Psychometric Properties of the Indonesian Version of Youth Quality of Life-Weight Instrument (YQOL-W)

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Abstract

Quality of life refers to a broad concept that describes life satisfaction in terms of culture, value, and life experiences which are used to explain someone's life aspect in general or specifically in relation to a particular condition, such as being overweight or obese. Obesity causes many health problems and affects the overall quality of life. As the obesity rate continues to be a growing public health problem in Indonesian adolescents, examining the perceptions regarding their weight is fundamental for planning a proper intervention. However, there has been little reported of available weight-specific instruments that measure the QoL in Indonesia. Youth Quality of Life-Weight (YQOL-W) is a multicultural measurement of QoL-weight that was specifically recommended by previous researchers to measure the QoL of adolescents with obesity and overweight conditions. This study was conducted to evaluate the psychometric properties of the adapted YQOL-W instrument for Indonesian adolescents. Twenty-one items were administered to 880 adolescents between 11 and 18 years of age, of whom 54.55% were female and 71.14% were junior high school students. Data were collected with a convenience sampling technique. Confirmatory factor analysis showed that a three-factor model had an acceptable model fit, including a Self factor (4 items), Social factor (12 items), and Environment factor (5 items) with p < .05. The YQOL-W instrument had good internal consistency reliability with Cronbach's alpha ranging from .87 to .95 and acceptable test-retest reliability with the intraclass correlation coefficients (ICC) all greater than .70. The one-factor and three-factor scores were negatively correlated with BMI and positively correlated with PedsQL (all at p < .01 level). In conclusion, the Indonesian version of the YQOL-W shows good reliability and validity for assessing the weight-specific QoL of adolescents in Indonesia.

Keywords: adolescent, confirmatory factor analysis, obesity, overweight, quality of life, weight

Abstrak

Kualitas hidup merupakan suatu konsep luas yang menggambarkan kepuasan hidup seseorang dalam hal budaya, nilai, dan pengalaman hidup yang digunakan untuk menjelaskan aspek kehidupannya secara umum atau khusus pada suatu kondisi tertentu, seperti kelebihan berat badan atau obesitas. Obesitas menyebabkan banyak masalah kesehatan dan mempengaruhi kualitas hidup secara keseluruhan. Oleh karena tingkat obesitas terus menjadi masalah kesehatan masyarakat yang kian meningkat pada remaja Indonesia, menguji persepsi mereka tentang berat badan sangat penting demi perencanaan intervensi yang tepat. Namun, hanya sedikit penelitian terdahulu yang mengukur kualitas hidup di Indonesia khusus instrumen terkait berat badan. Youth Quality of Life-Weight (YQOL-W) *adalah pengukuran multikultural kualitas hidup terkait berat badan yang secara khusus direkomendasikan oleh peneliti sebelumnya untuk mengukur kualitas hidup remaja dengan kondisi obesitas dan kelebihan berat badan. Penelitian ini dilakukan untuk mengevaluasi properti psikometri instrumen* YQOL-W *yang telah diadaptasi untuk remaja Indonesia. Dua puluh satu item diberikan kepada 880 remaja berusia 11 hingga 18 tahun, di antaranya 54.5% adalah perempuan dan 71.14% adalah siswa sekolah menengah pertama. Data dikumpulkan dengan teknik* convenience sampling. *Analisis faktor konfirmasi menunjukkan bahwa model tiga faktor memiliki kecocokan model yang dapat diterima, termasuk* Self factor *(4 item),* Social factor *(12 item), dan* Environment factor *(5 item) dengan p <.05. Instrumen* YQOL-W *memiliki reliabilitas konsistensi internal yang baik dengan* alpha Cronbach *mulai dari .87 hingga .95 dan reliabilitas* test-retest *yang dapat diterima dengan* intraclass correlation coefficients *(ICC) seluruhnya lebih besar dari .70. Skor satu faktor dan tiga faktor berkorelasi negatif dengan* BMI *dan berkorelasi positif dengan* PedsQL *(semuanya pada level p <.01). Maka dari itu,* YQOL-W *versi bahasa Indonesia menunjukkan reliabilitas dan validitas yang baik untuk mengukur kualitas hidup spesifik berat badan pada remaja di Indonesia.*

Kata Kunci*: analisis faktor konfirmatori, berat badan, kelebihan berat badan, kualitas hidup, obesitas, remaja*

Introduction

Obesity is defined as excessive fat accumulation due to an imbalance in energy intake with the energy used for a long time and poses a risk to health (WHO, 2019). Obesity and overweight are health problems experienced by almost all countries worldwide. The World Health Organization (WHO, 2019) states that being obese and overweight has become a global epidemic. Obesity and overweight pose a threat to society and the growing populations in several countries. In 2008, it was reported that 200 million men and 300 million women were obese. WHO (2019) stated that 65% of the world's population who are obese and overweight have a higher risk of dying.

