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Association of Physical Activity With Flexibility in Overweight and Obese Children

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ABSTRACT

Physical activity is also defined as a bodily movement which is produced by skeletal muscles that require energy expenditure. The Daily physical activity can reduce the risk factors such as hypertension, coronary heart disease, and juvenile diabetes mellitus, improves functional health and weight control. Due to lack of physical activity, the children can become overweight or obese. To find the association of physical activity with flexibility in healthy, overweight and obese children. Non-experimental, observational study and 100 samples were taken based on inclusion criteria to find the association of physical activity on flexibility in normal, overweight, obese children, between the age group of 11 - 13 years by using physical activity questionnaire (PAQ-C), Body Mass Index in percentile and, sit and reach test as outcome measures. The study setting was Sree Sankara BalaVidhyalaya School. The physical activity questionnaire was given to them and asked to fill the (PAQ-C) questionnaire, and the flexibility of each child was checked by sit and reach test. The score of the questionnaire and sit and reach test value was recorded. The results showed that there was no significant association in physical activity and flexibility in overweight and obese children. Whereas the physical activity was low among obese children than healthy weight and overweight children, and the flexibility was low among healthy children.

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INTRODUCTION

Physical activity is also defined as any bodily movement produced by skeletal muscles which require energy expenditure to reduce or lose weight according to the World Health Organization. Physical activity is not an exercise it is a subcategory or a part where it is a planned, repetitive or structured, purposeful activity and which also shows the improvement and maintenance one or more components of one's physical fitness. Mental health and well -being thoughts to produce the most significant health benefits, when the children don't take care of their well-being, they lead to obesity. Physical activity shows improvement in both physical and mental health in the long term and short term effect. The physical activity includes both movements as well as exercise like high-intensity exercises etc. Activities like sporting, playing. The physical activity should be done regularly to be fit and active. Globally 81% children age group of 11-17 years are physically inactive, and the girls seemed to be less active when compared to boys.

Childhood obesity is already being accelerated and epidemic in some areas. The prevalence of rate of childhood obesity has become more in number

and doubled in many countries, especially in the World health organization European region from the 1970s (Branca *et al.*, 2007). Physical activity is essential to children in the middle age group 11, 12, 13 years children. Due to lack of physical activity, the children can face certain health risks such as insulin resistance, juvenile Diabetes Mellitus, increase in blood pressure, sleep apnea, cardiovascular disease, quality of life related to health is lowered etc. Risk factors can also continue till there adolescent. The obese adults are facing some risk factors, and it is doubled and also seems to be higher in children who are obese when compared to normal-weight children (Serdula *et al.*, 1993). There are increased adult mortality and morbidity (Daniels *et al.*, 2005; Lee, 2009).

The physical activity and physical education classes should be a part school curriculum which makes the children more active and fit. The parents should take care of their children's regular physical activities and encourage them to play outdoor games rather than indoor games, to walk, running, jogging, bicycling etc. The parents should also need to concentrate on their diet along with the physical activity (Pearson *et al.*, 2014). The parents should give equal importance to their academic as well as to the biological activity

The obesity and overweight children face problems in their childhood like juvenile diabetes, asthma, arthritis, reduction in their life expectancy in the age group of (6- 10) years (Mokdad *et al.*, 2001). There will be an improvement in cardiorespiratory fitness in all ages by doing regular moderate level of physical activity to a vigorous level of physical activity (Lobstein *et al.*, 2005).

Obese and overweight children have comparatively less physical activity and fitness compared to normal-weight healthy children (Raistenskis *et al.*, 2016). Several studies show the prevalence rate or low physical activity can lead to obese or overweight in children (Abbott and Davies, 2004; Page *et al.*, 2005). The average child having a Body Mass Index percentile of 5^{th} to 85^{th} percentile are said to a healthy weight, between the range of 85^{th} to 95^{th} percentile are said to overweight, Body Mass Index above 95^{th} percentile are said to be obese.

The overweight, obesity is most occurring due to sedentary lifestyle, environment, genetics etc. Most of the children are found sitting for a long time on the electronic gadgets like video games, mobile phones and using the internet for surfing etc. rather than playing outdoor games The children during free time or break time they should go for a walk rather than sitting and chatting or eating.

