Original article:

Validity and Reliability of Knowledge and Behavioral Questionnaire about Weight Loss Diet in Teenage Girls

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Abstract

Background: The choice of diet method by teenage girl can be influenced by the knowledge. ***Methods:*** This study aimsto determining the validity and reliability of the knowledge and diet behavior questionnaire. The subject of this research is 30 female students. Data analysis of the validity using analysis of difficulty levels, differentiating power, distractor analysis, discrimination test and Lawshe's Content Validity Ratio (CVR) analysis. The reliability test using Cronbach's Alpha Coefficient test. ***Results:*** The results showed that 24 items of knowledge questions were declaired valid and 15 items in the diet behavior questionnaire were declared valid.The reliability test of the questionnaire for knowledge and diet behavior was declared reliable with result 0,877 and 0,858. ***Conclusions:*** The validity and reliability test of the instrument have proven that the instrument of diet knowledge and behavior has good validity and reliability values.

Keywords: Knowledge, Behavior, Diet, Validity, Reliability

Introduction

The capability of teenagers in behaving related to the physical changes that occur in the teenage's phase is that teenagers are able to accept physical states and make effective use of their body conditions.Howeverin this phase of development, it often causes its own problems so that teenagers are actually unable to accept the physical state due to the physical changes that occur. Weight problem is one of the main problems faced by teenagers, especially teenage girls. Paying attention to changes in body shape to look ideal is a form of teenagers response caused by changes in body shape due to weight problem[1]. The efforts made by teenagers to control weight are by doing a diet[2].

Diet behavior is an individual activity in the regulation of dietary habit, drinking, and physical activity based on stimuli from the surrounding environment to lose weight. Healthy dietbehaviors are carried out appropriately, while unhealthy diet behaviors are carried out excessively[3]. Unhealthy diet behaviors in teenagers such as eating very few portions, skipping meals or taking diet pills are the starting point for eating disorders that cause concern for teenagers health[4]. Nutritional status is one way to determine the health status of teenagers[5]. Riskesdas data (2018) shows the prevalence of nutritional status of teenage girls aged 16-18 years in Indonesia, including very thin (0.5%), thin (3.8%), normal (79.8%), obese (11.4%), and obese (4.5%). The selection of diet methods carried out by teenage girls can be influenced by the teenage girl's knowledge of the diet[6].

Knowledge is an important component in the formation of one's attitudes and behaviors[7].

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Nutritional knowledge is the result of a person knowing and understanding about things related to nutrition[8]. The level of knowledge and behavior of a person can be known by taking measurements using standardized measuring instruments to ensure the accuracy of the data and the consistency of the measurements collected. Standardized measuring instrumentsmust meet therequirements of validity and reliability[9]. A questionnaire is a set of structured lists of questions or statements that are used as a measuring tool to obtain information from respondents regarding perceptions, aspirations, behaviors, attitudes, circumstances, personal opinions, or other things according to the research or survey conducted[10]. A good questionnaire instrument will produce valid and reliable research data.So it is necessary to test the validity and reliability of the questionnaire first before the questionnaire is given to respondents. Invalid and reliable instruments will produce invalid and unreliable data when used to collect data[11]. Based on this description, this study aims to assess the validity and reliability of the questionnaire of knowledge and diet behavior in teenage girls.

Materials and Methods

This study is a descriptive examiner by examining the validity and reliability of the weight loss diet knowledge and behavior questionnaire in teenage girls that condected at SMA Negeri 1 Candimulyo. This research is quantitative, because the interpretation of research results is based on the results of statistical processing usingsoftware on a computer.The samples needed in this study were teenage girls aged 16-18 years who had been or were on a weight loss diet. The number of samples in this study was 30 teenage girls based on the minimum requirements for parametic statistical tests. Sample selection is carried out bypurposive sampling method.

Data Analysis

Analysis of Difficulty Levels

Difficulty level analysis is an analysis carried out to find out whether the question is included in the category of easy or difficult questions. The level of difficulty is a number that indicates the difficulty or ease of a question[12]. Here is the equation used to calculate the difficulty level of an item:

$$p = \frac{n_b}{N}$$

Description:

P = Difficulty level index

n_b = The number of students who answered the item correctly

N = The number of students who answer items

The criteria for the difficulty level index according to Arikunto (1999) are as follows[13]:

Table 1. Difficulty Level Criteria

P-value	Criteria
0,00 – 0,29	Difficult
0,30 – 0,69	Medium
0,70 – 1,00	Easy

Differentiating Power Analysis

The differentiating power of the question is the ability of the question item in distinguishing students who have high abilities from students who have low abilities[13]. Here is the equation used to calculate the differentiating power of the problem item:

$$DP = \frac{B_A}{J_A} - \frac{B_B}{B_B}$$

Description :

