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Original Research Article

Comparison of aerobic training versus relaxation therapy on anxiety and depression in children with asthma: a pilot study

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ABSTRACT

Background: Asthma in growing children affects their emotional, intellectual, and physical development. Aerobic training has been advised for asthmatics to increase fitness and cardio-respiratory endurance, decrease dyspnoea, and improve quality of life. However, studies regarding aerobic training and its effect on anxiety and depression in the paediatric population are limited. Psychological treatments can decrease emotional distress as a result of symptoms, but does not improve their physical capacity. Thus, the aim of our study was to study the effects of eight weeks of aerobic training versus Jacobson's relaxation technique on anxiety and depression in asthmatic children with mild to moderate severity.
Methods: It was a single centre prospective comparative study. 45 asthmatic children satisfying the inclusion criteria were screened for anxiety and depression by using revised children's anxiety and depression scale (RCADS) scale. They were divided into 3 groups. Group A received diagrammatic breathing exercises, group B children received aerobic training, and group C received Jacobson's relaxation. Pre- and post-8-week effects training effects were assessed.
Results: Study results showed there was a significant difference between aerobic and relaxation on anxiety score with p value of 0.004. There was no significant difference on depression score between aerobic and relaxation with p value of 0.086.
Conclusion: The study results showed that an aerobic training program reduces anxiety and depression levels in asthmatic children aged 6-11 years.

Keywords: Anxiety, Children with asthma, Aerobic

INTRODUCTION

Asthma is a major non-communicable disease (NCD), affecting both children and adults, and is the most common chronic disease among children. Inflammation and narrowing of the small airways in the lungs cause asthma symptoms, which can be any combination of cough, wheeze, and shortness of breath and chest tightness.[1,2]

There is a constant fear experienced by these children who have asthma due to an acute attack of breathlessness during exertion. It has a deleterious effect on their physical and mental health. A study done by Amelia et al found that asthmatic children had lower self-esteem, social isolation, aggression, and anxiety and depression compared to those with other chronic illnesses. Ciprandi et al also observed anxiety (36.9%) and depression (11%) in patients with asthma.[3,4]

Each child grows and develops at his or her own rate. School-age period between six to twelve years is a time of relatively slow and steady growth. And it is the period of development of expected physical, emotional, and mental abilities of children.[5,6]

School plays a crucial and formative role in the development of the child. The physical and mental growth is affected in the asthmatic children because of increased absentism in schools due to acute attack of breathlessness.[5,6]

A small amount of anxiety is normal in the developing child is accepted but it is seen that it has increased in asthmatic children. This persistent feeling of anxiousness affect their physical growth as well as mental stability as[7] It was mentioned in a study by Katan et al that an acute episode of stress can trigger, within hours, a sequence of molecular events related to structural modelling in the amygdala, which can lead to the eventual development of anxiety.[7]

Anxiety and depression in asthmatic children gives poor outcome measures with management and worsen the symptoms. Studies have also shown the positive correlation between psychosocial function and quality of life. So, there is need to reduce the anxiety and depression to improve the symptoms and quality of life. Most of the studies have given trial by using different relaxation therapy which includes Yoga, Pranayama, and guided imagery.[8]

These techniques improve the psychosocial function but do not improve the exercise capacity. Research strongly suggests that varying types of aerobic exercise (swimming, running, basketball, and cycling) can improve respiratory function, decrease asthma symptoms, decrease medication use, decrease hospitalisations and physician visits, improve quality of life, increase self-management, improve school and work attendance, and increase emotional wellbeing in asthmatics across all degrees of asthmatic severity.

Aerobic training has been advised for asthmatics to increase fitness and cardio-respiratory endurance, decrease dyspnoea, and improve quality of life.[9,10] Several randomized controlled trials have searched the effects of physical training methods in children with asthma on their respiratory function and symptom improvement and better quality of life, but very few studies have concentrated on their psycho-social function.[8-10]

RCADS is a 47-item self-reporting questionnaire designed to assess anxiety and depressive disorders based on the diagnostic and statistical manual (DSM) of mental disorders criteria.[10,11]

It has been demonstrated to be a reliable and valid instrument in both general population and school-based samples.

Thus, the study was conducted to find out the effects of eight weeks of aerobic training versus Jacobson's relaxation technique on anxiety and depression by using revised children anxiety scale (RCAD) in children with asthma with mild to moderate severity.

METHODS

Design

It was a single centre study.

Type of study

It was a prospective comparative study.

