Expert Judgement on Instrument for Measuring Healthy Lifestyle Knowledges and Behaviors of Senior High School Students in Coastal Area of Tanjungpinang

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Abstract. Healthy lifestyle behavior is the main asset in dealing with various health issues, including for people in the Islands region. Healthy lifestyle behavior implementation must be based on scientific knowledge. An instrument is needed to measure students' healthy lifestyle behaviour-related science knowldge and students' lifestyle behavior. This research aims to determine the content validity of the instrument for measuring science knowledge related to healthy living behavior and students' healthy lifestyle behaviour. This research was quantitative descriptive. The instrument was developed based on 8 main indicators including physical activity, nutritious food consumption, sleep duration, cigarette and alcohol consumption, use of clean water, hand washing habits, use of bathrooms and toilets, and waste disposal culture. The instrument was validated by 8 experts and analyzed using the Aiken Formula (V). The results of this validity test showed that the instrument was valid for aspects of relevance and presentation (V = 0.96), accuracy of language (V = 0.88), and conformity with conceptual and operational definitions (0.94). These results indicate that the instrument can be continued with empirical validity and reliability tests until a valid and reliable instrument is obtained.

1 Introduction

The world has faced various disease outbreaks, one of which has recently been experienced by almost all humans throughout the world, namely the COVID-19 pandemic. This pandemic was caused by a virus called Corona Virus Disease 19 (COVID-19) which was discovered in Wuhan City, China at the end of December 2019 [1,2]. WHO determined its status as a pandemic because the rate of transmission was so fast and spread in many countries throughout the world, including Indonesia [3,4].

Learning from the experience of the COVID-19 pandemic that has just passed, one of the things that must be done to deal with these situations and conditions is to adopt healthy lifestyle behavior. Among the healthy lifestyle behaviors recommended by WHO to keep yourself and others safe from the dangers of COVID-19 is implementing health protocols

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such as washing your hands with soap or using a hand sanitizer [5]. One of the factors that determines how to implement healthy lifestyle behavior such as implementing health protocols in the community is knowledge [6–8]. The knowledge referred to here is knowledge about the importance of implementing healthy lifestyle behavior and knowledge about the dangers that will be experienced if this behavior is not implemented in everyday life [9–12].

Healthy lifestyle behavior is the main capital that a person must have in dealing with various diseases. Simply put, healthy lifestyle behavior is defined as behavior that shows concern for personal health and the environment [13]. Among the forms of concern for one's own health is trying to maintain one's own health, such as doing regular physical activity [14,15], consuming healthy food [16–18], maintaining sleep patterns and duration[19–21], hand washing habits [22,23], and others.

Awareness of the importance of healthy lifestyle behavior is starting to be noticed, especially after the COVID-19 pandemic. Awareness of the importance of healthy lifestyle behavior is one that influences the number of confirmed cases of COVID-19 [24,25]. The importance of implementing healthy lifestyle behavior in everyday life can be seen from the many education programs about implementing healthy lifestyle behavior, one of which was carried out in Tanjungpinang City [26–29]. Tanjungpinang City is the capital of the Riau Islands Province, a province whose sea area is much wider than its land area [30]. Even though mobility is not as high as other cities in Indonesia whose territories are located on large land areas such as the islands of Sumatra, Java and Kalimantan, during the COVID-19 pandemic that has just passed the number of confirmed cases in this city is quite high. In fact, Tanjungpinang City was once the city with the highest confirmed cases in the Riau Islands Province [31,32].

Healthy lifestyle behavior is very possible for the people of Tanjungpinang City to implement. In terms of consuming nutritious food, Tanjungpinang City itself is located in an archipelagic region so people are accustomed to consuming sea fish which is good for health [33–35]. Apart from that, Tanjungpinang City is also the city with the best air quality in Indonesia in 2023 [36,37]. This condition really supports people to carry out physical activities such as sports comfortably outdoors [38].

