

# The Effect of Circuit Training on Physical Fitness of Hockey Athletes in Semarang District

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## Abstract

Regional Sports Week or called PORPROV is a multi-event championship at the regional level that competes in various sports, one of which is Hockey. This sport requires excellent physical conditions in achieving achievements, so athletes must have good preparation through various training programs, including circuit training. However, faced with a pandemic situation, it becomes a challenge in itself in preparing his physical condition, especially the physical fitness of athletes. This study aims to determine whether there is an influence between circuit training on the physical fitness of Hockey athletes in Semarang Regency. The method in this study is a quasi-experiment with a one-group pretest and posttest research design. The sample for this study is 12 hockey players from Semarang Regency. The instrument used is the Physical Fitness Level Test for the age of 16 - 19 years which consists of: 1) Running 60 meters, 2) hanging up and lifting 60 seconds, 3) Lying down (sit up) 60 seconds, 4) Straight jump (vertical jump), 5) Run 1200 meters. Circuit training has an effect on physical fitness with a significance value of 0.000 ( $p < 0.05$ ).

## Abstrak

Pekan Olahraga Daerah atau disebut PORPROV merupakan kejuaraan multi event di tingkat daerah yang mempertandingkan berbagai cabang olahraga, salah satu diantaranya adalah Hoki. Cabang olahraga ini menuntut kondisi fisik yang prima dalam meraih prestasi, oleh karena itu atlet harus memiliki persiapan yang baik melalui berbagai program latihan, diantaranya adalah latihan sirkuit. Akan tetapi dihadapkan pada situasi pandemi, menjadi tantangan tersendiri dalam menyiapkan kondisi fisiknya khususnya kebugaran jasmani atlet. Penelitian ini bertujuan untuk mengetahui ada tidaknya pengaruh antara latihan sirkuit terhadap kebugaran jasmani atlet Hoki Kabupaten Semarang. Metode dalam penelitian ini adalah eksperimen semu (quasy experiment) dengan desain penelitian one group pretest and posttest design. Sampel penelitian ini adalah atlet hoki Kabupaten Semarang yang berjumlah 12 orang. Instrumen yang digunakan adalah Tes Tingkat Kebugaran Jasmani usia 16 -19 tahun yang terdiri dari: 1)

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Lari 60 meter, 2) gantung angkat tubuh (pull up) 60 detik, 3) Baring duduk (sit up) 60 detik, 4) Loncat tegak (vertical jump), 5) Lari 1200 meter. Latihan sirkuit memberikan pengaruh terhadap kebugaran jasmani dengan nilai signifikansi sebesar 0.000 ( $p < 0.05$ ).

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### **Introduction**

In general, exercise is defined as an activity that involves the use of physical and mental energy to train the human body, both physically and mentally (Yuda, 2021). Exercise is an activity or physical effort that can help optimize the development of the body through movement based on muscle movement. Sports can also train one's body, not only physically but also spiritually. An exercise is an intentional form of physical activity for optimal enjoyment and achievement (Ricki Novan Sugandi & Pramono, 2019, p. 374).

Hockey is a game played by using a ball on a field of grass or artificial turf field. In the United States and Canada, this sport is popularly played by women, while in Indonesia the sport of Hockey was entered in 1962 (Kumparan, 2018) for the first time being competed at the 18th Asian Games in August 18 to September 2 2018 in Jakarta. This game is very interesting because players use costumes as futsal players, played with a field made of a flat floor, players use sticks or sticks as a tool in playing small and dense balls (Rahman, 2017, p. 320).

Semarang Regency Hockey is the parent of sports or sports institutions under the Semarang Regency Indonesian National Sports Committee (KONI), which is responsible for breeding, fostering achievements, and managing sports in accordance with their authority (KONI, 2020). The main goal is to realize proud sports achievements, build character, elevate the honor and dignity of the nation in order to participate in strengthening, fostering national unity and integrity, and strengthening national resilience (KONI, 2020, p. 3). The Semarang Regency Hockey Team which was formed in 2019 was classified as a

new sport in Semarang Regency, but it opens up opportunities for Semarang Regency in achieving achievements in the 2022 Central Java PORPROV because hockey teams have not been formed in other regions. This is different from the Semarang Regency men's hockey team which is considered less strategic in terms of achievement due to the high level of competition between cities and regencies in Central Java (Aristiyanto et al., 2021).