Place of study

The study was conducted at the Physiotherapy Department, Lokmanya Tilak Municipal Medical College and General Hospital, Sion, Mumbai, Maharashtra, India.

Duration of the study

The duration of the study was from February 2018 to January 2019.

Selection criteria

Children aged 6-11 years of both genders, with mild to moderate asthma according to GINA guidelines (2015), with RCAD score more than 65, and children who were able to understand English and Hindi were included. Children with associated neuromuscular disease, congenital cardiopulmonary and musculoskeletal disorders were excluded from the study.

Recruitment of patients

A total of 300 patients were screened for anxiety and depression by using RCAD scale from the paediatric outpatient department (OPD). The children with the score more than 65 were included in the study.[10,11]

Those meeting the inclusion criteria were enrolled in the study after obtaining informed consent (n=45). Demographic data was recorded.

Randomization

Then subjects were allocated into three groups by simple random method using different colours of cards.

Treatment protocol

The treatment was given for 8 weeks for all the groups and treatment sessions were given thrice a week and rest of the days' subject was not advised to do the exercises as thrice a week will be sufficient to cause an effect.

In protocol the child was supposed to do exercise 3/week and the rest of the days he was instructed to do his routine ADL activities. They were instructed not to do any strenuous and sports activities on any other days.

Group A: routine breathing techniques

Frequency was thrice a week, session duration was 30–60 minutes, and nebulization with bronchodilator was 5–10 minutes. Deep breathing exercises (apical, lateral costal, and diaphragmatic) along with pursed lip breathing were done in 3 sets of 10-20 repetition with a 3-minute rest pause (total: 20 minutes).[17]

Group B: routine breathing + aerobic exercise

Frequency was thrice a week, and session duration for week 0–4 was 30–45 minutes, and for week 4–8 (progression) was 45–60 minutes.

Intensity for week 0–4 was 50–60% of HR max, and for week 4–8 was 60–70% of HR max.

Heart rate (HR) calculation for paediatric population was done using the following formula.[19]

$$Maximal\ heart\ rate\ (HR\ max) = 208 - (0.7 \times Age)$$

Warm-up (10 minutes) included total body movements like neck flexion extension, biceps curls, shoulder flexion extension and abduction adduction, hip-knee flexion extension and flexibility exercises like arm circle, toe raises with increased repetitions (5–10 per movement).

Conditioning phase (30–40 minutes) included group aerobic training maintaining HRR at 60–70% HR max, graceful dance movements coordinated with music, and HR monitored using a pulse oximeter.[9]

Cool-down (10 minutes) included breathing exercises, shoulder movements, ankle-toe movements, and knee flexion-extension exercises.

Group C: breathing + Jacobson's relaxation technique

Frequency was thrice a week and session duration was 20–30 minutes.[20]

Preparation

Participants sat comfortably in a quiet room for 5 minutes.

They took a deep breath, held it for four seconds, and exhaled slowly through pursed lips.

Jacobson's relaxation technique included children were first trained using a small therapeutic ball to squeeze tightly and release, helping them understand muscle contraction and relaxation (practiced 5–10 times).

The relaxation sequence involved tensing and relaxing different muscle groups in the following order: right foot → right lower leg and foot → entire right leg; left foot → left lower leg and foot → entire left leg; right hand → right forearm and hand → entire right arm; left hand → left forearm and hand → entire left arm; and abdomen → chest → neck and shoulders → face

Each contraction was held for a few seconds, followed by relaxation while breathing out.

Table 1: Groups A, B and C.

Group A: routine breathing exercise	Group B: BE + aerobic training	Group C: BE + relaxation therapy
Apical, lateral costal and diaphragmatic breathing exercises were performed in combination with pursed-lip breathing. The child was instructed to inhale through the nose and exhale in a relaxed, slow, controlled, and prolonged manner. These breathing exercises were administered for 10 repetitions per cycle, with a total of 3 cycles (Chiang et al).	Aerobic dance steps training included the following. Warm-up: performed for 5-10 minutes, consisting of total body movements in a standing position; aerobic phase: 20-30 minutes of rhythmic step-based activity, incorporating increased footwork; and cool-down: lasting 5-10 minutes, involving slow spot marching in a standing position and relaxed movements (Andrade et al).	Jacobson's relaxation technique included the following. The technique involved applying tension to specific muscle groups, followed by relaxation. The sequence progressed from the lower limb (toes) to the head. Participants were instructed to hold the contraction for 8 seconds and then relax the muscle group for 30 seconds (Nickel et al).

