Content validity of men's u-21 soccer physical test

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Abstract: The purpose of this study was to test the content validity of the men's U21 football physical test. This research is a quantitative descriptive research with survey techniques using the delphy method. The sample in this study consisted of 7 experts, namely 2 physical condition experts, 2 football game experts, 2 soccer coaches, and 1 analyzer of the input results of each expert. A self design rubric used as an instrument in this study. The data analysis technique in this study uses the aiken-v formula. The finding showed the men's U21 football physical test has high content validity based on expert's mutual agreement. The experts validation showed high validity (r=1.0) for BMI test to measure body composition and Sit and Reach test to measure flexibility. 30 meter sprint test for speed, leg and back dynamometer test to measure strength and shuttle run for agility showed high validity value r= 0.89. The aerocic test using MFT test also have high validity (r=0.83). This reseach indicate that the test battery for men's U21 football players is relevant and able to measure their physical ability to perform well in the game. This fitness test battery need to be reviewed continuaslly based on the current demand and requirement.

Keywords: content validitys, football & instrument development

INTRODUCTION

Football is one of the leading sports in Papua, many people are enthusiastic about practicing to be part of the team (Memmel et al., 2023) (Lubis et al., 2018). Persipura is one of the proud clubs of the Papuan people because of their good achievements. However, in 2023 Persipura will be relegated from league 1. Of course, this needs to be a concern for coaches and related parties. The decline in Persipura's achievements was caused by several things. The factor of poor physical condition in both senior and junior players is the main factor for decreased performance, besides that the gap in the technical abilities of junior and senior players, player ethics and discipline are also causing a decrease in player performance (Guntoro, Muhammad, et al., 2020) . Physical condition is the problem that really determines success in sports. This is because poor physical condition will affect the technical performance of the game (Nugroho et al., 2022) (Komarudin et al., 2022) (Rivaldi et al., 2023).

The athlete's personality is one of the factors influence the achieving optimal performance (Guntoro, Kurdi, et al., 2020). Player's ethics and discipline are caused by poor self-regulation (Rawat et al., 2023) (Saputra & Ahmad, 2022). This realm is included in the realm of psychology, so that a good talent development program will direct athletes to have good self-regulation (Chen et al., 2022) (Andronikos, 2023). In its journey, talent development is also influenced by the environment, peers, norms and habits in society which are recorded from an early age (Orione & Fleith, 2022). This can be overcome slowly through education from psychologists in the talent development team (Martindale et al., 2023).

One of the factors causing the gap in the technical abilities of senior and junior players is poor talent development. Talent development is the long-term development of athletes to prepare for the

regeneration of athletes who are no longer performing well (Sweeney et al., 2023) (Kelly et al., 2022). Talent development is of course carried out in each age group in each sport branch with good management (Carlsson-Wall et al., 2023). The training program provided consists of physical, technical, tactical, and mental according to the developmental age (Bompa & Carrera, 2015). The training program that has been prepared is adjusted to the abilities of athletes at their age level and is based on data on the results of physical, technical, tactical and mental measurements (Andronikos, 2023). This is done so that the training program provided is not too light and too heavy which will cause injury and decreased ability (Ceballos-Laita et al., 2023). Evaluation using specific instruments is always carried out every certain period according to the talent development model that is referred to to prepare athlete (Villarejo-García et al., 2023) (Humaedi et al., 2023) (Røsten et al., 2023).