The obesity rate keeps becoming a public health concern in Indonesia, especially among adolescents (Kementerian Kesehatan RI, 2021). The social and economic transition and the increasing adoption of modern lifestyles, such as the consumption of fast food that is high in fat and less mobility, have made Indonesia enter the stage of an obesity epidemic in childhood and adolescence (Kementerian Kesehatan RI, 2018). There has been an increase of about 33% in adolescents with obesity and overweight, which is about three times bigger since 1980, and the prevalence of obesity in adolescents has doubled since then (Lee et al., 2012). The same thing also happened in Indonesia, where the obesity rate increased by 4.4% compared to data in previous years (Kementerian Kesehatan RI, 2018). Moreover, obesity has become a national problem among adolescents aged 13-15 years, or about 10.8% consisting of 8.3% overweight and 2.5% obese (Kementerian Kesehatan RI, 2018). Data on the proportion of obesity in adolescents aged 13-15 years on average from each province is 21.8%. Furthermore, the proportion in West Java is higher than in other provinces, which is above 31% (Kementerian Kesehatan RI, 2018).

Being overweight and obese in adolescence is associated with various future health consequences (Anderson et al., 2017; Friedlander et al., 2003; Gow et al., 2020; Rachmi et al., 2017). Some of these health problems are an increased risk of coronary heart disease (Lee et al., 2012), type 2 diabetes mellitus, cardiovascular disease, and other obesity-related complications that affect almost every organ of the body, from orthopedic problems to sleep apnea (Rachmi et al., 2017), and have the risk of obesity comorbidities that can lead to premature death and long-term comorbidities (Nugroho, 2020; Yuca, 2012). Not only health problems but obesity and overweight in adolescence also have the most common short-term consequences, that is, psychosocial problems, such as mockery, exclusion, and discrimination (Anderson et al., 2017; Avalos et al., 2020; Gow et al., 2020; Griffiths et al., 2010; Kharistik A et al., 2018; Reel et al., 2015). Adolescents with obesity tend to be socially isolated and have lower levels of self-esteem, and experience higher levels of eating disorders, anxiety, and mood disorders, such as depression (Anderson et al., 2017; Avalos et al., 2020; Gow et al., 2020; Griffiths et al., 2010; Lee et al., 2012; Nurvita, 2015). Several studies have also found that overweight and obese adolescents experience a decreased quality of life compared to their normal-weight peers (Anderson et al., 2017; Friedlander et al., 2003; Jalaham et al., 2021; Morales et al., 2011). Research even found that adolescents with obesity had a similar quality of life to adolescents diagnosed with cancer (Yu et al., 2019).

Quality of life (QoL) is an individual's perception of their position in various aspects of life, which is reviewed based on the cultural context, life experience, and value system in their environment (WHO, 2014). It is a comprehensive concept that is influenced in a complex way by their physical health, psychological state, personal beliefs, social relationships, and the associations with important features of their environment. Cella (1994) defines the quality of life as the gap between a person's actual functional level and his ideal standard.

The development of QoL instruments in adolescents, especially those specific to certain conditions, has continued in the last decade (Kolotkin & Crosby, 2002; Morales et al., 2011; Zeller & Modi, 2009). Solans et al. (2008) stated that 27 lists of QoL instruments were explicitly compiled for certain diseases in children and adolescents between 1980-2006, with asthma, cancer, and epilepsy as the most common

conditions. The majority of these measuring tools focus on the functional status and activity performance of children and adolescents daily. However, there are not many instruments that measure perceptions and involve adolescents directly in the critical stage of developing instruments (Edwards et al., 2002; Morales et al., 2011).

Research on adolescents' QoL in Indonesia is currently expanding (Dewi et al., 2021; Jalaham et al., 2021; Wardani et al., 2017). However, there are still few studies that use appropriate and specific adolescent QoL measurements to assess the impact of a pediatric condition/disease on adolescents. The majority of studies use an English translation instrument without qualitative research and proper validation. In addition, other studies use a generic QoL measurement designed for adults, such as Health-Related Quality of Life (HRQoL) (Dewi et al., 2021; Farahdina, 2018; Jalaham et al., 2021; Wardani et al., 2017; Widjaja et al., 2019). QoL instruments can be classified into two, that is (1) Generic QoL instruments that can be used on a wide range of individuals, including those with good health conditions and those with certain diseases, for example, HRQoL and PedsQL; (2) Condition-specific QoL instruments that are only applicable to individuals with one particular condition, such as Impact of Weight on Quality of Life-Lite (IWQoL-Lite) and Sizing Me Up. Generic QoL measurements facilitate comparisons between individuals with various conditions and without any conditions. On the other hand, the main advantage of condition-specific instruments over generic ones is that they are more sensitive to the particular QoL impacts affected by a specific condition (Morales et al., 2011).

