Jurnal Sains Sukan dan Pendidikan Jasmani Vol 11, No 1, 2022 (81-88)
ISSN: 2232-1918 / eISSN: 2600-9323
https://ejournal.upsi.edu.my/journal/JSSPJ

Validity, Objectivity and Reliability of Volleyball Skills Instrument

Febi Aulia[1], Ahmad Hashim[1], Zulakbal Abd Karim[1], Saifuddin[2] & Sadzali Hassan[1]

[1]Faculty of Sports Science and Coaching, Sultan Idris Education University, Tanjong Malim, Perak, MALAYSIA
[2] Universiti Syiah Kuala, Banda Aceh, INDONESIA

Published online: 29 June 2022

To cite this article (APA): Aulia, F., Hashim, A., Abd Karim, Z., Saifuddin, S., & Hassan, S. (2022). Validity, Objectivity and Reliability of Volleyball Skills Instrument. *Jurnal Sains Sukan & Pendidikan Jasmani, 11*(1), 81-88. https://doi.org/10.37134/jsspj.vol11.1.9.2022

To link to this article: https://doi.org/10.37134/jsspj.vol11.1.9.2022

Abstract

This study aimed to determine the validity, objectivity and reliability value of volleyball skills instruments. The study took place on a team from Serambi Mekkah University at Acheh. The sample of the study were 20 people aged 18 until 25 years old. Construct validity has been validated by three volleyball experts. The data analysis validity and objectivity used personal correlation, and the reliability data analysis used interclass and intraclass reliability coefficient. The results of the study indicated the validity value *r = 93* was high. Next, the objectivity value for movement score of volleyball skills instrument among researcher's score with tester assistance 1 was *r = .949*, with tester 2 was *r = .864* and the correlation coefficient value between assistant tester one score with tester two was *r = 880* which was high. Objectivity value of outcome score for volleyball skills instrument between the score of researcher with assistant tester one was *r = .959*, with tester two was *r = .951* and next, correlation coefficient value between assistant tester one with tester two was *r = 941* which was high. The reliability movement score for volleyball skills *r= .841* was high. The reliability value outcome score for volleyball skills r =.920 was high. Thus, it was concluded that the volleyball skills instrument is fit to be a standard instrument to measure volleyball players' skills aged 18 until 25 years old.

Keyword: Validity, Objectivity, Reliability, Volleyball Skills Instrument

INTRODUCTION

Volleyball games have distinguishing criteria and skills where each player needs to have all skills in increasing their performance and becoming a professional player. The techniques and skills mastered by the player determine their performance and achievement. The volleyball skills can be categorised into two main sections: attack and defence. The attack skills are serve and spike while the defence skills are dig, set and block (Kumar, 2014).

The issues faced by coaches are the method to measure the players ability in each situation within games and to select a good volleyball player. Due to that, the coaches need precise guidance and reference to coach and plan the training for athlete development (Serrano et al, 2016). Measurement procedure is essential as through it, coaches can assess the effectiveness of the training program. The results of the assessment will be the base for several planning and changes to increase the quality of the training program. Besides, coaches only conduct the measurement process of the volleyball skills using the current student assessment instrument and are not able to assess the actual movement. Student skills test is not compatible to be used in assessing senior volleyball players as their age factor and ability are different. There are differences in the games profile according to the results of games and age group

(Medeiros et al., 2017). According to Serrano, at el, (2016), the results indicated the differences of the spiker's performance in games, age group, and competition level.

The validity of an instrument is important so that the data gained are meaningful and any justification or generalization done are precise. An instrument is said to have validity when it is able to measure a measurement. Validity study involves the measuring of a measurement and if there is nil logical error in the conclusion of the data (Garson, 2013). According to Ahmad Hashim (2004) validity refers to a measurement instrument that is said to be valid when it really measures the actual measurement. Objectivity is a part of the matters that need to be focused when involving tests, measurement and assessment. Without objectivity, an instrument is regarded as not having reliability. The concept of objectivity is important for all instruments and measurement processes. The skills measurement in volleyball needs to be conducted equally for all volleyball players. According to Ahmad Hashim (2014), objectivity is defined as reliability between tester and assistant. Each test is said to have high objectivity when there is a mutual agreement between two or more testers who administered a similar test on a similar sample with approximately similar score.