Evaluation is important in supporting the training program that is made (Widianingsih et al., 2023). This is because the results of the evaluation are used by the coach as the basis for making the training program (Bompa & Carrera, 2015). Evaluation can be done in the presence of data, while to obtain data measuring tools/instruments are needed (Badby et al., 2023) (Tanveer et al., 2023). A good instrument is an instrument that is in accordance with the characteristics of sports and age stages (Sukys & Hoppen, 2023) (Humaedi et al., 2023) (Kahraman & Arslan, 2023). Several studies have started to develop physical tests according to sports and age stages (Nurhidayah, 2018) (Kuswanto, 2016) (Saputro & Siswantoyo, 2018). This is because in the long-term development/talent development program the training provided is adjusted to the main biomotor components and the developmental stages of each sport. The biomotor components in general are cardiovascular endurance, muscle endurance, muscle strength, speed, agility, balance coordination, and flexibility (Humaedi et al., 2023). Whereas for soccer the biomotor component consists of cardiopulmonary endurance, strength, speed, agility, power, flexibility, coordination, and balance (Womsiwor et al., 2020) (Rivaldi et al., 2023) (Kahraman & Arslan, 2023). In preparing an instrument required several stages so that the instruments considered as valid and reliable. The validity test consists of content validation or construc validation due to other factors. The content validation can be done in several ways such as conducting FGDs or using the delphy method.

Based on the explanation above and current situation in Persipura football team several problems were found: first, the degradation of the Persipura team from League 1, secondly, the physical condition of junior and senior Persipura players was not good, third, lack of discipline among Persipura players, fourth, non-scheduled physical condition tests were carried out, fifth, there was no physical condition measuring instruments -according to the age level of development as the basis for making a training program. The main aim of this study is to overcome the fitness testing problems and develop a specific and valid physical condition testing items through a relevant testing battery. For male U21 soccer players while preparing training programs.

METHOD

This quantitative descriptive research use survey techniques with the Delphy method. The delphy method is used because the content validity of each test in the proposed physical condition testing battery need to be done by experts.

Participants

Subjects involved in validity process were selected using several criteria. The criteria used are subjects who have expertise in the field of physical conditions, experts in the football game and football coaches. Based on these criteria, seven (7) subjects were selected consisting of: two (2) experts in physical condition, two (2) football experts, two (2) football coaches, and one (1) analyzer of the input results of each expert.

Sampling Procedures

The sampling procedure was carried out based on the expertise required in preparing the U-21 soccer physical test. The experts needed are physical condition experts, football experts, and coaches. The criteria for a physical condition expert are experts who handle physical condition problems and have a license. The criteria for a football expert are experts who have been involved in football for 10

years either as administrators, coaches, former athletes etc. The criteria for coaches are coaches who handle football clubs in Papua and have achievements.

Materials and Apparatus

Content validation was carried out through several stages, namely data collection, module preparation using the Delphy method process which contained aims and objectives, input filling sheets and scoring rubrics. All these information used in this study to obtain scores from each expert.

Procedures

The initial stage, namely the preparatory stage, carried out discussions involving researchers and analyzers of the discussion results. Communication in this discussion is done directly. The discussion was held to find out how important it is to prepare the physical test instrument for early-age football player. Material for discussion was obtained from observations in the field related to the need for early-age football player physical tests and examining theories and results of studies related to physical conditions both in general and specifically. The results of the discussion agreed to include several general biomotor components and the types of tests carried out for the men's U-21 football physical test. The components consist of body composition, flexibility, speed, agility, strength, power, and cardiovascular endurance. The discussion using the Delphy method was carried out in two rounds. In the first round, the distribution of the intent and purpose of the preparation sheets, the previous research sheets and the input sheets that had to be filled in by the experts was carried out. The results of the input from the experts above were then analyzed by the results analyzer to compile an arrangement of physical testing instruments for early-age football player. The results of the arrangement are then distributed back to the experts in the form of an assessment questionnaire which will be used in round two. The results of the second round are presented in table 3. Calculation of the score (Highly Relevant = 4, Relevant = 3, Less Relevant = 2, and Not Relevant = 1) given by the expert for each item. The results of the input from the experts above were then analyzed by the results analyzer to compile an arrangement of physical testing instruments to measure physical condition of football players. To measure physical condition of football players.

