

# Development of a Test Instrument for Physical Assessment in Junior Karate Practitioners: A Study Targeting 16-17-Year-Old Individuals

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**Abstract** Study purpose: Physical condition serves as the main supporting factor, which encourages the development of karateka's overall abilities in kihon, kumite, and kata. The purpose of this study was to formulate a test and compile a normative instrument to assess the physical fitness of junior karate practitioners, particularly those aged 16-17 years. Materials and Methods: Research and development (R&D) method. The research was conducted at a karate dojo under the auspices of the Indonesian Karate-Do Sports Federation (FORKI). The small-scale trial subjects were 55 respondents and the large trial group was 114 respondents. The karate test subjects were 16-17 years old (junior) and a purposive sampling technique was used for the determination of the trial sample. Data analysis techniques used were correlation test, validity test, and reliability test. Results: The results of this study showed two series of karate physical test instruments for male and female junior karate athletes (aged 16-17 years) consisting of; V Sit and Reach, Hexagonal Obstacle, Stork Standing balance, 2-Minute Sit Up, and Multistage Fitness Test. Validity of factor analysis eigenvalues >1 and can be said

to be valid. A reliability test was conducted with a test-retest or correlation between the same groups for two treatments. Based on the difference significance test, it shows that  $t\text{-count} = 3.617$ ,  $df = 59$ , and  $P\text{-Value} = 0.01 < 0.05$ , which means there was a significant difference in the pre-test and post-test results. Conclusions: 5 items of karate physical test instruments had been produced for junior karate athletes in the kata category, the preparation of karate physical test norms for junior karate athletes in the kata category, and 5 physical test instruments had been produced that were effectively used to improve the performance of junior karate athletes.

**Keywords** Test Instruments, Condition Physique, Karate Juniors, Category Kata

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## 1. Introduction

In the karate championship, there are two categories that

are contested, namely the sparring category (kumite) and the series of moves category (kata). Kumite is a match conducted by two people using certain techniques and strategies involving punching, kicking, and parrying movements [1]. Karateka kumite requires a lot of movements for various techniques in playing kumite. The stance is balanced, unstable, and able to perform punch techniques, and attacks towards the target, namely the opponent quickly so that it can produce points. Meanwhile, kata is a series of movements performed by athletes using certain techniques that contain martial arts compatibility values. Furthermore, according to Gauchard [2], it is said that the characteristics of kata movements relevant to dashi (stance) are stable, all karate techniques (kihon) must be mastered, and can be performed as perfectly as possible. This is a source of judgment in kata competitions, in addition to beauty and appreciation of movements.

Kata movements should be real in the sense of combat and show concentration, energy, and the potential impact of the techniques performed. Kata should be able to demonstrate strength, power, and speed as well as flexibility, rhythm, and balance [3]. It is further stated that in assessing the performance of individual participants or teams, the Judges will evaluate the performance equally based on two main criteria, namely technical performance and athletic performance [4]. There are seven criteria for technical performance as follows: 1) Stance, 2) Technique, 3) Movement transition, 4) Timing or synchronization, 5) Correct breathing, 6) Focus (Kime), 7) Conformity: consistency in performing kihon according to the flow (Ryu-ha) of the Kata being played. Meanwhile, there are three criteria for assessing athletic/sports performance, namely: 1) Strength, 2) Speed, and 3) Balance [4]. Performance is evaluated from the salute when starting to the salute when ending the kata. When performing kata karateka athletes must arrange the following things: (1) Accuracy of Form, (2) Accuracy of Understanding Form, (3) Accuracy of Rhythm, (4) Accuracy of Breathing, (5) Exertion, (6) Kime, (7) Accuracy of Neck and Eye Movement, (8) Opening and Closing of Kata.

Karate is a sport with a predominantly anaerobic energy system that requires maximum motor intensity, namely muscular endurance, speed, agility, muscle strength, flexibility, coordination, and balance, according to Filingeri, Bianco, Zangla, Paoli, & Palma, and Gauchard et al. Karate athletes use almost all muscles during training and competition [5], [6], but the two competing karate disciplines (kumite and kata) differ significantly in terms of style and muscle usage. A study conducted by Koropanovski [7], showed that there are some differences regarding the anthropometry and physical condition of kumite athletes and kata athletes. To improve sports performance, excellent physical condition is one of the aspects that is needed [8]–[10]. Reinforced by previous research, it is said that physical condition is one of the prerequisites that is indispensable for efforts to improve an athlete's performance and can even be said to be the basic

starting point for starting a sports achievement [11]. The physical conditions in question are strength, endurance, flexibility, agility, speed, and power [12].

