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## ORIGINAL

# ASSESSING CARDIOVASCULAR HEALTH BENEFITS OF FOOTBALL IN BRAZILIAN ADOLESCENTS

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### ABSTRACT

The aim of the research study is to assess the cardiovascular health benefits related to football in Brazilian adolescents. By assisting teenagers in maintaining a healthy body weight and lowering their risk of cardiovascular problems linked to obesity, these physical activities help control weight. Football regularly is also associated with better blood pressure control and advantageous metabolic profiles. For measuring the research, used smart PLS software and described results, including descriptive statistics, correlation coefficient analysis, and the smart PLS Algorithm model. In addition to their physiological advantages, team sports promote cardiovascular health due to their psychological benefits, including lowered stress levels and enhanced mental health. However, current studies carried out in the area should be examined to provide exact insights into the cardiovascular advantages in adolescents from Brazil. The overall result found that direct and significant analysis of the cardiovascular health benefits of football in Brazilian adolescents. As a result, even though the body of research highlights the potential benefits of football for youth cardiovascular health, more study that focuses on particular regions will be necessary to fully comprehend the connection between youth football participation and cardiovascular health in Brazil.

**KEYWORDS:** Cardiovascular Health Benefits (CHB); Football (F); Brazilian Adolescents (BA); Smart PLS Algorithm Model

### 1. INTRODUCTION

As the world has made tremendous improvements in each field of life with the help of science and technology, the importance of science and technology can never be denied in medical healthcare centers. The level of

cardiovascular diseases has been unceasing and increasing sharply in few past years because of variety of reasons. Each fourth person in Brazil has been suffering from mild or acute cardiovascular problems even without showing any particular symptoms. There are a variety of reasons and causes for cardiovascular diseases, such as genetic problems, poor health, improper daily routine, unbalanced lifestyle, no physical exercise and others (Bastos, Araújo, & Hallal, 2008). In recent years, different studies have been conducted on the increasing levels of cardiovascular diseases in Brazil. After viewing the results and analysis of these studies, it was concluded that these cardiovascular diseases are not only common in old age people but also in Adolescents. These cardiovascular problems were discussed deeply, and then it was concluded that the main problem of cardiovascular diseases in adolescents is the habit of not exercising in their daily routine (Christofaro et al., 2015).

Cardiovascular diseases (CVDs) continue to be a major cause of morbidity and death rates, raising concerns about global health. Adolescents now have an unacceptably high prevalence of CVD risk factors, which calls for immediate action to maintain heart health from a young age. In this regard, sports and physical exercise are essential for reducing cardiovascular risks and promoting a healthy way of life. This study aims to investigate and evaluate the advantages of football, a popular sport in Brazil, on cardiovascular health in teenagers. To manage with this rising and emerging issue, the Brazilian government recommended arranging community-based sports programs to encourage participation in outdoor sports that will improve the daily life routine of all people of Brazil, ranging from children to the elderly population. The medical healthcare sector suggested that playing football can play an important role in preventing and combating different cardiovascular diseases. To understand the impact of Football on cardiovascular diseases, we have to understand the basic reasons for cardiovascular diseases. All those diseases that are somehow related to the heart and blood vessels are called cardiovascular diseases, such as heart failure, stiffening or narrowing of arteries, plaque formation in arteries, stroke, thrombus formation and others (Ghorayeb et al., 2019). Football sport affects the heart in different ways.

The first positive impact of football is that it is a high energy demanding game that includes running, jumping, squatting and other such exercises. We all know that exercise is the solution to more than 90 percent of cardiovascular diseases. When the body performs these exercises in daily routine, they help to keep the body's blood oxygenated effectively, and this oxygenation in the body helps to prevent many cardiovascular diseases. Most of cardiovascular diseases are caused by high cholesterol levels in blood. This high level of cholesterol may form plaques inside blood vessels, and this plaque formation may cause stroke or even heart failure within a short time, but the level of cholesterol in the body can easily be balanced by diet and proper exercise (Clemente et al., 2022). Football is one of the most important sports in

