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2-D Videographic (Biomechanical) Reliability and Validity Coefficient Correlation of Selected Variables of Margaria Kalamen Power Test of Students of Physical Education High Altitude Himachal Pradesh University of Shimla

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Abstract – Research scholar has selected the topic with the purpose to find out reliability coefficient of selected margaria kalamen power test variables videographically recorded and analyzed repeatedly of students of Himachal Pradesh University of Shimla. With the following objectives. To find out the "2-D Vediographic (Biomechanical) Reliability and Validity Coefficient Correlation of Selected Variables of Margaria Kalamen Power Test of Physical education students of high altitude Himachal Pradesh University of Shimla". The study was delimited to 40 female students of physical education Himachal Pradesh University, Shimla. (High altitude = 2276 meters). The data were collected using 2-D video recording system. The data were analyzed using 2-D video analysis (Kinovea 0.8.15). The age of the subjects were ranging from 18 to 25 years.

Keywords: 2-D Video Recording System, 2-D Video Analysis System, Videographic (Biomechanical) Reliability and Validity, Power, Margaria Kalamen Power Test

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1. INTRODUCTION

The President's Council on Physical Fitness and Sports in 1971 offered one of the more widely used definitions, describing physical fitness as the ability to carry out daily tasks with vigor and alertness without undue fatigue and with ample energy to enjoy leisure-time pursuits and to meet unforeseen emergencies. Dr. H. Harrison Clarke wrote that physical fitness is the ability to last to bear up to withstand stress and to persevere under difficult circumstances where an unfit person would give up. Physical fitness is the opposite of being fatigued from ordinary efforts to lacking the energy to enter zestfully into life's activities, and to becoming exhausted from unexpected demanding physical exertion. It is a positive quality, extending on a scale from death to abundant life.

In 1996the surgeon general's report Physical Activity and Health adopted the 1985 definition of physical fitness proposed and most other organizations have followed suit. All of these definitions place an emphasis on having vigor and energy to perform work and exercise. Vigor and energy are not easily measured however and physical fitness experts have debated for more than a century the important measurable components of physical fitness.The most frequently cited components fall into two groups, one related to health and the other related to athletic skills. Summarizes the components of health and skill related fitness, with examples of the continuum of physical activities that represent each group.

It is felt by some researchers that while the elements of skill-related fitness are important for participation in various dual and team sports, they have little significance for the day to day tasks of Americans or for their general health. On the other hand individuals who engage in regular physical activity to develop cardio respiratory endurance musculoskeletal fitness and optimal body fat levels appear to improve their basic energy levels and place themselves at lower risk for the common diseases of our time including heart disease cancer diabetes osteoporoses and other chronic disorders.

Athletes who excel in throwing a ball or swinging a golf club should understand that they may not have optimal levels of body fat or cardio respiratory fitness, and as a consequence may be at higher risk for chronic disease. Also, even though individuals may possess poor coordination, they can still be

physically fit and healthy by engaging regularly in aerobic and musculoskeletal exercise. Of course, there are athletes who by the nature of their sport soccer or basketball would be rated high in both the health and skill related elements. Among the general population, many individuals would rather play sports while getting fit than engage in pure fitness activities such as running swimming or using indoor exercise equipment. Fitness leaders need to individualize their recommendations to fit the goals and interests of their clients realizing that many need the socialization and fun of sports to participate regularly in exercise.

The ability to produce maximum force in the shortest time is called force. The two components of power are muscle speed and force strength. An effective combination of these two components allows a person to produce explosive movements such as required in jumping putting the shot and spiking throwing and hitting a ball. Anaerobic power is power used in high-intensity bouts of exercise lasting fewer than ten seconds; which is the peak amount of time for phosphocreatine reserves to empty as a primary fuel source. It is expressed in terms of watts of force per kilogram of bodyweight. Power is considered a crucial component in overall athleticism. Ample power tends to be a key difference maker in short terms bouts of fast twitch, Type I myofibers events. For example athletic events, or competitions which call for optimal power output are weight lifting sprinting jumping and wrestling although may other team sports and individual sports and competitions also have high anaerobic power output demands. Anaerobic power can be measured and improved. The three physical assessments in this study are commonly used to measure power. Each has been researched and normative and standards have been established for force production by their use.

