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PREVALENCE OF EXERTIONAL ASTHMA AND ITS ASSOCIATION WITH FITNESS LEVEL IN PLAYERS

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ABSTRACT

Exertional asthma is a condition in which the airways become narrow or squeeze by the performance of hard physical activity. Sign and symptoms of exertional asthma include shortness of breath, wheezing, coughing, chest tightness, fatigue. Shortness of breath or wheezing get worse that make it hard to breathe. Air that is breathing in from mouth is dryer and cooler than breathe through nose. The complications that can be appearing due to exertional asthma are severe breathing difficulties, bronchoconstriction, and inability to exercise which effects quality of life. The factors that trigger exertional asthma are dry air Cold air Activities with long periods of deep breathing, such as long-distance running, swimming, polluted air. We will perform the cross-sectional study to check prevalence of exertional asthma in athletes. Moderate exercise has been shown to be beneficial for people with asthma, but repetitive, high-intensity exercise can contribute to the development of exertional asthma. ***OBJECTIVE:*** *The major aim of the study was to check the prevalence of exertional asthma and its relationship with fitness and how BMI affects the exertional asthma in players.* ***METHODOLODY:*** *A cross sectional study design with the sample size of 80 was used to collect data from different universities in Faisalabad. Convenient non-probability sampling technique was used recruit subjects in selection of study sample after screening with inclusion and exclusion criteria. After that we take that participant which was meeting our inclusion criteria. We collected data by using self-made screening sheet. After collecting data, statistical analysis was done through SPSS version 20.* ***RESULTS:*** *The data was analyzed through SPSS version 20. The mean age of participants is 23 years. The prevalence of exertional asthma in male was 63.9% and 36.1% in female. According to our sample size 11.1% have moderate, 25% have somewhat severe, 41.7% severe and 5.6% very severe exertional asthma. This research also aims that exertional asthma has significance influence on BMI and a great*

association with fitness. ***CONCLUSION:*** *This research concludes that exertional asthma is most commonly present in the age of 23. The prevalence of exertional asthma is more in male rather than female. Our research also concludes that exertional asthma has a great association with fitness level and BMI of players.*
KEYWORDS*: Exertional asthma, wheezing, shortness of breath, chest tightness, basic mass index, fitness, athletes, players.*

INTRODUCTION

Exertional asthma is defined as the narrowing of airways due to which the patient experiences chest tightness, coughing, breathlessness that is stimulated by exercise. Physical activity can trigger these symptoms in players with chronic asthma as well as the players with no history of asthma(1). A strong workout can trigger asthma that has been exercise-initiated, which results in an increase in airway resistance. Exercise typically results in bronchodilation of the airways as a first response. For athletes with exertional asthma, this early bronchodilation reverses after 5 to 8 minutes of near-maximum physical activity, and airway inhibition follows. After 20 to 60 minutes, most players easily perform rescues (2).

The symptoms of exertional asthma are difficulty in breathing, cough, angina, and gasping that regularly follow the concise time of bronchodilation present early during exercise. Bronchospasm normally emerge an increase in airway resistance brought on by severe exercise can result in exercise-induced asthma. The typical early response to exercise is bronchodilation of the airways. Almost 10% to 50% of competitive athletes encounter asthma symptoms with workout, because of either ongoing asthma or exercise-initiated bronchospasm. Early recognition and control of the symptoms can work on athletic presentation and quality of life of athletes with asthma or exercise-initiated asthma. Athletic mentors might have frequent chances to pinpoint asthma indicators and help competitors with treatment (3). Exercise testing could be required in some circumstances. Early detection and ongoing treatment can lessen EIA episodes (4). The initiation of EIB is probably compound and isn't totally gotten it. The overwhelming speculation for the etiology of EIB is that breathing moderately dry air makes the aviation routes thin by osmotic and warm results of evaporative water misfortune from the aviation route surface. These improvements have been shown to cause cough and bodily fluid production autonomously in patients without inclining respiratory circumstances like asthma. Normal side effects incorporate hacking, wheezing, chest snugness, and dyspnea. horrible showing for molding level, and aversion of movement (5).