Brazil. In Brazil, Football is also called (o país do Futebol) or (the country of football); the football culture in Brazil is not similar to any other country of the world. This sport is deeply inherent in the everyday life and culture of the Latin American country's people. It is a national attachment and is found everywhere you go in this country. In Brazil you can find people playing football everywhere you can see, children are playing football in the street with their friends, locals of Brazil talking about matches, players, or trades while enjoying local food at a neighborhood restaurant, and whenever the FIFA World Cup starts, the director himself give staff offs to watch the games. Football is an important part of Brazilian culture and their life. From research, we learned that over 16000 Brazilians play football professionally worldwide, and over 776 Professional football clubs have been made in Brazil. The obsession for this sport can be seen not only throughout the entire country but worldwide as well. In Brazil, Football has become a great part of the country's heritage. Many theories tell the story of how this iconic sport came to be in Brazil, but "Charles Miller" was the one person who was supposed to be responsible for bringing football to his home country. Playing football may also balance the level of hormones in the blood, and this balanced level of hormones in the blood help to normalize the stress or depression level in the body (ALSHAWY, Ibrahim, Hussein, & Lahlah, 2019).

The lessened or diminished stress level in the body also positively impacts the human heart. Playing football uses the forelimbs directly and continuously, and this kind of movement of the forelimbs can help strengthen the heart muscles, which may lead to proper heart health(A. A. d. P. d. Silva et al., 2019). Most cardiovascular and other health diseases are somehow related to being overweight, but playing football in a daily or weekly routine can help maintain a normal body weight because of exercise. When weight of any person is properly balanced and managed, the risk of cardiovascular diseases automatically decreases because obesity is the mother of all diseases. Playing football can also help body in learning endurance. When heart muscles are exposed to any tough work after a long time, the muscles may get damaged because of overwork, but playing football can make body muscles habitual of such work, which may reduce the chance of heart failure (Pacífico et al., 2018). Adolescence is a crucial stage marked by changes in life's social, psychological, and physical aspects. This stage not only signifies the passage from infancy to adulthood but also lays the groundwork for lifestyle choices that greatly influence cardiovascular health. Adolescents' cardiovascular risk factors, including obesity, hypertension, and dyslipidemia, have increased due to sedentary lifestyles, poor food choices, and an increased reliance on technology. Regular physical exercise is a vital component of treating and preventing cardiovascular disorders. It is linked to reduced blood pressure, better lipid profiles, and enhanced cardiovascular health. Playing sports as a youngster improves cardiovascular health and forms enduring habits that can improve general well-being. Using Football to Improve Cardiovascular Fitness.

Anaerobic and aerobic exercises are combined in football, often referred to as football in some areas. Football is a dynamic sport that requires running, sprinting, jumping, and precise movements, all of which contribute to a thorough cardiovascular exercise. The sport's popularity, especially in Brazil, offers a special chance to use its broad appeal for encouraging teenage cardiovascular health. Brazil has a vibrant football culture that is engrained in the country's social structure. The sport serves as a source of pride and identity for the country and a leisure pastime. Football is popular among kids and adolescents, who play it in leagues or informally on the streets and in public areas. Brazil's teenage population has a strong cultural passion for football, which makes it easy to include cardiovascular health promotion into daily life.

By playing football, the need for oxygen in the body increases, which is fulfilled by aerobic and anaerobic respiration at the same time; this kind of anaerobic respiration in the body can result in the consumption of fats in the body, which results in weight management. We all know that heart health is somehow related to mental health as well (Faria et al., 2020). The level of mental health disorders has been increasing in past years, not only in Brazil but all over the world; this increasing level of mental health disorders is also increasing the level of heart diseases across the world. By playing football, such hormones are produced in the body by exercise, which causes the sensation of happiness in the body, thus reducing mental health issues and indirectly reducing the rate of heart disease. By participating in such community-based sports, a person may feel the sensation of socializing, thus increasing their social capital. In present days, loneliness is the main reason for anxiety, stress and depression, which is causing more severe heart problems (Pedretti, Mello, Gaya, Pedretti, & Gaya, 2020). By participating in football games, a person may communicate with other people; thus, this kind of communication may help to allay stress levels.

