

Research Article

The Effect of Circuit Training on Some Selected Motor Fitness and Physiological Variables Among Welketa U-17 Basketball Players

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Abstract

The goal of the study was to assess the effect of circuit training on some selected motor fitness and physiological variables among Welkite Kenema U-17 male basketball project participants. 30 male U-17 basketball players from Welkite Kenema were selected as subjects for this study. The experimental group, EG (n = 15) and the control group, CG (n = 15) assigned randomly. For two months, the training period lasted three days a week for 30 to 50 minutes per session. All the data that were gathered before and after the treatment were provided as the groups mean value and standard deviation to summarize and determine the effect of circuit training on chosen motor fitness and physiological variables. A t-test can also be employed to find out the significant difference among the groups on the selected motor fitness and physiological variables individually. The statistical package software (SPSS) version 25 was utilized for data entry and analysis. The result demonstrates that there is a considerable mean difference between the control and experimental groups in the pre-and post-test outcomes. The researcher determined that circuit training has a substantial influence on motor and physiological characteristics. Therefore, coaches, trainers, and scholars can use circuit training into their training.

Keywords

Circuit Training, Motor Fitness, Physiological Variables

1. Introduction

Circuit training in basketball is a dynamic workout strategy that incorporates strength, endurance, and skill development. It involves a set of exercises performed in a sequence with minimal rest in between, targeting several physical traits essential for basketball play [28]. Circuit training is a useful technique for improving the motor and physiological aspects of basketball performance. Athletes can maximize their po-

tential while maintaining an enjoyable and productive work out by customizing the circuit to target particular areas of progress [32]. To attain these objectives, the length of the intervals between training sessions, the number of repetitions, and the amount of external resistance applied for each exercise can all be changed. This workout promotes the cardiorespiratory system and muscular metabolism. Because of

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the variety of exercises and the capacity to modify the level of difficulty, this training can be applied with athletes of all ages [12]. Circuit training was established in 1953 as effective and efficient technique for coaches to train numerous athletes in a limited amount of time with limited equipment. The exerciser progressed through a series of weight training or calisthenics arranged correspondingly [14].

Maximal oxygen uptake (VO₂max) is improved by using extra circuit training modifications that mix resistance training and aerobic conditioning, according to study by [23]. [4] found that a sample of postmenopausal women's VO₂max increased by 22% when compared to pre-test readings after using strength and circuit training. Additionally, [11] investigated circuit resistance training to raise VO₂max, indicating that it enhances athletes' somatic body composition and muscle strength. Therefore it may be stated that circuit training had a substantial effect in the above research. Basketball players must sprint, leap, and shift directions while employing all of their muscle strength [30]. Even if the physical characteristics of basketball players vary according on their positions in the game, changing direction, pace, and vertical leap during a game is regarded as an important sport-specific movement performed by all players [33]. It is acknowledged that the proper technical models that kids learn in accordance with their age groups during development will be the cornerstone of their future athletic careers. When choosing a course of action throughout the technical development stage, it can lead to a number of mistakes if the player's capabilities and limitations are not evaluated during training [16].

In basketball, agility refers to a player's capacity to move swiftly and change course without losing control of their body. Defense, offensive, and general gameplay all depend on this ability. Agility exercises help you become faster, more explosive in your movements, and more adept at changing directions quickly. In addition to the fundamentals, such as dribbling and shooting, basketball training demands agility, speed, and strength. Agility training is crucial in any physical activity, but basketball is a quick and unpredictable sport, with large changes occurring swiftly in a relatively small physical space. Numerous facets of a basketball player's game, including acceleration and deceleration, footwork, dribbling, body control, ball handling, and shooting, are improved by agility workouts [27]. Motor ability has been defined as the existing acquired and intrinsic ability to accomplish motor abilities of a general and fundamental character. It has historically been understood as a mix of elements that are fundamental to all motions requiring physical fitness components like strength, speed, agility, flexibility, and so forth [17].

