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ORIGINAL RESEARCH

Assessment of correlation of PEFR with age and BMI in children

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ABSTRACT

Background: Respiratory diseases represent the most important cause of morbidity/ mortality in children. The present study was conducted to assess correlation of PEFR with age and BMI in children.

Materials & Methods: 120 school children age ranged 10-15 years of both genders were included. Each child was subjected to measurement of peak expiratory flow rate. Child's weight was taken with minimal clothes using electronic scale. Height was measured using standard stadiometer. BBMI was calculated with the formula - wt. (kg)/ [ht (m)2].

Results: Out of 120 children, boys were 46 and girls were 74. Underweight were 22, normal 58, overweight 16, obese 24. PEFR was 200-249 in 10, 250-280 in 42, 281-310 in 12, 311-340 in 38, 341-370 in 10 and 371-400 in 8 children. Age 10 years had 14, 11 years had 20, 12 years had 26, 13 years had 20, 14 years had 12 and 15 years had 28 children. The difference was non- significant (P> 0.05). There was correlation of PEFR with age (r- 0.412, p- 0.02) and BMI (r- 0.582, p- 0.03).

Conclusion: Obesity prevention by regular exercises and appropriate diet is important in maintaining normal PEFR.

Key words: Obesity, BMI. PEFR

INTRODUCTION

Respiratory diseases represent the most important cause of morbidity/ mortality in children. In this a large number accounts to be obstructive airway disease. Allergic respiratory disorders particularly asthma are increasing in prevalence.[1] Asthma is a chronic inflammatory condition of the lung airways resulting in episodic airflow obstruction. This chronic inflammation heightens the twitchiness of the airways—airways hyper-responsiveness (AHR)—to provocative exposures.[2]Pulmonary function tests of various types are utilized clinically as well as epidemiologically to measure functional status of respiratory system. Pulmonary function testing, although rarely resulting in a diagnosis, is helpful in defining the type of process (obstruction, restriction) and the degree of functional impairment, in following the course and treatment of disease, and in estimating the prognosis.[3]

Peak expiratory flow rate (PEFR) gives the measure of maximal expiratory flow rate sustained by a subject for at least 10 milliseconds litres per minute.[4] It is used for assessment and management of asthma control as it measures the level of airway obstruction. PEFR

varies in an individual according to the age, sex and anthropometric variables.[5] Increasing body mass index (BMI) above the normal range for age puts children at increased risk of respiratory symptoms, such as breathlessness, particularly during exercise, even if they have no obvious respiratory illness. On contrary, malnutrition (BMI below the normal range for age) is also associated with impairment of PEFR perhaps because of slow growth of the larger airways.[6] The present study was conducted to assess correlation of PEFR with age and BMI in children.

MATERIALS & METHODS

The present study comprised of 120 school children age ranged 10-15 years of both genders. Parental as well as school authority consent was obtained before starting the study.

Data such as name, age, gender etc. was recorded. Detailed history and physical examination was done and all anthropometric parameters were measured. Each child was subjected to measurement of peak expiratory flow rate. Child's weight was taken with minimal clothes using electronic scale. Height was measured using standard stadiometer. BMI was calculated with the formula - wt. (kg)/ [ht (m)2]. Results were tabulated and assessed statistically. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 120		
Gender	**Boys**	**Girls**
Number	46	74

Table I shows that out of 120 children, boys were 46 and girls were 74.

Table III Assessment of parameters

Parameters	Variables	Number	P value
BMI	Underweight	22	0.05
	Normal	58	
	Overweight	16	
	Obese	24	
PEFR	200-249	10	0.04
	250-280	42	
	281-310	12	
	311-340	38	
	341-370	10	
	371-400	8	
Age group	10 years	14	0.17
	11 years	20	
	12 years	26	
	13 years	20	
	14 years	12	
	15 years	28	

Table II, graph I shows that underweight were 22, normal 58, overweight 16, obese 24. PEFR was 200-249 in 10, 250-280 in 42, 281-310 in 12, 311-340 in 38, 341-370 in 10 and 371-400 in 8 children. Age 10 years had 14, 11 years had 20, 12 years had 26, 13 years had 20, 14 years had 12 and 15 years had 28 children. The difference was non- significant (P> 0.05).

