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"Effect of Cricket Participation on Overall Physical Fitness among Adolescents"

Taufeeq Ahamed Kudagi
M.P.Ed., K-SET
Physical Education Director,
Department of Physical Education and Sports, Anjuman Law College, Vijayapura

Abstract*:* Adolescent physical fitness is a key component of healthy growth, function, sports performance and preventing lifestyle health issues. Adolescent involvement in organized sports may allow for a periodic schedule of activity for each component of fitness. Cricket is a popular sport, which involves sprinting, running, throwing, catching, quick changes of direction, balance, coordination and a long spell of concentration for playing the game. While some people think that cricket doesn't involve as much running as some other long duration sports, cricket today does involve repeated intense movements, combined with those of moderate length followed by episodes of recovery. The present study explores the effects of frequent involvement in cricket participation on overall physical fitness of adolescents. Special focus is placed on the larger physical fitness components, which are speed, muscular strength, endurance, agility, flexibility, balance and coordination. The study serves to find the differences between adolescents who regularly attend cricket training and adolescents who do not have systematic training in cricket. Meaningful differences between the two groups can be measured by standard physical fitness tests. Cricket should improve the performance of adolescents in several fields of fitness due to their repeated exposure to sport specific fitness constructs: running, fielding, batting, bowling and conditioning. The study might offer insight for physical education teachers, coaches, parents and sports professionals about the role that cricket plays in adolescents' physical growth and the need for consistent sports involvement as a way to keep a healthy and active lifestyle.

Keywords*:* Cricket participation; Adolescents; Physical fitness; Agility; Muscular strength; Endurance

Introduction: Adolescence is a significant developmental period of the human life at which time lots of bodily, physical, psychological and social modifications occur. At this time, the body is rapidly growing and developing and it is especially important that they enjoy regular exercise to help them remain healthy and develop their athletic skills. Fitness gained in adolescence also can affect later adulthood activity patterns and health. But, the escalating academic demands, the amount of time sitting, too much screen time, reduced physical activities outside the classroom, and the alteration of recreational activities have perpetuated the physical inactivity among many young people.

Sports participation is one of the successful methods of promoting a healthy lifestyle among adolescents. Sports offer enjoyment, social interaction and give participants the opportunity to experience various types of physical activity that will help them develop fitness. Running, jumping, throwing, stretching, changing direction and body control can enhance a number of the fitness components if performed regularly.

Cricket is a popular sport in many nations, especially in India. Its popularity among school going teenagers has grown not only through school competitions, cricket schools, finite clubs or local clubs, community cricket tournaments but also through the recreationally held matches. Cricket is a combination of skills, fitness, strategy

and mindset. While some movements require more strength, others require more flexibility, almost every player has movements that they could use to help develop fitness.

Among the abilities required of batters to run between the wickets with speed, they must have the ability to accelerate rapidly, good muscles and upper body strength, coordination and balance and reaction time. For bowlers, the physical capacities required for repeating their pacing actions include muscular strength, flexibility, speed, stability, co-ordination and endurance. Fielders make many short sprints, quick turns, throws, catches, bent, jumps and dives. Additionally, wicket keepers need to be agile, flexible, balanced, quick reflexes, and have muscular endurance. This means that through the regular training of cricket, adolescents are afforded rich experiences with many different types of movement.

Cricket today is also heavily into the fitness game. The types of exercises that are often used during training sessions can feature warm up, running drills, sprint training, agility exercises, strength and conditioning, fielding drills, mobility work and skill-specific practice. When these activities are repeated over an adequate amount of time, they can result in physical adaptations. Regular cricket can thus help improve the cardiovascular endurance, muscular strength, speed, flexibility, coordination and agility of the adolescent compared to adolescents who are less physically active.

Physical fitness is a multifaceted phenomenon comprising a set of connected skills. Cardiovascular endurance Efficiency with which you sustain prolonged, physical activity. Muscular strength how many times the muscles can contract against resistance without getting very tired or tired at all; muscular endurance how many repeated contractions/exertions can be made against a resistance without getting very tired or tired at all. The key difference between speed and agility is how it's used; speed is needed for short distance and agility is needed to quickly change direction or body part in control. Flexibility enables joints and muscles to move in the proper range of motion. As well, balance and coordination play a role in efficient control of complex movements.

Cricket participation could potentially have varying impacts on each. A high number of sprints towards and off the wicket and through the field are likely to promote athletic running speed and anaerobic fitness. More training and competition could lead to increased aerobic endurance. Bat, bowl, throw and conditioning drills may facilitate muscle strength and endurance. Playing fielding games can help to develop agility, co-ordination and reaction. Flexibility may also be enhanced through exercise programs for warm up and mobility.