The feeling and sense of self-worth are more important for each person, but the extensive use of technology resulted in extended emotional and social gaps among people. By participating in such community-based sports, the screen time has been reduced, and the side effects of more screen time can be minimized. Most cardiovascular diseases are caused by abnormal blood flow in the body (Nunes, Faria, Martinez, & Oliveira-Júnior, 2021). By participating in a football game, it was observed that normal blood flow was attained in the body; thus, the blood pressure was maintained at normal value, which solved most of the cardiovascular problems. In the present era, where a person has more friendships with technology as compared to a fellow people and screen time has extended to such a level that no one has time for any exercise or sports activity, this step of community-based sports programs is a marvelous step by Brazil government to engage people in Sports and also to minimize the alarming level of cardiovascular diseases in the present era of time. This step by the Brazilian government is evidence of the importance of sports for

maintaining and balancing human health (Clark, 2015; Vasconcellos et al., 2016).

## **2. Research Objective**

The main objective of this study is to understand the positive impact of Football on human heart. This study has effectively explained how football games can result in the betterment of heart health. This study has also concluded that sports are necessary for human health in any era of time.

### **2.1 Goals for the Research Study**

This study aims to methodically evaluate how football affects cardiovascular health indicators in teenage Brazilians. Particular objectives consist of: a. Compare the cardiovascular fitness levels of teenagers who play football with their classmates who don't play the sport. b. Analyze how football affects important cardiovascular risk variables such as blood pressure, lipid profiles, and body mass index (BMI). c. Examine the connection between the length and level of football play and the results in terms of cardiovascular health.

The research determines that Assessing Cardiovascular Health Benefits of Football in Brazilian Adolescents. The research study is divided into five chapters. The first portion represents the introduction and includes the objective of the research and the goal of the study related to the variables. the second portion describes the literature review, the third section describes the methods of research, and the fourth section represents results and descriptions of the independent and dependent variables. The last section summarized overall research also that present some recommendation between them.

## **3. Literature Review**

Researchers claim that a lot of Brazilian adults actively participate in sports-related activities. to indulge the people of Brazil in sports-related activities various sports-related public policies are developed These policies indulge the youth in sport-related practices and improve their physical health (Borges Pereira et al., 2022). Studies reveal that participation in sports reduces the chances of cardiovascular disease onset in adults. The parameters related to cardiovascular health and metabolic processes improve by engaging adults in sports programs (Cayres-Santos et al., 2020). studies reveal that the knee extension process influences the performance of soccer players. To assess the knee extension process in soccer players, isokinetic tests are made. The information obtained by the isokinetic test helps better monitor an athlete's muscular strength. The risk factors associated with soccer playing sports are identified using the assessment tests (Cosendey et al., 2022). Studies explain that the youth of Brazilian states actively participate in aerobic fitness programs. Participation in these programs improves their aerobic health. the risk of

cardiovascular disease is minimized greatly in aerobically fit adults. To meet health criteria, many Brazilian adults indulge in aerobic exercises. these aerobic exercises improve their physical health and make them mentally strong (Custódio Martins et al., 2021).studies explain that trained and highly mature players face more training load than young soccer athletes. The physical health of soccer athletes in the Brazilian state improves with the improvement in their training process. A well-trained and mature soccer player is more capable of tackling game-related pressure than a young soccer player(Da Silva et al., 2022).studies reveal that inspiratory muscle training is provided in sports training sessions for enhancing athletic physical health. the level of inspiratory pressure is enhanced through inspiratory muscle training programs. Also, the aerobic health of indoor soccer players improves through high-level inspiratory training(de Sousa et al., 2021).studies explain that anthropometric factors are influenced by the dietary habits of athletes nutritional health of athletes critically plays a part in improving their performance in the sports field. Young athletes in Brazilian states are provided with a Mediterranean diet to positively influence their physical health (Leão et al., 2023).studies suggest that the chronological age of a soccer player determines his physical fitness. A soccer player's body composition significantly improves their overall game-performing ability (Leite Portella et al., 2023).Studies reveal that the American Health Association predicts that maintaining physical health is important to reduce the chances of the onset of cardiovascular disease in people.