In the realm of basketball, where lightning-fast moves can be the difference between win and failure, speed training is crucial, according to [3]. In the fast-paced and dynamic nature of the game, the necessity of speed training cannot be stressed. Why is speed training crucial for basketball? The answer lies in the plethora of ways it boosts player performance, team

dynamics, and overall success on the court. Cardiovascular endurance in basketball refers to the ability of players to maintain a high level of physical intensity throughout a game. Unlike other sports that focus only on long distance running, basketball requires short bursts of energy and continual moving up and down the court. This implies that players must have the stamina to keep up with the fast-paced nature of the game and sustain their effort for extended periods of time. Athletes must have a strong cardiovascular system in order to succeed in basketball. This enables players to endure the physical demands of the sport while performing abilities like dribbling, shooting, and defending. By boosting their cardiovascular endurance, players can enhance their entire performance on the court, as they will be able to retain their speed, agility, and intensity throughout the game.

The importance of developing good conditioning programs based on the specific physiological demands of each sport is considered a key factor to success. The basketball player must train several aspects of fitness. Thus, the athlete will concurrently undertake several modalities of training (e.g., strength, anaerobic, endurance). In the present study sport specific circuit training was applied. This comprises abilities and movements unique to the activity, at levels sufficient to generate aerobic adaptations, are being progressively applied in professional team sports setting [6].

Basketball players should perform particular training activities that mimic the movements and intensity of the game in order to build cardiovascular endurance. These workouts may include interval training, such as sprinting and running, as well as circuit training that combines diverse cardiovascular activities. Basketball players can improve their cardiovascular fitness and succeed in the physically demanding and fast-paced game by adding these exercises to their training regimen [3].

Basketball players, especially well-conditioned ones, tend to have lower resting heart rates (RHR) compared to the general population. An optimum RHR for a well-conditioned basketball player is often less than 60 beats per minute (bpm). However, other athletes, notably basketball players, may have even lower RHRs, ranging from 30 to 40 bpm. Regular exercise strengthens the heart muscle and enables it to pump more blood with each heartbeat, which results in a lower RHR. As a result, the heart beats fewer times per minute in athletes than in non-athletes. If a basketball player's RHR is above 60 bpm, it may indicate a need for further endurance-based training. Keep in mind that individual variations exist, and factors like age, fitness level, physical activity, and emotions can influence resting heart rates. It's crucial to see a doctor if you have any symptoms in addition to a slow heart rate [32].

Breathing is a natural and vital action for humans. At the same time, the respiratory rate and frequency might vary so much, depending on the status of the person. In particular, breathing can either physiologically limit athletes' performance or, conversely, influence their psychological state. The

respiratory characteristics of basketball players can change based on their fitness levels and specialized training. The following are some pertinent findings, per [21]:

1. Vital Capacity (VC) and Forced Vital Capacity (FVC): Compared to inactive people, basketball players, water polo players, and rowers typically have statistically higher VC and FVC. The amount of air that a person may forcefully exhale following a deep inhale is reflected in these lung function measurements.
2. Peak Expiratory Flow (PEF): PEF, which measures the greatest flow of air during exhalation, may vary across different sports. While PEF levels in basketball are not always published, lower PEF values are found in boxing, kayak, rugby, handball, taekwondo, and tennis.
3. Maximum Voluntary Ventilation (MVV): water polo players and rowers have much higher MVV, which measures the greatest volume of air a person can breathe in and out in one minute. Conversely, boxers' MVV is lower than that of controls.
4. Aerobic Capacity (VO₂max): while not directly related to respiratory rate, aerobic capacity plays a key role in total fitness. Male basketball players' average VO₂max values fall between 50 and 60 mL/kg/min, with guards generally having more aerobic capacity than centers.

2. Materials and Methods

2.1. Description of the Study Area

Welkite is a town and distinct Woreda in southwestern Ethiopia. The administrative seat of the Gurage Zone of the Southern Nations, Nationalities and Peoples' Region (SNNPR), this town has a latitude and longitude of 8°17'N 37°47'E and an elevation between 1910 and 1935 meters above sea level. It is surrounded by Cheha Woreda.