Design or Data Analysis

The data analysis technique was carried out quantitatively using the percentage formula and Aiken's V formula. In this study, a content validation test was carried out using the Aiken's V formula with the help of 6 experts consisting of 2 experts on physical condition, 2 football experts, 2 football coaches, and 1 data analyzer. Aiken (1985) formulated the Aiken's V formula to calculate the content validity coefficient which is based on the results of an assessment by a panel of experts in terms of the extent to which the item represents the construct being measured. The formula proposed by Aiken is (Ihsan & Indonesia, 1995)2) and(Ihsan & Indonesia, 1995):

$$V = \sum s / [n(c-1)]$$
$$V_{total} = \sum v / n$$

s　　= r –lo
Lo = the lowest validity rating score
c　　= the highest validity rating score
r　　= the number given by the assessor
n　　= number of members

Table 1. Example of Aiken's V calculation

Evaluator	Item 1	
	Value (R)	S = R-Lo
1	3	3-1=2
2	4	4-1= 3
3	4	4-1= 3
4	3	3-1=2
5	3	3-1=2
6	4	4-1= 3
7	4	4-1=3
$\sum s$		18
V		0.857

The S value for assessor 1 is obtained from the score of assessors 3 minus the lowest score (Lo), so that 3-1 = 2, and so on. The ∑s value is the sum of the S scores, namely 2+3+3+2+2+3+3 = 18. Thus, the value of V can be calculated as follows:

$$V = \sum s / [n(c\text{-}1)]$$

$$V= 18/ [7(4\text{-}1)]$$

$$V = 0.857$$

Aiken's V coefficient values range from 0 – 1. This coefficient of 0.857 can be considered to have adequate content validity.

RESULT AND DISCUSSION

Preparation stage

At the preparatory stage, the researcher was assisted by an analyzer using the Delphy method, who is an expert in the field of physical conditions and football. In the preparation stage, researchers will do some literature reviews and suggest varies testing items based on fitness components to prepare the relevant physical condition testing Baterry for football players (Nugroho, Visalim, & Ndayisenga, 2022). The experts will be given a list of testing instruments to suggest the best and appropriate test for each and every fitness component. The list of tests can be seen in table 2 below:

Table 2. Optional table in the form of biomotor components and types of tests

No	Biomotor Components	Instrument
1	Cardiovascular Endurance	MFT / BeepTest
		Cooper Test
		Harvard Step Test
		Balke test
2	Strength Endurance Strength	Wall Sit
		Plank
		Push Ups
		Back Up
		Leg and Back Dynamometer
		Hand Grips
3	Speed	30M run
		40M run
		60M run
4	flexibility	Sit and Reach
		Split Tests
5	Agility	ShuttleRun
		The T Test
		Side Step
		Hexagons Test
		Pro Agility
		Three-Cone Drill
6	Body Composition	*BMI*
7	power	*Standing Board Jump*
		Vertical Jump
		Triple Jump

First round

The results of the first round are in the form of input from each expert based on the list that have been distributed. The results of the first round can be seen in Table 3 below:

Table 3. Results of expert input in the first round

No	Biomotor Components	A1	A2	A3	A4	A5	A6
1	Body Composition	BMI	BMI	BMI	BMI	BMI	BMI
2	flexibility	Sit and Reach	Sit and Reach	Sit and Reach	Sit and Reach	Sit and Reach	Sit and Reach
3	Speed	30M sprints	40M sprints	30M sprints	30M sprints	60M sprints	30M sprints
4	Agility	Side Step	ShuttleRun	ShuttleRun	The T Test	ShuttleRun	ShuttleRun
5	Muscle Strength	Leg and Back Dynamometer	Leg and Back Dynamometer	Leg and Back Dynamometer	Leg and Back Dynamometer	Leg and Back Dynamometer	Leg and Back Dynamometer
6	power	Standing Board Jump	Standing Board Jump	Vertical Jump	Standing Board Jump	Standing Board Jump	Triple Jump
7	Cardiovascular Endurance	Cooper Test	MFT(Multistage Fitness Test)	MFT(Multistage Fitness Test)	MFT(Multistage Fitness Test)	MFT(Multistage Fitness Test)	MFT(Multistage Fitness Test)