Psychological health is related to the person's physical health, and improving physical health increases the chances of improving mental well-being. For implementing the methods to improve cardiovascular health, various health monitoring systems are used in physical training sessions (Lloyd-Jones et al., 2022).Studies suggest that improving the cardiovascular health improves athlte other health factors. School adolescents show improved health conditions because they participate in habitual physical activities. The one major reason behind the onset of cardiovascular disease in school children is the lack of physical activity in their daily lives. endothelial dysfunction is prevalent in school adolescents who are obese due to physical inactivity and unhealthy eating patterns(Machado et al., 2021).studies highlights that in most of adults bad eating habits are prevalent. The bad eating habits and lack of physical activity in the life of young school students develop serious health problems in them. CA is an approach used for evaluating the lifestyle practices of the young of the present era (Miranda, Coimbra, Bastos, Miranda Junior, & Amorim, 2021).studies predict that various methodologies are used for evaluating the impact of the risk factor associated with cardiovascular indicators in recreational soccer players. BMI shows a great association with impacting the cardiovascular health of soccer player (Nunes et al., 2021).studies claim that different programs are used to assess skilled players' physical health activity. The profile related to the physical fitness of Brazilian athletes is assessed using special fitness assessment programs (Pedretti et al.,



2020). Researchers elaborate that the performance of athletes in any sport is related to their improved cardiovascular health. The test made on nonsmokers and smoker athletes suggests that the heart rate of smoker athletes is higher than that of nonsmoker' athletes. the increased heart rate suggests that smokers' athletes have cardiovascular problems. these cardiovascular problems in smoker athletes badly disturb their physical athletes and negatively impact athlete game-playing skills (Pepera & Panagiota, 2021). studies predict that physical health-based interventions are provided to children in Brazilian schools to promote PA in students. Movimento is a school-based intervention program provided to students to provide PA-related knowledge.

The extent of sedentary behavior in school adolescents decreases by promoting PA in school students using intervention programs (K. S. Silva et al., 2020). studies reveal that sedentary behavior is prevalent in athletes having obesity problems. most of the health-related problems in obese children arise due to a lack of physical activity practices in their daily lives. School children participating in soccer sports exhibit low cardio metabolic risk. Whereas the risk of cardio metabolic disease in obese children increases by eighty-four percent (Pinho et al., 2022). studies explain that the sleep patterns of soccer athletes improve when they are provided with physical training. The psychological factors improved in athletes getting physical training. Also, cardiac modulation is improved by providing at least four weeks of physical training to soccer athletes (Rodrigues Júnior et al., 2021). scholars studies explain that in Brazil the PA based policies and programs are employed to promote PA in schools. to improve the effectiveness of PA-based policies in Brazil, Strick measures are made by PA-providing organizations. By strictly implementing the PA politicos it became easy to influence PA in-school adolescents (D. A. S. Silva & Silva, 2022). studies predict that movement guidelines are implemented in sports-based training programs to assess the impact of HIGH PA levels in Brazilian schools. Students not living in urban areas are more indulgent in movement guideline-based programs than students living in urban areas (Schaan, Schaan, & Cureau, 2022). Moreover, the chances of cardiovascular disease development in athletes participating in PA programs are lower.

The Brazilian Society of Cardiology suggests that the heart health of soccer players is assessed using the ECG technique (D. L. M. Silva, Bonatto, Bonatto, Padovani, & Fioretto, 2023).

#### **4. Methods of Research**

The research describes that assessing cardiovascular health of football related to the Brazilian adolescents. The research based on primary data analysis for determine the research used smart PLS software and generate result included descriptive statistic, correlation coefficient also that smart PLS Algorithm model between them.