Balanced diet food should be followed regularly to be active and healthy. Some overweight and obese children have a positive effect and a negative effect, the positive impact is they do physical activity. The adverse impact is they intake more calories, so there is no benefit in reducing body weight (Pradinuk *et al.*, 2011). The children's should perform physical activity regularly for at least 60 minutes (Lipnowski and Leblanc, 2012) physical activity in children can develop healthy muscle, bones, joints, and improve the neuromuscular awareness, which gives the coordination, how to control the movement. The physical activity differs for children and adult. The current study is to evaluate the physical activity of the normal, overweight and obese children with the age group of 11, 12, 13 years was assessed with the physical activity questionnaire (PAQ-C).

Some study shows that children should do physical activity for at least 30 minutes in moderate-intensity regularly like two-mile of a brisk walk so this activity can make them feel warm and out of breath. Nowadays, all the parents and children are aware of the significance of physical activity to reduce weight, encouraging and promoting a healthy lifestyle. Along with physical activity, we can do yoga to maintain our body and mind in a relaxed state. The pattern of physical inactivity is also called as sedentism. The physical activity should be followed in routinely to develop strong bones and to reduce weight.

Flexibility is defined as the range of motion in joint or ability to move joints effectively through a complete range of motion, where they sit and reach test box is used to measure and assess the flexibility of the hamstring and lower back muscles and wells and Dillon in 1952 first developed it. This test is beneficial and widely used all over which identifies the tightness has been implicated in the lumbar lordosis, lower backache and pelvic tilt. The object required to assess one's flexibility which is done by sit and reach test box or ruler can be used, wooden box or steps can be used alternatively for assessing (Wells and Dillon, 1952).

The flexibility test has reliability and validity. There are some advantages and disadvantages to sit and reach test. The advantage is we can assess the flexibility easily and quickly. The disadvantage is the flexibility test seems to be not relevant to other parts of the body.

MATERIALS AND METHODS

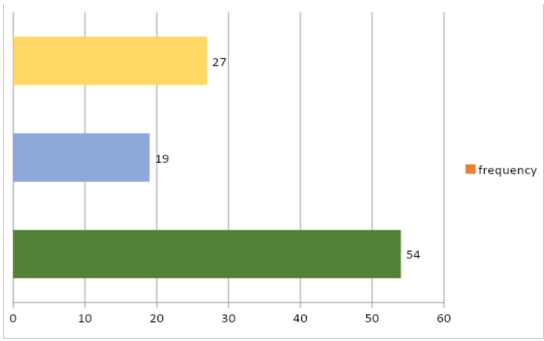
The study design was Non - experimental, observational. The study was conducted among the school children of Sree Sankara BalaVidhyalaya to iden-

tify the association of physical activity with flexibility in overweight and obese children. Before starting the survey, the departmental ethical community approval was obtained. The physical activity was estimated by physical activity questionnaire (PAQ-C), and flexibility was checked by sit and reach test as an outcome measure to determine the physical activity and flexibility between the age group of 11-13 years .100 samples were selected according to inclusion and exclusion criteria. Inclusion criteria are Age group of 11-13 years, Gender both boys and girls and Exclusion criteria those who were not willing to participate, underweight children, cardiovascular disease, Hypertension, Congenital heart disease, Dyspnea, Metabolic disorder like diabetes and the duration of the study 1month. All the children of 6^{th}, 7^{th}, 8^{th}std. children were included in the study. The consent form was given to their parents, and their parents obtained permission and from the school and parents were asked to help their children to fill the (PAQ-C) questionnaire. Physical activity questionnaire is of own -administrated 1week (seven days) (PAQ-C) questionnaire that consists of a total of 9 questions. Physical activity questionnaire which provides the physical activity levels of the children within the school. The PAQ-C score was obtained by marking the option five-pointer Likert scale from 1 to 5, and the total score was calculated and categorized into five options 1 = low-level physical activity, 2=mild physical activity, 3= low level moderate physical activity, 4= high level moderate physical activity, 5=high physical activity. After filling the questionnaire, the children were asked to return the questionnaire, then the flexibility of each child was checked by sit and reach test. First, the children were asked to sit on the floor with legs straightened or fully extended as much as possible, and shoes were removed. Both the feet were kept straight and flat on the floor. The knees of the child were kept closed or locked, the palm should be facing downwards, and one hand has to overlap on the other side. The child was asked to bend forward along the measuring line as much as possible and at which distance they were able to touch the children were asked to stop at that point, and the distance was recorded.