2.2. Sampling Method and Strategy

Using the census sampling method, the researcher chose all 30 Welkite Kenema U-17 basketball project participants. The health history questionnaires were produced for those male students to identify whether they are free from disorders such as diabetes, stroke, musculoskeletal injury, hypertension, and cardiovascular disease (CVD). Simple random sampling techniques were employed to assign 15 experimental and 15 control groups after recording the pre-test results. All basketball project players selected to participate in the study.

2.3. Study Design and Methodology

In this study, an experimental design was used. The essence of the experimental design is the notion that two or more groups are equal in relevant characteristics before the treatment is applied to one of the groups. Also, to judge whether the training programme has had an effect, the groups are

usually compared before and after the training programme. Therefore, the study had two groups (EG and CG). Participants who fulfilled the health history questionnaire were randomly assigned as the study subjects. The pre-and post-tests on speed, agility, cardiovascular endurance, resting heart rate, and respiration rate, respectively, were administered to the study group. In the experimental group (EG), players concerned with the treatment condition have taken the treatment (training), but the CG players are not allowed to participate in any of the special training programme except their regular training; they are only restricted to taking the treatment.

2.4. Basketball Circuit Training Protocol

The relevant data were acquired qualitatively from pre-test and post-test findings from experimental and control groups. The duration of the course was two months. Exercise training was conducted in a circuit for this study under the guidance and supervision of the researcher and assistants. The investigator conducted the training for eight weeks, three days a week, for forty to sixty minutes at an intensity of 55 to 70%.

The chosen individual was divided into comparison and intervention groups. The warm-up activities consisted: Running on the spot, arm circling, skipping jump, astride jumping, one knee raising and pressing to the chest with the assistance of hands (lift/ press/lower), through the vault in threes, free walking, kicking out-stretched hand with one foot every third step and back pushing. All participants were divided into 6 groups with 5, individuals in each group. Each group received circuit training at one of the six locations.

Each group worked at each station for 60 seconds with 30 seconds of active recovery time before proceeding to the next station by doing push up, knee pushes up, wide push up, lateral speed drills, sit, high knee sprints, squat trust, twists sit up, abdominal crunch, and jumping jacks which develop upper, middle, lower and total body region. The patients were transported to the station in a clockwise direction as soon as the recuperation time was over; they were needed to go through the 6 stations. During the recuperation intervals, subjects engaged in breathing exercises. Standing or walking around as the program progresses. At the end of the circuit training session, individuals were cool down by running, walking and static stretching.

2.4.1. Zigzag Agility Test

Objective: to keep an eye on the athlete's agility and speed.

Equipment: 5 cones, non-slip surface, Stopwatch and Assistant.

Procedures: The athlete warms up first. Four cones put on the corners of a rectangle of 10 by 16 feet, with a fifth cone placed in the center, serve as the course's markings. The athlete takes the route depicted in grey on the diagram. A single lap of the track is made by the athlete, beginning and termi-

nating at the Start/Finish cone. The athlete's time to complete the course is monitored by the assistant.

Rules:

- 1) The athlete commences the test at the start and finishes the cone.
- 2) The athlete only starts the test when the assistant gives the signal to go.
- 3) During the test, if the athlete touches one of the test cones that sited on the ground it was considered zero.

Scoring: The test is done twice and the best attempt is recorded.

2.4.2. Speed (35-meter Speed Test)

A 35-meter speed test was used to gauge speed.

Objective: to assess maximum running speed. It entails running a single, maximum sprint over a predetermined distance.

Equipment: Cones or markers, measuring tape or marked track, stopwatch or timing gates, and Assistant.

Procedures: The athlete warms up. A marker or cone is positioned 35 meters from the starting line. The athlete sprints 35m from a sprint start. The time it takes the participant to finish the 35 meters is recorded by the assistance.