Healthy lifestyle behavior is closely related to scientific knowledge. Scientific knowledge is empirical because the process of acquiring knowledge involves direct experience through scientific research [39]. There are many examples of the implications of applying scientific knowledge to healthy lifestyle behavior, including scientific knowledge about how to maintain diet and regulate physical activity in diabetes sufferers [40]. At the high school level, scientific knowledge is provided through several subjects including biology, physics and chemistry. Some of the material taught in biology, physics and chemistry can be related to health aspects and the implementation of healthy lifestyle behavior. An example of material that is directly related to health aspects and can be linked to healthy lifestyle behavior is material on the respiratory system in biology which can be linked to health and healthy lifestyle behavior by avoiding smoking [41,42]. In chemistry, material about substances that are harmful to the body can be related to dangerous substances contained in cigarettes and cigarette smoke [43–45] as well as material about electrolyte fluids and their relation to the importance of electrolyte fluids for the body [46]. In physics, material about wave radiation can be related to health because of the influence of radiation exposure on physical health [47–49].

With the COVID-19 pandemic and other diseases, healthy lifestyle behavior has become a habit that everyone must have. The implementation of healthy lifestyle behavior must also be based on appropriate knowledge, which includes knowledge of science. Students need to be educated about healthy lifestyle behavior, including through science learning by linking learning material with health aspects. At the high school level, the science learning material obtained by students is much more complex than at the middle school level. At the high

school level, scientific knowledge has been obtained specifically through separate subjects, namely biology, physics and chemistry. But to what extent is scientific knowledge related to healthy lifestyle behavior understood by students? So how can students apply this scientific knowledge in the form of healthy lifestyle behavior? To find out all this, it is very important to measure students' scientific knowledge regarding healthy lifestyle behavior and the students' own healthy lifestyle behaviour. To obtain this information, a valid and reliable instrument is needed that can measure students' scientific knowledge regarding healthy lifestyle behavior and how students' healthy lifestyle behavior. For this reason, researchers conducted research to develop an instrument and test the content validity of the instrument to measure students' science knowledge regarding healthy lifestyle behavior and the students' own healthy lifestyle behavior.

2 Method

This research conducted on July 2023. This was a descriptive research. A quantitative approach was used in this research in testing the instrument content validity. The instrument developed in this research was to measure students' science knowledge regarding healthy lifestyle behavior and the students' own healthy lifestyle behavior. Before testing content validity with experts, the instrument was first developed through a literature review. A literature review was carried out to determine the conceptual and operational definition of healthy lifestyle behavior. This was done to make it easier for researchers to formulate the main indicators for measuring students' science knowledge regarding healthy life behavior and the students' own healthy lifestyle behavior. After the instrument was developed, content validity testing was carried out involving 8 experts. The validity test was carried out using a validity assessment sheet with indicators that are presented in Table 1 [50]

Table 1. Content validity indicators.

No.	Indicators
1	Relevance and presentation
2	Accuracy of language
3	Comformity with conceptual and operational definitions

The assessment indicators are described into several question items to make the assessment more detailed with an assessment rating scale that are presented in Table 2.

Table 2. Content validity rating scales

Rating scale	Description
4	Execelent
3	Good
2	Poor
1	Very poor

Content validity data assessed by expert were analyzed using the Formula of Aiken [51] as follows.

$$V = \frac{\Sigma s}{N(c-1)}$$

Description:
V : expert agreement index
s : r-l
r : the value given by the expert

l : lowest value
N : number of experts
C : highest value

With 4 rating scales and involving 8 expert, the instrument is said to be valid (**v**) if a category or statement has a V value ≥ 0.75 for an allowed error rate of 5% [51].

3 Result and Discussion

The results of this research will be presented into two parts as follows.

a. Instruments Development

This research began by developing instruments. The instrument developed is a closed questionnaire. The questionnaires developed, both to measure scientific knowledge and healthy lifestyle behavior, were developed based on the same main indicators. Based on the literature review carried out, the indicators of healthy lifestyle behavior which became the basis for researchers in developing the instrument are as follows:

a. Physical activity
b. nutritious food consumption
c. Sleep duration
d. Cigarettes and alcohol consumption
e. Use of clean water
f. Habit of washing hands
g. Use of bathrooms and toilets
h. Throw-away culture

After determining the main indicators, researchers developed instruments both to measure scientific knowledge regarding healthy lifestyle behavior and healthy lifestyle behavior itself with the following details.

3.1.1 Instrument for measuring scientific knowledge regarding healthy lifestyle behavior.

The instrument developed is a closed questionnaire in the form of True and False questions. Statements were developed based on 8main. The grid of instruments for measuring high school students' science knowledge regarding healthy lifestyle behavior is presented in Table 3 below.