The results of the conducted literature review showed that the weight-specific QoL instruments for adolescents in Indonesia had been little reported to date. Moreover, most studies in Indonesia use the generic HRQoL or PedsQoL to measure the QoL of obese and overweight adolescents relevantly according to their conditions. In direct response to the need for a measure of weight-specific QoL for adolescents with obesity and overweight in Indonesia, a careful adaptation and psychometrically robust measurement are required. The Youth Quality of Life-Weight (YQOL-W) instruments which have been comprehensively developed by the Seattle Quality of Life Group (SeaQoL) at the University of Washington, appear to meet all the psychometric standards compared with other weight-specific patient-reported outcomes (PRO) instruments (SeaQOL, 2010).

Previous studies have examined the validity and reliability of the YQOL-W instrument. A study conducted by Morales et al. (2011) on 443 children and adolescents aged 11-18 years in the United States showed that YQOL-W had good internal reliability ($\alpha = 0.97$) and construct validity. Confirmatory Factor Analysis (CFA) performed on 21 items showed a fit model (CFA = 0.90; TLI = 0.89; RMSEA = 0.10). YQOL-W was also found to be negatively correlated with body mass index ($r = -0.41$, $p < 0.01$) as well as the subject's level of depression ($r = -0.58$, $p < 0.01$) and was positively correlated with a generic measure of QoL, Youth Quality of Life-Research ($r = 0.57$, $p < 0.01$). The research of Jiang et al. (2014) on 814 adolescents in China also showed good reliability ($\alpha = 0.96$), a fit CFA model (GFI = 0.904; RMSEA = 0.061; SRMR = 0.073), and good construct validity. This is indicated by a significant positive correlation with the generic Pediatric Quality of Life – PedsQL instrument ($r = 0.465$, $p < 0.01$).

Evidence of reliability and validity indicates that the YQOL-W scale provides a statistically significant response in obese and overweight adolescents. However, the use of the YQOL-W scale needs to be readjusted and adapted according to the characteristics of the research sample, especially in Indonesia, which has different characteristics from previous studies. The difference in the characteristics of this sample is due to several factors, such as differences in educational background, health status, social status, and culture. Therefore, this study aims to evaluate the measurement properties of the Indonesian version of the YQOL-W and examine whether it can be used to assess the weight-specific QoL of adolescents aged 11-18 years in Indonesia.

Methods

Sample and Research Design

In order to address the research questions, this study used a quantitative approach that focuses on gathering and analyzing numerical data and hypothesis testing on the obtained empirical data (Goodwin, 2017). The research design used in this study was non-experimental, that is, testing the psychometric properties and validating the adaptation results of the YQOL-W instrument. The entire research procedure had been reviewed and approved by Padjadjaran University Research Ethics Committee. The objectives of the study and all procedures involved were explained to the junior high school and senior high school authorities for getting approval to collect data on the 7th, 8th, 9th, 10th, 11th, and 12th graders at the school. All the primary data were analyzed anonymously and obtained using an online questionnaire via Google Forms. The population in this study was adolescents in Indonesia. The type of sampling used was convenience sampling, a technique based on willingness from the sample (Scheaffer et al., 2011).

After getting permission, an online questionnaire was given to the school, specifically the Guidance and Counseling teachers, who distributed the research questionnaire. The participants were asked to fill out the questionnaires, including research-related information as well as informed consent, personal demographic information, the Indonesian version of the YQOL-W, and PedsQL4.0 Generic Core Scales. All items on the questionnaires were mandatory and needed to be filled in based on the actual conditions experienced at that time. In order to ensure the validity of the obtained sample, participants' attention was checked by using the Instructional Manipulation Check (IMC), which is a tool used to detect participants who did not pay close attention to instructions. IMC is given by making one item that is the same length and has the same way of responding as other items, but this item requires participants to perform unexpected activities (Gosling & Mason, 2015). In this study, the IMC item inserted in the questionnaire was "This statement is intended to check your focus. Thus, regardless of what you are feeling right now, please choose number two". The filling-out process took about 5-10 minutes.

Participants

Only Bandung residents aged 11 to 18 enrolled in junior high school (JHS), and senior high school (SHS) were eligible to participate in this study. This study involved 880 respondents (N JHS = 626, N SHS = 254). Table 1 presents the proportion of gender that indicates this study was dominated by women (54.55%), and the majority of respondents were junior high school students (71.14%). The age of the respondents ranged from 11 to 18 years and had a mean of 13.77 years (SD = 1.81). About 37.95% of respondents had average weight, 34.43% were underweight, 15.91% were obese, and 10.68% were overweight.

