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Assess the Prevalence of Sleep Apnea as an Indicator of High Blood Pressure among Obese Children at Pediatric OPD, SMCH

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ABSTRACT

Obstructive sleep apnea is characterized by snoring, recurrent partial and/or complete obstruction of the upper airway that is associated with episodes of intermittent nocturnal oxyhemoglobin desaturations, and sleep disruption. The aim of the study to assess the prevalence of sleep apnea and to evaluate the high blood pressure among obese children. A quantiative research approach with descriptive research design was adopted for the present study.100 samples were selected by using purposive sampling technique. A structured quettionaries was used to collect demographic variable. In clinical variable pediatric sleep quettionaries was used to collect data from obese children. BMI was calculated by checking height and weight of the children with range of (25-29.9) above. In result it shows that there is a significant association of sleep apnea and blood pressure among obese children. When systolic BP increases then the sleep apnea among obese children also increases.

KEYWORDS: *Obstructive sleep apnea, obese children, high blood pressure*

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INTRODUCTION

Obstructive sleep apnea syndrome is a clinical disorder marked by frequent pauses in breathing during sleep usually accompanied by loud snoring these pauses cut off oxygen supply to your body for few seconds **world health organization**. OSA is characterized by snoring, recurrent partial and/or complete obstruction of the upper airway that is associated with episodes of intermittent nocturnal oxyhemoglobin desaturations, and sleep disruption. The diagnosis of OSA is confirmed by the gold standard polysomnography (PSG) on the basis of the number of obstructive apneas, hypopneas, and mixed apneas that occur per hour of sleep. Other methods of screening for OSA, including questionnaires and overnight pulse oximetry, have lower reported sensitivities(1)The high prevalence of obesity is believed to be a complex interplay of genetic, environmental (life-style), socioeconomic, cultural, and psychological factors which are beyond the scope of this paper. However, interestingly the pattern of in utero growth may program the pattern of subsequent body fat deposition and neuroendocrine interactions that promote eating behavior. Specifically, there is an observed increase in childhood obesity with increasing birth weight. Counterintuitively, infants with low birth weight and an early adiposity rebound are also predisposed to higher rates of obesity in later childhood(2) Hypertension is a severe, non-infectious disease and an important risk factor in the causation of CHD, stroke, renal disease and retinal injuries and other cardiovascular complications. The disease is a silent threat to the health of individuals all over the world. It is the typical vascular disorder, contributing to a significant public health challenge to population in socio-economic transition Pediatric HTN is an upcoming issue in the school children (3) Overweight and obesity now rank as the fifth leading risk for mortality worldwide. Although the health consequences of obesity are mostly manifested during adult-hood, the factors underlying the disease's

conditions commonly originate during childhood. Overweight and obese children are more likely to grow to become overweight and obese adults with higher chances of developing non-communicable diseases like diabetes and CVDs(4) Sleep-related breathing disorders are very frequent in the paediatric population and are associated with important repercussions on health, such as changes in growth, metabolic, cardiovascular and neurocognitive disorders and impaired quality of life confirmation requires performance of a sleep study, respiratory polygraphy or overnight polysomnography (PSG). 2On the other hand, there is an association between obesity and SAHS in adults that is starting to be seen in children with increasing frequency(5) Obesity is an independent risk factor for CVD and is associated with an increased risk of morbidity and reduced life expectancy. Obesity has reached epidemic proportions globally. The rising prevalence of obesity in developing countries is largely due to reduction in the energy expenditure which has resulted from rapid urbanization and mechanization, increase in energy intake due to increased purchasing power and availability of high fat/energy-dense fast food(6) The prevalence of elevated blood pressure (BP) in children increased significantly from 1988 to 2008, a public health phenomenon that parallels the current childhood obesity epidemic. School screening studies show that the prevalence of hypertension is as high as 10% in children who are overweight, a remarkably high number given that nearly 20% of adolescents in the US are obese In addition to the association with hypertension, obesity is also associated with sleep-disordered breathing and obstructive sleep apnea OSA In adults, there is a well-established relation between obesity, OSA, and elevated BP, and it has been shown that OSA predicts incident primary hypertension In children, reports also suggest an association between OSA and elevated BP, but the relation is less well-defined, with most studies limited to measures of BP obtained during visits for polysomnography in children suspected of having OSA(7).

MATERIALS AND METHODS

The quantitative research approach descriptive reseach design was used to assess the prevalence of sleep apnea and to evaluate the high blood pressure among obese children. The sample size was 100 of school age obese children who met the selected criteria. Data was collected from the sample using a purposive sampling technique method. The selected criteria were school age obese children. Those who wish to participate in this study. Individual who did not wish to participate this study were excluded. Data was collected using structured quettionaries for demographic variable and pediatric sleep quettionaries for clinical variable. BMI was calculated by checking height and weight of the children with the range of (25-29.9) above. confidentiality was maintained. colleted data was analyzed. The project has been approved by the ethics committee of the institution.

RESULT AND DISCUSSION

SECTION A: DESCRIPTION OF THE DEMOGRAPHIC OF OBESE CHILDREN.