The data obtained from measurement is very useful for evaluation and decision-making needs in the training process [13]. A very important point related to the need and function of measurement in the training process is that tests and measurements can be used as a means to develop objectives in the training process [14]. The results obtained can also be used to assess training progress, improve training programs, and record student progress and other matters deemed necessary to improve training effectiveness [15]. Based on observations through interviews with former national athletes in the kumite category and as Chairperson of the Achievement Development Division of FORKI North Sumatra, so far the physical tests used by KONI SUMUT in the kumite and kata categories were the same even though the two numbers competed in karate had different characteristics so it was necessary to distinguish between physical tests conducted on kumite and kata karateka. The results were also obtained from the PPLP North Sumatra physical trainer who was a karate athlete in the kata category representing North Sumatra, stating that some physical condition components were different for the kumite category such as reaction speed and agility which were needed, while in the kata category these physical condition components were less needed. Where some research also says that physical condition is very important to know [16], [17].

The development of physical tests for junior karate athletes is the focus of research because there is a wide achievement gap between top athletes and athletes below them so that development at this age gets more attention. Based on a analysis needs conducted on thirty-one karate coaches in Central Deli Regency, all coaches said that they did not yet have literature on test instruments and measurement of the physical condition abilities of karateka kata category, so this really needed to be developed. Likewise, the results of a group discussion forum conducted with FORKI administrators in Deli Serdang Regency concluded that because the tests from KONI North Sumatra and KONI Medan City were not valid and reliable, it was necessary to develop a test instrument and measure the physical condition abilities of kata category karateka. In addition, it is also necessary for the coach to understand to continue to provide physical exercise and conduct tests and measurements of karateka's physical condition regularly so that it becomes an evaluation material for better performance [1]. From the results of observations made by thirty-one coaches, 20 coaches did not provide physical training, while 11 people sometimes provided physical training to their athletes. For kihon, kumite, and kata training, every coach always provided this training in every training session.

Therefore, this is one of the things that need to be considered where physical condition is the main supporting factor so that karateka's kihon, kumite, and kata abilities

can develop properly. Therefore, it is necessary to develop a test instrument and measure the physical condition of karate [18]. With a valid and reliable kata category, it can be used in karateka training so that FORKI Deli Serdang has a standard for karateka's physical abilities in both the Kata category and the Kumite category. This test will reveal the physical condition in karate kata category. Knowing, understanding, and being able to carry out sports ability tests is very important for sports coaches. By knowing the physical condition standards and the correct sequence of physical tests for karate athletes, it is hoped that they can provide good physical progress before the karate athlete takes part in the match and achieves optimal results, especially for the kata category. Therefore, researchers wanted to develop a physical test instrument for junior karate martial arts specifically for the kata category.

## 2. Materials and Methods

### 2.1. Study Participants

The subjects in this study were karate athletes who were active in dojo or karate schools in Deli Serdang Regency.

The sampling technique in this study used purposive sampling. Small trial samples for men were 35 people and 20 women and large-scale trials for men were 75 people and 42 women. Feasibility assessments were obtained from four experts, namely: (1) Sports test and measurement expert by Dr. Mesnan, M.Kes, (2) International certified physical trainer expert by Dr. Nimrot Manalu, M.Kes, (3) Kata Category Karate Coach Expert by Siti Asmah Tanjung, S.Pd, and (4) Kata Category Karate Referee Expert by Novri Gentawan, S.Kom., M.Kom.

### 2.2. Study Organization

Research and development procedures have stages that must be passed before producing a product. According to Sugiyono [19], The first objective is referred to as the validation function while the second objective is referred to as the effectiveness test. By dividing the development steps into 10 steps, namely: 1) research and data collection, 2) planning, 3) development, 4) initial field trial, 5) revision of trial results, 6) second field trial, 7) refinement of field test products, 8) field implementation test, 9) final product refinement, 10) dissemination and implementation.