Exercise might increment ventilation up to 200 L/min for brief timeframes in speed and power competitors and for longer periods in perseverance competitors, like marathon runners and swimmers. During winter in nations with particular seasons, competitors train outside in chilly climate or inside where air quality might be poor. Inward breath of cold air during exercise irritates work out actuated asthma in individuals with asthma. Inward breath of cold air during rest to some degree increments bronchial responsiveness to receptor in subjects with and without asthma (10). High ventilation and endurance athletes are more prone to develop exertional asthma than athletes who play low ventilation sports. Any environment can lead to asthma brought on by exercise. It is especially prevalent during endurance events. For instance, long distance running, swimming, and cross-country skiing, where ventilation expands for extended periods of time during practice and competition (5). Regular exercise seems to be one of the most incredible indicators of effective weight maintenance. Although regular physical activity and exercise are significant parts in the avoidance and treatment of obesity, numerous obese adults without coexisting problems can't practice because of asthma on exertion. Thus, they may avoid physical activity. Increased respiratory muscles forced generation and accessory increased ventilation are important impression of respiratory exertion in obese subjects decrease in the productivity of respiratory muscles during exercise contributes to dyspnea in hyper inflating obese subjects should not be degraded (6). In players the physical workload is more than normal individuals. Due to increased physical workload in players leads to the exertional asthma. Due to exertional asthma the players limit their work load which effects their training sessions. The severity of disease affects the quality of life of the players as it reduces their exercise ability. The objective of study was to find the prevalence of exertional asthma in players and its association with fitness level in players.

METHODOLOGY

The study was designed as a cross-sectional investigation to assess the relationship between exertional asthma and fitness levels in undergraduate students. Data were collected from multiple campuses and institutions in Faisalabad, including Government College University Faisalabad, Saeed Ajmal Academy, Agriculture University Faisalabad, Faisalabad Medical University, National Textile University, and The University of Faisalabad. The study targeted both male and female undergraduate students aged between 18 and 23 years. The total sample size consisted of 80 participants. A purposive sampling technique was employed to select participants based on the study's objectives. Participants were screened for eligibility using predefined inclusion and exclusion criteria. Those eligible were aged between 18 and 23 years, had a BMI greater than 18, and engaged in physical activity at least three times a week. Exclusion criteria included recent knee or back injuries within the last six months, a history of surgery within six months, psychological or neurological disorders, cardiac issues, or refusal to consent.

The primary outcome of the study was to assess the presence of exertional asthma and its association with the fitness levels of the participants. To measure physical fitness, the study used the vertical jump test, countermovement jump test, four square step test, and spirometry to assess pulmonary function. Data collection began with educating participants about the purpose and methods of the study. Those willing to participate provided informed consent, after which they were screened according to the inclusion and exclusion criteria. A structured questionnaire was used to gather data. Participants engaged in a 6-8 minute exertion session, including jogging, running, and walking, to measure their fitness levels.

RESULTS

The study aimed to explore the association between exertional asthma and fitness levels in undergraduate students, with a total of 78 participants included in the analysis. The participants' ages ranged from 18 to 23 years, and both males and females were included. 67.9% of the participants were male, while 32.1% were female. The data indicates that 46.2% of the participants reported having exertional asthma, while 53.8% did not have the condition. This suggests that exertional asthma is relatively common in this group of players, potentially influencing their exercise capacity and fitness levels. It would be essential to consider the impact of exertional asthma on the players' performance during physical activities.

Fitness Levels: Vertical Jump Performance

The vertical jump test is often used as an indicator of explosive power and lower-body strength. The distribution suggests that most of the participants demonstrate average to high levels of vertical jump performance, with the higher frequencies of jumps (4-6) being particularly notable.

Fitness Levels: Countermovement Jump Performance

The countermovement jump is a key measure of reactive strength and vertical power, and the results here suggest that a substantial portion of the participants have a moderate to high level of fitness, capable of performing multiple jumps within a short time frame.

Fitness Levels: Four-Square Steps Performance

Results shows that agility and coordination were moderate to high in this sample, with a substantial portion achieving a relatively low number of steps within 5 seconds.

Body Mass Index (BMI) of Participants

Results distribution suggests that the majority of participants maintained a healthy body weight, which is a key factor for optimal athletic performance. However, the 32.1% of participants with BMI above 24 could potentially face challenges in performance and health due to excess weight.

Exertional Asthma and Fitness Levels

The prevalence of exertional asthma, which was reported in 46.2% of participants, may have implications for their physical performance, particularly during high-intensity activities. This could be especially relevant for those participants who fall into the higher-intensity jump categories (e.g., 4-6 vertical jumps) or those with higher scores in agility tests (e.g., the four-square step test). Furthermore, asthma could potentially affect participants' performance scores on the Borg PRE and CR10 scales. Those with exertional asthma may have lower perceived exertion levels due to respiratory limitations, impacting their perceived effort and performance. These ratings suggest that while a portion of the participants found the activity to be moderately challenging, others reported more intense exertion, which could be related to their fitness levels, asthma status, or both.