The COVID-19 pandemic is an unprecedented global problem, posing great risks and challenges to all aspects of the sport. Such spontaneous societal restrictions and considerations pose major challenges for all (Jermyn et al., 2021). The COVID-19 pandemic has hampered all activities or training activities because the government has imposed restrictions on community mobility from the beginning of the 2020 pandemic until semester 1 of 2021 (Kompas Pedia, 2021). This policy is a major obstacle for coaches in maintaining the physical condition of athletes who will prepare for PORPROV Central Java through physical activity (sports) and nutritional intake and the role of nutritional status on endurance (Sonia et al., 2020) which needs to be managed properly. Therefore, a scientific approach is needed through research and exercise programs that can improve physical conditions, especially the physical fitness of the Semarang Regency hockey athletes who are suspected of contributing to increased achievement in welcoming the Provincial Sports Week (Porprov) which was original to be held in 2022 (i News, 2021). The training program in question is circuit training which according to Harsono in Bazargan (2013, p. 38) has several advantages including; a)



improving various components of physical condition simultaneously in a relatively short time. b) each athlete can train according to their respective progress. c) each athlete can observe and assess his own progress. d) exercises are easy to supervise. e) save time, because in a relatively short time it can accommodate many people at once.

Exercise according to Sukadiyanto (2005, pp. 5–6) is a process of improving the ability to exercise which contains theoretical and practical material using methods and implementing rules with a scientific approach, using the principles of education that are planned and regular so that the training objectives can be achieved on time. Meanwhile, according to Irianto (2002, pp. 11-12) training is a training process that is carried out regularly, planned, using certain patterns and systems, methodical and repetitive, such as movements that were originally difficult to do, less coordinative becomes easier, automatic and reflective so that movement becomes easier. more efficient and it has to be done many times. While circuit training is a combination of six or more exercises performed with a short rest period between them for either a certain number of repetitions or a specified amount of time (Goulding, 2021). One circuit is when all selected exercises have been completed. Several circuits can be done in one training session. Circuit training is one way that can simultaneously improve the overall fitness level of an athlete's body which includes basic motor components (Prof. Dr. Rusli Lutan & Drs. J. Hartoto, 2002). In a previous study by (& Setiawati, 2017) circuit training is a form of cardiorespiratory exercise that is useful for improving fitness (Robinson, 2021). Meanwhile, according to Aristiyanto (2021) in previous research, circuit training has an effect on physical fitness.

Physical fitness is an important factor that needs to be considered, in addition to various other factors. Basically, all

aspects of the physical condition must be jointly fostered, grown, and developed in a harmonious and balanced manner so that human quality can be achieved as a whole and to create productive and competitive individuals. Physical fitness according to Djoko Pekik Irianto (Rismayanthi, 2012) that physical fitness is a person's ability to be able to do daily work efficiently without causing excessive fatigue so that they can still enjoy their free time. Given the importance of physical conditions, especially the physical fitness of athletes in supporting achievement, the researchers felt the need to conduct research in measuring the effect of circuit training on physical fitness for hockey athletes in Semarang Regency.

### Method

This study is a quasi-experimental research design with a one-group pretest and posttest design, namely, an experiment carried out in a single group without a comparison group (Arikunto, 2010), using a sampling technique on male hockey athletes in Semarang Regency, amounting to 12 people. The treatment in this study was to provide a circuit training menu to the Hockey athletes in Semarang Regency who had an initial test to determine the initial conditions before being given training, the athletes were given treatment (treatment) as many as 16 meetings, for approximately 6 weeks with a frequency of training 3 times. In a week (Sugiardo Tjaliek, 2002) circuit training consists of 7 exercise items as follows: a) Push Up, b) Jumping Jack, c) Sit Up, d) Squat, e) Back-Up, f) Plank, g) Squat Thrush. The duration of the exercise was 1 minute (60 seconds) for each exercise, then a final test was carried out to determine whether there was a change after being given treatment. The instruments used in this study are as follows: Measurement of physical fitness both at pre-test and post-test using the Indonesian Physical Fitness Test (TKJI) for ages 16-19 years which consists of a) running 60 meters, b) Pulling up for 60 seconds, c) lying down



(sit up) for 60 seconds, d) vertical jump, e) running 1000 meters.

This research was carried out on the basketball court of the Randu Campus of Sports Science, Faculty of Health, Ngudi Waluyo University in March – April 2021. The chosen site is very representative in terms of data collection because, in addition to being spacious, it is also a training ground for hockey players in Semarang Regency. The procedure for measuring physical fitness in TKJI aged 16-19 years according to (Sepdanius et al., 2019) is as follows: a) the 60-meter run aims to measure running speed, starting with the initial attitude of standing behind the start line, after having on his, her, their, etc. cue the participants run as fast as possible to the finish line to record the time, b) Pull Up for 60 seconds to measure the strength and endurance of the arm and shoulder muscles starting by standing under a single bar, both hands holding on to a single bar shoulder width apart, palms facing towards the location of the head then take a Pull Up stance, the chin is on the single bar and keep it as long as possible then the time is recorded, c) lie down (sit ups) for 60 seconds to measure the strength and endurance of the abdominal muscles starting by lying on your back on the floor, both knees bent at an angle of 90° with both fingers placed behind the head, after there is a signal, participants a move to take a sitting position until both elbows touch the thighs, then return to the initial position carried out repeatedly without stopping for 60 seconds, d) vertical jump to measure the explosive power of the leg muscles starting by standing upright near the wall, feet together, the scale board is on the right / left side of the participant's body. Raise the hand that is near the wall straight up, the palm of the hand is pressed against the scale board until it leaves finger marks, then the participant jumps as high as possible while tapping the board with the hand closest to it, causing a mark. Recording results through jump achievement minus

standing achievement, e) running 1200 meters to measure cardiopulmonary endurance starting by standing behind the start line then after running to the finish line and recording the time using a digital stop watch with an accuracy of 0.01 seconds.