The research and development procedure has stages, as follows in Figure 1:

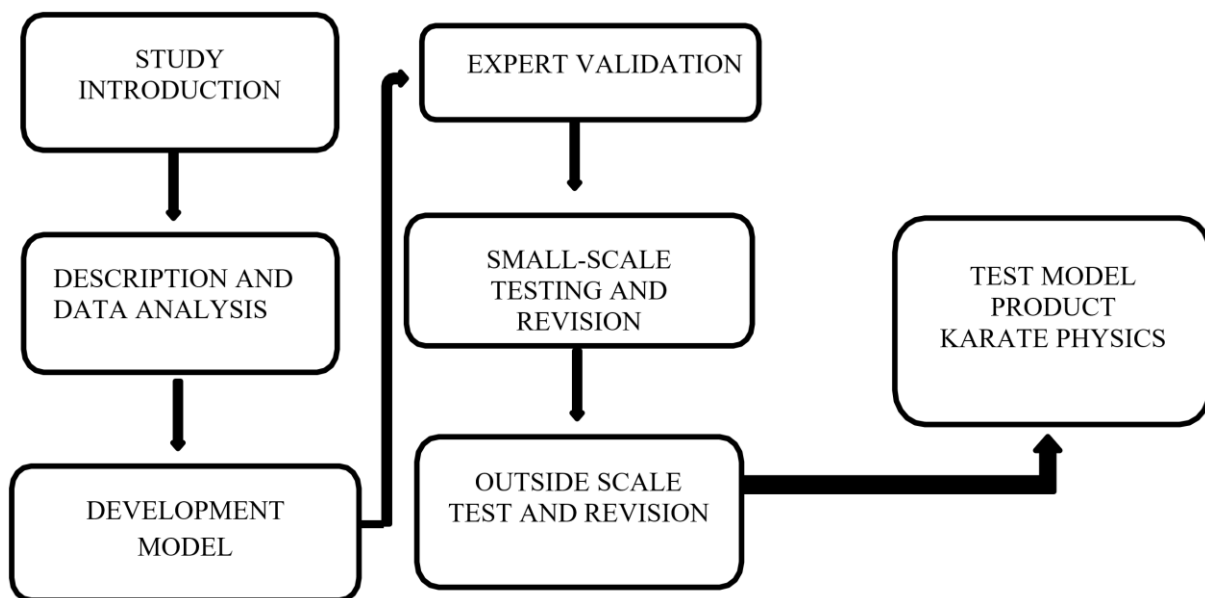


Figure 1. Study Steps and Karate Physical Development Test Based on Sugiyono [19]

The test instrument preparation technique was carried out as a reference to see what measuring instruments were suitable for use in the junior karate physical test instrument in the kata category. The initial product series of karate physical tests included tests; 1) V Sit And Reach Test, 2) Hexagonal Obstacle, 3) Stork Standing Balance Test, 4) Sit-Up, and 5) Multistage Fitness Test identified in Table 1.

**Table 1.** Junior Karate Kata Physical Test Grid Instrument

Sub Variable	Indicator	Instrument Test
Flexibility	Ability to room motions widely as possible in joints	<i>V Sit and Reach Test</i>
Agility	Ability to change direction and position of body fast without losing balance	<i>Hexagonal Obstacle</i>
Balance	A person's abilities are deeply maintained	<i>Stork Standing Balance Test</i>
Power Stand MuscleStomach	The ability of a muscle group to carry out continuous contractions when holding a load for a period of certain time	<i>Sit-Ups (2 minutes)</i>
Power stand cardiorespiratory	Capacity to engage in action throughout a variety of time, length, and repetitions Which Lots don't get tired	<i>Multistage Fitness Test</i>

**2.3. Statistical Analysis**

Data reliability testing was carried out using test-retest analysis techniques, two-sided tests, and one-way variance analysis (intra-class correlation). To test statistical products in test development with validity tests, test reliability tests, and normality tests, the validity of this test used expert judgment and the calculation of its value using SPSS 25.