DP= Differentiating power index

B_A = The number of upper group test takers who answered the correct questions

B_B = The number of lower group test takers who answered the correct questions

J_A = The number of upper group test takers

J_A = The number of lower group test takers

The limits of the distinguishing power index criteria are as follows:

Table 2. Differentiating Power Index Criteria

DP value	Criterion
0,00 – 0,19	Ugly
0,20 – 0,39	Enough
0,40 – 0,69	Good
0,70 – 1,00	Very well
Negative	Not good, it must be thrown away

Distractor Analysis

An instrument used to measure learning achievement with multiplechoice question

itemswith several alternative answers. The question item can be said to be good if the deceiver can function properly, which is at least chosen by 5% of respondents[13].

Validity Test

Validation is a test to show how well the data collected from the research instrument[14]. Reliability is testing on research instruments that are carried out to find out how well the instrument provides stable and consistent results. The validity test of the diet behavior questionnaire was carried out usingLawshe's Content Validity Ratio (CVR) analysis. CVR analysis is a test performed to measure the validity of the contents. The CVR value is considered to be the higher the validity of its contents if the > 0[15].

Discrimination Item Test

The power of *item* discrimination is a test carried out to measure the ability of *items* to distinguish between individuals or groups of individuals who have attributes and do not have attributes that are measured. *Items* that reach a correlation coefficient of ≥ 0.30 are included in the criteria for high discrimination power, while *items* with a correlation coefficient of < 0.3 are included in the criteria of low discrimination power[16]. The *item* discrimination power test was performed using *the Pearson Product Moment* correlation coefficient which was analyzed using SPSS version 25 *software*.

Reliability Test

Reliability tests are important because they refer to the consistency of all instruments[14]. The reliability test used in this study was the Cronbach's Alpha coefficient. The reliability test results are considered good if they have aCronbach's Alphavalue ≥ 0.6 or $r_{alpha} > r_{critical}$. The instrument is reliable when the value of Cronbach's Alphawhich is < 0.5 means low, 0.5-0.7 means medium, 0.7-0.9 means high, and > 0.9 means very good[17].

Results and Discussion

The research was conducted by preparing a list of questions and questionnaire statements to be used. The questionnaire used in this study consisted of 25 questions regarding knowledge about the nutritional needs of teenagerswith multiple choice answer and 15 statements regarding teenagers dietbehavior in losing weight body with the answer using Skala Likert.Furthermore, testing

was carried out on 30 girl students at SMANegeri 1 CandimulyoMagelang. The validity of knowledge questionnaire using analysis of difficulty levels, differentiating power, and distractor analysis. The behavioral questionnaire validity test uses an item discrimination test and Lawshe's Content Validity Ratio (CVR) analysis. While reliability testing using Cronbach's Alpha Coefficient test. The following are the results and discussions on eachquestionnaire test conducted:

Table 3. Difficulty Level of Question Items on the Knowledge Questionnaire

Item	Difficulty Index	Kategory
1.	0.43	Medium
2.	0.70	Easy
3.	0.53	Medium
4.	0.37	Medium
5.	0.60	Medium
6.	0.23	Difficult
7.	0.40	Medium
8.	0.60	Medium
9.	0.47	Medium
10.	0.87	Easy
11.	0.93	Easy
12.	0.73	Easy
13.	0.67	Medium
14.	0.33	Medium
15.	0.50	Medium
16.	0,30	Medium
17.	0.40	Medium
18.	0.77	Easy
19.	0.40	Medium
20.	0.53	Medium
21.	0.43	Medium
22.	0.90	Easy
23.	0.47	Medium
24.	0.47	Medium
25.	0.37	Medium

Source: *Microsoft Excel Calculation Result (2022)*

Table 3 shows the results of the calculation of the difficulty level in each question, it can be seen that as many as 1 question item (4%) belongs to the category of easy questions, 18 question items (72%) belong to the medium question category,

and 6 question items (24%) belong to the difficult question category.

Table 4. Knowledge Questionnaire Differentiating Power Index

Item	Differentiating Power Index	Criteria
1	0,73	Very well
2	0,60	Good
3	0,67	Good
4	0,20	Enough
5	0,67	Good
6	0,33	Enough
7	0,47	Good
8	0,13	Bad
9	0,27	Enough
10	0,13	Bad
11	0,13	Bad
12	0,27	Enough
13	0,53	Good
14	0,40	Good
15	0,60	Good
16	-0,07	Not good
17	0,67	Good
18	0,47	Good
19	0,27	Enough
20	0,53	Good
21	0,27	Enough
22	0,20	Enough
23	0,27	Enough
24	0,53	Good
25	0,33	Enough

Source: Microsoft Excel Calculation Result (2022)

Table 4 shows an analysis of the differentiating power of items on knowledge questionnaires as many as 1 item (3.3%) including criteria to be eliminated, 3 items (10%) including bad criteria, 9 items (30%) including the criteria are enough, 11 items (36.7%) include good criteria, and 1 item (3.3%) includes criteria for very well.