Reliability is the second technical standard that the teacher can use when selecting tests. A test is said to be reliable if it is dependable: if similar results occur when the test is repeated by the same group under like conditions. Reliability is related to the test performance itself. The tester is the same, the students are the same, and the test is the same. Assume that the test is administered and then re-administered. If the students' scores fall in the same positions, the test is reliable. The student who performed best the first time is still best, the poorest performer is still poorest, and all in between is approximately in the same order. A test is given to position students on a ladder, so to speak. If their positions are true indications of their skill, then the test is said to be valid; if their positions are dependable and consistent, then the test is considered to be reliable.

One method of establishing reliability is to administer the test completely one time and then to give it another time. Usually the second administration is on the next day or two under very similar conditions and certainly before forgetting, practicing, and learning factors become too influential in the results. This method is time-consuming and sacrifices some of the interest factor of the students during the second administration. The scores of the first and second administrations are correlated to determine the coefficient.

Split Halves odd and even. An alternative time-saving method is to administer the test only once and then correlate the total of the even numbered trials with the total of the odd-numbered trials. In a 10-trial test the 1st 3rd 5th 7th and 9th trials totaled provide 1 score and the 2nd, 4th, 6th, 8th, and 10th trials totaled provide the second score for the correlation problem. This method requires the subsequent use of the Spearman-Brown Prophecy Formula to predict what the reliability would be had the test-retest method been used instead. The Prophecy Formula predicts the reliabilty of the whole test on the basis of only half of it. This formula is also useful to predict what effect additional trials or longer trials or even reduced trials would do to the reliability of a test.

Validity is the most important of the technical standards because it tests the honesty of a test. The teacher wants to have confidence that a test selected to use as a measure of the tennis serve for example is indeed just that and not a test of shoulder girdle strength or of general motor ability. It must be a measure of a rather specific skill namely the tennis serves. It would be unfair to use a fitness test as one basis for assigning grades if the test were so complicated that an intelligence factor weighed heavily in the performance score of each student. If a test is presented as a measure of the volleyball volley then to be valid it must measure volleying ability and. ideally it must measure it to such a degree that other influencing factors such as height and weight are incidental to the final results. A test may be considered valid if it is measuring, as accurately as possible what it is described as measuring. Validity is inherent in the purpose of the test.

Validity can be ascertained either empirically or statistically. Logical validity usually comes first and is sometimes considered sufficient without the fellow-up either concurrent or constructs validity using statistical techniques.

The athlete's weight is determined in kilograms. The athlete is given a few practice runs up the steps to warm up. The athlete stands ready at the starting line 6 meters in front of the first step. On the command "Go", the athlete sprints to and up the flight of steps, taking three steps at a time (stepping on the 3rd, 6th and 9th steps), attempting to go up the steps as fast as possible. The time to get from the 3rd step to the 9th step is recorded (either using a stopwatch or using switch mats placed on the 3rd and 9th steps), starting when the foot was in first in contact with the 3rd step, and stopped when the foot

contacts the 9th step. Allow three trials of the test, with 2-3 minutes recovery between each trial.

2. MATERIALS AND METHOD

2.1 Participants

Keeping in view the purpose of the study, 40 female students of Himachal Pradesh University of Shimla were randomly selected. The age of the subjects ranged from 18 to 25 years. The randomly selected female subjects were sportsperson (i.e. at least state level participation)

2.2 Instrumentation

2-D Camera was used for Video recording.

Figure 1) 2-D video recording system.

2.3 Selection of the Variables

The selected variables has been documented in table-1

Table 1

Selected test and variables

S. No	Test Item	Selected Variables	Abbreviations
1.	Margaria Kalamen Power Test	Time taken to cover first stair	(MKPT-TT1stS)
		Time taken to cover second stair	(MKPT-TT2ndS)
		Time taken to cover third stair	(MKPT-TT3rdS)
		Time taken to cover fourth stair	(MKPT-TT4thS)
		Time taken to cover fifth stair	(MKPT-TT5thS)
		Time taken to cover sixth stair	(MKPT-TT6thS)
		Time taken to cover seventh stair	(MKPT-TT7thS)
		Time taken to cover eighth stair	(MKPT-TT8thS)
		Time taken to cover ninth stair	(MKPT-TT9thS)
		Time taken to cover tenth stair	(MKPT-TT10thS)
		Time taken to cover eleventh stair	(MKPT-TT11thS)
		Time taken to cover twelfth stair	(MKPT-TT12thS)
		Performance (total time taken)	(MKPT-TT)

2.4 Data Acquisition

After the subjects properly warmed up and explain about Margaria kalamen power test and educated about its significance. The Margaria Kalamen Power test was done in front of the subjects. Subjects performed the test and their performance was recorded by 2D video recording camera.