The preparation of the norm score for each item of the karateka kata physical condition test was to convert the raw score or rough number into a standard score with a scale of 5, namely A (excellent), B (good), C (sufficient), D

(moderate) and E (very poor). The preparation of norms with a scale of 5 is as follows in Table 2:

**Table 2.** Formula Categorization Classification Norm

Formula	Category	Mark
$> \text{Mean} + (1.5 \text{ StDev})$	A (Good Very)	5
Mean $+(0.5 \text{ StDev})$ up to Mean $+(1.5 \text{ StDev})$	B (Good)	4
Mean $-(0.5 \text{ StDev})$ up to Mean $+(0.5 \text{ StDev})$	C (Fair)	3
Mean $-(1.5 \text{ StDev})$ up to Mean $-(0.5 \text{ StDev})$	D (Not enough)	2
$< \text{Mean} - (1.5 \text{ StDev})$	E (Very Not enough)	1

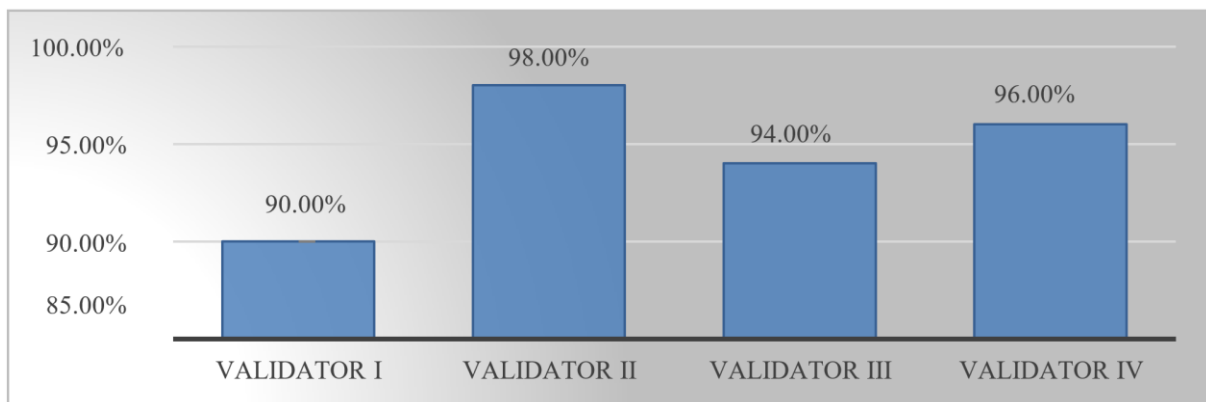
Source: Based on the research of Saputro et al, [20]

**3. Results**

There were three indicators that became expert assessments of the instruments developed by researchers, including suitability, convenience, and feasibility of instruments. The suitability indicator consisted of ten questions, convenience consisted of nine questions and feasibility consisted of eight questions so there were twenty-seven questions to assess the junior karate physical condition test instrument in the kata category. Explained as follows:

a) Suitability

The results of the expert assessment of the suitability indicators of the physical condition test instrument for the junior karate kata category from validator I gave an appropriate assessment of 90%, validator II 98%, validator III 94%, and validator IV 96%. Overall the validator gave an assessment of product suitability of 94.5%. The results of the validator assessment can be seen in Figure 2.



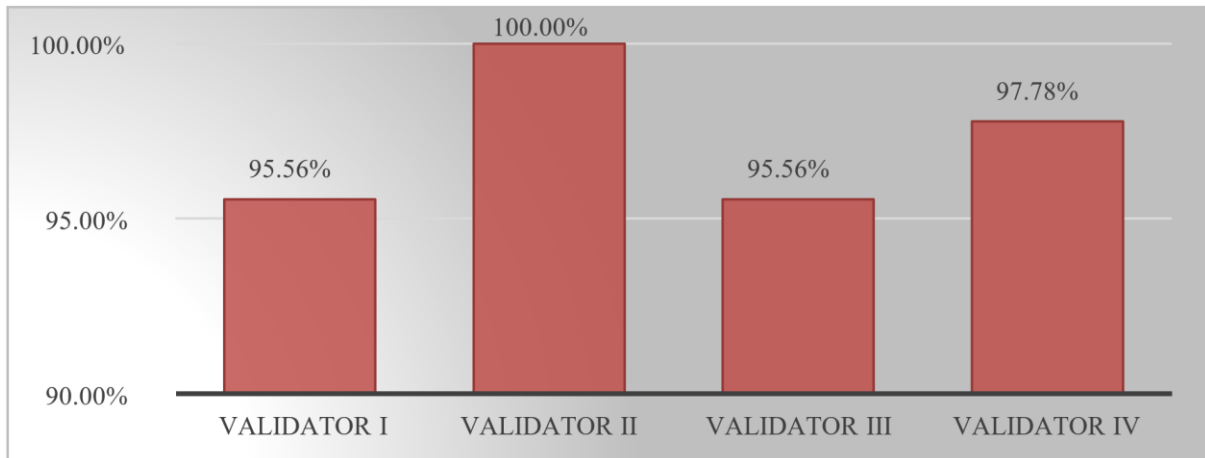
**Figure 2.** Validator Assessment Results on Suitability Indicators for the Instruments Developed