The students' skills test does not have a reliability value. Instrument is regarded as to have reliability when it is able to produce consistent results. While a reliable tester exists when they are able to measure similar phenomena at different times and places and are able to produce similar outcomes (Garson, 2013). According to Ahmad Hashim (2015), reliability refers to something that has stability, consistency and precision as criteria. Thus this study This study was aimed to develop a volleyball skills instrument which has a good score test and possess validity, reliability, objectivity, and standard effectiveness to measure volleyball players ability and skills and can be used by coaches, lecturers and physical education teachers in measuring skills and selecting volleyball players.

METHODOLOGY

Research Design

This pre-experimental study used the combination of descriptive and correlation study. 20 volleyball players aged 15 to 25 years old from the team of Serambi Mekkah University at Acheh became the sample of the study. The instrument development method was based on the model proposed by Morrow at el. (2005). Figure 1 below shows the process of developing the instrument adapted from Morrow at el. (2005).

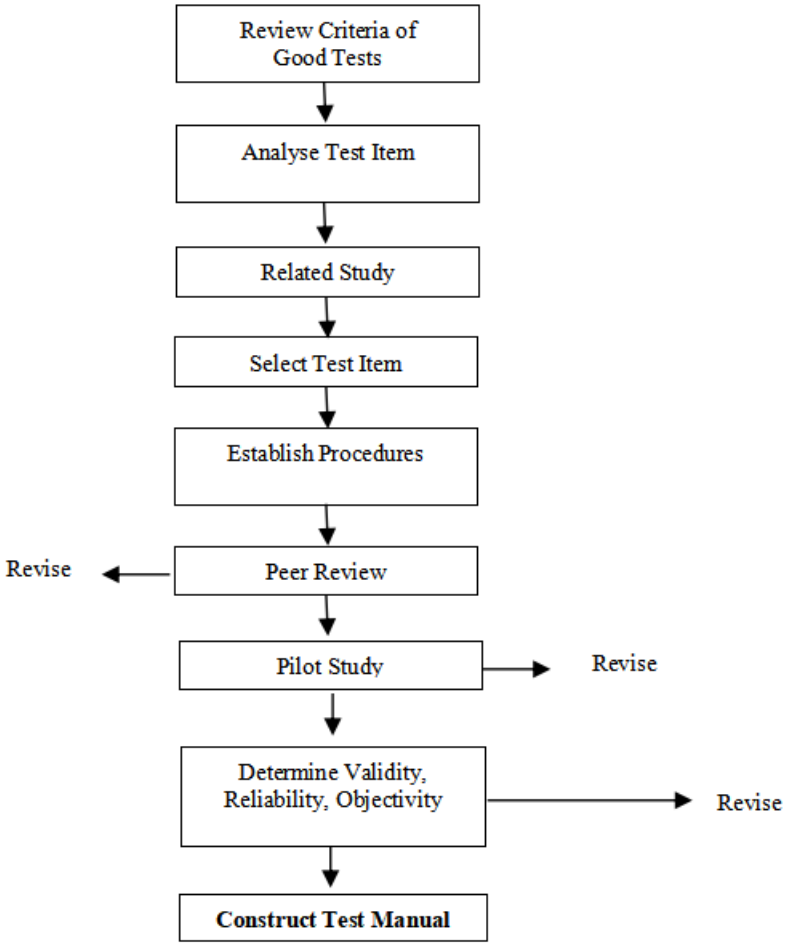

Figure 1. Flow Chart of the Development of Physical Fitness Test Modified and adapted from Morrow at el. (2005).

Data Analysis Procedure

Statistical Package for Social Science (SPSS) version 21.0 was used to analyse the data collected. The validity of content was determined based on the content validity formula. Three volleyball expert panellists answered the survey related to the content validity. Objectivity was determined by the Pearson correlation value correlation coefficient between the score of researcher, tester 1 and tester 2. The reliability data analysis used interclass and intraclass reliability coefficient.