First round analysis

Based on the results of the experts' input in the first round (table 3) it was found that 100% of the experts chose BMI to measure body composition, sit and reach for the body flexibility test. 67% of experts choose the Sprint 30 M for a speed test, 17% of experts choose the Sprint 40 M for a speed test and 17% of experts choose the Sprint 60 M for a speed test. 67% experts choose the Shuttle Run for agility test, only 17% choose the side step test and the t test. 100% experts choose leg and back dynamometer for muscle strength test. 67% of the experts chose the standing board jump for the power test, 17% experts choose vertical jump and triple jump for the power test. 83% of experts choose the MFT for the cardiovascular endurance test and 71% experts choose the Cooper test. Based on these results the researchers and analyzers formed a test arrangement in the form of a test battery. An assessment rubric used in the second round. The contents of the assessment rubric are as follows:

Table 4. Assessment rubric based on the first round of discussions

No	Biomotor Components	Instrument	4	3	2	1
1	Body Composition	*BMI*				
2	flexibility	*Sit and Reach*				
3	Speed	*30M sprints*				
4	Agility	*30M sprints*				
5	Muscle Strength and Endurance	*Push-Ups* *Leg And Back Dynamometer*				
6	power	*Standing Board Jump*				
7	Cardiovascular Endurance	*MFT*(Multistage Fitness Test)				

Second round

Aiken's V coefficient values range from 0 – 1. BMI has a validity of r=1.00, sit and reach has a validity of r=1.00, 30 m sprint test has validity of r=0.89, shuttle run has a validity of r= 0.89, leg and back dynamometer has a validity of r=0.89, standing board jump has a validity value of r=0.83, and MFT has a validity value of r=1.00. Based on the results of the second round, each item of the Papua U-21 football physical test has high validity (Table 5).

Table 5. Results of the second round

Test items	Expert						∑ s	validity
	A1	A2	A3	A4	A5	A6		
BMI	4	4	4	4	4	4	24	
s	3	3	3	3	3	3	18	1
sit and reach	4	4	4	4	4	4	24	
s	3	3	3	3	3	3	18	1
30 m sprints	4	3	4	4	3	4	22	
s	3	2	3	3	2	3	16	0.888889
shuttle run	3	4	4	3	4	4	22	
s	2	3	3	2	3	3	16	0.888889
leg and back dynamo meter	4	4	4	4	4	4	24	
s	3	3	2	3	2	3	16	0.888889
Standing Board Jump	3	3	4	4	4	3	21	
s	2	2	3	3	3	2	15	0.833333
MFT	4	4	4	4	4	4	24	
s	3	3	3	3	3	3	18	1

The battery test arrangement above is composed through several processes. In the early stages, discussions were held involving researchers and data analysts. Communication in this discussion is done directly. Material for discussion was obtained from the results of observations in the field related to the need for early-age pencak silat physical tests which indicate the need for physical test batteries (Nurhidayah, 2018). Other considerations are based on the results of previous research which resulted in the composition of the youth pencak silat battery test consisting of sit and reach, 30 meter sprint, 30 second push up, wall sit test, side step, standing board jump, bleep test, 300 meter sprint (Saputro & Siswantoyo, 2018) .The battery arrangement for the adult pencak silat physical test consists of side split, 40 meter sprint, 30 second push up, standing triple jump, sit up, back up, shuttle run, bleep test, 300 meter sprint (Kuswanto, 2016) .Material for discussion is also obtained by reviewing the theories and results of studies related to physical condition at each age. This is done to consider individual differences such as the growth rate of bones, muscles, organs and the nervous system at each stage of growth (Bompa & Carrera, 2015). Based on these considerations, researchers tried to compile a battery of physical tests for male U21 soccer players. Based on the data obtained, it was agreed that there are seven biomotor components that need to be carried out for the men's U-21 football physical test, namely body composition, flexibility, speed, agility, strength, power and cardiovascular endurance.