Figure 2) Margaria Kalamen Power Test Layout

2.5 Data Processing

The raw data acquired from the subjects were quantified with the help of Kinovea Software 0.8.15.

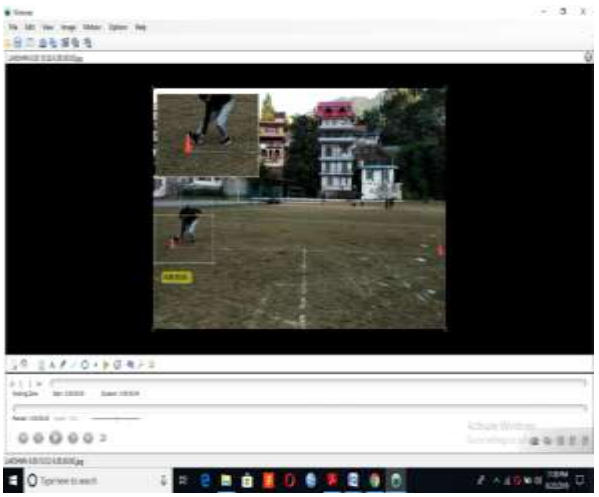

Figure 3) illustration of data processing

3. Statistical Analysis

Following statistical techniques were applied for analysis

1. Descriptive statistics (Mean and Standard Deviation).
2. Cronbach's Alpha.
3. Product moments correlation for obtaining reliability and validity coefficient.

4. For the purpose of evaluating the reliability coefficient. Kirkendall et.al., (1987) criteria was followed as given in table 2

Table 2

Kirkendall et.al., (1987) Criterion of Reliability

Value or reliability coefficient	Reliability Rating
0.00 to 0.59	Unacceptable
0.60 to 0.79	Average
0.80 to 0.89	High
0.90 to 1.00	Excellent

A commonly accepted rule for describing internal consistency using Cronbach's alpha is as on Table 3

Table 3

Internal Consistency Reliability Ratings

Cronbach's alpha (α)	Internal consistency
$0.9 \leq \alpha$	Excellent
$0.8 \leq \alpha < 0.9$	Good
$0.7 \leq \alpha < 0.8$	Acceptable
$0.6 \leq \alpha < 0.7$	Questionable
$0.5 \leq \alpha < 0.6$	Poor
$\alpha < 0.5$	Unacceptable

Table 4

Distributive Statistics of Selected Variables of Margaria Kalamen Power Test

S. No	Variables	Minimum	Maximum	Mean	Std. Deviation
1.	MKPT-1st ST1	.06	.16	.1133	.02631
	MKPT-2nd ST1	.23	.43	.3370	.04822
	MKPT-3rd ST1	.46	.66	.5407	.05356
	MKPT-4th ST1	.63	.93	.7717	.07302
	MKPT-5th ST1	.83	1.26	1.0110	.10899
	MKPT-6th ST1	1.06	1.63	1.2687	.12867
	MKPT-7th ST1	1.26	1.96	1.5447	.15549
	MKPT-8th ST1	1.56	2.29	1.8087	.17888
	MKPT-9th ST1	1.73	2.59	2.0677	.19989
	MKPT-10th ST1	1.96	2.86	2.3163	.21859
	MKPT-11th ST1	2.19	3.19	2.5897	.25425
	MKPT-12th ST1	2.43	3.49	2.8473	.28093
2.	MKPT-1st ST2	.06	.16	.1137	.02760
	MKPT-2nd ST2	.23	.43	.3380	.05047
	MKPT-3rd ST2	.43	.66	.5387	.05526
	MKPT-4th ST2	.63	.93	.7717	.07400
	MKPT-5th ST2	.83	1.26	1.0090	.10678
	MKPT-6th ST2	1.06	1.63	1.2687	.12867
	MKPT-7th ST2	1.26	1.96	1.5437	.15575
	MKPT-8th ST2	1.53	2.29	1.8087	.17955
	MKPT-9th ST2	1.73	2.59	2.0677	.19989
	MKPT-10th ST2	1.96	2.86	2.3163	.21859
	MKPT-11th ST2	2.19	3.19	2.5907	.25488
	MKPT-12th ST2	2.43	3.49	2.8463	.28230
3.	MKPT-1st ST3	.06	.19	.1157	.02837
	MKPT-2nd ST3	.23	.43	.3380	.04838
	MKPT-3rd ST3	.43	.66	.5377	.05587
	MKPT-4th ST3	.63	.93	.7717	.07400
	MKPT-5th ST3	.83	1.26	1.0090	.10649
	MKPT-6th ST3	1.06	1.63	1.2687	.13027
	MKPT-7th ST3	1.26	1.96	1.5427	.15507
	MKPT-8th ST3	1.53	2.29	1.8107	.18242
	MKPT-9th ST3	1.73	2.59	2.0687	.19993
	MKPT-10th ST3	1.96	2.86	2.3163	.21859
	MKPT-11th ST3	2.19	3.19	2.5907	.25488
	MKPT-12th ST3	2.43	3.49	2.8473	.28093
	MKPT-PTT	43.26	63.57	51.6466	4.9515