The data was recorded and calculated accordingly, and the results were obtained after the data analysis SPSS version 20.

RESULTS AND DISCUSSION

Graph 1 shows that out of 100 samples the Healthy weight children were more in number that is 54 when compared to overweight 19 and obese 27. The sample contains 60 boys and 40 girls, which shows that majority of the children were boys. Table 1 and Graph 2 depicts the Association of physical activity and Body Mass Index out of 100 samples 54 children were a healthy weight, 19 were overweight, and 27 were obese children. In that the physical activity was less among obese children is of 7 when compared to a healthy weight is of 20 and overweight is of 12. The chi-square test is applied to measure the association. Which shows that there is no statistical association, and the p-value is ($p<0.05$). Table 2 and Graph 3 shows the Association between Body Mass Index and flexibility. This table and graph shows there are 41 children had average flexibility, one-third of the children have excellent flexibility and among healthy weight majority of the children were having average flexibility, only three obese children were having excellent flexibility and nearly half that is of 54 out of 100 is having excellent flexibility which is found in healthy weight children. The chi-square shows that there is no statistical association and the p-value ($p<0.05$).



The above Graph shows the Frequency out of 100 samples the healthy weight children were more in number that is 54, overweight children's 19 and obese children 27

Graph 1: Frequency of Healthy, Overweight, Obese Children

From the above data analysis, the results of the current study show that there was a low physical activity which more commonly seen in obese children that is of 39%' and the flexibility is also average in healthy children. The prevalence which was taken in overall shows that is lack of physical activity among the study population is 63% seen more commonly in the adolescent age group 13 systematic review of (Jurakić and Ž Pedišić, 2012). The prevalence study was done in Tamil Nadu Shows that there is a lack of physical activity among adolescents was found to be 59% (Rani and Sathiyasekaran, 2013). There is a significant decrease in the duration of physical activity in 10 –

Table 1: Association Between Physical Activity and Body Mass Index Percentile

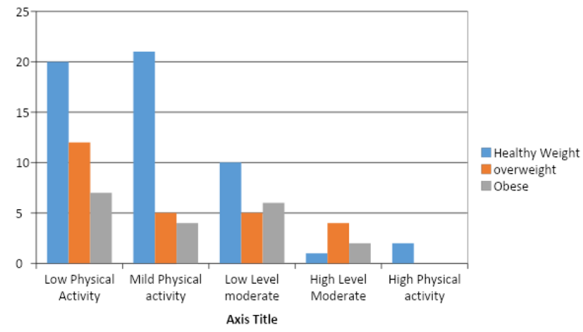
PAQ- mean	Healthy weight	Overweight	Obese	Total	Chi square	P value
Low physical activity	20	12	7	39	10.088	0.25
Mild physical activity	21	5	4	30		
Low-level moderate	10	5	6	21		
High-level moderate	1	4	2	7		
High physical activity	2	1	0	3		
Total	54	27	19	100		

The above table shows the association between physical activity (PAQ-C) and Body Mass Index percentile calculator, which shows that physical activity is less among obese children

Table 2: Association Between Body Mass Index Percentile Calculator and Flexibility

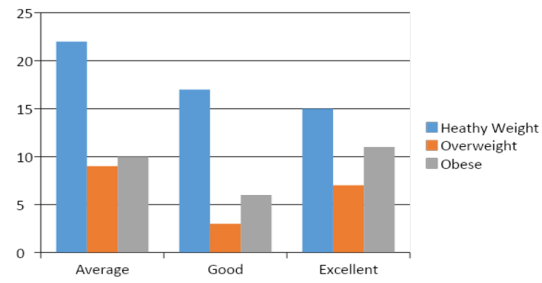
Flexibility	Healthy weight	Overweight	Obese	Total	Chi square	P value
Average	22	9	10	41	2.848	0.58
Good	17	3	6	26		
Excellent	15	7	11	33		
Total	54	19	27	100		