Table 3. Grids of instrument for measuting scientific knowledge regarding healthy lifestyle behavior

No.	Main indicators	Item numbers
1	Physical activity	1, 2, 3, 4
2	nutritious food consumption	5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16
3	Sleep duration	17, 18, 19, 20
4	Cigarettes and alcohol consumption	21, 22, 23, 24, 25, 26, 27
5	Use of clean water	28, 29, 30
6	Habit of washing hands	31, 32
7	Use of bathrooms and toilets	33, 34
8	Throw-away culture	35, 36, 37

3.1.2 Instrument to measure healthy living behavior of high school students

The instrument developed has 3 forms of answers. The form of answer given on this instrument is as follows.

a. Confirmation answer.
   The question with this form of answer aims to find out whether a behavior is correct or not carried out by the student. The answer choices given are as follows.
   1) **Yes**, this answer is chosen if the student actually does this behavior and is still doing it today.
   2) **No**, this answer is chosen if the student has never done this behavior at all.
   3) **Once but no longer doing it**, this answer is chosen if the student has indeed done this behavior but the student has stopped doing it.

b. Optional answer.
   The question with this form of answer contains several answer choices regarding the duration or frequency or number of a behavior that students can choose according to their conditions or habits.

c. Behavior frequency answers.
   The question with this form of answer contains the frequency of a behavior carried out by students. This form has several answer choices including Always, Often, Sometimes, Rarely, and Never.

The questions of the instrument were also developed based on 8 main indicators of healthy lifestyle behavior. The instrument grid for measuring students' healthy lifestye behavior can be seen in Table 4 below.

Table 4. Grid of Instrument for measuring healthy lifestyle behavior

No.	Main Indicators	Item Numbers
1	Physical activity	1, 2, 3
2	nutritious food consumption	4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17
3	Sleep duration	18, 19, 20, 21, 22
4	Cigarettes and alcohol consumption	23, 24, 25
5	Use of clean water	26, 27
6	Habit of washing hands	28, 29, 30, 31
7	Use of bathrooms and toilets	32, 33
8	Throw-away culture	34, 35, 36, 37, 38,

Healthy lifestyle behaviour must be possessed by everyone, including students in high school. Healthy lifestyle behavior is a form of our readiness and anticipation in facing various health-related problems such as the Covid-19 pandemic which in a short time can paralyze various sectors in various countries around the world because of its very high transmission rate [1,52,53]. For this reason, there are many appeals regarding the implementation of healthy lifestyle behavior to maintain personal and environmental health [54–56].

Healthy lifestyle behavior itself has various aspects or measurement indicators. Some studies contain several indicators using different terms or aspects but have the same measurement essence. The 8 main indicators that indicate healthy lifestyle behavior can be seen through several aspects, namely physical activity, nutritious food consumption, sleep

duration, cigarette and alcohol consumption, use of clean water, hand washing habits, use of bathrooms and toilets, and throw-away culture [14,15,57–62,16–23]. This instrument is very important to use in measuring students' science knowledge and healthy lifestyle behavior of high school students in the Tanjungpinang city because the conditions of the Tanjungpinang City which is in the archipelago area allow for healthy lifestyle behavior to be carried out. Such as consuming nutritious food from fresh fish produced in the sea [33–35] or doing physical activities outside which are supported by the good air quality of this city [36–38].

b. Content validity of the instrument

After being developed, the instrument was validated by experts based on 3 content validity indicators. The instrument was validated by 8 experts consisting of 4 Biology Education Lecturers, 1 Biology Teacher, 1 Physics Education Lecturer, 1 Chemistry Education Lecturer, and 1 Physical Education Lecturer. The 8 experts are lecturers and teacher whose knowledge is needed to complete this instrument. The details of the content validity results for the relevance and presence aspects are presented in Table 5 below.

Table 5. content validity test result for relevance and presentation aspect

Aspect of validity	Sub-aspects of validity	V	Description
Relevance and Presentation	1. Operational definition.	1.00	**v**
	2. Conceptual definition.	0.96	**v**
	3. Presentation of the assessment scale	0.92	**v**
	4. Filling instructions.	1.00	**v**
	5. The function of the questionnaire as a survey instrument	1.00	**v**
	6. Representation of the question item numbers	0.92	**v**
	7. Answer format.	1.00	**v**
	8. Scoring Techniques	0.96	**v**
	9. Sample and Population	0.92	**v**
	10. Measurement time interval.	0.92	**v**
Average		0.96	**v**

description: **v** = valid and **nv** = not valid.