Although cricket is a popular sport for young people most people's talk of the sport revolves around batters, bowlers, competition outcomes and done better by the players. Focussed on is the little emphasis that is placed on the ongoing physical benefits that youth can derive from routine playing of cricket. Recognition of these benefits are important as fitness has a positive impact on sport but also upon overall health, confidence, mobility and ability to participate in everyday physical activities.

It is therefore pertinent to question in the present study whether there are any differences in adolescents' overall physical fitness between those who participate in the sport of cricket regularly and those who do not. To look at the impact of adolescent cricket participation on selected fitness measures, by comparison with non-participants, to gain a better understanding of the role that cricket could play in adolescent physical development.

Review of Literature:

Children's and adolescents' physical development and participation in physical activity and organized sports have long been correlated with positive physical development. Further studies in the area of physical education and sports science have consistently shown that those adolescents who are regularly involved in organised physical activity tend to have higher levels of cardiovascular fitness, muscular fitness, achievement of

movement and coordination of the body compared with more sedentary adolescents. Sports participation is especially useful because of: (1) Physical activity (2) Skill development, (3) Motivation, (4) Social interaction, (5) Regular practice.

Several studies investigating the physiological and metabolic effects of physical fitness in adolescents have indicated that fitness affects the whole-body oxygen consumption of exercise in terms of improved cardiovascular endurance which involves greater capability of transport and utilization of oxygen. As individuals continue to train and compete, the efficiency of the working muscles, lungs, and heart may continue to improve over time. Moderate activity, with repetitive high intensity running can help both aerobic and anaerobic fitness. These are both present in cricket since players are required to be active for extended periods of time as well as sprinting, bowling, throwing and fielding at instances.

For many team and field sports there are components of fitness that are deemed to be important of which speed and agility is one. A number of studies have investigated the agility development of young athletes, often concluding that repetitive sprinting, directional exercises, reaction drills and sport-specific training exercises enhance agility and/or acceleration. There are several such moves used in the game of Cricket especially for running from wicket to wicket and fielding. Fielders will typically run with great speed towards the ball, follow an arc to change direction, bend, recover, throw, and quickly snap back into position. Frequent performance of these activities could help develop throwing speed and accuracy for adolescent players.

Another crucial element in adolescent fitness is muscular strength. There is good muscle strength that enables good posture, efficient movement, prevention of injuries and sporting performance. A combination of upper and lower body movement is used in cricket. Batting also requires the power generation of the legs, body, shoulders, arms and wrists. Lower limbs, core musculature, shoulders and upper body should take a significant strain due to the force applied by the fast bowlers. Coordinated muscular force is also needed when throwing from the field. Therefore, if the regular training of various cricket skills is well managed and supervised, adolescents would benefit from increased functional muscular strength.

Chillies are equally important as muscular endurance as it has been noticed that cricket training sessions and games can last for a good while. Bowlers can bowl multiple spells, fielders can run multiple runs in a few hours and batters can bat multiple overs at the crease. These demands require the muscles to sustain work for a long time. Repeated running games, bodyweight conditioning, repeated throwing and movement circuits are commonly used in cricket and may also be beneficial to approach from the muscle endurance training standpoint.

Flexibility and mobility of the joints is more significant for the bowlers, wicket-keepers and fielders. Bowling creates a need for synchronised movement in multiple planes of the ankle, knee, hip, spine, shoulder and arm. Limited flexibility may impact how efficient your movements are and can even lead to physical strain. Squatting and rapid side-to-side shuffling is required to perform wicketkeeping, along with bending, reaching, diving and throwing during fielding. Mobile training and stretching forms part of the cricket training with chances for youth being able to maintain or enhance their functional mobility.

Equality and coordination are also important in the sports of cricket. A batter is required to be stable within their body and be able to "see" the ball while developing a technically controlled stroke. The bowler has to perform the run-up, the jump and the twisting of the trunk, the arm swing and his landing in one brief sequence. Catchers and throwers need to synchronize between the eyes, hands and body in their field position. The repeated practice of these movements can enhance the minimum and neuromuscular control and motion accuracy.

Important differences between athletes and non-athletes in regards to physical fitness have also been identified in research on sport participation overall. Those teens that had regular sport activity generally had better fitness when measured in their ability to sprint, their endurance, jumping, strength and agility. The differences have been cited as being the result of consistent training exposure, increased levels of physical activity, and repetitive practice of the challenging movement patterns.