Graph I Assessment of parameters

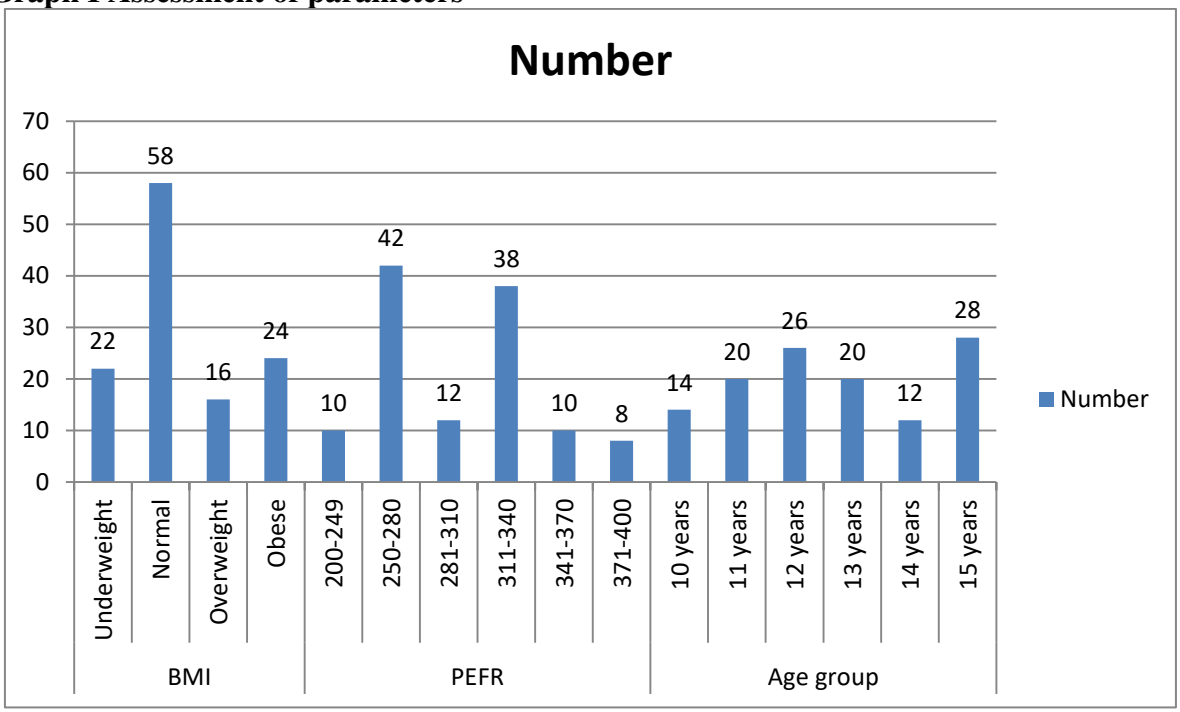

Table III Correlation of PEFR with age and BMI

Parameters	R value	P value
PEFR/age	0.412	0.02
PEFR/BMI	0.582	0.03

Table III shows that there was correlation of PEFR with age (r- 0.412, p- 0.02) and BMI (r- 0.582, p- 0.03).

DISCUSSION

Obesity has become a major public health concern in many parts of the world. In recent years it has reached epidemic proportions among adolescents and children in whom it has become an increasingly important medical problem.[7] Many of the outcomes associated with obesity that were previously considered to be diseases of adults are now also affecting children. Being overweight or obese increases the risk of many diseases and health conditions, including respiratory problems.[8] Obesity may also affect lung function. In adults, pulmonary function abnormalities related to obesity are well-reported complications. The most frequently reported abnormalities are reductions in lung volumes and expiratory flow rates. Similar data in the paediatric population are also reported4 but the data are limited, especially in developing countries.[9] The present study was conducted to assess correlation of PEFR with age and BMI in children.

