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Physical Fitness Level of Female Handball Athletes of the Special Sports School (SKO) of Riau Province

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Abstract

This study aims to determine the physical condition of female handball athletes at the Special Sports School (SKO) in Riau Province. Good physical condition is crucial for athletes, especially in sports like handball, which require speed, endurance, strength, and body coordination. This study used a quantitative descriptive method with an observational approach through a cross-sectional survey. The sample consisted of 14 female handball athletes at SKO in Riau Province. Data were collected using the Indonesian Physical Fitness Test (TKJI), which includes five components: a 60-meter run, a 60-second hang lift, a 60-second sit-down, a vertical jump, and a 1200-meter run. The results showed that the physical condition of female athletes was generally in the good (71.43%) and moderate (28.57%) categories. No respondents were in the poor or very poor categories. The best physical component was the sit-down test, with 78% in the good to excellent category. Aspects that need to be improved are the endurance and strength of the arm and shoulder muscles (64.28% in the moderate category) and explosive power of the legs (57.14% in the moderate to low category). These results indicate that the training program at the Riau Province SKO is quite effective, but improvements in upper-body strength and leg explosiveness training are needed to optimize athlete performance. Therefore, this study can serve as a reference for coaches and trainers at the Riau Province SKO in developing more specific, data-driven training programs to improve the physical fitness and performance of handball athletes at the regional and national levels.

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INTRODUCTION

Sport is a planned physical activity carried out for various purposes, including health, fitness, recreation, education, and achievement (Vania et al., 2018). Sport plays a crucial role in developing healthy, active, and highly productive human resources (Sasmarianto et al., 2022). For an athlete to achieve success, several supporting factors must be considered (Tania & Anisa, 2024). Handball is a sport that requires a very high level of physical fitness because it involves speed, strength, agility, and endurance in a short period of time (Putri & Siantoro, 2022). In handball, several aspects must be considered, namely physical, technical, tactical, and mental aspects (Madya & Yani, 2024).

One of the main aspects of physical fitness is physical fitness, which is the primary foundation for an athlete's competitive ability (Insanistyo et al., 2023). Physical fitness is the body's ability to perform physical activities without causing excessive fatigue (Frihasan & Boy, 2020). For example, research shows that in high-intensity team sports, good aerobic and anaerobic capacity are closely related to athlete performance (Tanujaya & Safitri, 2023). In Indonesia, one way to optimize the abilities of young athletes is through training programs, including through institutions such as the Special Sports School (SKO), which aims to improve overall physical fitness (Junaedi et al., 2023).

Handball requires excellent physical fitness. During play, athletes must sprint, change positions, jump, throw, and defend repeatedly in a short period of time (Frihasan & Boy, 2020b). Research on female handball athletes shows that during a match, the majority of energy used is aerobic, approximately 90 percent. The average distance covered by players ranges from 4 to 6 kilometers at an intensity of approximately 80 to 90 percent of maximum heart rate (Wagner et al., 2020). Therefore, physical fitness is crucial as an indicator of physical readiness for handball athletes, including female athletes (Arinda et al., 2025). Furthermore, female athletes differ from male athletes in physical characteristics such as muscle mass, body composition, and recovery capacity (Rios et al., 2023).

Research shows that among female handball athletes, body composition, such as body fat percentage, is negatively associated with their fitness abilities, while muscle mass and strength are positively associated with physical performance (Yusuf et al., 2023). Therefore, a tailored fitness training approach for female athletes is crucial to improving performance and preventing injury (Ni'mah & Melisa, 2021). In Indonesia, institutions such as Special Schools also play a role in this regard.

The Riau Province Sports Association (SKO) plays a crucial role in training young athletes with the potential to become national athletes (Harahap & Fardi, 2022). As a regional sports

development institution, the Riau Province SKO is responsible for producing athletes who are not only technically and tactically proficient but also possess good physical condition and endurance (Suyono & Monalisa, 2022). Regular physical fitness assessments at the SKO are an important tool for evaluating the quality of training programs, recovery, and preparation for competition.

