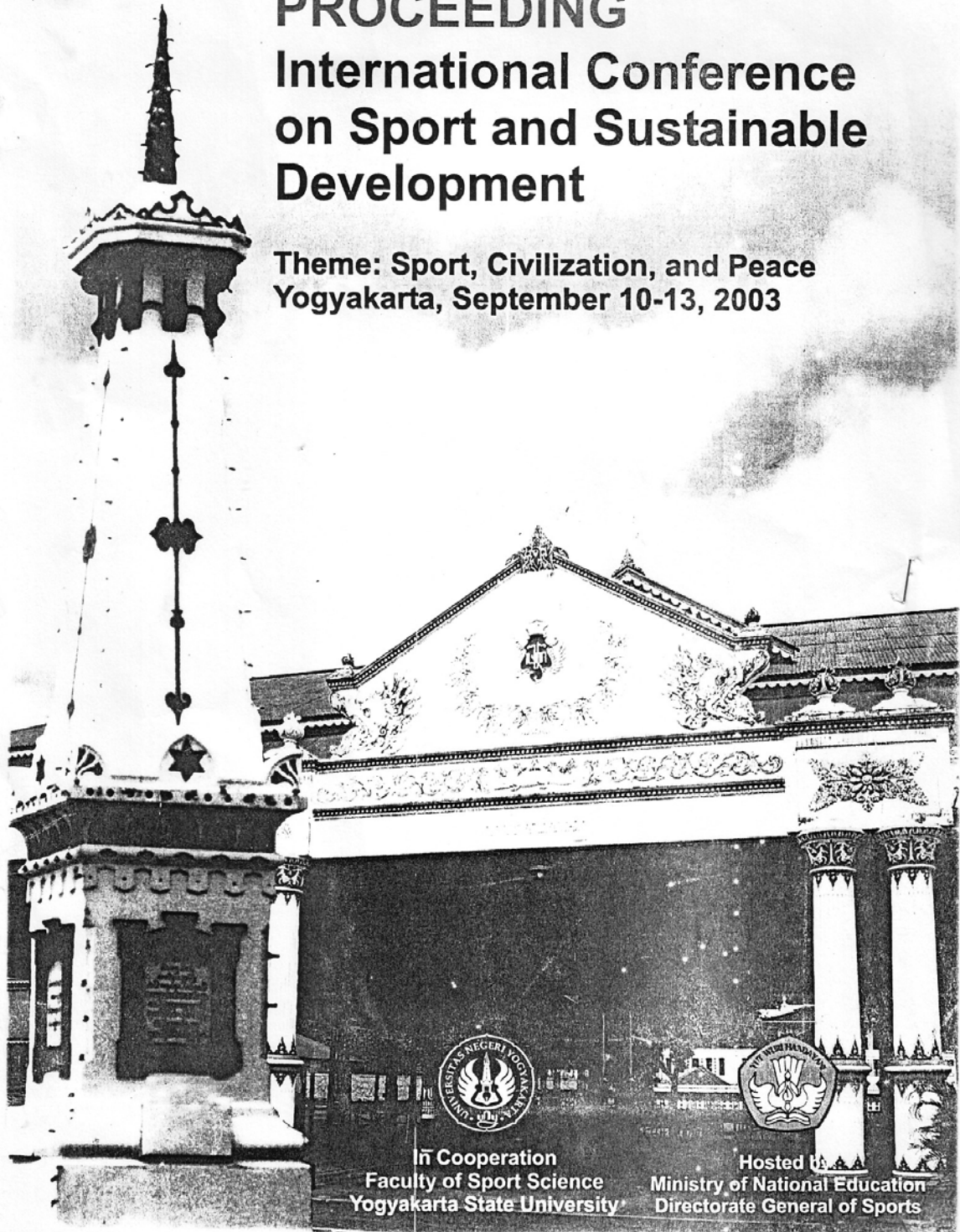B3

PROCEEDING
International Conference on Sport and Sustainable Development

Theme: Sport, Civilization, and Peace
Yogyakarta, September 10-13, 2003

In Cooperation
Faculty of Sport Science
Yogyakarta State University

Hosted by
Ministry of National Education
Directorate General of Sports

The Construction of Health Related Fitness Test of High School Student and its Validity and Reliability

By Sumaryanti
Yogyakarta State University
sumaryanti@uny.ac.id

Abstract

This gool of this research is to construct the instruments of health related physical fitness and the instrument norms of the high school students of Yogyakarta. The basic of this assumption is that the assessment of high school physical education theacher health related physical fitness level need the validity, reability and norm of assessment of batteray test.