Rules:

- 1) Only when the assistant said, "On your marks, set, go," did the athlete start the test; otherwise, it was repeated.
- 2) The athlete should only begin in a standard starting position behind the line.

Scoring: The best of three 35-meter sprints is noted.

2.4.3. 12 Minutes Run and Walk Test

(Cooper 12-minute run and walk test)

Purpose: to gauge respiratory and cardiovascular endurance.

Equipment: - Stopwatches, score sheets, whistles, and the conventional 400-meter track.

Procedure: A 400-meter track will be used for this test. Every 25 meters, cones were stored and marked with a line indicator. The group was divided into two groups for testing. Each student partnered with a partner, while the other partner counted the laps as the students ran. The crew was given instructions to count how many laps were completed in the specified time. The instructor blew his whistle to signify the end of the 12 minutes, and the runner took note of the marking he had just passed.

Scoring: The distance covered in twelve minutes by the participants was recorded for calculation.

2.4.4. Resting Pulse Rate (per Minute)

Purpose: To measure the resting pulse rate of each individual each minute.

Equipment: - A stopwatch (1/10th of a second) was used to record the resting pulse rate.

Procedure: Every participant's pulse rate is measured

while they are seated between 4 and 5 p.m. The participants were instructed to unwind for around half an hour prior to having their pulse rates measured. The pulse rate will be recorded using the stethoscope or the radial artery at the wrist. The number of palpations should be counted for a full minute, and the palpation should be clear.

Scoring: The number of pulse beats for a minute will be recorded as the score.

2.4.5. Respiratory Rate Measurement

Objective: Measuring and determining the trainee's breathing rate was the goal of respiratory rate measurement.

Required equipment: Mats, a recording sheet, and a pen are needed to complete this test timer.

Procedure: To obtain a more precise count, the trainees' respiratory rate is calculated while they are unconscious at rest. The breathing rate per minute is assessed by having athletes lie on the floor in a supine position with their eyes covered. They then multiply the number of breaths they take in 15 seconds by 4.

Scoring: To get the breathing rate per minute, count the number of inhalations in 15 seconds and multiply the result by 4.

2.5. Data Quality Control

Only the most popular physiological variables (resting pulse rate and respiration rate) and motor skill assessments (speed, agility, and cardiovascular endurance) were utilized to guarantee the quality of the data. To minimize data collection errors, the assistant skill test recorders were trained to gather the right information. To further confirm the test technique, all of the aforementioned tests were videotaped and photographed. The researcher used caution when collecting data in order to manage the data and get an accurate result. Even before the quality control stage, quality control was greatly enhanced data usability and helps decrease time and effort waste across the entire study work flow.

All test procedures, data gathering, and information management were done in compliance with standard protocols and measurements to guarantee data quality. Additionally, an assistant was employed by the researcher to gather data. The test measurements were taken with the same examines. Subjects were informed about the test and advised pre-conditions by the researcher, which they attempted to fulfill before the test. In order to keep the control groups under control and improve the validity and reliability of the test results, the researcher also made an effort to let them know that they were not engaging in any exercises or training beyond what their coach had instructed. Finally, the data was programmed and fed to the software twice, with various professionals handling it to avoid problems in data feeding.

2.6. Data Analysis

The information obtained from fitness tests was collected,

analysed, and transformed into a meaningful concept both manually and using a computer in order to evaluate the changes observed among participants who had undergone 8-week circuit training. Computerized statistical package software (SPSS), version 25, was utilized for data analysis. To compare the pre-and post-training data, the paired sample T-test was applied and to compare the control and experimental groups, an independent sample t-test was performed. At 0.05%, the level of importance is set.