Based on this context, several issues require attention. First, there is insufficient data on the physical fitness levels of female handball athletes in the Riau Province SKO. Second, without adequate data, coaches and trainers struggle to create measurable training programs tailored to the athletes' needs. Third, the physical fitness of young athletes in the region still needs to be compared with national standards or relevant references. Therefore, this research is crucial to address this information gap.

Therefore, this study aims to determine the physical condition of female handball athletes at the Special Sports School (SKO) in Riau Province. This study will measure several important components of physical fitness, such as cardiovascular endurance, muscle strength, speed, fast and controlled running ability, and body flexibility (Fahruzi et al., 2017). These measurements are conducted to determine the extent to which their physical abilities support their performance in handball (Pamungkas et al., 2022).

The results of this study are expected to provide benefits in two aspects. Theoretically, this study will provide additional information in the study of the physical fitness of female athletes, particularly in handball. The results can be directly used by coaches, program supervisors, and SKO management in developing training plans, monitoring physical fitness development, and designing more appropriate development strategies for female handball athletes at SKO Riau Province.

METHODS

This research is descriptive in nature with an observational approach to describe the conditions and circumstances of the research conducted directly through observation. This research is also descriptive quantitative, namely explaining the relationship between variables by analyzing data in the form of numbers using statistical methods based on hypothesis testing (Sugiyono, 2013). The research method used is a cross-sectional survey method, namely research that aims to study the dynamics of the correlation between risk factors and their effects with an observational approach, or data collection at a certain point in time (Abduh et al., 2023). The population and sample in this study were female handball athletes from a special sports school in Riau Province. This research instrument used observation by measuring the level of physical fitness of students (TKJI, 1999).

Based on the type of data required in this study, the type of measurement used was the Indonesian Physical Fitness Test. The Indonesian Physical Fitness Test consists of five components: 1) a 60-meter run, 2) a 60-second body lift, 3) a 60-second sit-up test, 4) a vertical jump, and 5) a 1200-meter run (TKJI, 1999).

1. 60-meter run

This test measures a person's running speed Equipment:

a. Straight, level, and non-slippery track. The distance between the start and finish lines is 60 meters.
b. Whistle
c. Stopwatch
d. Flag, pencil, and book

Implementation:

The subject stands behind the starting line in a running position. When given the command "yes," the subject must run as fast as possible for 60 meters. When the subject touches or crosses the finish line, the stopwatch is stopped. Scoring: The test score is the time it takes the runner to cover 60 meters. Time is recorded in tenths of a second.

Tabel 1. 60 Meter Run Assesment Norms

Mark	16 -19 Years
5	s.d -7.2
4	7,3 – 8,3
3	8,4 – 9,6
2	9,7 – 11,0
1	11,1 – dst

2. 60-second Body Lift Test

This test aims to measure the strength and endurance of the arm and shoulder muscles.

Equipment :

a. A flat, clean floor
b. A single crossbar
c. A stopwatch
d. A book and a pencil

Implementation:

The examiner uses a single bar, straight from head to toe. The examiner holds both arms shoulder-width apart. Then, the examiner lifts the body by bending both arms so that the body touches or passes over the single bar, then returns to the starting position. Repeat this movement continuously without stopping for 60 seconds.

Tabel 2. Assessment Norms 60 Seconds Body Lift

Mark	16 -19 years
5	Up 19
4	14-18
3	9-13
2	5-8
1	0-4

3. 60-Second Sitting Test

This test aims to measure abdominal strength and endurance.

Equipment :

a. Clean floor/grass
b. Stopwatch
c. Book and pencil

Implementation:

The test involves sitting on the floor or grass with both knees bent at about a 90-degree angle. The arms are folded and placed behind the head, with the fingers interlocked and both hands touching the floor. A friend helps hold and apply pressure to the ankles to prevent the legs from lifting. Upon hearing the command "yes," the test subject begins to sit up, bringing both elbows to rest on the thighs, then returns to the starting position. Repeat this

movement quickly without stopping for 30 seconds.