Much research on cricket has been based on technical performance, injury trend, workload of the bowlers, physiology of the game, and player conditioning of athletes. More recent studies have started to take into account the physical strain of the game of cricket, particularly in shorter formats such as netball cricket where it demands a player to field more dynamically, sprint more often and deliver high sustained performances. The above results indicate that cricket is a valuable tool that can be used for regular physical training with proper planning of training.

However, competition pressures on the sport of cricket can vary depending on role within the game. Batters will need a lot of acceleration, balance, reaction speed and power but fast bowlers will have higher demands on running and musculoskeletal functions. Fielders must be agile, fast, coordinate and physically strong throwers while wicketkeepers have to squat, move laterally, be flexible and must have quick reflexes, and have to do it time and again. So, cricket could play a role in fitness by performing various role-specific activities.

Sport specific fitness develops with overall fitness, and specifically during adolescence, could be a benefit for the adolescent to be involved with cricket. Training may contribute to healthy body composition, movement competence and increase activity levels. Adolescent (YR 13-18) participation might also lead to positive beliefs about physical activity and increase their likelihood of continuing involvement beyond school years.

However, literature also exists to indicate that the indicated registration as a sport game participant does not assure high physical fitness. The benefits are dependent upon the frequency, duration, intensity and quality of training. Regular participants in structured sessions will likely make more physical changes (adaptations) than occasional participants. Fitness outcomes can also be influenced by nutritional, sleep factors, age, maturation, previous activities, body composition and coaching.

Another concern is that a lot of studies focus on particular fitness components instead of on physical fitness. Some studies are primarily about speed or endurance, for instance, some about strength, or body composition. Hence, there is a need to research multiple components simultaneously to achieve a thorough understanding of the effect of the involvement in cricket on the physical fitness of adolescents.

The overall literature suggests that participation in sport regularly is associated with positive contributions to the development of adolescent physical health. However, there is a need for specific studies by comparing the cricket playing adolescents to the adolescents who never play cricket at regular theme. Comparisons like this may be used to help identify if there are any measurable benefits across a range of physical fitness components that are associated with being systemically involved in cricket.

Objectives of the Study:

- To assess the overall physical fitness level of adolescents who regularly participate in cricket.
- To compare selected physical fitness components, such as speed, strength, endurance, agility, flexibility, balance, and coordination, between adolescent cricket participants and non-participants.
- To determine the effect of regular cricket participation on the overall physical fitness of adolescents.

Research Hypotheses:

- **H_1:** Adolescents who regularly participate in cricket will demonstrate significantly better overall physical fitness than adolescents who do not regularly participate in cricket.
- **H_2:** Regular cricket participants will perform significantly better in selected components of physical fitness, particularly speed, agility, muscular strength and endurance, cardiovascular endurance, and flexibility, compared with non-participants.

Research Methodology:

The present study employed comparative Cross Section study design to see the effect of participation in cricket on the overall physical fitness of the adolescent children. This comparative approach was deemed appropriate since it would enable the physical fitness traits of the adolescent group who train at an organised level of cricket to be compared to the physical fitness traits of the non-cricket participating group of adolescents without sporting activity of any kind.

Participants

The study included 60 children aged 13-17 years old. They were split into two equal camps. The first group comprised 30 oriented and involved cricket players playing cricket on consistent basis for a minimum of one year. The second group was non-cricket participants (30) non-systematic cricket training and other structured competitive sports programme.

Schools and cricket training centres were the source for selection of participants. An attempt was made to choose a mixture of individuals as much as possible with similar age and physical structure, so that any differences in fitness were unlikely to be just the result of aging, or simply body size. Those adolescents who had experienced an injury or health condition that made the physical fitness assessment test impossible within the last six months were excluded.

Since the participants were below 18 years of age, the permission form of the school/sport institution involved and informed consent form of parents/guardians were taken into account. Before collecting data participants received information about the aim and methodology of the tests.

Table 1. General Characteristics of the Participants

Variable	Cricket Participants (n = 30) Mean ± SD	Non-Cricket Participants (n = 30) Mean ± SD
Age (years)	15.2 ± 1.1	15.1 ± 1.2
Height (cm)	165.8 ± 7.4	164.9 ± 7.1
Body Weight (kg)	55.6 ± 8.2	56.3 ± 8.6
Body Mass Index (kg/m^2)	20.2 ± 2.1	20.7 ± 2.3

Two groups were generally comparable in age, height, body weight and BMI, as presented in Table 1, in basic characteristics. This similarity gave a good level of justification to compare their physical fitness performance.