#### 4.1 Descriptive statistical analysis

Table 1

NAME	NO.	MEAN	MEDIAN	SCALE MIN	SCALE MAX	STANDARD DEVIATION	EXCESS KURTOSIS	SKEWNESS	CRAMÉR-VON MISES P VALUE
CHB1	0	1.429	1.000	1.000	3.000	0.535	-0.671	0.709	0.000
CHB2	1	1.776	2.000	1.000	3.000	0.647	-0.654	0.263	0.000
CHB3	2	1.408	1.000	1.000	3.000	0.531	-0.509	0.803	0.000
CHB4	3	1.531	1.000	1.000	3.000	0.575	-0.634	0.541	0.000
CHB5	4	1.592	1.000	1.000	4.000	0.697	1.499	1.149	0.000
CHB6	5	1.510	1.000	1.000	3.000	0.610	-0.305	0.794	0.000
FBA1	6	1.633	2.000	1.000	3.000	0.523	-1.052	-0.120	0.000
FBA2	7	1.551	1.000	1.000	3.000	0.641	-0.403	0.763	0.000
FBA3	8	1.551	2.000	1.000	3.000	0.574	-0.694	0.463	0.000
FBA4	9	1.429	1.000	1.000	3.000	0.535	-0.671	0.709	0.000
FBA5	10	1.490	1.000	1.000	3.000	0.576	-0.453	0.703	0.000
FBA6	11	1.673	2.000	1.000	3.000	0.711	-0.838	0.584	0.000
FBA7	12	1.347	1.000	1.000	3.000	0.517	0.185	1.114	0.000

The above result represents that descriptive statistical analysis describes that mean values, median rates, minimum values, and maximum values also explain each indicator's standard deviation rate. The CHB1,2,3,4,5,6 shows that mean values are 1.429, 1.776, 1.408, 1.531, 1.592, and 1.510 are, showing the average mean value. Its shows that the standard deviation of each variable, 53%, 64%, 53%, 57%, 69% and 61%, deviates from the mean.

The skewness values are 70%, 26%, 80%, 54% and 79% skewness values of each variable. The FBA1,2,3,4,5,6 and 7 are all considered dependent variables. Its shows that mean values are 1.633, 1.551, 1.490, 1.673, also that 1.347, which shows the positive average value of the mean.



The overall minimum value is 1.000, the maximum value is 3.000, and the median rate is 2.000, respectively. The standard deviation rate is 52%, 53%, 71%, and 51% deviate from the mean. The overall significant value is 0.000, showing that there is a 100% significant level between them

## **4.2 Benefits of Regular Physical Activity**

The benefits of regular physical activity on cardiovascular health have been shown in several research. Football, a popular activity everywhere, particularly in Brazil, can help teenagers' cardiovascular health in a number of ways:

1. **Aerobic Exercise:** Playing football requires constant, dynamic movement, which enhances aerobic capacity. Frequent engagement in the activity helps strengthen the heart and improve cardiovascular endurance.

2. **Cardiorespiratory Fitness:** Football demands a consistent level of effort, which enhances cardiorespiratory fitness. There is a correlation between increased fitness and a decreased risk of cardiovascular diseases.

3. **Weight Management:** Playing football or engaging in other regular physical exercise helps an individual maintain a healthy body weight. Being overweight increases the risk of cardiovascular issues, and heart health generally depends on maintaining a healthy weight.

4. **Blood Pressure Regulation:** Research has shown that exercise can help control blood pressure. Playing football regularly might help keep blood pressure levels in check.

5. **Metabolic Health:** Exercise positively impacts blood sugar levels and cholesterol profiles, among other metabolic parameters. Consequently, there may be a lower chance of cardiovascular disease development.

6. **Psychological Benefits:** Playing team sports like football improves mental health in addition to physical health. Improved mental and emotional well-being can promote cardiovascular health.

## **4.3 Cardiovascular Health**

Cardiovascular health is important for youngsters or adolescents as it can affect their health and well-being. Having bad cardiovascular health can lead to many health problems, including high blood pressure, heart disease, and strokes, therefore youngsters need to maintain good cardiovascular health through healthy lifestyles and habits that include regular physical activity, a balanced diet, and avoiding smoking and too much alcohol consumption. Many physical activities, such as playing football, can play an important role in developing cardiovascular health in adolescents. Performing physical activities

regularly can help improve cardiovascular fitness, reduce the risk of getting fat, and lower blood pressure.

Physical activity can also have positive effects on mental health, such as reducing stress and anxiety. Keeping in mind that physical activity alone may not be enough to promote good cardiovascular health, one also needs a balanced diet and avoid unhealthy habits that include smoking and excessive alcohol consumption. These are the most important factors in maintaining good cardiovascular health. Physical activities such as playing football can effectively promote cardiovascular health in youngsters, but they should be combined with healthy lifestyle habits to optimize the results.