## b) Convenience

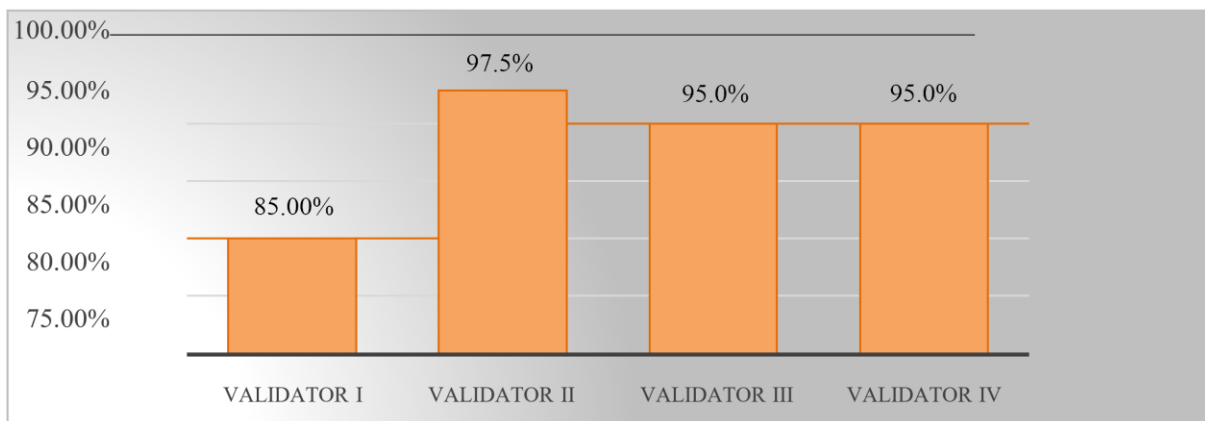
The results of the expert assessment on the indicator of the ease of the junior karate physical condition test instrument in the kata category from validator I gave a decent assessment of 95.56%, validator II 100%, validator III by 95.56% and validator IV by 97.78%. Overall, the validator gave a product suitability assessment of 97.22%. The results of the validator assessment can be seen in Figure 3.

## c) Instrument Feasibility (Eligibility)

The results of the expert assessment of the suitability indicators (feasibility) of the junior karate physical condition test instrument in the kata category from validator I gave an appropriate assessment of 85%, validator II of 97.5%, from validator III of 95% and validator IV of 95%. Overall the validator gave an assessment of product suitability of 93.13%. The results of the validator assessment can be seen in Figure 4.



**Figure 3.** Validator Assessment Results on Convenience Indicators for the Instruments Developed



**Figure 4.** Validator Assessment Results on Instrument Eligibility Indicators for the Instruments Develop

**Results of Small-scale and Large-scale Empirical Validity Calculations**

## a) Men's karateka calculation results

**Table 3.** Results Test Calculation Statistics to 8 Item Test for Male Karateka (SPSS 25)

	Y		Flexibility	Agility	Balance Left	Power Stand Muscle	Power Stand
Y	Pearson Correlation	1	,727**	,706**	,703**	,722**	,808**
	Sig. (2-tailed)		,000	,000	,000	,000	,000
	N	75	75	75	75	75	75
V Sit And Reach	Pearson Correlation	,727**	1	,390**	,369**	\$1,509**	,568**
	Sig. (2-tailed)	,000		,001	,001	,000	,000
	N	75	75	75	75	75	75
Hexagonal Obstacle	Pearson Correlation	,706**	,390**	1	,373**	,485**	,536**
	Sig. (2-tailed)	,000	,001		,001	,000	,000
	N	75	75	75	75	75	75
Stork Standing Balance	Pearson Correlation	,703**	,369**	,373**	1	,448**	,576**
	Sig. (2-tailed)	,000	,001	,001		,000	,000
	N	75	75	75	75	75	75
Sit Up 2 Minute	Pearson Correlation	,722**	\$1,509**	,485**	,448**	1	,601**
	Sig. (2-tailed)	,000	,000	,000	,000		,000
	N	75	75	75	75	75	75
Multistage Fitness	Pearson Correlation	,808**	,568**	,536**	,576**	,601**	1
	Sig. (2-tailed)	,000	,000	,000	,000	,000	
	N	75	75	75	75	75	75