Statistical analysis

Data analysis

All the collected data was entered and cleaned in Microsoft excel 2021 (©Microsoft Inc.). Data analysis was carried out in statistical package for the social sciences (SPSS) version 26 (©IBM Inc.). For continuous data, mean and standard deviation (SD) were taken as measure of central tendency. For categorical data, median and inter quartile range (IQR) were calculated. For nominal data, proportion of each variable was calculated. Descriptive analysis was done and analyzed data was represented graphically. Normality of the data was checked with the help of Shapiro-Wilk test ($p<0.05$ as non-normal distribution).

Intragroup analysis was done with paired-t test (for parametric data) or Wilcoxon signed rank test (for non-parametric data). Intergroup analysis was done with

analysis of variance (ANOVA) test (for parametric data) or Kruskal Wallis test (for non-parametric data). Significance level was set at $p<0.05$.

RESULTS

Table 2 shows equal number of male and female in all groups.

The mean age of males in control group was 8.53 with SD of 1.04 and female in control group is 9.25 with SD of 1.61 The mean age of male in aerobic group was 9 with SD of 1.19 and females in aerobic group was 9 with SD of 1.41 The mean age of males in relaxation was 8 with SD of 1.51 and females was 8.37 with SD of 0.99.

Anxiety score

Table 3 shows a decrease in anxiety score from pre to post 8 weeks within all three groups. Intra-group significant effect was tested by Wilcoxon signed rank test, showed p value of 0.001 in all three groups.

Table 4 indicates comparison between the 3 groups by independent-samples Kruskal-Wallis test. It shows all three groups significantly differs with p value of 0.004. Aerobic group shows more number of lowest mean ranks, suggesting smaller anxiety scores are more in aerobic group compared to relaxation and control group.

As per Table 5, pairwise comparison showed significant difference between aerobic and relaxation with p value of 0.004.

Depression score

Table 6 shows decrease in depression score from pre to post intervention within all three groups. Intra-group significant effect was tested by Wilcoxon signed rank test, showed p value of 0.001 in all three groups.

Table 7 shows comparison between the 3 groups by independent-samples Kruskal-Wallis test. It shows all three groups significantly differ with p value of 0.000.

Aerobic group shows more number of lowest mean ranks, suggesting smaller depression scores are more in aerobic group compared to relaxation and control group.

As per Table 8, pair wise comparison showed no significant difference between aerobic and relaxation with p value of 0.086.

Table 2: Demographic data.

Age	Group (gender)					
	Control		Aerobic		Relaxation	
	Male	Female	Male	Female	Male	Female
Count (15 in each group)	7	8	7	8	7	8
Minimum	8.12	8.50	8.20	8.32	8.30	8.20
Maximum	11.00	11.00	11.00	11.00	11.00	11.00
Median	8.00	9.00	8.00	8.00	8.00	8.50
Percentile 75	10.40	10.30	10.30	10.40	10.20	10.50
Mean	8.43	9.25	9	9	8	8.37
Standard deviation	1.04	1.61	1.19	1.41	1.51	0.99

Table 3: Comparison within the groups for anxiety score.

Groups	Control A	Aerobics B	Relaxation C
Anxiety			
Mean			
Pre-	71	72.26	73.46
Post-	61.40	57.26	61.60
Wilcoxon signed ranks test			
Negative rank	15	15	15
Positive rank	0	0	0
Tie	0	0	0
Mean rank-negative	8	8	8
Sum of mean rank	120	120	120
Z value	0.3466	0.3416	0.3415
Statistical significance (intra-group)			
P value	0.001, significant	0.001, significant	0.001, significant
Clinical significance (intra-group)	d_{cohens}=0.870, large effect size	d_{cohens}=0.880, large effect size	d_{cohen}=0.876, large effect size

Table 4: Comparison between the 3 groups by independent-samples Kruskal-Wallis test.

Ranks and group	N	Mean rank	Test statistics
AXRCADW0			
Group-1	15	18.33	Kruskal-Wallis H=4.333, df=2, p value=0.115
Group-2	15	22.50	
Group-3	15	28.17	
Total	45		
AXRCADW8			
Group-1	15	27.50	Kruskal-Wallis H=10.83, df=2, p value=0.004
Group-2	15	13.93	
Group-3	15	27.57	
Total	45		

Table 5: Pair wise comparison.