Many studies have looked into that, cardiovascular health issues in youngsters or adolescents, including the risks and benefits. One of the studies has explored the relationship between blood pressure, body size, and physical activity in adolescents. We came to know that body size impacts the blood pressure in youngsters. Additionally, there are guidelines for screening and managing high blood pressure in children and adolescents. In another study, they inspected the impact of food processing on a solid nutritional recommendation for preventing diet-related chronic diseases.

The study found that food processing can harm the nutritional value of food and may not enable solid nutritional recommendations for preventing diet-related chronic diseases. Maintaining good cardiovascular health is important for Brazilian youngsters. It can be achieved through healthy lifestyle habits such as regular physical activities like football, a balanced diet, and avoiding trash eating.

#### **4.4 Impact of Football on Brazilian Adolescents**

From many surveys and studies that have connected physical activities, especially sports like football, with cardiovascular health improvement, participating in sports like football or soccer promotes and provides many benefits to cardiovascular structure and functions in youngsters. Football training can give us satisfactory cardiovascular health like muscle strength, functional capacity, lipid profile, and body composition. A study found that a school providing soccer practices is also an effective way to improve overweight children's cardiovascular and metabolic risk factors.

Playing football regularly can cause blood pressure drugs unnecessarily and make the heart younger and healthier in patients with high blood pressure or type 2 diabetes. By playing football, we get another health benefit, which is an increase in stamina, improved cardiovascular health, reduced body fat, and increased overall fitness.

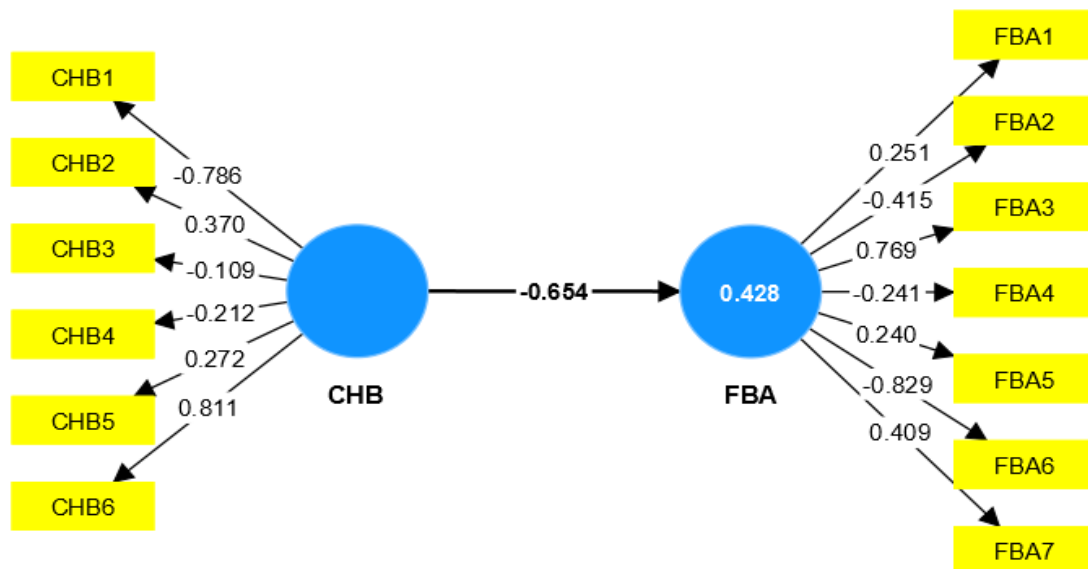
Playing football significantly affects myocardial structure and functions

at rest, including reducing blood pressure and resting heart rate, which are independent risk factors for cardiovascular disease. All these studies suggested that participating in sports like football can positively impact cardiovascular health, including reducing blood pressure, improving heart function, and enhancing overall fitness.

Playing football can give so many psychological and social benefits to adolescents. All of us know that football is a team game, so the team aspect of football develops social connection, teamwork, and a sense of belonging. We can see that playing as a team helps children and youngsters develop essential skills such as cooperation, listening to others, and being less selfish. It also provides a sense of belonging and helps in building new friendships outside the school or their comfort zone.