N=40 all measurements of Margaria Kalamen Power Test in seconds
T1 = Trail One
T2 = Trail Two
T3 = Trail Three
TT = Total time of all Trails

According to table 4 the selected variables namely time taken to cover first stair (MKPT-TT1stS), Time taken to cover second stair (MKPT-TT2ndS),Time taken to cover third stair (MKPT-TT3rdS), Time taken to cover fourth stair (MKPT-TT4thS), Time taken to cover fifth stair (MKPT-TT5thS), Time taken to cover sixth stair (MKPT-TT-6thS), Time taken to cover seventh stair (MKPT-TT7thS), Time taken to cover eighth stair (MKPT-TT8thS), Time taken to cover ninth stair (MKPT-TT9thS), Time taken to cover tenth stair (MKP-TT10thS), Time taken to cover eleventh stair (MKPT-TT11thS), Time taken to cover twelfth stair (MKP-TT12thS), Performance (total time taken) (MKPT-TT).T1, T2 and T3 Measuring in seconds

Table 5

Reliability Coefficient of Selected Variables of Margaria Kalamen Power Test

S. No.	Variables	Between Trails	Reliability coefficient (r)	Evaluations
1	MKPT-TT1stS	T1 vs T2	.942	Excellent
		T2 vs T3	.963	Excellent
		T1 vs T3	.949	Excellent
		T1 vs TT	.348	low
2	MKPT-TT2ndS	T1 vs T2	.982	Excellent
		T2 vs T3	.988	Excellent
		T1 vs T3	.994	Excellent
		T1 vs TT	.602	Excellent
3	MKPT-TT^{3rd}S	T1 vs T2	.980	Excellent
		T2 vs T3	.985	Excellent
		T1 vs T3	.987	Excellent
		T1 vs TT	.730	High
4	MKPT-TT4thS	T1 vs T2	.994	Excellent
		T2 vs T3	1.00	Excellent
		T1 vs T3	.994	Excellent
		T1 vs TT	.900	Excellent
5	MKPT-TT5thS	T1 vs T2	.998	Excellent
		T2 vs T3	.997	Excellent
		T1 vs T3	.995	Excellent
		T1 vs TT	.950	Excellent
6	MKPT-TT6thS	T1 vs T2	1.00	Excellent
		T2 vs T3	.998	Excellent
		T1 vs T3	.998	Excellent
		T1 vs TT	.976	Excellent
7	MKPT-TT7thS	T1 vs T2	.998	Excellent
		T2 vs T3	.999	Excellent
		T1 vs T3	.999	Excellent
		T1 vs TT	.986	Excellent
8	MKPT-TT8thS	T1 vs T2	.998	Excellent
		T2 vs T3	.998	Excellent
		T1 vs T3	.997	Excellent
		T1 vs TT	.988	Excellent
9	MKPT-TT9thS	T1 vs T2	1.00	Excellent
		T2 vs T3	1.00	Excellent
		T1 vs T3	1.00	Excellent
		T1 vs TT	.990	Excellent
10	MKPT-TT10thS	T1 vs T2	1.00	Excellent
		T2 vs T3	1.00	Excellent
		T1 vs T3	1.00	Excellent
		T1 vs TT	.979	Excellent
11	MKPT-TT11thS	T1 vs T2	1.00	Excellent
		T2 vs T3	1.00	Excellent
		T1 vs T3	1.00	Excellent
		T1 vs TT	.982	Excellent
12	MKPT-TT12thS	T1 vs T2	1.00	Excellent
		T2 vs T3	1.00	Excellent
		T1 vs T3	1.00	Excellent
		T1 vs TT	1.00	Excellent