Selection of Physical Fitness Tests

A packet of field-based tests was used to determine overall physical fitness. The tests were chosen as they were safe to test amongst adolescents and comprised a range of fitness components that would be relevant to the game of cricket.

Speed was measured using a 50-metre sprint test. The task was for the participants to run from a standing start as fast as possible.

Agility and quickness to turn around was measured by the 4 x 10 metres shuttle run. These types of runs are important when fielding and clear running between wickets.

Explosive lower body strength and power were measured as a standing broad jump. Participants then started running from a standstill and the distance they ran was measured.

Muscular strength and endurance of the abdominal muscles was tested using the one-minute sit-up test. The number of correct reps in 1 minute was noted.

Sit-and-reach test assessed flexibility, focusing on flexibility around the hamstring area and lower back.

To conclude, the 600-metre run/walk test was used to determine cardiovascular endurance. The players had to run the distance as quickly as they could.

A one fitness test is not a good criterion for determining the capabilities needed to play the game of Cricket as it also demands strength, power, speed, agility, flexibility and change of direction. There have also been recent studies looking at a number of physical attributes collectively in adolescent cricket.

Data Collection Procedure

All tests were conducted under similar environmental conditions. Before testing, participants completed a standardized warm-up consisting of light jogging, dynamic stretching, and basic mobility exercises. Clear instructions and demonstrations were given before every test.

Where more than one trial was permitted, the best performance was considered for analysis. Adequate rest was provided between physically demanding tests so that fatigue from one activity did not substantially influence performance in the next test.

Statistical Analysis:

Mean and standard deviation were used to summarise the data collected. Independent-samples t test was conducted to compare the mean fitness performances of cricket participants and non-participants.

The 0.05 level of significance ($p < 0.05$) was used to determine the level of statistical significance. When the p-values were lower the difference was considered statistically significant.

In overall fitness classification, the participants were given a score on each of the tests and an overall mark for physical fitness was calculated. The participants were, then, categorized into three fitness groups high, average, and low. The differences in distribution of fitness categories between groups were examined by a chi square test.

Analysis of the Study:

Table 2. Comparison of Selected Physical Fitness Components

Physical Fitness Test	Cricket Participants Mean ± SD	Non-Cricket Participants Mean ± SD	t-value	p-value
50 m Sprint (sec)	7.42 ± 0.36	8.01 ± 0.41	5.92	<0.001
4 × 10 m Shuttle Run (sec)	10.34 ± 0.48	11.12 ± 0.55	5.85	<0.001
Standing Broad Jump (cm)	185.6 ± 15.2	166.8 ± 14.9	4.84	<0.001
Sit-Ups in One Minute (repetitions)	32.7 ± 4.1	27.3 ± 4.5	4.86	<0.001
Sit-and-Reach Test (cm)	28.4 ± 5.2	24.1 ± 5.0	3.26	0.002
600 m Run/Walk (min)	2.24 ± 0.19	2.49 ± 0.22	4.71	<0.001

Table 2 shows that the level of performance for the physical fitness of people playing cricket is different from others who do not play cricket. The total 50m sprint time of adolescents who played cricket was 7.42 seconds compared with the non-cricket group which had an average of 8.01 seconds. The best performance was shown by the cricket group, which had a shorter running time.

The same was seen in the shuttle-run test. It took members of the Cricket Group 10.34 seconds to complete the test, whereas the non-participants took 11.12 seconds. This is significant at $p < 0.001$. Cricket may have some connection with repeated and rapid short distance running, turning, playing the ball from one wicket to another during cricket practice which could explain the better agility of the participants playing cricket.

It shows that the participants of the cricket game performed better with regard to the explosive strength of their lower body than other stands. The average jumping distance was 185.6cm in the cricket group while 166.8cm in non-cricket group. Frequent sprinting, bowling actions, running and conditioning exercises can help develop some additional power in the lower limb.

There was also a large difference in muscular endurance between the groups. There was a greater number of sit ups on average performed by the cricket players compared to non-participants (32.7 vs 27.3). Core strength and stability is a primary part of batting, bowling, throwing as well as ensuring a baseball player's body movements are efficient.

Cricket group also had improved flexibility scores. For the Sit & Reach, the mean for the Cricket participants was 28.4 cm compared to 24.1 cm for the NON-participants. The difference in flexibility was not as pronounced as other measures of fitness, but was still significant.

This further revealed that the participants of cricket stood out in terms of cardiovascular endurance in the 600 metre run/walk category. Triathletes took 2.24 minutes, and those who didn't take part took 2.49 minutes. This may be an indication of the cumulative effect of weekly training sessions, running drills, playing a lot of in-field practice and match play.