Based on the results of statistical tests in Table 3, the correlation coefficient of each component of the physical test instrument for junior karate athletes in the men's kumite category against the criteria was very significant,  $p$ -value  $\leq 0.05$ . The full explanation can be described as follows;

## 1. V Sit And Reach

The results of the correlation calculation on the V Sit And Reach physical component test instrument were calculated using SPSS version 25. From the results of the analysis, the validity of the physical component instrument for the V Sit And Reach indicator for men was 0.727.

## 2. Hexagonal obstacle

The results of the correlation calculation on the physical component test instrument for the Hexagonal Obstacle were calculated using SPSS version 25. From the results of the analysis, the validity of the physical component instrument for the Hexagonal Obstacle indicator for men was 0.706.

## 3. Stork Standing Balance

The results of the correlation calculation on the physical component test instrument for Stork Standing Balance were calculated using SPSS version 25. From the analysis results, the validity of the physical component instrument for the Stork Standing Balance indicator for men was 0.703.

## 4. Sit Ups 2 Minutes

The results of the correlation calculation on the physical component test instrument for the 2-minute sit were calculated using SPSS version 25. From the results of the analysis, the validity of the physical component instrument for the 2-minute Sit indicator for men was 0.825.

## 5. Multistage Fitness

The results of the correlation calculation on the physical component test instrument for Multistage Fitness were calculated using SPSS version 25. From the results of the analysis, the validity of the physical component instrument for the Multistage Fitness indicator for men was 0.808.

## b) Calculation results for female karateka

**Table 4.** Results Test Calculation Statistics to 8 Item Test for Female Karateka (SPSS 25)

	Y		V Sit And Reach	Hexagonal Obstacle	Stork Standing Balance	Sit Up 2 Minute	Multistage Fitness
Y	Pearson Correlation	1	,754**	\$1,799**	,850**	,756**	,872**
	Sig. (2-tailed)		,000	,000	,000	,000	,000
	N	42	42	42	42	42	42
V Sit And Reach	Pearson Correlation	,754**	1	,579**	,570**	,522**	,661**
	Sig. (2-tailed)	,000		,000	,000	,000	,000
	N	42	42	42	42	42	42
Hexagonal Obstacle	Pearson Correlation	\$1,799**	,579**	1	,784**	,537**	,573**
	Sig. (2-tailed)	,000	,000		,000	,000	,000
	N	42	42	42	42	42	42
Stork Standing Balance	Pearson Correlation	,850**	,570**	,784**	1	,512**	,676**
	Sig. (2-tailed)	,000	,000	,000		,001	,000
	N	42	42	42	42	42	42
Sit Up 2 Minute	Pearson Correlation	,756**	,522**	,537**	,512**	1	,694**
	Sig. (2-tailed)	,000	,000	,000	,001		,000
	N	42	42	42	42	42	42
Multistage Fitness	Pearson Correlation	,872**	,661**	,573**	,676**	,694**	1
	Sig. (2-tailed)	,000	,000	,000	,000	,000	
	N	42	42	42	42	42	42

Based on the statistical test results in Table 4, the correlation coefficient of each component of the physical test instrument for junior karate athletes in the men's kumite category against the criteria was very significant,  $p\text{-value} \leq 0.05$ . The full explanation can be described as follows:

## 1. V Sit And Reach

The results of the correlation calculation on the physical component test instrument for V Sit And Reach were calculated using SPSS version 25. From the results of the analysis, the validity of the physical component instrument for the V Sit And Reach indicator for men was 0.754.

## 2. Hexagonal Obstacle

The results of the correlation calculation on the physical component test instrument for the Hexagonal Obstacle were calculated using SPSS version 25. From the results of the analysis, the validity of the physical component instrument for the Hexagonal Obstacle indicator for men was 0.799.