RESEARCH FINDINGS

Validity value of expert panels' volleyball skills instrument

According to (2014) the expert of field evaluation is based on the items constructed by researchers and was evaluated based on Likert scale 5 (strongly agree), 4 (agree), 3 (not sure), 2 (disagree), and 1 (strongly disagree). After that, the test content validity distributed to the expert panellists and the value of content validity was calculated using this formula ;-

$$\frac{\text{Total Expert Score (X)}}{\text{Maximum Score (5x22)}} = \text{Content Validity Correlation}$$

Table 1. Expert Panellist Volleyball Skills Instrument Validity

Section	Item	Expert 1	Expert 2	Expert 3
Content	Item 1	5	5	5
	Item 2	5	4	5
	Item 3	4	4	5
	Item 4	4	4	5
	Item 5	5	4	4
	Item 6	5	5	5
	Item 7	4	5	5
	Item 8	4	5	5
	Item 9	5	4	5
	Item 10	4	4	5
Instructional Design	Item 11	5	5	5
	Item 12	4	5	5
	Item 13	4	5	5
	Item 14	4	5	5
	Item 15	4	4	4
Technical Writings	Item 16	4	5	5
	Item 17	5	5	5
	Item 18	4	5	5
	Item 19	4	5	5
	Item 20	4	5	5
	Item 21	5	5	5
	Item 22	4	5	5
	r value	.87	.94	.98

Overall *r* value = *.93*

According to Sidek Mohd Noah and Jamaludin Ahmad, (2005) and Tuckman and Waheed, (1981), correlation value r = .70 was regarded as have mastered or achieved highest achievement level. Thus, the results of this study indicated the volleyball skills instrument in this study has a high validity value of .93. This explained that volleyball skills instrument is precise and able to measure the volleyball skills of players aged 18 to 25 years old. Based om the suggestions from the experts, several small amendments need to be done on this volleyball skills instrument. The result of correlation analysis in Table 1 indicates the content validity of expert 1 is $r = 0.87$, Expert 2 is $r = 0.94$ and expert 3 is $r = .98$. Physical measurement in Sport Science Education accepts test validity correlation coefficient between .80 and above (Ahmad Hashim, 2014).

Volleyball skills objectivity value

The objectivity value of the tester assistant was based on the *inter-tester* and *intra-tester* methods. According to Ahmad Hashim (2014), objectivity was defined as the reliability between tester and tester assistant. In this study, researcher (y), tester 1 (x_1), and tester 2 (x_2).

Table 2. Objectivity Value of Volleyball Skills Instrument (N=20).

Skills	***r Value***	**Skills**	***r Value***
Serve Movement Test	$y.x_1 = .937^{**}$ $y.x_2 = .850^{**}$ $x_1.x_2 = .788^{**}$	Serve Outcome Test	$y.x_1 = 1.00^{**}$ $y.x_2 = 1.00^{**}$ $x_1.x_2 = 1.00^{**}$
Dig Movement Test	$y.x_1 = 1.00^{**}$ $y.x_2 = .704^{**}$ $x_1.x_2 = .704^{**}$	Dig Outcome Test	$y.x_1 = .793^{**}$ $y.x_2 = .793^{**}$ $x_1.x_2 = .100^{**}$
Set Movement Test	$y.x_1 = .780^{**}$ $y.x_2 = .632^{**}$ $x_1.x_2 = .810^{**}$	Set Outcome Test	$y.x_1 = .943^{**}$ $y.x_2 = .805^{**}$ $x_1.x_2 = .905^{**}$
Block Movement Test	$y.x_1 = .764^{**}$ $y.x_2 = .786^{**}$ $x_1.x_2 = .934^{**}$	Block Outcome Test	$y.x_1 = 1.00^{**}$ $y.x_2 = 1.00^{**}$ $x_1.x_2 = 1.00^{**}$
Spike Movement Test	$y.x_1 = .780^{**}$ $y.x_2 = .849^{**}$ $x_1.x_2 = .921^{**}$	Spike Outcome Test	$y.x_1 = .793^{**}$ $y.x_2 = .667^{**}$ $x_1.x_2 = .840^{**}$
Volleyball Skills Instrument Movement Test	$y.x_1 = .949^{**}$ $y.x_2 = .864^{**}$ $x_1.x_2 = .880^{**}$	Volleyball Skills Instrument Outcome Test	$y.x_1 = .959^{**}$ $y.x_2 = .951^{**}$ $x_1.x_2 = .941^{**}$

***. Correlation is significant at the 0.01 level (2-tailed)*

Based on the above table, the value of correlation coefficient score test for volleyball skills instrument between the researcher score and tester assistant score was *r = .949*, with tester 2 was *r = .864* and next the value of correlation coefficient score test for volleyball skills instrument between tester assistant 1 with tester 2 was *r = 880.* Next, the value of correlation coefficient test score for volleyball skills instrument outcome between researcher's score and tester assistant 1 was *r = .959,* with tester 2 was *r = .951* and the value of correlation coefficient between the score of tester assistant 1 with tester 2 was *r = .941.* This indicated a high value of objectivity. Pearson correlation method statistical analysis was used to achieve the correlation value. The size of correlation coefficient to determine the volleyball skills instrument objectivity was based on the recommendation form the experts (Miller, 1998; Safrit & Wood, 1995), which was the value of correlation coefficient between i ± *.80* until *1.00* as high, ± *.60* until *79* average high, ± *.40* until.*59* average, ± *.20* until.*39* low and ± *.00* until.*19* showed no relation.