We found that out of 120 children, boys were 46 and girls were 74. Nepal et al[10] identified the effect of body mass index on peak expiratory flow rate among healthy Nepalese school children. Three hundred and ten students of a government school were included in this study. Highest of the three peak expiratory flow rate readings were recorded. Peak expiratory flow rate initially increased with increasing body mass index from -1SD to +2 SD and it declined as body mass index increased above +2SD. Pearson's correlation r was positive with values of 0.7, 0.65, 0.64, 0.35 for height, weight, age and body mass index respectively. Height had highest positive correlation with peak expiratory flow rate while body mass index though had positive but weak correlation with peak expiratory flow rate.

We observed that underweight were 22, normal 58, overweight 16, obese 24. PEFR was 200-249 in 10, 250-280 in 42, 281-310 in 12, 311-340 in 38, 341-370 in 10 and 371-400 in 8 children. Age 10 years had 14, 11 years had 20, 12 years had 26, 13 years had 20, 14 years had 12 and 15 years had 28 children. Gundogdu et al[11] investigated the relationship between body mass index (BMI) and peak expiratory flow (PEF) values in children between the ages of 6 and 14 years. Data were collected from 1,439 children during public health screening. Each child was classified on the basis of age- and sex specific BMI percentile as non-obese or obese (BMI >95th percentile). PEF and BMI were compared among age-sex-BMI percentile groups. PEF values were lower in obese children than in non-obese children. There were also significant differences between girls and boys.

We found that there was correlation of PEFR with age (r- 0.412, p- 0.02) and BMI (r- 0.582, p- 0.03). Chakravarthy K et al[12] studied the correlation of age and BMI with peak expiratory flow rate in children aged 10-15 years. Around 54% of the children were Male and 46% of them were female. Majority of the children 24.5% were 13 years, followed by 20.5% were 12 years, 18.5% were 11years, 14.5% were 14years, 12.5% were 10 years and only 9.5% were 15years. There was a positive correlation between PEFR and BMI with r value 0.471 and this correlation was statistically significant. PEFR and female BMI had more positive correlation than male BMI.

The shortcoming of the study is small sample size.

CONCLUSION

Authors found that obesity prevention by regular exercises and appropriate diet is important in maintaining normal PEFR.

REFERENCES

1. Canoy D, Luben R, Welch A, et al. Abdominal obesity and respiratory function in men and women in the EPIC-Norfolk Study, United Kingdom. Am J Epidemiol 2004;159:1140-9.
2. Rasslan Z, Saad R, Stirbulov R, Fabbri RMA, Da Conceição limae CA. Valuation of pulmonary function in class I and II obesity. J Bras Pneumol 2004;30:508-14.
3. Ülger Z, Demir E, Tanaç R, et al. The effect of childhood obesity on respiratory function tests and airway hyper-responsiveness. Turkish J Pediatr 2006;48:43-50.
4. A Pocket Guide for Physicians and Nurses based on the workshop report: global strategy for asthma management and prevention (updated 2005).
5. Brand PLP, Roorda RJ. Usefulness of monitoring lung function in asthma. Arch Dis Child 2003;88:1021-5.
6. Sly PD, Flack F. Is home monitoring of lung function worthwhile for children with asthma? Thorax 2001;56:164-5.
7. Frontini MG, Bao W, Elkasabany A, Srinivasan SR, Berenson G. Comparison of weight-for-height indices as a measure of adiposity and cardiovascular risk from childhood to young adulthood: The Bogalusa Heart Study. J Clin Epidemiol 2001;54:817-22.
8. De Lorenzo A, Maiolo C, Mohamed EI, Andreoli A, De Luca PP, Rossi P. Body composition analysis and changes in airways function in obese adults after hypocaloric diet. Chest 2001;119:1409-15.
9. Bundak R, Furman A, Gunoz H, Darendeliler F, Bas F, Neyzi O. Body mass index references for Turkish children. Acta Pædiatr 2006;95:194-8
10. Nepal A. Correlation of peak expiratory flow rate with body mass index in school children of a government school of Kathmandu. Journal of Kathmandu Medical College. 2019 Aug 18;8(1):37-40.

11. Gundogdu Z, Eryilmaz N. Correlation between peak flow and body mass index in obese and non-obese children in Kocaeli, Turkey. Primary Care Respiratory Journal. 2011 Dec;20(4):403-6.
12. Chakravarthy K, Sree S, Yadav B. Correlation of PEFR with age and BMI in children of 10-15 years of age. 2022;10(25):12-5.