Table:1

Table:1 Frequency Distribution		
How many Vertical Jump performed in 5 seconds?		
	Frequency	Percent
2 Jump	3	3.8
3 Jump	12	15.4
4 Jump	18	23.1
5 Jump	14	17.9
6 Jump	17	21.8
7 Jump	14	17.9
2 Jump	78	100.0
How many Countermovement Jump performed in 5 seconds?		
2 Jump	11	14.1
3 Jump	13	16.7
4 Jump	26	33.3
5 Jump	16	20.5
6 Jump	11	14.1
7 Jump	1	1.3
How many Four-square steps performed in 5 seconds?		
1 Jump	26	33.3
2 Jump	28	35.9
3 Jump	18	23.1
4 Jump	6	7.7
What is BMI of participants?		
below 18	3	3.8
18-24	50	64.1
above 24	25	32.1
Exertional Asthma		
No	42	53.8
Yes	36	46.2
On which score participant lie Borg PRE Scale?		
no Exertion	3	3.8
Extremely Light	4	5.1
very light	13	16.7
Light	19	24.4
somewhat hard	17	21.8
hard (Heavy)	13	16.7
On which score participant lie Borg CR10 Scale?		

no Exertion	4	5.1
Very. very slight	1	1.3
very slight	3	3.8
Slight	12	15.4
moderate	22	28.2
somewhat severe	11	14.1
Severe	16	20.5
very severe	7	9.0
Very, very severe	2	2.6

The association between exertional asthma and vertical jump performance was found to be statistically significant This indicates that there is a statistically significant relationship between exertional asthma and vertical jump performance. The P-values for all tests (Pearson Chi-Square, Likelihood Ratio, and Linear-by-Linear Association) are below the commonly used threshold of 0.05, suggesting that participants with exertional asthma tend to perform differently on vertical jump tests compared to those without asthma. This difference could be due to the respiratory limitations exerted by asthma, affecting explosive power and physical performance. Similarly, the relationship between exertional asthma and countermovement jump performance was also found to be statistically significant: The significant P-values suggest that the presence of exertional asthma impacts countermovement jump performance. Since this test requires a combination of strength and reactive power, individuals with asthma may experience reduced performance, possibly due to difficulty in maintaining adequate oxygen intake during rapid movements. The association between exertional asthma and four-square step performance was also found to be statistically significant: These results indicate that participants with exertional asthma may have difficulty with agility and coordination, as reflected in their four-square step performance. This limitation may be due to the physical constraints imposed by asthma during dynamic movements.

A highly significant relationship was found between exertional asthma and BMI. These results suggest that participants with exertional asthma are more likely to have an abnormal BMI (either underweight or overweight). Excess weight or a lower-than-healthy body weight could contribute to the severity of asthma symptoms, influencing fitness performance. The link between BMI and asthma prevalence highlights the need for targeted interventions to improve the overall health and fitness of players with exertional asthma. The relationship between exertional asthma and the Borg PRE Scale, which measures perceived exertion, was highly significant: These results indicate that participants with exertional asthma tend to perceive their effort as higher compared to those without asthma. The significant association suggests that asthma increases the perceived intensity of physical activity, possibly due to respiratory discomfort or reduced exercise tolerance during physical exertion. Similar to the Borg PRE Scale, the results show that participants with exertional asthma report higher levels of perceived exertion, which reinforces the idea that asthma affects not only physical performance but also how participants experience physical effort during exercise.

Table:2

Table:2 Factors Association		
Association of exertional asthma with vertical Jump		
	Value	P Value
Pearson Chi-Square	13.245[a]	.021
Likelihood Ratio	14.039	.015
Linear-by-Linear Association	9.821	.002
Association of exertional asthma with Countermovement jump.		
Pearson Chi-Square	11.565[a]	.041
Likelihood Ratio	12.518	.028
Linear-by-Linear Association	6.902	.009
Association of exertional asthma with Four square step		