Sample 1-sample 2	Test statistic	Standard error	Standard test statistic	Significance	Adj. sig[a]
Group-2-group-1	13.567	4.773	2.842	0.004	0.013
Group-2-group-3	-13.633	4.773	-2.856	0.004	0.013
Group-1-group-3	-0.067	4.773	-0.014	0.989	1.000

Each row tests the null hypothesis that the sample 1 and sample 2 distributions are the same. Asymptotic significances (2-sided tests) are displayed. The significance level is 0.05. [a]Significance values have been adjusted by the Bonferroni correction for multiple tests

Table 6: Comparison within the groups for depression score.

Groups	Control A	Aerobics B	Relaxation C
Depression			
Mean			
Pre-	72.26	74.86	73.40
Post-	57.26	56.53	59.20
Wilcoxon signed ranks test			
Negative rank	15	15	15
Positive rank	0	0	0
Tie	0	0	0
Mean rank-negative	8	8	8
Sum of mean rank	120	120	120
Z value	0.3411	0.3416	0.3412
Statistical significance (intra-group)			
P value	0.001, significant	0.001, significant	0.001, significant
Clinical significance (intra-group)	d_{cohens}=0.870, large effect size	d_{cohens}=0.880, large effect size	d_{cohen}=0.876, large effect size

Table 7: Between the 3 groups-RCAD depression score by independent-samples Kruskal-Wallis test.

Ranks and group	N	Mean rank	Test statistics
DepW0			
Group-1	15	23.77	Kruskal-Wallis H=1.415, df=2, p value=0.493
Group-2	15	25.37	
Group-3	15	19.87	
Total	45		
DepW8			
Group-1	15	33.57	Kruskal-Wallis H=17.712, df=2, p value=0.000
Group-2	15	13.63	
Group-3	15	21.80	
Total	45		

Table 8: Pairwise comparison of group.

Sample 1-sample 2	Test statistic	Standard error	Standard test statistic	Significance	Adj. sig[a]
Group-2-group-3	-8.167	4.762	-1.715	0.086	0.259
Group-2-group-1	19.933	4.762	4.186	0.000	0.000
Group-3-group-1	11.767	4.762	2.471	0.013	0.040

Each row tests the null hypothesis that the sample 1 and sample 2 distributions are the same. Asymptotic significances (2-sided tests) are displayed. The significance level is 0.05. [a]Significance values have been adjusted by the Bonferroni correction for multiple tests

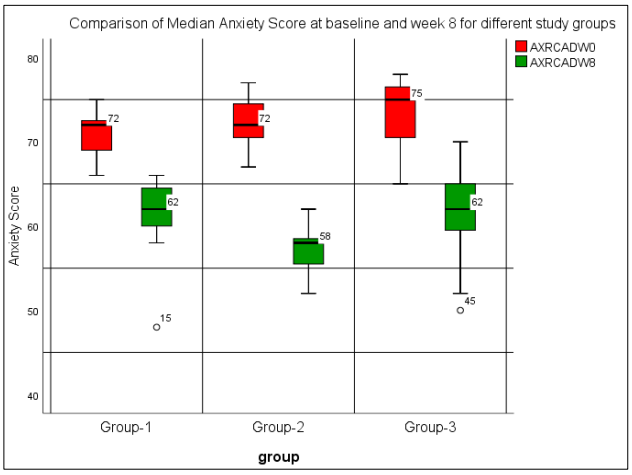

Figure 1: Comparison of median anxiety score at pre and post intervention between group A, group B and group C.

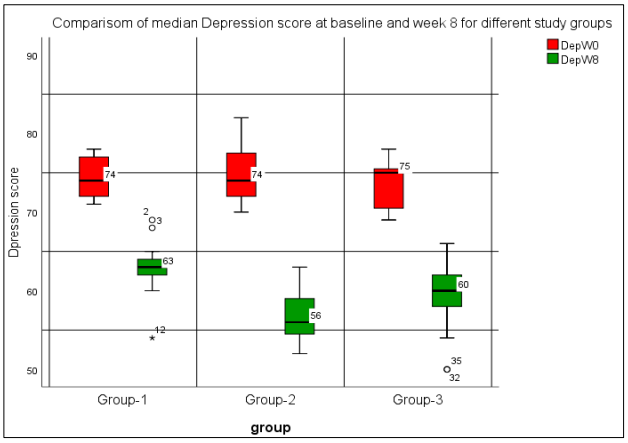

Figure 2: Comparison of between the groups-depression score.

DISCUSSION

The aim of this study was to compare the effects of eight week's aerobic training versus Jacobson's relaxation technique on anxiety and depression in asthmatic children with mild to moderate severity.