Table 1. Demographic Characteristics of the Sample.

	Category	Total	Percentage (%) N = 880
Age	Mean = 13.77 (SD = 1.81)		
Gender	Woman	480	54.55
	Man	400	45.45
Level of Education	Junior High School	626	71.14
	Senior High School	254	28.86
BMI Classification	Underweight	303	34.43
(Body Mass Index)	Normal Weight	334	37.95
	Overweight	94	10.68
	Obesity	140	15.91

Instruments

The Indonesia Version of the YQOL-W

The instrument used in the data collection is Youth Quality of Life-Weight (YQOL-W), which was developed by SeaQOL (2010) and has been adapted into the Indonesian version. YQOL-W consists of 21 items that measure three dimensions, that is (1) Self (4 items), (2) Social (12 items), and (3) Environment (5 items). These items were filled out using an 11-point Likert scale with a range of 0 (Not At All) to 10 (Very Much) according to the current state of the individual. The total score of each dimension was averaged. The greater the average score indicates, the higher level of weight-specific QoL in adolescents.

There was a simplified meaning of language in the instrument during the adaptation process. The simplification of the instrument was done to make it easier to be understood by adolescent respondents from various backgrounds. For example, replacing the word "*aktivitas sosial*" with "*keramaian*" and giving the meaning of the word "loser" according to Kamus Besar Bahasa Indonesia (KBBI, 2016). Adjustments were also made to the content of the instrument, for example changing the statement "*Karena berat badan saya, saya merasa perlu memakai pakaian yang menutupi badan saya*" to "*Karena berat badan saya, saya merasa perlu memakai pakaian yang dapat menyembunyikan bentuk badan saya*". The grid of the YQOL-W instrument is listed in Table 2.

Table 2. The YQOL-W Instrument Grid Specification.

Dimension	Definition	Number of Items	Item Number	Item Sample
Self	Refers to adolescents' feelings about themselves	4	1, 2, 3, 4	2. *Saya merasa malu dengan berat badan saya*
Social	Pertains to adolescents' relationships with others, including family and peer relationships	12	5, 6, 7, 8, 9, 10, 11, 12, 15, 16, 17, 18	5. *Karena berat badan saya, orang lain berpikir saya tidak menarik*
Environment	Pertains so opportunities and obstacles in adolescents' social and cultural milieu	5	13, 14, 19, 20, 21	13. *Karena berat badan saya, tubuh saya terasa tidak nyaman ketika bergerak*
	Total	21		

The Indonesian Version of the PedsQL 4.0 Generic Core Scales

The Pediatric Quality of Life Inventory Measurement Model (PedsQL) was first developed by Varni et al. (2001). It includes a general core scale and several disease-specific modules. The PedsQL General Core Scale has 23 items grouped into four subscales: (1) Physical functioning (8 items), (2) Emotional functioning (5 items), (3) Social functioning (5 items), and (4) School functioning (5 items). It was reported to have strong internal consistency reliability and validity for the overall scale and subscales, both of which were over 0.70 and could distinguish between healthy children and pediatric patients with acute or chronic health conditions (Varni et al., 2001). It was the most commonly used patient-reported outcome instrument for children and adolescents with obesity (Ahuja et al., 2014). The Indonesian PedsQL 4.0 Generic Core Scale has good measurement properties (Nikmah & Mauliza, 2018; Wiwaha et al., 2022). Therefore, it was included in this study to examine the convergent and discriminant validity of the Indonesian YQOL-W.

Validity Evidences

Several methods were done to test the validity of the YQOL-W instrument, which had been adapted into Indonesian, namely, evidence based on internal structure obtained through Confirmatory Factor Analysis (CFA), evidence-based on test content, and evidence-based on relation to other variables. All the analyses were performed using the JASP software.

Evidence-based on Internal Structure

This assesses the dimensionality or primary factors measured in an instrument (Sireci & Sukin, 2013). Evidence-based on the internal structure was determined using *Confirmatory Factor Analysis* (CFA). It is an internal structure of the validity technique that uses a hypothetical model to estimate the population covariance matrix compared to the observed covariance matrix (Kaplan & Saccuzzo, 2018). Indicators for the goodness of fit in determining model fit are CFI, NFI, NNFI, and S-RMR (McDonald & Ho, 2002). To say the model is a good fit, these criteria must be met: the values of CFI, NFI, and NNFI that are greater than 0.90 and S-RMR value are less than equal to 0.08 (Hooper et al., 2008).