N = 40 all measurements in second
T1 = Trail one
T2 = Trail Two
T3 = Trail Three
TT = Total time

According to table 5 the reliability coefficient of correlation variable namely **MKPT-TT1stS** between T1 and T2 was found .942 which was highly reliable as per table 2 Krikendall et.al., (1987)

According to table 5 the reliability coefficient of correlation variables namely **MKPT-TT1stS** of between T2 and T3 was found .963 which was highly reliable as per table Krikendall et.al., (1987)

According to table 5 the reliability coefficient of correlation variable namely **MKPT-TT1stS** of between T1 and T3 was found .949 which was highly reliable as per table 2 Krikendall et.al., (1987)

According to table 5 the reliability coefficient of correlation variable namely **MKPT-TT1stS** of between T1 and TT was found .348 which was low reliable and unacceptable as per table 2 Krikendall et.al., (1987)

According to table 5 the reliability coefficient of correlation variable namely **MKPT-TT2ndS** of between T1 and T2 was found .982 which was highly reliable as per table 2 Krikendall et.al., (1987)

According to table 5 the reliability coefficient of correlation variable namely **MKPT-TT2ndS** of between T2 and T3 was found .988 which was highly reliable as per table 2 Krikendall et.al., (1987)

According to table 5 the reliability coefficient of correlation variable namely **MKPT-TT2ndS** of between T1 and T3 was found .994 which was highly reliable as per table 2 Krikendall et.al., (1987)

According to table 5 the reliability coefficient of correlation variable namely **MKPT-TT2ndS** of between T1 and TT was found .602 which was average reliable and acceptable as per table 2 Krikendall et.al., (1987)

According to table 5 the reliability coefficient of correlation variable namely **MKPT-TT3rdS** of between T1 and T2 was found .980 which was highly reliable as per table 2 Krikendall et.al., (1987)

According to table 5 the reliability coefficient of correlation variable namely **MKPT-TT3rdS** of between T2 and T3 was found .985 which was highly reliable as per table 2 Krikendall et.al., (1987)

According to table 5 the reliability coefficient of correlation **MKPT-TT3rdS** of between T1 and T3 was found .987 which was highly reliable as per table 2 Krikendall et.al., (1987)

According to table 5 the reliability coefficient of correlation variable namely **MKPT-TT3rdS** between T1 and TT was found .730 which was high reliable and as per table 2 Krikendall et.al., (1987).

According to table 5 the reliability coefficient of correlation of variables namely **MKPT-TT4thS** between T1 and T2 was found .994 which was highly reliable as per table 2 Krikendall et.al., (1987).

According to table 5 the reliability coefficient of correlation variables namely **MKPT-TT4thS** between T2 and T3 was found 1.00 which was highly reliable as per table 2 Krikendall et.al., (1987)

According to table 5 the reliability coefficient of correlation variables namely **MKPT-TT4thS** between T1 and T3 was found .994 which was highly reliable as per table 2 Krikendall et.al., (1987)

According to table 5 the reliability coefficient of correlation variables namely **MKPT-TT4thS** between T1 and TT was found .900 which was highly reliable as per table 2 Krikendall et.al., (1987)

According to table 5 the reliability coefficient of correlation variables namely **MKPT-TT5thS** of between T1 and T2 was found .998 which was highly reliable as per table 2 Krikendall et.al., (1987)

According to table 5 the reliability coefficient of correlation variables namely **MKPT-TT5thS** between T2 and T3 was found .997 which was highly reliable as per table 2 Krikendall et.al., (1987)

