observed could be attributed to variation in sample sizes and the distinct socio-cultural backgrounds of the study population. Consequently, these findings further support the suitability of the Sinhala version of WEL-SF as an appropriate instrument for use among adult females in Sri Lanka who aspire to modify their overeating behaviour and achieve a healthy body weight.

To the best of our knowledge, this study presents the first validated instrument to measure self-efficacy in managing overeating among women in Sri Lanka, within a non-clinical setting. The response rate in the present study was high, which can be attributed to the purposive sampling procedure used in the study. This method was deemed appropriate, given the practical challenges in identifying eligible participants in the local context. Purposive sampling is a non-probability sampling technique, which entails both

advantages and disadvantages. One of its merits lies in the ability to recruit a diverse range of study participants, facilitating a maximum level of variation relevant to the study objective. However, it is essential to acknowledge that due to the nature of this sampling approach, the research findings may not be readily generalizable.

Despite the strengths of the WEL-SF validation process in this study, certain limitations should be acknowledged. Firstly, the study focused exclusively on women recruited from non-clinical settings. In contrast, validation studies conducted in other countries involved a larger sample comprising both men and women, primarily consisting of morbidly obese patients within clinical setting, either awaiting bariatric surgery or referred to a community centre for overweight/obesity management. using a large sample. The only exceptional occasion was the Persian version of the WEL-SF, where they recruited only women referred to health centres (12).

Additionally, it is important to note that the present study did not validate the instrument among the male population or in the Tamil language. The Tamil language is considered Sri Lanka's second official language. However, the inability to respond in Sinhala was considered as exclusion criterion as it was beyond the scope of the present study. Moreover, while the recruitment criteria specified women aged 18 years or older, it is noteworthy that the majority of participants fell within the range of 25 to 49 years. Consequently, the generalizability of the findings to the elderly population may be limited. These limitations necessitate careful interpretation of the study's outcomes and underscore the potential for future research to address these gaps in the assessment of WEL-SF's validity in different populations and languages.

The WEL-SF instrument was validated through a triangulation of methods. The construct validity of the factor structure was derived using PCA, but it

was not further validated using CFA. The EFA is often considered appropriate at an early stage of scale development as misspecification of the number of factors may not be detected by CFA, allowing for the identification of the underlying factor structure. However, when the study population differs from the original validation study population, conducting EFA to verify the original structure may be instructive (18). CFA, on the other hand, tests the hypothesis that a relationship exists between the observed variables and their underlying latent constructs exists. It is suitable when there is a well-structured theory to be tested but does not show how well the item in a scale load on non-hypothesized factors (19). Since the scope of the present study was only to identify the underlying factor structure, CFA was not conducted, which is a both a limitation and a recommendation for future research.

Although CFA was not performed in the original scale of the American study, the present study findings have more similarities to it (11). One important fact is that the EFA confirmed a single-factor structure of the scale with factor loadings of more than 0.4, showing many similarities with the original study findings. This further supports the preservation of the original scale's structure in the Sinhala version of WEL-SF.

Conclusions & Recommendations

The Sinhala translation of Weight Efficacy Lifestyle Questionnaire Short Form for women, used to assess self-efficacy levels in overeating, appears to be psychometrically valid with high reliability. This instrument can be recommended as a valuable screening tool for evaluating the self-efficacy levels of women striving to attain a healthy weight by managing their overeating behaviour. Future research should prioritize additional validation of the WEL-SF and assess its effectiveness to ensure its utility and applicability across diverse populations.

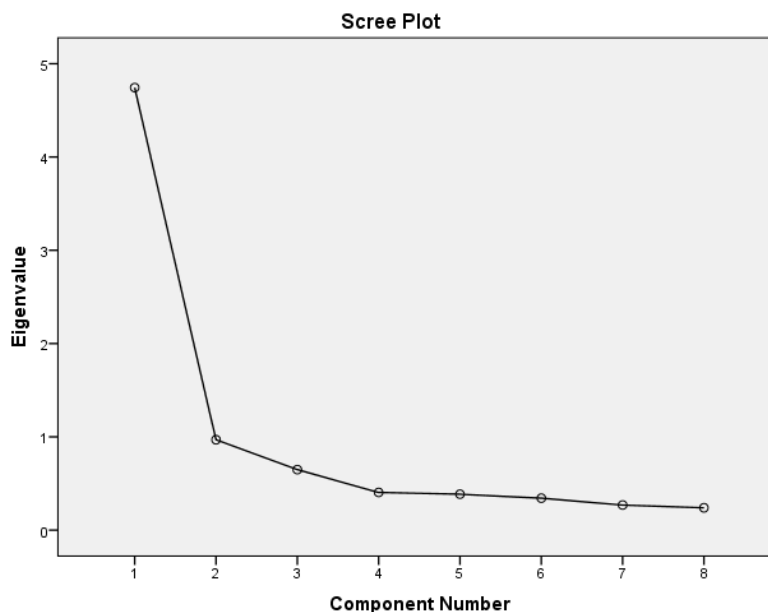


Figure 1: Scree plot in Principal Component Analysis of the Sinhala version of WEL-SF questionnaire

Public Health Implications

- The assessment of the self-efficacy level in improving their health behaviour is important to understand their personal sense of control over the desirable behaviour.
- The Sinhala version of the Weight Efficacy Lifestyle Questionnaire short form for women has been found to possess a high level of validity and reliability. This tool assists in identifying the necessary changes in self-efficacy levels to control overeating behaviours and achieve a healthy weight.

Author Declarations

Competing interests: The authors declare that they have no competing interests.

Ethics approval and consent to participate: Ethics approval was granted by the Ethics Review Committee of the Faculty of Medicine, University of Kelaniya (Reference number P/21/01/2018). Prior to conducting the

study, permission was obtained from the original authors of the WEL-SF, RDHS Kalutara District and respective MOH areas. Informed written consent was obtained from the participants.

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Author contributions: DCK Herath conducted the research as principal investigator. KTAA Kasturiratne contributed as the technical supervisor of the research project.

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