2.7. Ethical Considerations

The study addressed ethical issues, and according to ethical rules, researchers shouldn't place persons in danger as a result of their participation. By confirming that they had been fully informed about the study's goals, each participant fulfilled a commitment. The appropriate bodies received and distributed the written consent/agreement form. To guarantee anonymity and secrecy, each participant was given a number and alphabetical code. This study was carried out with ap-

proval of Hawassa University Sport Science Department (Ref. No. SpSc/6420/2015). Based on the above approval letter number Welkite University U-17 basketball project player's management gives permission to the re-researcher to perform the research on them. All subjects supplied informed written consent, and the study followed Hawassa University statement. Before providing their written consent to participate in the current investigation, each participant received comprehensive information about the study (one-on-one) from a member of the research team. They were also told of their rights as participants and given the opportunity to ask questions.

3. Results

The researcher tallied, examined, and interpreted the trustworthy data after gathering it using experimental techniques like before and post-tests of each variable.

Table 1. The Mean and Standard Deviation Value of Chosen physiological and Motor Variable of Basketball Project Players Between Experimental and Control Groups.

Variables	Tests	Experimental group		Control group	
		Pre-test	Post –test	Pre-test	Post –test
		$\bar{x} \pm SD$	$\bar{x} \pm SD$	$\bar{x} \pm SD$	$\bar{x} \pm SD$
Agility	zig – zag test	11.67 ±439	10.29 ±372	11.79 ±341	11.58 ±382
speed	35-meter speed test	9.02 ±266	7.69 ±470	8.99 ±162	8.87 ±283
Cardiovascular endurance	12 minutes run test	2387.27 ±266.25	2380.40 ±225.36	2372.93 ±220.41	2380.40 ±225.36
Resting pulse rate	Pulse rate	62.67 ±1.58	57.67 ±2.09	63.40 ±2.97	63.46 ±2.44
Respiratory Rate	breathing rate	10.60 ±1.68	14.2 ±2.14	10.53 ±2.61	10.8 ±2.83

The mean values of agility (zig zag test) Pre-test and Post-test results of the experimental groups were 11.67 ±439 and 10.29 ±372. Whereas the mean results of the control group agility (zig zag test), were 11.79 ±341 and 11.58 ±382. After an eight-week circuit training intervention, basketball project players' mean value of agility (zig zag test) results that the players cover the given distance in zigzag pattern in minutes was decreased from 11.67 to 10.29 (since the trainers who can cover the given distance in a short period of time have a good performance) due to the stated interventions. We can therefore draw the conclusion that eight weeks of circuit training had a beneficial impact on the experimental groups.

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The mean values of cardiovascular endurance (12 minutes run test) of Pre-test and Post-test findings of the experimental groups were 2387.27 ±266.25 and 2380.40 ±225.36. Whereas the mean values of the control group of cardiovas-

cular endurance (12 minutes run test), were 2372.93 ± 220.41 and 2380.40 ± 225.36 . After eight-weeks of circuit training, the mean result of basketball project player's cardiovascular endurance (12 minutes run test) that the players cover the given distance in minutes was decreased from 2387.27 to 2380.40 (the trainers who can cover the given distance in a short period of time have a good performance) due to the programed eight-weeks of circuit training. Therefore, anyone can draw the conclusion that circuit training for eight weeks has a beneficial impact on experimental groups.

The experimental groups' pre-test and post-test mean resting pulse rates were 62.67 ± 1.58 and 57.67 ± 2.09 , respectively. Whereas the mean values of the control group of resting pulse rate (pulse rate), were 63.40 ± 2.97 and 63.46 ± 2.44 . After eight-weeks of circuit training, the mean result of basketball project player's resting pulse rate (pulse rate) that the players pulse rate was dropped in beat per minute from 62.67

to 57.67 due to the programed eight-weeks of circuit training. Therefore, anyone can draw the conclusion that circuit training for eight weeks has a beneficial impact on experimental groups.