Evidence-based on Test-Content

The Content Validity Index (CVI) method was used to collect evidence of the validity from the results of the adaptation of the YQOL-W instrument. CVI is an approach that involves expert reviewers to determine how relevant the items in a measuring instrument are by calculating the average percentage or Average Congruence Percentage (ACP) of each given assessment (Polit & Beck, 2006). The results of the validity test using the CVI method in this study involved three peer reviewers and three experts on the topic of Child and Adolescent Development.

Evidence-based on Relation to Other Variables

The following validity method involved correlating each YQOL-W dimension with a generic QoL instrument, namely PedsQL4.0 Generic Core Scales and the Body Mass Index (BMI). First, YQOL-W and PedsQL measure youths' perception of their position in life in the context of the culture and value systems that affect their fundamental physical, psychological, and social needs (Morales et al., 2010). Therefore, it was predicted that comparable dimensions, like the YQOL-W social domain and PedsQL social functioning dimension, would result in a better correlation compared with less comparable dimensions, such as the YQOL-W social domain and PedsQL school functioning. Second, it was hypothesized that YQOL-W scores would have an inverse correlation with BMI values, as the previous studies had found (Jiang et al., 2014; Nicholls et al., 2014). Thus, weight-specific-QoL scores were expected to decrease as BMI values increased.

All the YQOL-W items are not normally distributed ($p < 0.05$). Hence, the test used is Spearman's rho. If the correlation coefficient is a positive number (+), then the correlation shown by the two variables is unidirectional. On the other hand, if the correlation coefficient is a negative number (-), then the correlation shows an inverse relationship.

Reliability Analysis

Reliability analysis of this instrument was carried out using the internal consistency method, which aims to see the consistency between items with one in measuring the same construct (Kaplan & Saccuzzo, 2018). Internal consistency reliability of the three subscales and the overall YQOL-W items was determined using Cronbach's alpha coefficient and inter-item correlation. Kaplan & Saccuzzo (2018) state that the greater the value of the Cronbach's alpha coefficient and the closer it is to the value of one, the stronger the relationship between the items. The inter-item correlation was also tested to get the level of correlation between items to determine that the items in the instrument measure the

same construct, in this case, the weight-specific QoL. This study used the JASP software to get the Cronbach's alpha coefficient and inter-item correlation of the three subscales and the overall YQOL-W instrument.

Results and Discussion

Results

Evidence-based on Internal Structure

Confirmatory Factor Analysis (CFA) was conducted on 21 YQOL-W items. This test was done using a three-factor model. The calculation of the fit model is CFI = 0.92, NFI = 0.91, NNFI = 0.91, and S-RMR = 0.04. Based on the criteria of Hooper et al. (2008), these four calculations indicate that the YQOL-W instrument has a fit model (CFI, NFI, and NNFI values are greater than 0.90; S-RMR is less than equal to 0.08). The CFA analysis produces a factor loading value that shows the relationship between indicators (observed variables) and factors (latent variables). The factor loading (standardized) value is in the range of -1.00 to 1.00. The closer the factor loading value is to 1.00, the stronger the relationship between factors and indicators. One indication of good construct validity is getting a factor loading value > 0.50 or, ideally > 0.70 (Jr Hair et al., 2018). In addition, the thing that needs to be considered is the level of significance of the factor loading. That is, if the p-value obtained is less than 0.01, then it is considered significant (Jr Hair et al., 2018). Table 3 shows the results of the factor loading of the adapted YQOL-W's CFA model for Indonesian adolescents. The results listed in Table 3 and Figure 1 show that all factor loadings obtained have a value of > 0.70, which range from 0.71 to 0.91, and factor covariances range from 0.84 to 0.87. All items also have p-value < 0.001, which indicates that the factor loading values are significant. Therefore, it can be said that the items on the Indonesian version of YQOL-W have a strong and significant relationship with each dimension being measured.

Table 3. Factor Loading of YQOL-W.