According to table 5 the reliability coefficient of correlation variables namely **MKPT-TT5thS** between T1 and T3 was found .995 which was highly reliable as per table 2 Krikendall et.al., (1987)

According to table 5 the reliability coefficient of correlation variables namely **MKPT-TT5thS** between T1 and TT was found .950 which was highly reliable as per table 2 Krikendall et.al., (1987)

According to table 5 the reliability coefficient of correlation variables namely **MKPT-TT6thS** of between T1 and T2 was found 1.00 which was highly reliable as per table 2 Krikendall et.al., (1987)

According to table 5 the reliability coefficient of correlation variables namely **MKPT-TT6thS** of between T2 and T3 was found .998 which was highly reliable as per table 2 Krikendall et.al., (1987)

According to table 5 the reliability coefficient of correlation variables namely **MKPT-TT6thS** of between T1 and T3 was found .998 which was highly reliable as per table 2 Krikendall et.al., (1987)

According to table 5 the reliability coefficient of correlation variables namely **MKPT-TT6thS** of between T1 and TT was found .976 which was highly reliable as per table 2 Krikendall et.al., (1987)

According to table 5 the reliability coefficient of correlation variables namely **MKPT-TT7thS** of

between T1 and T2 was found .998 which was highly reliable as per table 2 Krikendall et.al., (1987)

According to table 5 the reliability coefficient of correlation variables namely **MKPT-TT7thS** of between T2 and T3 was found .999 which was highly reliable as per table 2 Krikendall et.al., (1987)

According to table 5 the reliability coefficient of correlation variables namely **MKPT-TT7thS** of between T1 and T3 was found .999 which was highly reliable as per table 2 Krikendall et.al., (1987)

According to table 5 the reliability coefficient of correlation variables namely **MKPT-TT7thS** of between T1 and TT was found .986 which was highly reliable as per table 2 Krikendall et.al., (1987)

According to table 5 the reliability coefficient of correlation variables namely **MKPT-TT8thS** of between T1 and T2 was found .998 which was highly reliable as per table 2 Krikendall et.al., (1987)

According to table 5 the reliability coefficient of correlation variables namely **MKPT-TT8thS** of between T2 and T3 was found .998 which was highly reliable as per table 2 Krikendall et.al., (1987)

According to table 5 the reliability coefficient of correlation variables namely **MKPT-TT8thS** of between T1 and T3 was found .997 which was highly reliable as per table 2 Krikendall et.al., (1987)

According to table 5 the reliability coefficient of correlation variables namely **MKPT-TT8thS** of between T1 and TT was found .988 which was highly reliable as per table 2 Krikendall et.al., (1987)

According to table 5 the reliability coefficient of correlation variables namely **MKPT-TT9thS** of between T1 and T2 was found 1.00 which was highly reliable as per table 2 Krikendall et.al, (1987)

According to table 5 the reliability coefficient of correlation variables namely **MKPT-TT9thS** of between T2 and T3 was found 1.00 which was highly reliable as per table 2 Krikendall et.al, (1987)

According to table 5 the reliability coefficient of correlation variables namely **MKPT-TT9thS** of between T1 and T3 was found 1.00 which was highly reliable as per table 2 Krikendall et.al, (1987)

According to table 5 the reliability coefficient of correlation variables namely **MKPT-TT9thS** of between T1 and TT was found .990 which was highly reliable as per table 2 Krikendall et.al, (1987)

According to table 5 the reliability coefficient of correlation variables namely **MKPT-TT10thS** of between T1 and T2 was found 1.00 which was highly reliable as per table 2 Krikendall et.al., (1987)

According to table 5 the reliability coefficient of correlation variables namely **MKPT-TT10thS** of between T2 and T3 was found 1.00 which was highly reliable as per table 2 Krikendall et.al., (1987)

According to table 5 the reliability coefficient of correlation variables namely **MKPT-TT10thS** of between T1 and T3 was found 1.00 which was highly reliable as per table 2 Krikendall et.al., (1987)

According to table 5 the reliability coefficient of correlation variables namely **MKPT-TT10thS** of between T1 and TT was found .979 which was highly reliable as per table 2 Krikendall et.al., (1987)

According to table 5 the reliability coefficient of correlation variables namely **MKPT-TT11thS** of between T1 and T2 was found 1.00 which was highly reliable as per table 2 Krikendall et.al., (1987)