The above table shows the Association between Body mass index and flexibility of the participants. Which shows that flexibility is less among healthy children



The above Graph shows the association between physical activity (PAQ-C) and Body Mass Index percentile calculator, which shows that physical activity is less among obese children

Graph 2: Association of Physical Activity Questionnaire (PAQ-C) and Body Mass Index Percentile



The above Graph shows the Association between Body mass index and flexibility of the participants. Which shows that flexibility is less among healthy children

Graph 3: Association of Flexibility and Body Mass Index Percentile

12 years children (Anmol *et al.*, 2016). In some studies shows that females have higher physical activity when compared to males. The encouragement of physical activity should be done from their schooldays which is being highly promoted in India to prevent the children from many risk factors and including childhood obesity (Strong *et al.*, 2005; Myers *et al.*, 1996). The physical activity was objectively assessed that the children should do moderate level to vigorous level of physical activity in the cohort of obese adolescents and children have deficient level physical activity when compared to healthy weight children (national survey data) meeting only 18% of physical activity.

Obese children should be motivated and encouraged to do physical activity (Sothern, 1999). Some stud-

ies show that there was some difference in physical activity among overweight, average weight, and obese were the obese children seems to have low physical activity. The obese girls and overweight, obese boys were prone to have low physical activity than normal-weight children. There are some reasons for intense physical activity in obese, overweight girls and obese boys. The reason can be less supportive parents, not enjoying physical activity, the activity choices are less .Vigorous physical activity can decrease obesity. WHO has recommended that children and adolescents should do physical activity for at least 60 minutes daily (WHO, 2011).In the American academy of paediatrics, the obese children are encouraged to do a physical activity more than 1 hour per day. In Canadian overweight and obese adolescents, physical activity levels were significantly lower. Reduction in television time may be useful in the prevention of obesity among school children (Robinson, 2008).

The obese children's of age group 11-15 years in Coimbatore in 2011 revealed that 20.5% of obese children's had inadequate physical activities. A study in adolescents of age group 10 - 14 years in Kuwait, revealed that the prevalence of overweight and obese children with 30.7% and 14.6% which they reported that lack of physical activity (El-Bayoumy *et al.*, 2009). Despite the physical activity, the overweight and obese children's of age group 8-15 years in Chennai spending more than 2 hours in television. The low-level physical activity is seen during childhood which is combined with obesity which contributes to substandard health-related fitness (Biddle *et al.*, 2004). No evidence was present to support the impact or consequences based on childhood obesity of the recommended amount of physical activity for obese children. In this cohort study, the obese children and adolescent had low physical activity, and the majority showed that they are not meeting physical activity recommendation (Anderson *et al.*, 2017). Some Children hesitated to participate in the study. The parents were not accepting and encouraging their children's to participate in the physical activity program. In this study, the sample size was not in equal distribution because the samples were taken in one school and the sampling technique was done based on convenient sampling method, so there was a disparity in the number of samples in different Body Mass Index.

CONCLUSION

The study concluded that the obese children had less physically active than healthy weight and overweight children, so they need some interventions to reduce weight through regular physical activity, and the study also concluded that the flexibility is also less among healthy weight children. Limitations of the study are a sample size of the study was not probably significant, the sample size in the study was less due to shorter duration, the primary outcome measure was the children's response towards the questionnaire was evaluated, underweight children physical activity was not analyzed, more concentrated on physical activity and flexibility in children, no interventions were given to the children. Recommendation of the study sample size can be more than 500 samples at least, and Balance can also be assessed with physical activity in overweight and obese children. Interventions can be given. Aerobic exercises can be provided with intervention. Then the flexibility can be checked for the children.

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Conflict of Interest

The authors declare that there is no conflict of interest for this study.

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