In Table 5 it can be seen that the relevance and presentation aspect are in the valid category based on the experts' judgement for all sub-spects of validity. This shows that in terms of operational and conceptual definition and presentation, this instrument is appropriate. Research instruments must have relevance to the concept being measured and be presented appropriately [63]. The results of the accuracy of language aspect were also measured by several sub-aspects as shown in Table 6. For this aspect, the instrument also showed valid results for all sub-aspects. In contrast to the relevance and presentation aspects, the average score of the accuracy of language aspect is 0.88, lower than the average score in the relevance and presentation aspects. These results are in line with the input given by the expert regarding sentences that must be corrected so that the concept to be measured or the attitude to be measured through the questions given is in line with the research objectives. This is in accordance with the essence of the content validity test which aims to determine the extent to which the instrument being developed is appropriate and relevant for measuring the aspects that want to measure [64]. Each item must be able to show the aspect you want to measure through the questions given [65]. For this reason, accuracy of language is an important aspect of an instrument.

Table 6. Content validity test result for accuracy of language aspect

Aspect of validity	Sub-aspects of validity	V	Description
Accuracy of language	Meaning clarity in each sentence.	0.83	**v**
	Comformity of Sentences with Enhanced Spelling	0.96	**v**
	Accuracy of sentence structure	0.83	**v**
	Sentences effectiveness	0.83	**v**
	Sentence standardity.	0.92	**v**
	comformity of language use to the cognitive level of the research sample	0.88	**v**
	comformity of language use to the emotional development level of the research sample	0.88	**v**
Average		0.88	**v**

The validity results for the third aspect showed valid results for all sub-aspects as shown in Table 7. For this aspect, the results shown are almost the same as the relevance and presentation aspects where the average V value shows value of 0.94. These results indicate that the instrument developed is in accordance with the conceptual and operational definition that have been formulated. This is in accordance with the essence of content validity where each item contained in the instrument must be able to represent the concept to be measured [64,66,67].

Table 7. content validity test result for conformity with conceptual and operational definition aspect

Aspect of validity	Sub-aspects of validity	V	Description
Comformity with the conceptual and operational definition	1. Conformity of indicators with the concept.	0.96	**v**
	2. Conformity of statements with indicators.	0.96	**v**
	3. Accuracy of conceptual	0.92	**v**
	4. Accuracy the scientific terms use.	0.92	**v**
Average		0.94	**v**

A good instrument is that can measure the research variable. In this case, the instrument developed can be said to be good if the instrument can measure scientific knowledge regarding healthy lifestyle behavior and also healthy lifestyle behavior itself. The feasibility of the instrument must include several aspects of validity [50]. The content validity test is to criticize and assess the instrument [64,68]. This is important stage to creat the instrument that can measure the research variables [69–71]. The results show that the instrument developed is valid according to expert assessment so that the instrument can be continued with empirical validity tests and reliability tests so that a valid and reliable instrument is produced as a measuring tool for students' science knowledge and students' healthy lifestyle behavior. An instrument said to be valid is an instrument that is developed with appropriate interpretation based on the main indicators that have previously been prepared [72]. The validity of this instrument is very important so that the data obtained is also valid. The analysis or interpretation of the valid data can produce conclusions that can be trusted and accounted for [63,73,74].

4 Conclution

Based on the literature review carried out in developing instruments to measure students' science knowledge and healthy lifestyle behavior, 8 main indicators were obtained, namely physical activity, nutritious food consumption, sleep duration, cigarettes and alcohol consumption, use of clean water, habit of washing hands, Use of bathrooms and toilets, throw-away culture. The main indicators of healthy lifestyle behavior are the basis for developing an instrument in the form of a closed questionnaire consisting of 2 aspects, namely the knowledge aspect and the behavioral aspect. Based on the results of the content validity test, it was found that all validity aspects are in valid category. These results showed that the instrument can be continued with empirical validity tests and reliability tests to make the instrument valid and reliable.

5 Acknowledments

Researchers thank a lot to LPPM of Universitas Maritim Raja Ali Haji (UMRAH) for funding and facilitating this research through HIBAH INTERNAL UMRAH 2023.

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