According to table 5 the reliability coefficient of correlation variables namely **MKPT-TT11thS** of between T2 and T3 was found 1.00 which was highly reliable as per table 2 Krikendall et.al, (1987)

According to table 5 the reliability coefficient of correlation variables namely **MKPT-TT11thS** of between T1 and T3 was found 1.00 which was highly reliable as per table 2 Krikendall et.al., (1987)

According to table 5 the reliability coefficient of correlation variables namely **MKPT-TT11thS** of between T1 and TT was found .982 which was high reliable as per table 2 Krikendall et.al., (1987)

According to table 5 the reliability coefficient of correlation variables namely **MKPT-TT12thS** of between T1 and T2 was found 1.00 which was highly reliable as per table 2 Krikendall et.al., (1987)

According to table 5 the reliability coefficient of correlation variables namely **MKPT-TT12thS** of between T2 and T3 was found 1.00 which was highly reliable as per table 2 Krikendall et.al., (1987)

According to table 5 the reliability coefficient of correlation variables namely **MKPT-TT12thS** of between T1 and T3 was found 1.00 which was highly reliable as per table 2 Krikendall et.al., (1987)

According to table 5 the reliability coefficient of correlation variables namely **MKPT-TT12thS** of between T1 and TT was found 1.00 which was highly reliable as per table 2 Krikendall et.al., (1987)

Table 6

Internal Consistency of Selected Variables of Margria Kalamen Power Test

S. No.	Variables	Cronbach's Alpha (α)	Performance
1	MKPT-T1	.959	Excellent
2	MKPT-T2	.960	Excellent
3	MKPT-T3	.959	Excellent

N = 40; all measurements in seconds
T1 = Trail one
T2 = Trail Two
T3 = Trail Three
TT = Total time of all three trails

According to table 6 the internal consistency of variable namely **MKPT-T1** was found .959 which was excellent and acceptable as per given table 3.

According to table 6 the internal consistency of variable namely **MKPT-T2** was found .960 which was excellent and acceptable as per given table 3.

According to table 6 the internal consistency of variable namely **MKPT-T3** was found .959 which was excellent and acceptable as per given table 3.

4. DISCUSSION AND FINDINGS

Major Findings

1) Margaria Kalamen Power Test, Time taken to cover first stair, time taken to cover second stair, time taken to cover third stair, time taken to cover fourth stair, time taken to cover fifth stair, time taken to cover sixth stair, time taken to cover seventh stair, time taken to cover eighth stair, time taken to cover ninth stair, time taken to cover tenth stair, time taken to cover eleventh stair, time taken to cover twelfth stair, performance (total time taken). The selected all temporal variables are highly reliable and except one variable namely **MKPT-TT1st** Stair between trails T1 and TT of selected test namely margaria kalamen power test.

Analyzing by using open source software kinovea (0.8.15) for two dimensional video analysis of Power Test has highly reliable and validity.

2) Time taken to cover first stair **(MKP-TT1stS)**, Time taken to cover second stair **(MKP-TT2ndS)**,Time taken to cover third stair **(MKP-TT3rdS)**, Time taken to cover fourth stair **(MKP-TT4thS)**, Time taken to cover fifth stair **(MKP-TT5thS)**, Time taken to cover sixth stair **(MKP-TT6thS)**, Time taken to cover seventh stair **(MKP-TT7thS)**, Time taken to cover eighth stair **(MKP-TT8thS)**, Time taken to cover ninth stair **(MKP-TT9thS)**, Time taken to cover tenth stair **(MKP-TT10thS)**, Time taken to cover eleventh stair **(MKP-T11thS)**, Time taken to cover twelfth stair **(MKP-TT12thS)** and Performance (total time taken) **(MKPT-TT)** found to be having excellent reliability coefficient for the test item Margaria Kalamen Power Test.

3) Variables **(MKPT)** T1, T2 and T3 found to be having excellent internal consistency for the test item Margaria Kalamen Power Test.

Within the limitations of the present study, the following have been concluded. Analyzing by using kinovea (0.8.15) open source software for two dimensional video analysis of all variables of selected Margaria Kalamen Power Test reported has highly reliability and validity except one variable MKPT-TT1st Stair between trails T1 and TT accordingly table 5.

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