Reliability Value of Volleyball Skills

In this study, researchers used testing and re-testing methods to achieve the reliability of Volleyball Skills Instrument. The test and re-testing methods require similar test administration on similar students in two different times. These methods frequently used in measuring physical fitness and motor behavioural skills yet less used in written tests. The test was administered on students to collect the first data set and then re-tested to collect the second data set. By using correlation method, both data were correlated to get the reliability coefficient (Ahmad Hashim, 2014). In this study, the test was conducted by researcher at different times on the sample to collect the first data and was re-tested for the second data set. Both data were correlated to get the reliability coefficient. Next, Ahmad Hashim (2004) explained that an instrument that is able to produce consistent results after being tested and retested, has the reliability. Instruments with reliability value will produce stable data.

Table 3. Reliability Value of Volleyball Skills Instrument (N=20).

Skills	***r Value Test and Retest***	**Skills**	***r Value Test and Retest***
Serve Movement Test	.793**	Serve Outcome Test	.840**
Dig Movement Test	.905**	Dig Outcome Test	.688**
Set Movement Test	.840**	Set Outcome Test	.688**
Block Movement Test	.667**	Block Outcome Test	1.000**
Spike Movement Test	.728**	Spike Outcome Test	.793**
Volleyball Skills Instrument Movement Test	.841**	Volleyball Skills Instrument Outcome Test	.920**

***. Correlation is significant at the 0.01 level (2-tailed)*

Based on the above table, the reliability value of volleyball skills instrument movement score was *r =.841* reliability value of volleyball skills instrument outcome score was *r* =.920. The results of reliability testing for volleyball skills instrument indicated high reliability value. Statistical analysis of the Pearson correlation method was used based on the recommendation of expert Valette (1977), who suggested that the acceptable minimum reliability coefficient value of measurement tools is .50. Fraenkel and Wallen (1996) also stated that at least .70. According to Hastad and Lacy (2002) if a conducted test was aimed to master the syllabus topic, therefore the index value of difficulty above .50 ($p > 0.50$) is acceptable.

DISCUSSION

The present study aimed to investigate the validity, objectivity and reliability of volleyball skill instrument to measure the volleyball ability and skills of the players aged 18 to 25 years old. The finding of this study showed high value of validity, objectivity and reliability for instrument that has been develop to measured serve, dig, set, block and spike skills among volleyball player aged 18 to 25 years old. It proved that, skill instrument in this study can be used to measured what is supposed to be measured as stated by Zonifa (2020). In study by Zonifa (2020), instrument to measured several skills in volleyball such as forearm pass, smash overhand serve, blocking and underarm pass has been develop specifically for advanced-level students and it have high validity and reliability.

In other study, Arif and Sujarwo (2022) has developed a questionnaire to measure self confidence among athlete to perform jump serve in volleyball. Content validity was obtained from two expert and Cronbach's Alpha was used to obtained reliability of the instrument. According to Arif and Sujarwo (2022), high validity and reliability found in that study proved the instrument was suitable to be use for measuring self confidence among volleyball player during performing jump serve skill.

In sport, to achieved the goal to determine a player's skill level, it is important for those skills need to be measured and accessed using appropriate measuring instruments (Yudasmara & Fadhli, 2018). In study by Yudasmara and Fadhli (2018), they emphasized that the instrument must have some

criteria such as having high validity, which is measuring what should be measured. In addition, the instrument must also have high objectivity, which is, if the measurement is done by several people the results are quite similar and lastly, the instrument used must have high reliability, which is have consistency in measurement.