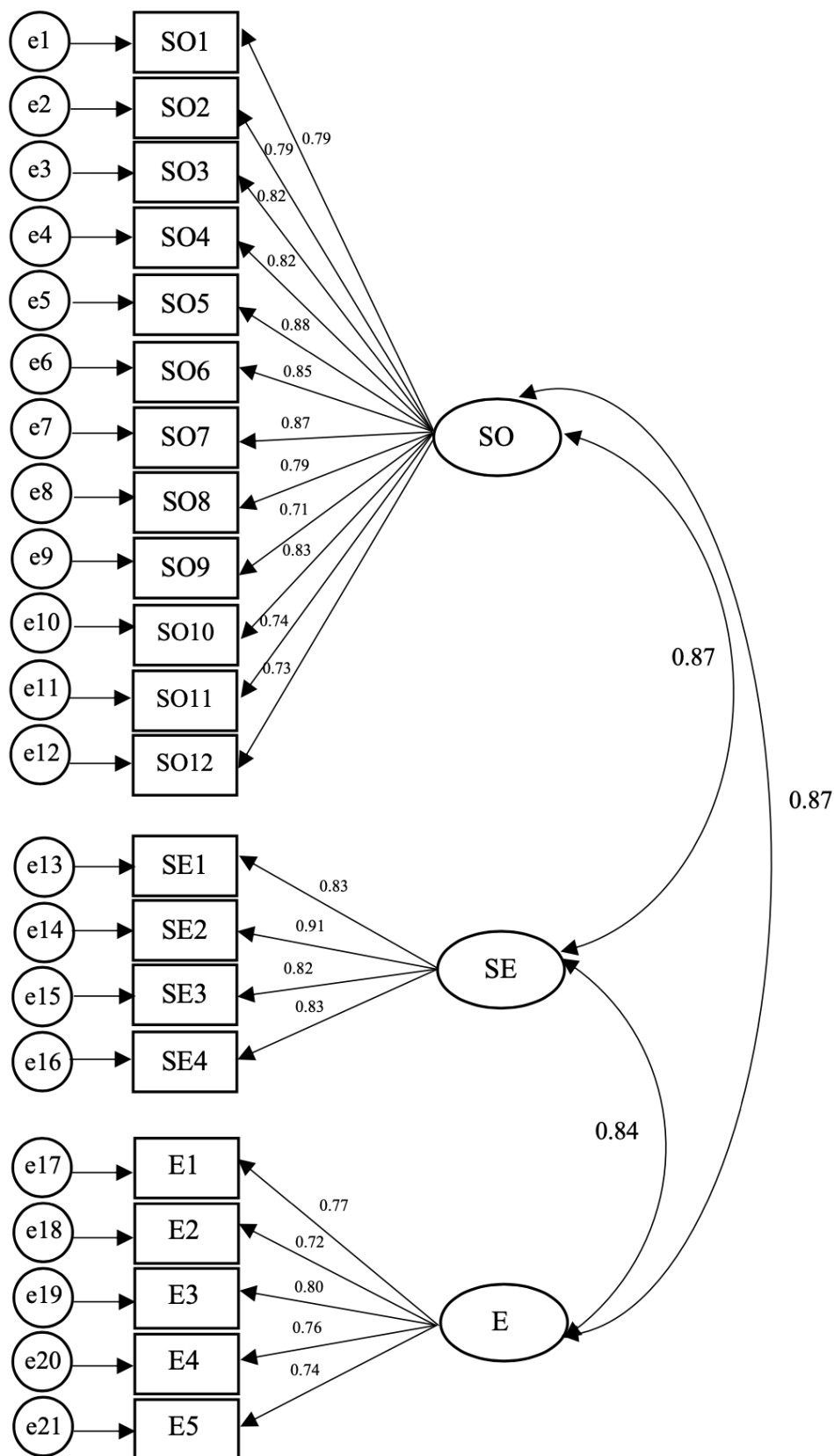| Factor	Indicator	Std. Estimate (Standardized Factor Loading)	Std. Error	p-value
Self (SE)	SE1	0.83	0.08	< 0.001
	SE2	0.91	0.08	< 0.001
	SE3	0.82	0.07	< 0.001
	SE4	0.83	0.08	< 0.001
Covariances SE - SO		0.87	0.01	< 0.001
Covariances SE - E		0.84	0.01	< 0.001
Social (SO)	SO1	0.79	0.07	< 0.001
	SO2	0.79	0.06	< 0.001
	SO3	0.82	0.07	< 0.001
	SO4	0.82	0.05	< 0.001
	SO5	0.88	0.06	< 0.001
	SO6	0.85	0.08	< 0.001
	SO7	0.87	0.07	< 0.001
	SO8	0.79	0.07	< 0.001
	SO9	0.71	0.07	< 0.001
	SO10	0.83	0.06	< 0.001
	SO11	0.74	0.05	< 0.001
	SO12	0.73	0.07	< 0.001
Covariances SO - E		0.87	0.01	< 0.001
Environment (E)	E1	0.77	0.06	< 0.001
	E2	0.72	0.08	< 0.001
	E3	0.80	0.09	< 0.001
	E4	0.76	0.08	< 0.001
	E5	0.74	0.07	< 0.001

Figure 1. Confirmatory Factor Analysis Results of YQOL-W.
*SO: Social, SE: Self, E: Environment