The experimental groups' pre-test and post-test respiratory rate (breathing rate) mean values were 10.60 ± 1.68 and 14.2 ± 2.14 , respectively. Whereas the mean values of the control group of resting pulse rate (pulse rate), were 10.53 ± 2.61 and 10.8 ± 2.83 . After eight-weeks of basketball circuit training, the mean result of basketball project player's respiratory rate (breathing rate) that the players breathing rate was increased in breathing rate per minute from 10.60 to 14.2 due to the programed eight-week basketball circuit training. Anyone can therefore draw the conclusion that players' respiration rates improve after eight weeks of circuit training in experimental groups.

Table 2. Comparing the Experimental and Control Groups' Pre- and Post-Test Findings for a Few Chosen Physiological and Motor Variables of Basketball Project Participants.

Variables	Group	Pre-test to Post-test $\bar{x} \pm SD$	T	p
Agility	Experimental group	11.40 ± 4.748	14	.000
	Control group	$-.13 \pm 1.32$	14	.69
Speed	Experimental group	0.0700 ± 0.00378	14	0.000
	Control group	0.00600 ± 0.04085	14	0.578
Cardiovascular endurance	Experimental group	146.86 ± 182.55	14	.008
	Control group	7.46 ± 23.871	14	.24
Resting pulse rate	Experimental group	4.30 ± 2.15	14	.00
	Control group	0.167 ± 1.43	14	.66
Respiratory rate	Experimental group	3.600 ± 0.828	14	.00
	Control group	0.266 ± 7037	14	.164

Because the p value is less than 0.05, or 0.00, Table 2 above shows that there was a statistically significant difference in the experimental group's agility (zigzag test) pre and post test results. However, as the table above illustrates, there was no discernible difference in the control group; that is, the p value was greater than 0.05, or 0.69. From this, the researcher concluded that eight-week programed basketball circuit training had statistically significant improvement in the experimental group. But the control group does not. The chosen physiological and motor skill factors of basketball project players are greatly influenced by this training. Due to this reason the alternative hypothesis was adopted.

The aforementioned eight-week basketball circuit training significantly ($P = 0.000$) increased the experimental group's basketball project players' speed (35-meter speed test). The

eight-week basketball circuit training intervention was essential for improving the players' speed (35-meter speed test) because the experimental group's p value is less than 0.05, indicating a statistically significant difference ($P = 0.00$) between pre and post measurements. However, according to the above table, the control group did not significantly improve ($p = 0.578$) in the 35-meter speed test for basketball project participants. This suggests that it is challenging to get the athletes to make the necessary progress without structured basketball circuit training. Due to this rationale, the alternative theory was adopted.

According to the above table that the pre and post-test results of cardiovascular endurance (12 minutes run test) indicated a statistically significant difference in the experimental group since the p value is less than 0.05, which is

0.008. But there was no significant change in the control group i.e., the p value was greater than 0.05, which is 0.24. From this, the researcher concluded that eight-week programmed basketball circuit training had statistically significant improvement in the experimental group. But the control group does not. This exercise plays a big effect on project players' cardiovascular endurance. Due to this reason the alternative hypothesis was adopted.

Depending on the above table that the pre and post-test findings of resting pulse rate (pulse rate) indicated a statistically significant difference in the experimental group since the p value is less than 0.05, which is 0.000. However, the control group showed no discernible change; that is; the p value was higher than 0.05, or 0.66. From this, the researcher concluded that eight-week programmed basketball circuit training had statistically significant improvement in the experimental group. But the control group does not. The resting heart rate of project participants is significantly influenced by this training. Due to this reason the alternative hypothesis was adopted.

According to the above table, the experimental group's respiratory rate (breathing rate) pre- and post-test results demonstrated a statistically significant difference because the p value is less than 0.05, or 0.000. But there was no significant change in the control group i.e., the p value was greater than 0.05, which is 0.164. From this, the researcher concluded that eight-week programmed basketball circuit training had statistically significant improvement in the experimental group. But the control group does not. The respiratory rate (breathing rate) of project participants is greatly influenced by this training. Due to this reason the alternative hypothesis was adopted.