## 3. Stork Standing Balance

The results of the correlation calculation on the physical component test instrument for the Stork Standing Balance were calculated using SPSS version 25. From the results of the analysis, the validity of the physical component

instrument for the Stork Standing Balance indicator for men was 0.850.

## 4. Sit Ups 2 Minutes

The results of the correlation calculation on the physical component test instrument for the 2-minute sit-up were obtained calculation results using SPSS version 25. From the analysis results, it was found that the validity of the physical component instrument for the 2-minute Sit Up indicator for men was 0.756.

## 5. Multistage Fitness

The results of the correlation calculation on the physical component test instrument for Multistage Fitness were calculated using SPSS version 25. From the results of the analysis, the validity of the physical component instrument for the Multistage Fitness indicator for men was 0.872.

**Mark**

The following is the score calculation table, after the Five physical test items had been carried out in a battery test or should have not been intermittent, each item's score category was calculated by adding up the five test results.  $T1+T2+T3+T4+T5 = \text{Result}$ . Calculation of scores for the men's category was presented (in Table 5) and calculation of scores for the women's category was given in Table 6.

**Table 5.** Male category values

Mark	V Sit And Reach	Agility Hexagonal/ Obstacle (Seconds)	Balance Stork Standing Balance Test	Abdominal Endurance/Sit Ups 2 Minutes	Cardio-Respiratory Endurance/Multistage Fitness Test
1	<3	< 13.44	< 20.48	< 26	<32.4
2	4 - 5	13.45 - 14.66	20.49 - 41.94	27 – 35	32.5 - 35.5
3	6 - 7	14.67 - 15.87	41.95 - 63.41	36 – 44	35.6 - 38.7
4	8 - 10	15.88 - 17.09	63.42 - 84.87	45 – 52	38.8 - 41.8
5	>11	>18.09	>85.87	> 53	> 42.8

**Table 6.** Female category values

Mark	V Sit And Reach	Agility Hexagonal/ Obstacle (Seconds)	Balance Stork Standing Balance Test	Abdominal Endurance/Sit Ups 2 Minutes	Cardio-Respiratory Endurance/Multistage Fitness Test
1	< 3	< 15.66	< 0	<25	< 30.70
2	4 – 7	15.67 - 16.99	0.01 - 25.52	26 - 31	30.71 - 33.96
3	8 – 12	17.00 - 18.33	25.53- 52.20	32 - 36	33.97 - 37.22
4	13 – 17	18.34 - 19.66	52.21 -78.87	37 - 42	37.23 - 40.48
5	>18	>20.66	>78.88	>43	>41.48

## Norm

The following is the calculation of norms after calculating the total scores obtained by participants and classifying test ability levels physique karate junior category aged 16-17 years. This can be seen in Table 7 for males and Table 8 for women.

**Table 7.** Norms of Physical Male Karate Junior Category

Numbers	Physical fitness	Classification
1	X 16	E (Very Not enough)
2	16 < X 24	D (Not enough)
3	24 < X 29	C (Fair)
4	29 < X 34	B (Good)
5	34 <	A (Good Very)

Based on the test norms that had been developed (can be seen in Table 7), athletes who performed the junior men's karate physical test and obtained a total score of less than 16, were declared to have Very Poor physical ability (E), and athletes who obtained a total score of more than 16 to 24, were declared to have Less Good physical ability (D), athletes who obtained a total score of more than 24 to 29 were declared to have Less physical ability (C), athletes who got a total score of more than 29 to 34 were declared to have good fitness (B), and athletes who got a total score of more than 34 were declared to have Very Good fitness (A).

Based on the test norms that had been developed (seen in Table 8), athletes carried out physical tests of female karate junior category and gained a total score of less than

or equal to 13, it was declared to have Very Poor physical ability (E), The athletes obtained a total score of more than 13 to 17, was declared to have Poor physical ability (D), the athletes got a total score of more than 17 up to 24 were declared to have less than moderate physical ability (C), athletes getting a total score of more than 24 to 27 were considered to have good fitness (B), and athletes getting a total score of more than 27 were considered to have Very Good fitness (A).