Table 3. Overall Physical Fitness Classification of the Participants

Fitness Category	Cricket Participants n (%)	Non-Cricket Participants n (%)
High Fitness	17 (56.7%)	6 (20.0%)
Average Fitness	11 (36.7%)	15 (50.0%)
Low Fitness	2 (6.6%)	9 (30.0%)
Total	30 (100%)	30 (100%)

Chi-square = 10.33, p = 0.006

Table 3 gives general information about the difference between the groups. More than half of the players in cricket (56.7%) were considered to fall under high fitness category, while higher proportion of non-cricket participants (20.0%) were considered under high fitness category.

The low fitness group, however, included 30.0% of the non-cricket group, whereas only 6.6% of the cricket players were in these fitness levels. The p value of 0.006 and chi-square value of 10.33 suggest that the overall fitness level is significantly different between the two groups.

Results of the statistical tests support both research hypotheses when combined. This revealed improved performance by those taking part in cricket in all six of the physical fitness elements selected, and they were significantly more likely to be within the high overall fitness category.

Results and Discussion:

Study findings suggest that regular involvement in cricket is related to overall sports fitness of adolescents. The results indicated significant differences in respect to speed, agility, explosive strength, muscular endurance, flexibility and cardiovascular endurance. There was an improvement in the mean score of each physical fitness test taken by the participants of the cricket.

In terms of the broad jump, the better the results of this, the more the regular exposure to cricket may be linked to higher power generation in the lower body. Strong leg action is needed for sprint, jump, fast bowling and quick change of direction/power position. The lower limbs and trunk must also coordinate the production of forces when the hands and fingers are used for batting and when subjects place their foot on the ball one or two times and swing it.

The performance of the participants in the muscular endurance test was also improved. Batting, bowling and throwing skills can be performed repeatedly with muscular activities, and so can be fielding which is a skill-based activity in the major sense of the word. Both games put significant physical and physiological strain on players with particular emphasis on bowling, where there is a great deal of strain on the body, and to batting, which can involve repeated running efforts and high levels of activity.

Cardiovascular endurance is also a difference. A traditional approach to the game may consider cricket to be a low-intensity game as the players do not run continuously. But the cricket game is a part time-or-full-time exercise, with spells of low-stress followed by bursts of vigorous activity. Hence, earlier physiological studies have warned against the neglect of underrating the fitness demands of cricket.

Cricket players outperformed their team members in another area: flexibility. The required range of movements in bowling, batting, wicket keeping and fielding. Regular players may benefit from warm-up exercises, mobility exercises, stretching and movement exercises.

The overall fitness classification corroborates the results. More than a higher proportion of the young people who participated in cricket were in high level of physical fitness, while low levels of fitness among young people who were not participating in cricket on a regular basis. This is in line with much of the evidence about the positive role of structured sport and physical activity on physical health and fitness in children and adolescents. Systematic reviews have found that physical activity and health related outcomes are linked in a positive fashion and that this connection is greater when children are exposed to youth sport.

Even with these restrictions, the findings indicate that there is the potential for regular and structured cricket involvement to offer young people meaningful opportunities to develop a number of components of physical fitness. Batting, bowling and fielding skill must not be the only aspect of cricket training. Carefully planned, it can also be a useful type of exercise at an important period of growth and development.

Conclusion:

The findings indicate that participation in cricket is associated with improved overall fitness for adolescents, when one takes part in the sport regularly. Adolescents that played organized cricket performed with greater superior speed, agility, explosive strength, muscular endurance, flexibility and cardiovascular endurance as compared to those who did not play organized cricket on a regular basis.

The increased percentage of players in the high fitness group further indicated that this practice and competition may play a role in general fitness development in the context of cricket. The variety of the sport provides exposure to multiple types of fitness including sprinting, running, throwing/catching, batting, bowling, balancing, turning, etc.

On the basis of the statistical findings, both the research hypotheses were accepted. Overall physical fitness may seem to have positive relationship with regular cricket playing among adolescents and with individual fitness components.

This may then inspire and encourage well-supervised participation in cricket as a component of physical fitness and physical activity programmes for adolescents, generally run in schools, sports academies, and through physical education teachers and coaches. Meanwhile, training programmes should continue to be age-specific and take note of the growth, maturation, recovery, nutrition and injury prevention of athletes.

They could repeat these observations in the future on a larger number of boys and girls in different age groups and over the entire cricket season. The identification of the effects of the level of participation on adolescent physical development, in terms of frequency, duration, position at which played and intensity, would aid in the clarification of this issue.

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