The population of the study consist of grade 1,2 and 3 of high school; of Yogyakarta. The number sample is 1216 popils, which consists of 606 females and 610 males. The procedure of sampling is random sampling. While, the procedure of collecting data is tes and measurement technique. The procedure of constructing the instrument is the difine of variable concept, to determine components and to construct item tests of health related physical fitness. The data analysis of instrument by following technique: normality test, linearity test, the validity item test by the correlation of Parth With Whole and the reability test by Hoyts technique. The construction of norm assessment by mean statistics and standard deviation.

The results of this research shows that battery test of health related physical fitness as follows: sit-up tests, two site skinfold tests, run-walk 12 minutes tests, and sit and reach test. The validity of the instrument by logical validity. The item tes valid. The reability instrument is rtt= 0.890. The interpretation of result is that battery test very reliable. The finding of this batteray test, can be used by the physical education teacher as a means for assessing the level of health related physical fitness of high school student of DIY. While, the scale score and assessment borm of male and female of high school students has been constructed, as well. So that, these finding, can be used as a guide to classified students (male and female) based on their age, level, into very good, good, fair, and very poor levels.

Keywords: Instrument, Norm, *physical fitness*.

Introduction

In the constancy of People's Consultative Councii (MPR) number II/MPR/1993 about the Broad Outlines of the Nation's Direction (GBHN) stated that physical education and sport need to be constructed and socialized as a medium of the quality improvement of Indonesian human resources which is pointed on physical

312

health improvement mentally and spiritually. The aims are to formulate the characteristic and the personality of the societies and to bring the sense of national pride under the higher disciplines and sportsmanship.

Based on the above elaboration, it is clear that the physical education is a way of constructing the physical health that is undoubtedly achievable through the fitness program.

Nieman (1986: 35) divided the fitness into two types. They are health related fitness and skill related fitness. Practically, these two types of fitness tend to give precedence to the health related fitness.

The realization of fitness program related to the health need to be socialized in the schools in relation to the overall health program for constructing human resources who can productively give a good contribution to the national development.

However, to know the result of this fitness program, it needs to be testified. The test should be closely related to the aim of program. So far, the tests of fitness program are mostly conducted by using the combination method between the test for the aim of the health related fitness and the test for the skill related fitness. (test on TKJI) This test conducts either to primary schools or to the higher level schools. On the level of primary school and the higher level of schools, the results of researches conducted by the lecturers of Faculty of Sport Science and Recreation, State University of Yogyakarta, Yogyakarta by applying the test of TKJI shows a tendency that the students' physical fitness lies under the category of fair or even poor. So, how it would be, if the test of physical fitness is conducted by applying the test of physical fitness related to the health? Would the research give the same result or it might be different? To give the right answer, so far, there is no standard test on the physical fitness related to the health, especially for the students of senior high school in the Special Region of Yogyakarta.

Thus, in this research, the researcher wishes to formulate the instruments of physical fitness related to the health of Senior high school students in the Special Region of Yogyakarta.

Literary Review

1. components of Physical Fitness related to the Health

    Niemen (1986: 35) differentiated the physical fitness into two types. They are health related fitness and skill related fitness. The components related to the health consist of the cardio-respiration resistant, physical components (fat wide), strength and the muscle resistant as well as the flexibleness.

    The cardio-respiration resistant is the capacity of heart, lungs, and the circulation to provide the oxygen and substance to the muscle's work (Fox, 1981: 134).

    Physical component shows the physical solidness consisting of some elements such as weight, tall, and physical fat. (Nieman, 1986: 36)

    The strength of the muscle is showing the maximum contraction which is provided by the muscle or a group of muscles. The contraction of the muscle can be dynamic or static depends on its resistance. If the resistance is indifferent, it means the contraction is static or isometric, while if the resistance moves to other position, it means the contraction is dynamic (Travers, 1974: 99-111)

    The muscle resistant is the readiness of the muscle to endure the activity for a long time. The muscle resistant consists of two types such as static resistance and dynamic resistance. (Sutarman, 1975: 44)

    The flexibleness is a quality which gives the possibility to any segments to gain the maximum movement in proportion to the workable act. However, the decisive factor in the flexibleness is bone, muscles, ligament, tendon, sprain, and skin (Fox, 1987: 123-126)

2. The Arrangement of Test Points

    Based on the above elaboration, in order to know the level of physical fitness, the test to measure the component of physical fitness related to the health lies on the cardio-respiration resistant, the strength and muscle resistant, the flexibleness and the fat wide.

The test to measure the cardio respiration resistant, the aerobe's resistance check becomes one of the most important components in the physical fitness related to the health. In this checking, the maximum capability of someone to consume the oxygen becomes the parameter (Astrand, 1977: 334). The tests, usually, are conducted indirectly. It may be conducted with 12 minutes run, (from Cooper), 15 minutes run-walk from Balke, the test or run-walk 12 and 9 minutes (a modification test on run-walk from Balke).