Evidence-based on Test-Content

Results of I-CVI, S-CVI/UA, and S-CVI/Ave. are shown in Table 4. I-CVI is determined as the number of experts giving a rating of "very relevant" for each item divided by the total number of experts, which in this study involved three experts and three peer reviewers. The I-CVI score obtained for 21 YQOL-W items is 1 that exceeds the criteria of 0.79. This indicates that the items of the adapted version of YQOL-W are relevant (Zamanzadeh et al., 2015). Correspondingly, S-CVI is computed using the number of items in the instrument that has achieved a rating of "very relevant" (Zamanzadeh et al., 2015). The first method to calculate S-CVI is using the Universal Agreement (UA) among experts. It is computed by adding all items with I-CVI equal to 1 divided by the total number of items (Zamanzadeh et al., 2015). The acquired S-CVI/UA score is 1, which is greater than the criteria of 0.80. This shows that the YQOL-W has good content validity (Shi et al., 2012). The second method for calculating S-CVI is the Average CVI (S-CVI/Ave.), where the sum of the I-CVIs is divided by the total number of items (Zamanzadeh et al., 2015). The S-CVI/Ave. score for 21 YQOL-W items is also 1 that demonstrates a good content validity of the instrument (Shi et al., 2012). Thus, it can be concluded that the YQOL-W instrument has good content validity and consists of appropriate items in measuring adolescents' perception of the important concepts and items themselves in relation to how weight affects their fundamental physical, psychological, and social needs.

Table 4. CVI Results of YQOL-W.

CVI Classification	Criteria	Score	Interpretation
I-CVI	I-CVI > 0.79	1	Good *content validity*
S-CVI/UA	S-CVI/UA ≥ 0.80	1	Good *content validity*
S-CVI/Ave.	S-CVI/Ave ≥ 0.90	1	Good *content validity*

Evidence-based on Relation to Other Variables

Spearman rho correlation analysis between the YQOL-W score with the PedsQL score and the z-score of BMI confirmed the hypothesis. The analysis showed that the PedsQL score had a significant positive correlation with Self (0.42, $p < 0.01$), Social (0.54, $p < 0.01$), Environment (0.49, $p < 0.01$), and the one-factor model of YQOL-W (0.51, $p < 0.01$). This indicates that the higher the respondent's generic QoL level, the higher the level of weight-specific QoL. The Spearman's correlation coefficients between the YQOL-W and the PedsQL were stronger between comparable dimensions compared to less comparable dimensions. First, YQOL-W social dimension and PedsQL social functioning similarly measure adolescents' perceptions regarding their social relationships and have the highest correlation (0.49, $p < 0.001$). Second, both YQOL-W self dimension and PedsQL emotional functioning measure adolescents' feelings about themselves. This results in the second-highest correlation (0.43, $p < 0.001$). Moreover, the z-score of Body Mass Index (BMI) was also found to be negatively correlated with Self (-0.32, $p < 0.01$), Social (-0.25, $p < 0.01$), Environment (-0.34, $p < 0.01$), and the one factor model of YQOL-W (-0.34, $p < 0.01$). This shows that the greater the respondent's BMI, the lower the respondent's YQOL-W score, which indicates a lower weight-specific QoL.

Reliability Analysis

The reliability test was conducted on 880 adolescents between the ages of 11 to 18 who were enrolled in Junior High School (N = 626) and Senior High School (N = 254) in Bandung, Indonesia. The reliability test on the YQOL-W instrument shows that all YQOL-W dimensions have Cronbach's alpha coefficients greater than 0.70, namely Self (0.91), Social (0.95), and Environment (0.87). This indicates that the YQOL-W instrument adapted for adolescents in Indonesia has good reliability. The discrimination index of all YQOL-W instrument items is very good (> 0.40). Therefore, the YQOL-W instrument can

distinguish individuals with high and low QoL scores. Respectively, inter-item correlation analysis showed that the mean score, the smallest, and the most significant correlation coefficients between items are 0.59, 0.45, and 0.80. All coefficients were significantly correlated ($p < 0.05$). This indicates that each item in the YQOL-W dimension that has been adapted measures the same construct and dimension.

Discussion

The development of the Indonesian version of the YQOL-W was to measure the weight-specific QoL for adolescents of 11-18 years of age in Indonesia. This study assessed the measurement model, validity, and reliability of the YQOL-W. It was found that the adapted YQOL-W has good psychometric properties, including reliability and validity, in a sample of adolescents aged 11-18 years in Bandung, Indonesia. Confirmatory Factor Analysis (CFA) on 21 items produces a three-factor model that reflects the dimensions of Self, Social, and Environment related to weight-specific QoL. The three-factor model fits the data better and parallels the previous conceptualizations of multidimensional QoL in adolescents (Jiang et al., 2014; Oluboyede & Robinson, 2019; Oluboyede et al., 2021).