**Table 8.** Norms of Physical Female Karate Junior category

Numbers	Physical fitness	Classification
1	X 13	E (Very Not enough)
2	13 < X 17	D (Not enough)
3	17 < X 24	C (Fair)
4	24 < X 27	B (Good)
5	27 <	A (Good Very)

## 4. Discussion

Before the instrument was validated and used, an expert review was conducted regarding the suitability and feasibility of its use based on theory and studies with the development of karate physical test instruments. The results of the expert review and focus group discussion (FGD) resulted in; 1) the usefulness and usefulness of the test, 2) the ease of administering the test, 3) the economic value of the test, 4) a validated test instrument, 5) a product in the form of a karate physical test instrument model along



with its guidebook. The results also show that there were five karate physical test models suitable for junior male and female athletes in the kata category, namely V Sit And Reach, Hexagonal Obstacle, Stork Standing Balance, Sit Up 2 Minutes, and Multistage Fitness Test.

Measuring physical fitness is an important factor from various perspectives, it is also a determinant of healthy child development [21]. Therefore, physical education should be of high quality to encourage and support all learners to develop into lifelong learners by maintaining their health, fitness, and well-being [22]. The findings of a study conducted by Wong [23], showed that early life frequency in socioeconomic status plays an important role in childhood and physical fitness in adolescence. Osteoarthritis later in life in children can be prevented by interventions early in life [24]. Based on these statements, measuring children's physical condition is recommended to provide an overview of the learning process and provide sports activities.

Physical condition is an absolute requirement for achieving sports achievements because every athlete must have a prime physique to be able to excel [9], [25]. The elements of physical condition needed in each sport are different, therefore the physical condition of an athlete needs to be improved through training that is carried out systematically, steadily, and continuously [1]. Physical conditions generally consist of cardiorespiratory endurance, muscle strength, endurance, flexibility, and body composition which are an important part of physical growth [2]. Physical condition in karate sports is a condition where karate athletes have prime and good physical condition and are ready to face opponents [1]. Physical factors in each category of Karate have several different needs. Physical conditions are a unity that cannot be separated from one another [9], but in practice, some dominant physical conditions have a greater contribution and influence on a particular sport [26], [27].

Several studies prove that physical activity has a positive impact on physical fitness [11], [28], [29], health [30], [31], physical fitness [25], [32], children's knee structure [24], [33], adiposity, bone health, psychological health, and cardiorespiratory fitness. [34], improving pediatric vascular hemodynamics [35], reducing body fat levels [36]–[38] preventing overweight [39]–[41], obesity [42]–[46], type 2 diabetes mellitus [47], muscular endurance [48], [49], and possibly increasing sports participation in high school [50].

It is further confirmed by Helmi Chaabe'ne, et al. [51], that in kata competitions at national and international levels, the assessment of karateka is based on technique, rhythm, strength, movement variation, and also kime which is the most important assessment in the execution of kata. Based on the findings and discussion, this study underscores the importance of creating physical assessments for karate athletes to improve their athletic ability. The importance of valid and reliable physical tests is evident in optimizing

athlete performance, tailoring effective training regimes, monitoring progress, selecting and evaluating talent, preventing injuries, and setting evaluation standards a national and international scales. By understanding and measuring the physical dimensions of karate athletes, this study aims to build a strong foundation for athlete development, improve performance, and propel the sport of karate forward.

## 5. Conclusions

Based on the undertaken research procedures, the gathered data, and the conducted analysis, the study draws the following conclusions: 1) There were five physical fitness test models suitable for junior male and female athletes in the kata category in karate, namely V Sit And Reach, Hexagonal Obstacle, Stork Standing Balance, 2 Minute Sit Up, and Multistage Fitness Test. 2) The physical fitness test model for junior karate athletes in the kata category was effective. This effectiveness was evident in the difference between the pretest scores before the intervention and the posttest scores after the intervention. The calculation reveals that the average post-test value was higher than the average pretest value. Overall, the results of research and development conclude that there were two series of valid junior karate physical tests in the kata category and each had a norm category. So the results of a series of junior karate physical tests in the kata category for male and female athletes had implications for efforts to select and develop karate performance systems. These efforts will be more efficient with a scientific approach, one of which is by using physical tests and measurements for the selection of male karate athletes, and junior women in the word category because statistically, it has a better influence than not using a test or based on observation alone. This research focused on physical aspects, so to perfect the selection of prospective karate athletes, further research is recommended on psychological, technical, and tactical aspects.

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## Conflict of Interest

All authors declare there is no conflict of interest

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