Score: Number of lying down done for 60 seconds.

Tabel 3. Assessment Norm: Sitting Position For 60 Seconds

Mark	16 -19 years
5	Up 41
4	30-40
3	21-29
2	10-20
1	0-9

4. Vertical Jump

This test aims to measure explosive power or explosive force.

Equipment :

a. Flat walls and a level, sufficiently spacious floor.
b. A dark-colored board measuring 30 x 150 cm, scaled in centimeters, hung on the wall, with the distance between the floor and the zero mark on the board at 150 cm.
c. Chalk powder and an eraser.
d. Books and pencils.

Implementation:

The subject stood upright near a wall, resting on both feet, and the scale board was next to either his left or right hand. Then the hand next to the wall was raised straight up with the palm facing the scale board, leaving a finger print. After that, the subject moved to the starting position by bending both knees, then jumped as hard as he could while slapping the scale board with the hand still attached to the wall, leaving a sharpened mark on the scale board. Without jumping, the subject also placed the hand next to the wall on the scale board, leaving a trace as a reference. The subject was given the opportunity to jump three times. The vertical jump result was obtained by taking the highest reach of the three jumps, then subtracting the reach obtained when not jumping.

Tabel 4. Assessment Norm: Sitting position for 60 seconds

Mark	16 -19 Years
5	Up 73
4	60-70
3	50-59
2	39-49
1	0-38

1. 1200 meter run

This test aims to measure heart, blood circulation and respiratory endurance.

Equipment :

a. A flat field or track of known length to easily determine the distance of 1200 meters
b. Starting flag
c. Stopwatch
d. Book and pencil
e. Start and finish line markers

Implementation:

The subject stands behind the starting line. At the command "ready," the subject assumes a standing start position, ready to run. At the command "yes," the subject runs to the finish line, covering a distance of 1,200 meters. If someone jumps the start, the subject can repeat the test.

RESULT

1. 60 meter running test data

Based on data collected from 14 sample participants, the fastest score was 4.50 seconds and the lowest was 11.1 seconds. For more details, see the frequency distribution table below.

Tabel 5. Frequency Distribution of 60 Meter Running Test Data

Mark	16-19 Year	Frekuensi	Persentase
5	s.d -7.2	2	14,28
4	7,3 – 8,3	3	21,42

3	8,4 – 9,6	6	42,85
2	9,7 – 11,0	2	14,28
1	11,1 – dst	1	7,14
	Amount	**14**	**100**

2. 60-second Body Lift Hanging Test Data

Based on data collected from 14 sample people, the highest hanging body lifting score was 16 times and the lowest was 8 times. For more details, please see the following frequency distribution table:

Tabel 6. Frequency distribution of body lifting hanging test data

Mark	16-19 Year	Frekuensi	Persentase
5	Up 19	0	0
4	14-18	3	21,42
3	9-13	9	64,28
2	5-8	2	14,30
1	0-4	0	0
	Amount	**14**	**100**

3. 60-second Sitting-Lying Test Data

Based on data collected from 14 sample participants, the highest score for the sitting-lying test was 54 times and the lowest was 20 times. For more details, see the following frequency distribution table:

Tabel 7. Frequency distribution of 60-second sitting-lying test data

Mark	16-19 Year	Frekuensi	Persentase
5	Up 41	5	35,71
4	30-40	6	42,85
3	21-29	2	14,30
2	10-20	1	7,14
1	0-9	0	0
	Amount	**14**	**100**

4. Vertical Jump Test Data

Based on data collected from 14 sample participants, the highest vertical jump score was 56 cm and the lowest was 32 cm. For more details, see the following frequency distribution table:

Tabel 8. Frequency Distribution of Vertical Jump Test Result Data

Mark	16-19 Year	Frekuensi	Persentase
5	Up 73	0	0
4	60-72	0	0
3	50-59	4	28,57
2	39-49	8	57,14
1	0-38	2	14,30
	Amount	**14**	**100**