CONCLUCION

This study has developed a volleyball skills instrument to measure the volleyball ability and skills of the players aged 18 to 25 years old. The results of this study indicated that validity value *r = 93* was high. Furthermore, the objectivity value of volleyball skills instrument movement score between the researcher's score with tester assistant 1 was *r = .949*, with tester 2 was *r = .864* and next, the correlation coefficient value between the score of tester assistant 1 with tester 2 *r = 880* was high. The objective value of outcome score for volleyball skills instrument between researcher's score with tester assistant 1 was *r = .959*, with tester 2 was *r = .951* and the correlation coefficient value between tester assistant 1 and tester 2 *r = 941* was high. The reliability value for movement score of volleyball skills *r= .841* was high. The reliability value of outcome score of volleyball skills *r =.920* was high. Volleyball skills instrument is valid and reliable to be used for measuring volleyball skills of players aged 18 to 25 years old. For the practical implication, the development of the instrument in this study becomes a valuable tool to measure the movement and outcome of the volleyball skills, namely: serve, dig, set, block and spike.

REFERENCES

Ahmad Hashim. (2015). *Pengujian, Pengukuran dan Penilaian Pendidikan Jasmani*. Edisi Pertama. Dubook Press Sdn Bhd.

Ahmad Hashim. (2014). *Panduan Analisis Data Secara Efisien*. *Panduan Lengkap Berajah Untuk Menganalisis Data*. Bangi: Dubook Press Sdn Bhd.

Ahmad Hashim. (2004). *Pengukuran Kecergasan Motor*. Tanjong Malim: Quantum Books

Arif, A. P., & Sujarwo, S. (2022). Instrument Validity and Reliability Confidence to Jump serve in Volleyball. *Jurnal Olahraga*, 7(1), 151-158.

Fraenkel, J. R., & Wallen, N. E. (1996). *How to design and evaluate research in education* (3rd ed.). New York: Mc Graw Hill Inc.

Hastad, D. N., & Lacy, A. C. (2002). Measurement and evaluation in physical educaton and exercise science(4th ed.). Massachusetts: Allyn & Bacon.

Garson, G.D. (2013). *Validity & Reliability*. USA: Statistical Publishing Associates.

Kumar, S. (2014). Differentials on passing ability between universal attackers and blockers of volleyball players. *International Journal of Physical Education, Fitness and Sports*, *3*(4).

Morrow, J. R., Jackson, A. W., Disch, J. G., & Mood, D. P. (2005). *Measurement And Evaluation In Human Performance* (3rd ed.). Champaign, IL: Human Kinetics.

Medeiros, A. I. A., Marcelino, R., Mesquita, I. M., Palao, J. M., Medeiros, A. I. A., Marcelino, R., Palao, J. M. (2017). Performance differences between winning and losing under-19, under-21 and senior teams in men' s beach volleyball. *International Journal of Performance Analysis in Sport*, *17*(1–2), 96–108.

Miller, D. K. (1998). *Measurement By The Physical Educator*. Dubuque, Iowa: Wm. C. Brown.

Niaz, M (2018). Evolving nature of objectivity in the history of science and its implications for science education. New York. Kenneth Tobin, City University

Safrit, M. J., & Wood, T. M. (1995). *Introduction To Measurement In Physical Education and Exercise Science*. 3rd ed. St. Louis: Times Mirror/Mosby

Serrano, A. G. de A., David Valades, & Palao, J. M. (2016). Evolution of game's demands from young to elite players in men's volleyball, *International Journal of Sports Physiology and Performance,* Human Kinetics, Inc.

Sidek Mohd Noah & Jamaludin Ahmad. (2005). *Pembinaan Modul. Bagaimana Membina Modul Latihan dan Modul Akademik.* Selangor: Penerbit Universiti Pertanian Malaysia.

Tuckman, B. W., & Waheed, M. A. (1981). Evaluation an individualized science programme for community collage students. *Journal of Research in Science Teaching*, 18, 489-495.

Valette, R. M. (1977). *Modern language testing: A handbook* (2nd ed.). New York: Harcourt Brace Jovanovich.
Yudasmara, D. S., & Fadhli, F. (2018). Development of Volleyball Course Scoring Instrument for Students. *In Proceedings of the 2nd International Conference on Sports Science, Health and Physical Education*. Volume 1, pages 153-157
Zonifa, G. (2020). A volleyball skills test instrument for advanced-level students. *Journal of Physical Education & Sport, 20*.

✉ Febi Aulia
Faculty of Sports Science and Coaching,
Sultan Idris Education University,
Tanjong Malim, Perak, MALAYSIA
Email: febiaulia99@gmail.com