The tests for the strength and the muscles' resistant, according to Safrit (1986: 229 – 328) and Bosco (1983: 79-99) stated that the test for the strength and the muscle's resistant static is conducted by the tool of dynamometer. On the other hand, the test for the strength and the muscle's resistant dynamic can be acted through the test of sit-up, pull-up as well as push-up that can be conducted as long as possible depends on the doer's ability.

The tests for flexibleness, Safrit (1986: 334) stated that the test can be identified by fleksometer with the measurement in the centimeter.

The tests for the measurement of fat wide, Fox (1985: 89-95) stated that the fat wide can be predicted by seeing the two-site skinfold (tricep and subscapula) by the help of Caliper in which the result is recorded on the millimeter.

Research Methodology

A. Generalization of Area. Generalization of Area is focused on the overall students of the intermediate level from the state and private school in the Special Region of Yogyakarta.

B. Population and Sample. The population that is used in this research is taken from the male and female students who studied in the state and private school in Special Region of Yogyakarta. The sampling is taken by making use of Stratified Random sampling. The total samples of male students are 610 while female students are 606.

C. The Technique of Gathering the Data

In this research, the data are collected by using the test of technique and measurement

D. Research Instrument

The instrument's arrangement to collect the data is making use of *Logical Validity*. The research will be conducted as follows: (1) the researcher will define the changing concept such the physical fitness related to the health. (2) The components of physical fitness will be arranged in relation to the health. (3) Its battery test will be put in the right order such as: the test of run-walk 12 minutes to measure the resistant cardio respiration, two site skinfold (tricep and subscapula) is used to measure the fat wide of the body, sit and reach test is conducted to measure the flexibleness and the test of sit-up is conducted to measure the strength and the muscle's resistance.

The instruments that have been ready are evaluated in a seminar to have some critical opinions to get the reliability whether the instruments are proper or not to be used as a test. Next, they would be testified.

E. Analysing the Data

The data which have been gathered are analyzed and evaluated on the way of quantitative description

The Research Result and the Discussion

A. The result of testifying the instrument is conducted in two schools. The data of testifying the instruments is analyzed by testifying the normality of the data, the linearity of the data, the reliability of the test points. The result of analyzing the data are as follows:

1. Test of Normality

No	The Test Points	Kaai Kuadrat	P	Stated
1	Sit-up	14.599	0.103	Normal
2	Sit and Reach	5.613	0.778	Normal

316

3	Two site skinfold	9.438	0.398	Normal
4	Run-walk 12 minutes	3.917	0.917	Normal
5	Physical Fitness	9.264	0.413	Normal

discussion. The data test on sit-up, sit and reach, two site skinfold, and run-walk 12 minutes are normal. Thus, data can be formulated further.

2. Test of Linearity. Based on the statistical calculation, the test of linearity and the form of regression can be drawn as follows

Resume on the Calculation of Linear Test

No	Regression Analysis	F	P	Stated
1	X1 & Y	0.499	0.5111	Linear
2	X2 & Y	1.546	0.214	Linear
3	X3 & Y	0.267	0.612	Linear
4	X4 & Y	0.615	0.559	Linear

discussion. The above resume shows the correlation between the predicator and criterion is all linear. It means that all data can be formulated further

3. Test of Validity

    a. The test on the valid point. Calculating the point, in this occasion, is conducting by a way of correlation between the sub-division and the total. The summary of statistic calculation is as follows:

3	Two site skinfold	9.438	0.398	Normal
4	Run-walk 12 minutes	3.917	0.917	Normal
5	Physical Fitness	9.264	0.413	Normal

discussion. The data test on sit-up, sit and reach, two site skinfold, and run-walk 12 minutes are normal. Thus, data can be formulated further.

2. Test of Linearity. Based on the statistical calculation, the test of linearity and the form of regression can be drawn as follows

Resume on the Calculation of Linear Test

No	Regression Analysis	F	P	Stated
1	X1 & Y	0.499	0.5111	Linear
2	X2 & Y	1.546	0.214	Linear
3	X3 & Y	0.267	0.612	Linear
4	X4 & Y	0.615	0.559	Linear

discussion. The above resume shows the correlation between the predicator and criterion is all linear. It means that all data can be formulated further

3. Test of Validity

   a. The test on the valid point. Calculating the point, in this occasion, is conducting by a way of correlation between the sub-division and the total. The summary of statistic calculation is as follows:

Summary of Testing the Valid Point on the Physical Fitness Test

No	Testing Points	F	P	Stated
1	Sit-Up	0.882	0.774	Valid
2	Sit and Reach	0.859	0.757	Valid
3	Two site skinfold	0.870	0.764	Valid
4	Run-walk 12 minutes	0.860	0.743	Valid

discussion. Based on the above summary, the four testing points on the physical fitness related to the health are all valid. Thus, those points fulfilled the requirements and they can be conducted further.