All coefficients of Cronbach's alpha Inter-Class Correlation (ICC) exceed the recommended standard, which is above 0.70, and indicate that the Indonesian version of YQOL-W has good internal consistency reliability. ICC reliability was also calculated to determine the level of correlation and agreement among measurements (Kaplan & Saccuzzo, 2018). The ICC scores not only show the level of agreement between repeated measurements but also measure the extent to which the instrument can distinguish individuals (Schober et al., 2021).

Construct validity in this study was carried out using convergent and discriminant methods. Convergent and discriminant validity is defined as the extent to which a measurement is correlated with other measures of the same concept (Rönkkö & Cho, 2020). This study proves that the Indonesian version of YQOL-W dimensions is positively correlated with the dimensions of PedsQL. The results also demonstrated that comparable dimensions significantly correlate higher than those less comparable dimensions. The social dimension in YQOL-W was found to have the highest correlation with PedsQL social functioning (0.49, $p < 0.001$), followed by the correlation between YQOL-W self dimension and PedsQL emotional functioning (0.43, $p < 0.001$), and the correlation between YQOL-W environment dimension and PedsQL physical functioning (0.42, $p < 0.001$). This is due to items in each of the dimensions in YQOL-W dealing with the respective aspects in PedsQL. PedsQL is also a generic measure of patient-reported outcome QoL, which is most commonly used in adolescents with obesity. Accordingly, many aspects of health found in obesity-specific instruments are not measured by PedsQL (Ahuja et al., 2014; Hoedjes et al., 2018; Pakpour et al., 2019). This study also shows a significant inverse correlation between BMI and all three dimensions and the one-factor YQOL-W model. This is in line with other studies on weight-specific QoL in adolescents (Jiang et al., 2014; Oluboyede & Robinson, 2019; Susmiati et al., 2019). A meta-analysis study of overweight adolescents' QoL shows an inverse association between BMI and overall QoL of -0.70 ($p < 0.01$), with Physical and Social functioning being the greatest impairments. This is in line with the results of the one-factor YQOL-W model (r = -0.34, $p < 0.01$), and the Environment dimension (r = -0.34, $p < 0.01$) is the highest correlation coefficient. Differences between the adapted version of YQOL-W and the instruments used in other studies and/or differences in the population studies may explain these dissimilarities.

In order to reflect the cultural and social factors that determine the good, Youth quality of life-Weight is specifically defined in a broader sense than the concept of "subjective well-being" (Edwards et al., 2011). This definition of QoL also requires that adolescents themselves define important concepts and items in the measurement through subjective self-reports (Jiang et al., 2014). The basis of this definition makes YQOL-W have advantages over other weight-specific instruments (Oluboyede et al., 2021; Pakpour et al., 2019). The YQOL-W items were developed using an ethnographic method, that is, in-depth interviews with 50

children and adolescents from various cultural backgrounds and directly describing the experiences and language used by children and adolescents in explaining weight on their QoL. This approach ensures as much as possible that the content of the YQOL-W items is valid. This is different from other weight-specific QoL instruments, which are completely developed based on expert opinion without involving children and adolescents, such as the Impact of Weight on Quality of Life (IWQOL) (Kolotkin et al., 2021) and Sizing Me Up (Zeller & Modi, 2009). Additionally, YQOL-W also takes into account culturally sensitive issues related to weight and QoL, informs how adolescents perceive and evaluate the importance of weight, and also provides a measure to evaluate the association of weight to environment and behavior (Abbey-Lambertz, 2021; Oluboyede & Robinson, 2019; Patrick et al., 2011).

However, there are several limitations in this study that must be taken into account. The sample in this study was taken through convenience sampling techniques in several schools, which may not fully represent all adolescents aged 11-18 years in Indonesia due to different conditions and characteristics. Further studies are needed to confirm the results of this study in an obese or overweight patient population to better characterize the psychometric properties of the YQOL-W. The analysis in this study is also based solely on classical test theory. Therefore, further research could include the use of modern test theory, such as Item Response Theory, to provide a deeper picture of the YQOL-W scale and examine its ability to detect QoL levels related to changes in body weight over time.

Conclusion

The validity test results based on content validity (expert judgment) and construct validity (Confirmatory Factor Analysis and relations with other variables) on the Indonesian version of the YQOL-W instrument in a sample of Indonesian adolescents meets the fit criteria and shows good validity results. The CFA results show strong and significant factor loading values between items with the dimensions being measured. Therefore, the Indonesian version of the YQOL-W presents acceptable measurement properties in a sample of obese, overweight, and normal-weight adolescents of 11-18 years of age in Bandung, Indonesia. Future research can address the ability of the YQOL-W to detect weight change over time and the interpretability of YQOL-W scores.

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