## Results and Discussion

Based on the calculations that have been carried out using the Kolmogorov-Smirnov normality test on the circuit training variable, it was found that the significance value of *asiymp.sig* (2-tailed) is  $0.131 > 0.05$ , so it can be ascertained that the circuit training variable data is normally distributed.

Table 1. Data Normality Test Results

Variable	Sig.	K-S	P	description
Fitness	0,131		0,05	Normal

The general characteristics of the respondents are presented in Table 2. The average age of the treatment testees was 17 years, with an average height of 158 cm and an average weight of 52.92 kg.

Table 2. Characteristics of Respondents Before and After Giving Treatment

Karakteristi k	Median/Mean±S D	Min-Max
Age (years)	17*	16-19
Height (kg)	166*	160-171
Weight (cm)	54.17*	50-60
Fitness <sup>Pretest</sup>	14,67±1,775	13.00 - 18.00
Fitness <sup>Posttest</sup>	19,92±2,152	17.00 - 24.00

Description: \*Mean

Based on the results of data analysis, it is known that before being given circuit training treatment, there were 4 people (33.33%) in the poor category, 6 people (50%) in the sufficient category, as many as 2 people (16.66%) in the good category, and no athletes with very poor



or very good categories. After being given treatment to the athletes, 3 people (25%) were in the good category, 7 people (58.33%) were in the sufficient

category, 2 people (16.67%) were in the category and there were no athletes in the poor or very poor category. Illustrations can be seen in the image below:

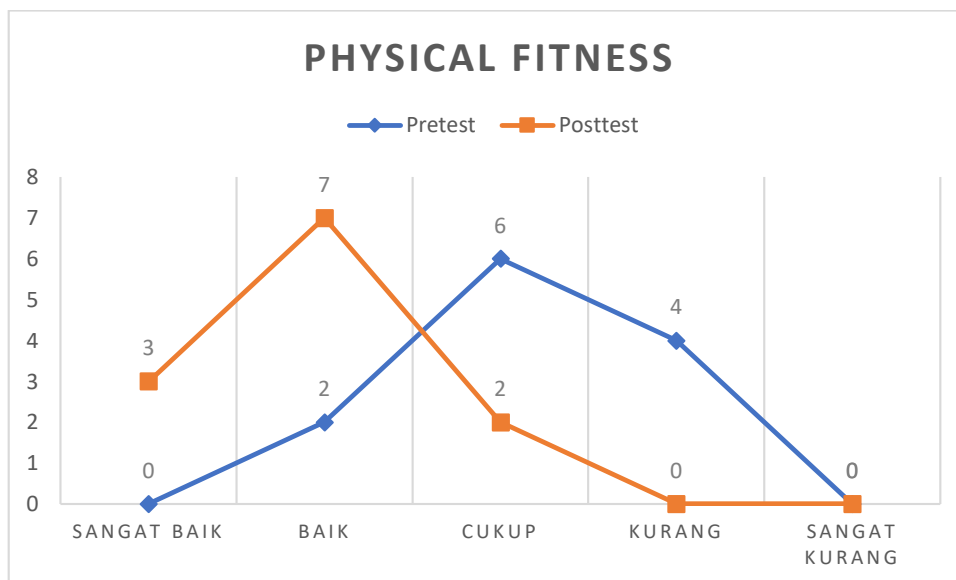


Figure 1. Physical Fitness Before and After Treatment

Determine whether there is a difference between the pretest and the posttest based on the results of the paired sample test. Analysis of differences in physical fitness after being given circuit training exercises obtained t count of 9.507 and t table of 2.179 (t count > t table) with a significance value of 0.000 ( $p < 0.05$ ) so, it can be concluded that there is an effect of circuit training on physical fitness and the effect is equal to 54%. This fact is by previous research conducted by (Bazargan, 2013) that there is an effect of circuit training on increasing physical fitness in basketball extracurricular members at SMA Negeri 3 Bantul, and agrees with the results of the study (Dwicahya, 2017) that there is an effect of the circuit training exercise. against the endurance of SSB Rumbai Junior football athletes.

#### Conclusion and Suggestions

Based on the above research results, it can be concluded that circuit training has a significant effect on the physical fitness of hockey players in Semarang area.

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