4. Test of the Instruments' Reliability

The statistic calculation on the testing of reliability with Hoyt is depicted as follows:

Summary of Calculating the Test Reliability According to Hoyt

Sources	JK	db	RK
subject	38.263.130	114	335.641
Points	69,750	3	--
Balance	12.622.750	342	36.909
Total	50.955.630	459	--
Rtt	0.890	p=0.001	Reliable

Based on the above summary, the test of reliability according to hoyt the result is achieved rrt = 0.890. It means that the systematic test on physical fitness related to the health in this research fulfilled its reliability's requirements.

5. Scale Score Arrangement

In arranging the scale of the score, it is conducted by changing the whole number values into T-score. The calculation result by changing the number values into T scores is as follows:

6. Arranging the Standard Assessment

The arrangement of this standard assessment is taken from the amount of the T score based on the distribution and the frequency of the data the amount of T score for a student categorizes into excellent, good, fair, bad, poor. Every category is given an interval 1.2 as the standard deviation. In order to find the calculation of the standard assessment, it needs the average and the standard deviation for every age grouping by sorting out male and female students. The result is as follows:

The Standard Assessment of the Physical Fitness Related to the Health Level 1 (the age of 17) Male and Female

Category	Code	Female	Male
Excellent	E	232 – upper	236 – upper
Good	G	210 – 231	211 – 235
Fair	F	187 – 209	186 – 210
Bad	B	165 – 186	162 – 185
Poor	P	164 – lower	161 – lower
Stated		Average = 198.224 F.G = 18.288	Average = 198.06 F.G = 20.26

The Standard Assessment of the Physical Fitness Related to the Health
Level 2 (the age of 18) Male and Female

Category	Code	Female	Male
Excellent	E	229 – upper	232 – upper
Good	G	209 – 228	210 – 231
Fair	F	188 – 208	186 – 209
Bad	B	168 – 187	163 – 185
Poor	P	167 – lower	162 – lower
Stated		Average = 197.783 F.G = 16.338	Average = 197.63 F.G = 19.4

The Standard Assessment of the Physical Fitness Related to the Health
Level 3 (the age of 19) Male and Female

Category	Code	Female	Male
Excellent	E	237 – upper	235 – upper
Good	G	212 – 236	211 – 234
Fair	F	186 – 211	186 – 210
Bad	B	161 – 185	162 – 186
Poor	P	160 – lower	161 – lower
Stated		Average = 197.59 F.G = 20.16	Average = 198.041 F.G = 20.808

Discussion

The arrangement of the instrument in this research is conducted in three steps, (1) to give a definition on the physical fitness related to the health, (2) to determine the factors or components in physical fitness, (3) to determine the test points. The test points are used to measure those components such as, run-walk 12 minutes, two site skinfold, sit and reach, and the maximum sit-up. The researcher uses the logical validity in this research. Therefore, she gets the result that every point of testing the components is valid and its reliability is (rtt = 0.890) which is stated reliable enough. Thus, this battery test and its standard assessment can contribute an alternative choice of test which is applicable to the suitable condition and situation of the students, schools, or the purposive achievement to measure the level of physical fitness related to the health of the intermediate level students in Yogyakarta.

Conclusion

Based on the result of this research, it can be concluded that:

A. The systematic instruments have been arranged for the physical fitness related to the health.

B. It is found that the validity of the systematic test points such as, run-walk 12 minutes is 0.764, two site skinfold is 0.743, sit and reach is 0.757, and sit-up is 0.774. While the reliability instrument is 0.890.

C. This research also contributes the score scale of the physical fitness test.

D. The standard assessment has also been arranged for the physical fitness for the students of the intermediate level, male and female students.

References:

Bosboo S. James, (1983). *Measurement and Evaluation in Physical Education Fitness and Sport.* New Jersey: Prentice-Hall.

Fox. E. L. Edward, (1987). *Basic of Fitness.* New York: Macmillian Publishing Company.

Fox. III. Samuel and Wilmore Jack H and Polloock L Michael, (1985). *Health and Fitness Through Physical Activity.* London: Macmillian Publishing Company.

Jhonson A. S. and Colaman A. E., (1976). *Validation Distance Run Test Elementary School Children.* The Research Quartely. 42 (2) : 86 – 93.

Nieman David. C., (1986). *Measurement in Physical Education and Exercise Science.* Toronto. Santa Clara: Timcs Mirror Mosby College Publishing.