5. 1200 Meter Running Test Data

Berdasarkan data yang dikumpulkan dari 14 orang sampel, diperoleh skor lari 1200 meter tertinggi 4, 54 menit dan terendah 7, 42 menit. Untuk lebih jelasnya dapat dilihat pada tabel distribusi frekuensi berikut ini:

Tabel 9. Frequency Distribution of 1200 Meter Running Test Results Data

Mark	16-19 Year	Frekuensi	Persentase
5	Sd-3,14	0	0
4	3,15-4,25	0	0
3	4,26-5-12	3	21,42
2	5,13-6,33	9	64,28
1	6,34 dst	2	14,28
	Amount	**14**	**100**

6. Physical Fitness Test Results for Female Handball Athletes at the Special Sports School (SKO) in Riau Province

Data on the results of the physical fitness test classification of female handball athletes at the Special Sports School (SKO) in Riau Province, there were no

very good scores or above 22-25 from respondents, namely 0%, classified as good 18-21 There were 10 respondents, namely 71.42% of respondents classified as moderate 14-27 there were 4 respondents, namely 28.57% while the classification of less than 10-13 had no respondents, namely 0%. Furthermore, for clarification, there were no respondents, namely 0%, for more details, see the table below:

Tabel 10. Classification of Physical Fitness Test Results for Female Handball Athletes at the Special Sports School (SKO) of Riau Province

No	Klasifikasi	Skor	X	%
1	Baik Sekali (BS)	22– 25	0	0%
2	Baik (B)	18 - 21	10	71,43%
3	Sedang (S)	14 - 17	4	28,57 %
4	Kurang (K)	13-10	0	0%
5	Kurang Sekali(KS)	5 – 9	0	0%
Amount				**100%**

CONCLUSION

Based on a study of 14 female handball athletes from the Riau Province Special Sports School (SKO), the conclusion obtained was that the general level of physical fitness was in the good category, with a percentage of 71.43%, while 28.57% of athletes were in the moderate category. No athletes were included in the poor or very poor category. These results indicate that the training program at the Riau Province SKO has had a positive impact on the athletes' physical condition, especially in aspects of endurance, strength, and flexibility. Thus, it can be said that most athletes have adequate physical readiness to support performance in the sport of handball.

In more detail, the test results show that the 60 meter running ability is mostly in the fairly fast to moderate category.

In the arm and shoulder muscle strength test (hanging body lift), most athletes were in the moderate category (64.28%), indicating that upper body strength still needs to be improved. Meanwhile, the results of the abdominal muscle endurance test (sitting position) showed good results, with more than 78% of athletes falling into the good to excellent category. The results of the vertical jump test, which measures leg muscle explosiveness, showed that most athletes were in the moderate to low category, indicating the need for increased explosive training. The results of the 1200-meter run test, which measures cardiovascular endurance, showed that 64.28% of athletes were in the moderate category, so increasing aerobic capacity is necessary.

These results are in line with research by Camacho-Cardenosa et al. (2019) which states that playing handball requires high aerobic capacity and endurance so that athletes can maintain optimal performance throughout the match.

These results also support the research of Yusuf et al. (2023) which explained that muscle strength and body composition have a positive relationship with the performance of female handball athletes Haksever et al. (2021). In this context, the achievements of most SKO

Riau athletes in the good category indicate that they have a sufficient physical foundation to support competitive performance. Furthermore, this study also strengthens the findings of Kamola et al. (2023) who emphasized the importance of designing training programs tailored to the physiological characteristics of female athletes, particularly in increasing muscle strength and endurance, which tend to differ from those of male athletes.

Overall, this study provides a clear picture of the physical fitness of female handball athletes at the Riau Province SKO. The results also reinforce previous research findings, which emphasized that physical fitness is a key indicator in determining athlete performance. This study also provides suggestions for coaches and sports trainers in designing more specific and continuous training programs, focusing on increasing explosive power, upper body muscle strength, and aerobic breathing capacity. By managing training in a more measured and data-driven manner, it is hoped that the female handball athletes at the Riau Province SKO can achieve peak performance and be ready to compete at the national level.

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