Anxiety score on RCADS in groups A, B and C

Intra group assessment was done by using Wilcoxon signed ranks test as the data was ordinal. There was significant effect between pre - post anxiety score of RCAD in all three groups (A, B and C) indicating p value is less than 0.05.

Inter-group comparison tested by Kruskal–Wallis has shown significant effect between aerobic and control (p=0.04), relaxation and control (0.989) and aerobic and relaxation (0.04). That means intervention by aerobic training has significant effect to reduce the anxiety than conventional and relaxation therapy.

The findings also indicated that aerobic training was the most effective intervention for reducing anxiety in asthmatic children compared to relaxation therapy. Aerobic and relaxation exercises lowered anxiety scores, but aerobic training had a significantly more significant impact. This suggests that structured physical activity may be crucial in managing psychological well-being in children with asthma. Integrating aerobic exercises into routine asthma management could improve mental health outcomes alongside respiratory function.

Our study's results were similar to those of on asthmatic adults, which promotes physical training in the form of circuit training for about 45 min to 60 mins at an RPE rate of 12-14 on the 0-20 Borg scale decreases anxiety from 5.4±3.5 to 3.4±3.2.[18] Turner et al studied the relationship between aerobic training and adult psychosocial function. Their study mentioned a moderate linear relationship between baseline anxiety (r=0.52; p=0.001) and depression (r=0.62; p=0.001) scores that improved after aerobic training.[20]

Aerobic training is known for its effect on the cardio-respiratory system and overall well-being, but its effects on psychosocial function are still being processed. There is little evidence available on this aspect. Improvement in anxiety could be because of improvement in a sense of self-confidence and independence. The reason attributed was that aerobic training showed an overall improvement in exercise capacity, which might have led to increased self-esteem and, thus, improved emotional function.

Effect on depression

There was significant effect from pre – post in depression score indicating p value is less than 0.05 in all three groups.

Inter-group comparison tested by Kruskal-Wallis test has shown significant effect only between aerobic and control (p=0.001). This means aerobic training has reduced depression more as compared to breathing exercises.

Effect between aerobic and relaxation was non-significant with p value of 0.427. This means that aerobic training was equally effective as relaxation in reducing depression.

Several mechanisms can explain the mood improvement in our patients.

Exercise produces changes in the concentration of several biologically active molecules such as adreno corticotrophic hormone, cortisol, catecholamines, and cytokines, which have been reported to affect mood or are involved in the physiopathology of affective disorders.[5,9,20]

The factor such as motivation, expectancy, and human contact had influences the mood of participants.

Physical therapist-guided aerobic exercise enhanced the feeling of well-being and improves the self-confidence.

The antidepressant effect of exercise is to promote self-esteem, self-perception, and self-efficacy and can enhance social support to create a buffer against depressive symptoms.[21,22]

Aerobic exercises improve humour and reduce levels of anxiety and depression in healthy children as well as in children with asthma. The present study results showed that reduction in depression score after the physical exercises. So, it was equally effective as compared to relaxation therapy.

Limitations

The limitation of this study was the inability to systematically track medication usage. Children were non-adherent with group B and C.

CONCLUSION

To the best of our knowledge, this is the first article evaluating the effects of a supervised indoor aerobic training program on anxiety and depression in mild-moderate asthmatic children. The intervention by aerobic training has shown a significant effect in reducing anxiety and depression. This study definitely adds to the Literature suggesting that physical aerobic activity can be routinely used in primary care of asthmatic children to reduce their anxiety and depression.