Pearson Chi-Square	12.277[a]	.006
Likelihood Ratio	12.751	.005
Linear-by-Linear Association	8.222	.004
Association of exertional asthma with Body Mass Index		
Pearson Chi-Square	23.196[a]	<.001
Likelihood Ratio	25.343	<.001
Linear-by-Linear Association	8.542	.003
Association of exertional asthma with Borg PREPRE Scale		
Pearson Chi-Square	59.796	<.001
Likelihood Ratio	74.189	<.001
Linear-by-Linear Association	42.481	<.001
N of Valid Cases	78	
Association of exertional asthma with Borg CR10PRE Scale		
Pearson Chi-Square	51.025[a]	<.001
Likelihood Ratio	63.153	<.001
Linear-by-Linear Association	37.715	<.001
N of Valid Cases	78	

DISCUSSION

The cross-sectional study was performed on the topic exertional asthma and fitness level in players. The major goal for the research was to check the exertional level and fitness level in the population of players between the ages of 18-23. In this cross-sectional study, we have checked the association between exertional asthma and fitness level in players. To check the relationship between exertional asthma and fitness level in players a data collection sheet and screening form was given to the 80 players that manifest a considerable bond between exercise induced asthma and fitness level.

In 1998 Borg, Gunnar introduced and used Borg scale to check exertion level in individuals. The fundamental spotlight is on the introduction of 2 scaling strategies: the Borg RPE scale and the Borg CR10 scale. The Borg RPE scale is a scale for evaluations of seen effort (RPE). It is a device for assessing exertion and effort, shortness of breath, and exhaustion during actual work. The Borg CR10 scale is a classification proportion (CR) scale moored at the number 10, which addresses outrageous forces. It is an overall power scale for most emotional extents that with exceptional anchors can be utilized to gauge effort and agony (22). In our recent study we also used borg scale as a measuring tool to examine exertion level in players after performing physical activities.

In September 2017, Bishop, Chris; Turner, Anthony; Jarvis, Paul; Chavda, Shyam; Read, Paul performed research that's aim was to critically analyze the utility of strength and jumping tests that are frequently used to measure asymmetry. In their research they used vertical jump test and counter movement jump test to evaluate the fitness in athlete and non-athlete population (23). In this study we used these tests as a tool to evaluate the fitness level as well as the purpose of their performance was to trigger exertion asthma in players. So, we set a time limit for the performance of these test which was 5 seconds. In 2017, Marthe Moore and Karen Bark used four step squat test as a tool and proved that this test is a valid tool to measure dynamic balance in individuals. The Four-Square Step Test (FSST) is utilized to evaluate dynamic security and co-appointment. It takes a gander at the capacity of the subject to step over low articles forward, sideways, and in reverse. The FSST might be a compelling and legitimate device for estimating dynamic equilibrium and a members' falls risk. It has been displayed to major areas of strength for have with different proportions of offset and versatility with great unwavering quality displayed in various populaces (24).

In 2016, KD Lu,K Manoukian performed a research on the relationship between asthma and BMI. Their research concludes that obesity builds the endanger of asthma over the course of life however the basic instruments connecting these very much normal dangers to youngster wellbeing are ineffectively perceived. Intense episodes of activity, oxygen consuming wellness, and levels of active work plainly assume a part in the pathogenesis or potentially the executives of both youth stoutness and asthma. Besides, both corpulence

and actual latency are related with asthma side effects and reaction to treatment (an especially difficult component of heftiness related asthma) (25). Teresa To PhD, Tatiana N Vydykhan MSc, Sharon Dell MD, Marjan Tassoudji MSc, Jennifer K Harris BScH conclude in their research about the gender specificity and obesity and their relation with asthma. The pervasiveness of asthma was 9.9%. Maternal history of asthma was a gamble factor for asthma among all youngsters. Single youngster status and maternal misery were risk factors for young ladies. The chances proportion for asthma, looking at most noteworthy and least weight record classifications, was 1.02 (almost 100% certainty span, 0.70-1.46) for young men and 1.06 (almost 100% certainty stretch, 0.67-1.69) for young ladies (26).

CONCLUSION

In conclusion, the data reveals a clear association between exertional asthma and various fitness levels in players, with significant differences in performance. These findings suggest that exertional asthma may have a negative impact on physical performance, especially in activities requiring explosive power, agility, and stamina. However, no association was found between asthma and the participants' age or gender, suggesting that these demographic factors do not influence the likelihood of having exertional asthma in this group.

RECOMMENDATION

Further research is needed to explore the underlying mechanisms behind these associations and to develop strategies to manage exertional asthma in athletes effectively.

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