4. Discussion of the Findings

The initial null hypothesis was Eight weeks of circuit training will not have a significant influence on the physiological variables (resting pulse rate and respiration rate) and motor variables (speed, agility, and cardiovascular fitness) of U-17 male basketball project players in Welketa. The alternative hypothesis was accepted whereas the null hypothesis was rejected. Since, the pre-post findings of those selected physiological and motor characteristics of U-17 male basketball project participants indicated substantial mean differences in the control and experimental groups. It was demonstrated in Speed [20, 19, 26, 8], and [10] that players' speed increases with a certain speed test. Other studies [13, 24, 5] revealed that a 10-week training program, with one hour per week shuttle sprint training, provided considerable improvement in 30m sprint. [9]. In most team sports, being able to start, halt, and change directions quickly and effectively is crucial for success. This is especially true for sports that involve intermittent repeat sprints, such as basketball [22].

Agility Other research findings also revealed that basket-

ball-specific agility training can be an effective training approach to increase an athlete's agility. This study's finding was consistent with the finding of [25]. According to the findings, the basketball player's speed, agility, muscular strength, endurance, and explosive power have all greatly improved as a result of the Agility and Quickness training [1]. In contrast, Cardiovascular Endurance, the results of this study were consistent with those of [31], who studied the effects of 12 weeks of low resistance training on muscular fitness and cardiorespiratory endurance in ninety healthy inactive people and discovered that the training group significantly improved cardiorespiratory endurance.

The second null hypothesis was likewise rejected, i.e., eight weeks of circuit training will not have a significant influence on the resting pulse rate of U-17 male basketball project participants in Welketa. Accepting the alternative hypothesis also implies that the resting pulse rate of Welketa's U-17 male basketball project participants is significantly impacted by eight weeks of circuit training. The results of this study are likewise consistent with the research findings of [34] about the impact of the circuit training program on the resting pulse rate of male university students. He said that his agility had greatly increased as a result of the circuit training. The study conducted by [18] produced similar findings. Similarly examined the Influence of circuit training on specified physical fitness factors among men hockey players. There was founded considerable improvement [2], stating that there was a significant difference between the experimental and control group among male college volleyball players. Consequently, it may be said that there has been a notable improvement.

The third null hypothesis was likewise rejected, i.e., eight weeks of circuit training will not have a significant influence on the respiration rate of U-17 male basketball project players in Welketa. And embracing the alternative hypothesis suggests that eight weeks of circuit training has a significant influence on the respiration rate of U-17 male basketball project participants in Welketa. This pre-sent study results also coincide with the research findings completed by [13, 24, 7, 29] even if the intervention duration, geography, subjects, and discipline changes. Whereas the study of [15] did not agree with the present study. They evaluated the effect of circuit training on respiratory rate among secondary school hockey players. They found experimental group is statistically negligible to the control group. It is concluded that the circuit training group considerably improved the specified motor fitness characteristics of secondary school hockey players.

5. Conclusion

The study assessed the impact of 8-week circuit training on several selected motor fitness and physiological variables in the case of Welketa Kenema U-17 basketball project trainers. The study found that after 8 weeks of a training

programme can significant mean difference in agility, speed, cardio-vascular endurance, resting heart rate, and respiratory rate measurement increased significantly in the circuit training (CT) group, while no significant increase was observed in the control group.

Abbreviations

VO ₂ max	Maximum Oxygen Uptake
RHR	Resting Heart Rate
bpm	Beat per Minute
VC	Vital Capacity
FVC	Forced Vital Capacity
PEF	Peak Expiratory Flow
MVV	Maximum Voluntary Ventilation
SNNPR	South Nation Nationalities and Peoples Region
CVD	C cardiovascular Disease
SPSS	Statistical Package for Social Science
U-17	Under Seventeen
CT	Control Group
EG	Experimental Group

Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this article. I hereby declare that I have no conflicts of interest related to this work. I have not received any financial support or sponsorship from any organizations that could influence the research or its outcomes. Thank you for considering this statement. I am committed to maintaining the integrity of my research.

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