Table 5. Distractor Analysis on Knowledge Questionnaire

No.	Criterion	Amount
1.	Good	68
2.	Not good enough	32
	Total	**100**

Source: Microsoft Excel Calculation Result (2022)

Table 5 shows the calculation of the distractor analysis on the knowledgequestionnairewhich is carried out based onnumber of answer choices which are then multiplied by the number of question items, but the key answer is notincluded in the calculation so that the total number ofdistractor is100 distractors.A total of 68 distractor are included in the good criteria, while 32distractor are included in the bad criteria.

Table 6. *Lawshe's Content Validity Ratio* (CVR) Analysis on Dietary Behavior Questionnaire

Items	CVR value	Matrix Value
1	1,00	0
2	0,45	0
3	0,45	0
4	0,45	0
5	0,82	0
6	0,64	0
7	0,82	0
8	1,00	0
9	0,82	0
10	0,27	0
11	0,82	0
12	0,82	0
13	1,00	0
14	0,82	0
15	0,64	0

Source: Microsoft Excel Calculation Result (2022)

Table 6 shows the results of the validity test of the contents of the diet behavior questionnaire usingLawshe's Content Validity Ratio(CVR) analysis showing that 15 itemson the dietbehavior questionnaire were declared valid because they had a CVR value of > 0.

After testing the validity of the contents, a trial

was continued on 30 respondents to determine the power of item discrimination and reliability in the diet behavior questionnaire. The results of the item discrimination power test with the Pearson Product Moment test resulted in a coefficient ranging from 0.279 to 0.776 (Table 7).

Table 7. Discrimination Power Test Items on The Diet Behaviour Questionnaire

Items	Value of the Correlation Coefficient	Criteria
1	0,527	high
2	0,639	high
3	0,776	high
4	0,379	high
5	0,440	high
6	0,726	high
7	0,279	low
8	0,333	high
9	0,453	high
10	0,300	high
11	0,518	high
12	0,623	high
13	0,366	high
14	0,741	high
15	0,347	high

Source: SPSS 25 Results (2022)

Table 7 shows the results of the item discrimination test on the diet behavior questionnaire of 15 question items, as many as 14 items (93.3%) were declared to have a high degree of discrimination because of the coefficient correlation value greater than 0.30 and 1 item (6.7) questions were stated to have low discrimination power because of the coefficient correlation value less than 0.30.

Table 8. Questionnaire Reliability Test Results

No.	Variable	Cronbach's Alpha	N of items
1.	Knowledge	0.877	24
2.	Dietary Behavior	0.858	15

Source: SPSS 25 Results (2022)

Table 8 shows that the reliability test on the questionnaire of knowledge and diet behavior was declared reliable with an r_{alpha} (Cronbach's Alpha count) $> r_{critical}$ (Cronbach's Alpha standard). The r_{alpha} value of the knowledge questionnaire with 24 question items was 0,877. And the r_{alpha} value of the dietary behavior questionnaire was 0,858. So that the two questionnaires can be said to be reliable or reliable as research instruments.

Conclusion

The validity test of the teenager nutritional needs knowledge questionnaire there were 24 items of questions declared valid. On the validity test of the diet behavior questionnaire, all items of statements with a total of 15 statements were declared valid. Meanwhile in the reliability test, the two questionnaires were declared reliable or consistent with the value of Cronbach's Alpha knowledge questionnaire, which was 0.877 and the value of Cronbach's Alpha questionnaire on diet behavior was 0.858. The results of the trial of the validity and reliability of the instrument have proven that the research instrument on knowledge and diet behavior has a validity and reliability value that meets the criteria for used as a measuring tool for the level of knowledge of teenagers nutritional needs and diet behavior in teenage girls.

Conflict of Interest

There is no conflict of interest regarding the publication of this paper.

Ethical Clearance

This article has been derived from a research project approved by Sebelas Maret University of Medical Sciences, with protocol number 01/02/09/2022/114

Authors' Contribution

Diva Amalia conceptualized and designed the study, prepared the draft of the manuscript and reviewed the manuscript. Tri Rejeki Andayani conducted the study, data analysis and interpretation, assisted in drafting of the manuscript, reviewed the manuscript. Sapja Anantanyu asisted in drafting of the manuscript and reviewed the manuscript.

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