Playing football can have a positive impact on mental well-being; participating in youth team sports is directly linked to reducing the rate of depression and anxiety, along with the decreased risk of suicide and many sorts of abuses. Playing sports can also lead to a sense of performance, which improves self-esteem and confidence.

#### 4.5 Smart PLS Algorithm Model



The above model represents that CHB is mainly independent; it shows that -0.786, 0.370, -0.109, 0.212, 0.272 and 0.811 these are show some positive and some negative values of each factor. The result also describes that FBA is the main dependent variable.

The result represents that 0.251, -0.415, 0.769, -0.241, -0.829, and 0.409, which show positive and negative values between the overall result, show a negative and positive link between them. the CHB shows -0.654 shows negative link with FBA.

#### 4.6 Correlation Coefficient

Table 2

	CHB1	CHB2	CHB3	CHB4	CHB5	CHB6	FBA1	FBA2	FBA3	FBA4	FBA5	FBA6	FBA7
CHB1	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CHB2	-0.076	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CHB3	0.103	0.029	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CHB4	-0.076	0.156	0.159	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CHB5	-0.297	-0.113	-0.046	-0.020	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CHB6	-0.358	0.238	-0.013	-0.306	0.058	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FBA1	-0.094	-0.183	0.246	0.173	0.149	-0.244	1.000	0.000	0.000	0.000	0.000	0.000	0.000
FBA2	-0.332	0.249	-0.001	0.093	0.092	0.012	-0.066	1.000	0.000	0.000	0.000	0.000	0.000
FBA3	0.361	-0.162	-0.135	-0.020	-0.152	-0.395	0.199	-0.160	1.000	0.000	0.000	0.000	0.000
FBA4	-0.071	0.278	-0.113	0.256	0.086	-0.107	-0.167	0.264	-0.038	1.000	0.000	0.000	0.000
FBA5	0.180	-0.088	0.414	-0.045	-0.010	-0.072	0.055	-0.178	0.048	-0.284	1.000	0.000	0.000
FBA6	-0.384	0.151	0.137	-0.175	-0.104	0.525	-0.103	0.216	-0.560	0.207	-0.158	1.000	0.000
FBA7	0.422	-0.011	0.153	0.204	-0.230	-0.173	-0.057	0.039	0.112	0.053	-0.159	-0.136	1.000

The above result describe that correlation coefficient related to the independent and dependent variables the FB shows that 0.180, -0.088, 0.414 also that -0.010, -0.072 these are shows that some negative and also that positive interrelation between them.

#### 5. Conclusion

Physical activities such as playing football can be an effective way to promote cardiovascular health in adolescents in Brazil, but they should be combined with other healthy lifestyle habits for optimal results. Playing football will promote social connection, teamwork, and a sense of belonging and contribute to improved self-esteem, reduced stress, and enhanced mental well-being of Brazilian youth. Overall, football is a popular sport in Brazil and has potential and benefits for those who play it regularly.

The results of this study are extremely important in addressing the rising concerns over adolescents' cardiovascular health in Brazil. In particular, our goal in concentrating on football is to offer evidence-based perspectives on how well-suited this well-liked sport is to promote cardiovascular health. The results might influence community initiatives, school curricula, and public health policies that support teenagers frequent physical exercise. In conclusion, current research indicates that regular football involvement can positively influence cardiovascular health, even if I do not have access to the most recent studies on the advantages of football for cardiovascular health in Brazilian adolescents beyond 2022.

The activity encourages blood pressure regulation, weight control, aerobic exercise, cardiorespiratory fitness, and general metabolic health. Adolescent wellbeing is enhanced by these elements, as well as the mental health advantages of team sports. For more precise and current information on the particular cardiovascular advantages of football for teenagers in Brazil, one may consult recent studies in the area. More studies in this field will help us understand how environmental and cultural variables may affect the association between this population's cardiovascular health and playing football. The possible advantages of football for cardiovascular health for teenage Brazilian players are outlined in this study. Although the data shown research indicates that playing football, a popular sport in Brazil may have a favorable effect on a number of cardiovascular markers. Football is a vigorous, continuous sport that improves cardiorespiratory fitness and encourages aerobic activity.

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