The seven biomotor components were then conveyed to each expert in the first round. In the first round, 6 experts mutually chose test items for each biomotor component. These differences are based on the maturity of children, adolescents and adults, which can be determined by chronological age, skeletal age and stage of sexual maturation. In childhood, the organs are not fully developed, including the bones and muscles. Cardiac output in childhood is lower than adolescence, in the respiratory system alveoli enlargement begins to occur, and in the skeletal system growth increases eight to nine times. Exercising programs or physical tests that are too strenuous will hinder the growth process(Rodrigues et al., 2023). Therefore, in addition to exercises that must be adapted to these developments, it is also necessary to pay attention to the selection of physical condition tests (Ageberg, et al., 2022). This is done to reduce the risk of injury in the process of training as well as tests and measurements (Karamanoukian et al., 2022) (Jayanthi et al., 2022). Another basis for determining test items is the specification of functional abilities and the specifications of each sport (Utama et al., 2022) (YÜKSEL, 2021). For example, in gymnastics, to improve physical abilities requires balance, agility, and strength at each age stage (Sulistiyono et al., 2022). In the sport of pencak silat the important biomotor abilities are strength, endurance, speed (Lanos & Lestar, 2022).

The results of the men's U-21 soccer physical test battery arrangement in the first round were used in the second round to be tested quantitatively for content validity. The construction of the men's U-21 football physical test battery has been produced consisting of seven biomotor components. The components consist of (1) body composition using BMI, (2) flexibility using sit and rich, (3) speed using

30 meter sprint test, (4) strength test using legs and back dynamometer, (5) agility using a shuttle run, (6) power using standing board jump and (7) aerobic endurance using MFT suttle run test. Based on these data it can be stated that each of these test items has been agreed by experts or has high content validity. High validity indicates that the instruments prepared have standards to use in measurement and evaluation process (Sumaryanti, Arovah, & Rahayu, 2021). Standard measurement instruments will produce accurate data. Accurate data can be used as an indicator in the evaluation process. This test battery can later be used as a measuring tool in measuring the physical condition of U-21 football players in the next development process. Anthropometric measurements and physical condition tests in the development of talented athletes are very important (Syaifullah & Doewes, 2020) (Irurtia et al., 2022). The data generated from the measurements is more specific, because the test battery that has been prepared has been adjusted to the age and characteristics of the sport of football (Rawat et al., 2023).

Instruments that have content validation can be used for physical condition evaluation (Diebels et al., 2023) (Kim et al., 2023). However, further research is needed in order to obtain evidence from the response process and evidence based on other factors (Molina-Garcia et al., 2022). This is because the validation process is divided into several forms of evidence based on content, evidence based on the response process and evidence based on other variables (Mardaphi, 2017). The content validation test itself was carried out to test the arrangement of instruments based on expert judgment (Hadžović et al., 2023) (Nofrida et al., 2023). Content validation testing has drawbacks, namely too subjective and has not been proven with several other variables (Sallam, 2023). Besides that, to get a good football physical test battery, reliability testing is needed. This is because the requirements for a good measuring instrument besides having validity also should have high reliability. Reliability is the consistency or consistency of a measuring instrument when used in different places. Test-retest is often used to test the reliability of an instrument (Lambrich et al., 2023) (Sulistiyono et al., 2022) (Utama et al., 2022). Therefore, based on the discussion above, further research is needed to determine the reliability of the men's U-21 soccer physical test instrument. In addition, it is necessary to prepare norms for each component of the test to translate test results and measurements. This is to get better test and measurement results (Nofrida et al., 2023).

CONCLUSSION

Based on the result and discussion above, it can be concluded that the construction of the football test battery has high content validity. In other words this test can be used to evaluate the physical abilities of male U-21 soccer players. The experts validation showed high validity (r=1.0) for BMI test to measure body composition and Sit and Reach test to measure flexibility. 30 meter sprint test for speed, leg and back dynamometer test to measure strength and shuttle run for agility showed high validity value r= 0.89. The aerocic test using MFT test also have high validity (r=0.83). This research shows that the battery test for U-21 male soccer players is relevant and able to measure their physical ability to perform well in the game. These fitness test batteries need to be continuously reviewed based on current demands and needs. For example testing reliability and creating a battery test norm for U-21 male soccer players.

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