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REFERENCES

1. Daniel RA, Aggarwal P, Kalaivani M, Gupta SK. Prevalence of asthma among children in India: A systematic review and meta-analysis. Lung India. 2022;39(4):357-67.
2. Mathew P, Indiradevi ER, Soniya UR, Poonnen SB, Alex ST, Solomon S. Prevalence and risk factors for respiratory morbidity, among high school students of South India. Int J Res Med Sci. 2015;3(5):1149-52.
3. Licari A, Ciprandi R, Marseglia G, Ciprandi G. Anxiety and Depression in Adolescents with Severe Asthma and in Their Parents: Preliminary Results after 1 Year of Treatment. Behav Sci (Basel). 2019;9(7):78.
4. Lehrer P, Feldman J, Giardino N, Song HS, Schmaling K. Psychological aspects of asthma. J Consult Clin Psychol. 2002;70(3):691-711.
5. Gonçalves RC, Nunes MPT, Cukier A, Stelmach R, Martins MA, Carvalho CRF. Effects of an aerobic physical training program on psychosocial characteristics, quality-of-life, symptoms and exhaled nitric oxide in individuals with moderate or severe persistent asthma. Braz J Phys Ther. 2008;12(2):127-35.
6. Amer AAA, Maksod YHA, EI Bakry ST, El-Yamany WHA. Anxiety and depression among children with chronic diseases. Middle East Curr Psychiatr. 2013;20:146-55.
7. Katon WJ, Richardson L, Lozano P, McCauley E. The relationship of asthma and anxiety disorders. Psychosom Med. 2004;66(3):349-55.
8. Bahreinian S, Ball GDC, Colman I, Becker AB, Kozyrskyj AL. Depression is more common in girls with nonatopic asthma. Chest. 2011;140(5):1138-45.
9. Andrade LB, Britto MC, Lucena-Silva N, Gomes RG, Figueroa JN. The efficacy of aerobic training in improving the inflammatory component of asthmatic children. Randomized trial. Respir Med. 2014;108(10):1438-45.
10. Kösters MP, Chinapaw MJ, Zwaanswijk M, van der Wal MF, Koot HM. Structure, reliability, and validity of the revised child anxiety and depression scale (RCADS) in a multi-ethnic urban sample of Dutch children. BMC Psychiatry. 2015;15:132.
11. De Ross R, Gullone E, Chorpita BF. The Revised Child Anxiety and Depression Scale: A Psychometric Investigation with Australian Youth. Behaviour Change. 2002;19(2):90-101.
12. Ciprandi G, Schiavetti I, Rindone E, Ricciardolo FL. The impact of anxiety and depression on outpatients with asthma. Ann Allergy Asthma Immunol. 2015;115(5):408-14.
13. Goodwin RD, Bandiera FC, Steinberg D, Ortega AN, Feldman JM. Asthma and mental health among youth: etiology, current knowledge and future directions. Expert Rev Respir Med. 2012;6(4):397-406.
14. Huntley A, White AR, Ernst E. Relaxation therapies for asthma: a systematic review. Thorax. 2002;57(2):127-31.

15. Jerath R, Crawford MW, Barnes VA, Harden K. Self-regulation of breathing as a primary treatment for anxiety. Appl Psychophysiol Biofeedback. 2015;40(2):107-15.
16. Jindal SK, Aggarwal AN, Gupta D, Agarwal R, Kumar R, Kaur T, et al. Indian study on epidemiology of asthma, respiratory symptoms and chronic bronchitis in adults (INSEARCH). Int J Tuberc Lung Dis. 2012;16(9):1270-7.
17. Chiang LC, Ma WF, Huang JL, Tseng LF, Hsueh KC. Effect of relaxation-breathing training on anxiety and asthma signs/symptoms of children with moderate-to-severe asthma: a randomized controlled trial. Int J Nurs Stud. 2009;46(8):1061-70.
18. Crosbie A. The effect of physical training in children with asthma on pulmonary function, aerobic capacity and health-related quality of life: a systematic review of randomized control trials. Pediatr Exerc Sci. 2012;24(3):472-89.
19. Mahon AD, Marjerrison AD, Lee JD, Woodruff ME, Hanna LE. Evaluating the prediction of maximal heart rate in children and adolescents. Res Q Exerc Sport. 2010;81(4):466-71.
20. Turner S, Eastwood P, Cook A, Jenkins S. Improvements in symptoms and quality of life following exercise training in older adults with moderate/severe persistent asthma. Respiration. 2011;81(4):302-10.
21. Farid R, Azad FJ, Atri AE, Rahimi MB, Khaledan A, Talaei-Khoei M, et al. Effect of aerobic exercise training on pulmonary function and tolerance of activity in asthmatic patients. Iran J Allergy Asthma Immunol. 2005;4(3):133-8.
22. Liu Y, Zhao Y, Liu F, Liu L. Effects of Physical Exercises on Pulmonary Rehabilitation, Exercise Capacity, and Quality of Life in Children with Asthma: A Meta-Analysis. Evid Based Complement Alternat Med. 2021;2021:5104102.
23. Milanese M, Miraglia Del Giudice E, Peroni DG. Asthma, exercise and metabolic dysregulation in paediatrics. Allergol Immunopathol (Madr). 2019;47(3):289-94.
24. Philpott JF, Houghton K, Luke A. Physical activity recommendations for children with specific chronic health conditions: juvenile idiopathic arthritis, hemophilia, asthma, and cystic fibrosis. Clin J Sport Med. 2010;20(3):167-72.

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