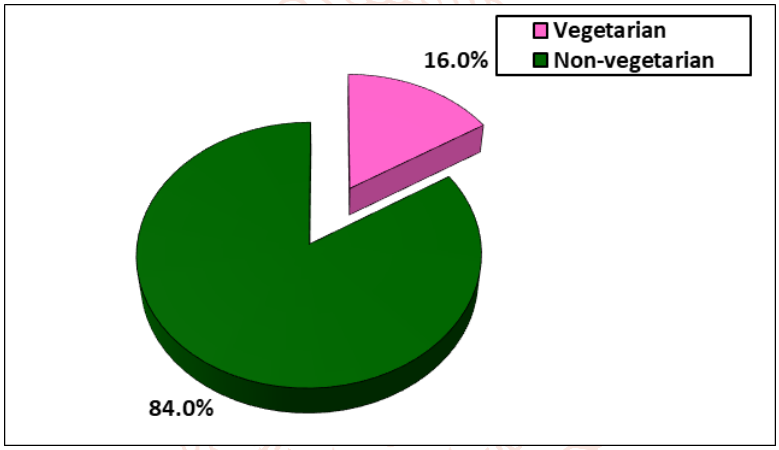
Table 1: Frequency and percentage distribution of demographic variables of obese children

N = 100

Demographic Variables	Frequency(f)	Percentage (%)
Age (in years)		
6 – 8 years	27	27.0
8 – 10 years	25	25.0
10 – 12 years	48	48.0
Gender		
Male	56	56.0
Female	44	44.0
Religion		
Hindu	67	67.0
Christian	26	26.0
Muslim	7	7.0
Educational status		
Primary school	15	15.0
High school	50	50.0
Higher secondary	35	35.0
Residency		
Urban	78	78.0
Rural	22	22.0

Economic status		
Upper class	16	16.0
Middle class	75	75.0
Lower class	9	9.0
Type of family		
Nuclear family	81	81.0
Joint family	18	18.0
Extended family	1	1.0
Dietary habit		
Vegetarian	16	16.0
Non-vegetarian	84	84.0
BMI		
Normal weight (18.5 – 24.9)	-	-
Overweight (25 – 29.9)	63	63.0
Obesity (30 and above)	37	37.0

The table 1 shows that most of the obese children, 48(48%) were aged between 10 – 12 years, 56(56%) were male, 67(67%) were Hindus, 50(50%) were studying high school, 78(78%) were residing in urban area, 75(75%) belonged to middle class, 81(81%) belonged to nuclear family, 84(84%) were non-vegetarian and 63(62%) were overweight.



Percentage distribution of dietary habits among obese children

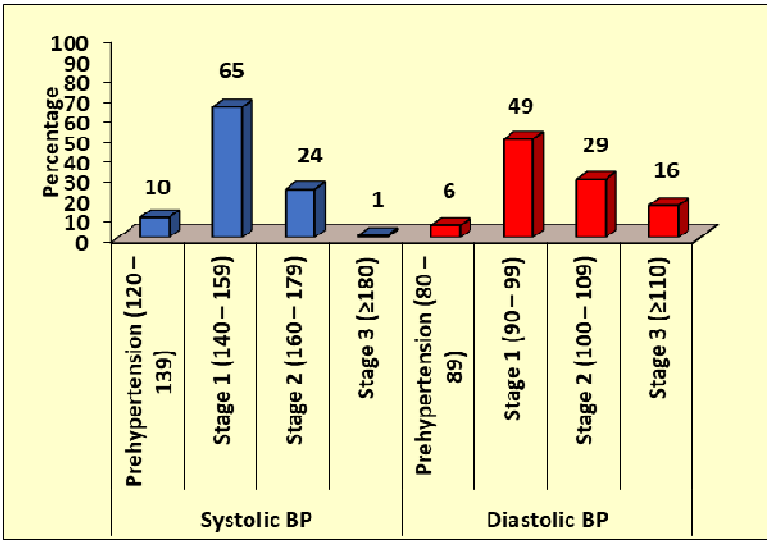
SECTION B: ASSESSMENT OF LEVEL OF BLOOD PRESSURE AND SLEEP APNEA OBESE CHILDREN.

Table 2: Frequency and percentage distribution of blood pressure among obese children.

N = 100

BP		Frequency (F)	Percentage (%)
Systolic BP	Prehypertension (120 – 139)	10	10.0
	Stage 1 (140 – 159)	65	65.0
	Stage 2 (160 – 179)	24	24.0
	Stage 3 (≥180)	1	1.0
Diastolic BP	Prehypertension (80 – 89)	6	6.0
	Stage 1 (90 – 99)	49	49.0
	Stage 2 (100 – 109)	29	29.0
	Stage 3 (≥110)	16	16.0

The above table 2 shows that regarding systolic BP, 65(65%) had stage I hypertension, 24(24%) had stage 2 hypertension, 10(10%) had prehypertension and 1(1%) had stage 3 hypertension.The above table 2 also shows that regarding diastolic BP, 49(49%) had stage I hypertension, 29(29%) had stage 2 hypertension, 16(16%) had stage 3 hypertension and 6(6%) had prehypertension.



Percentage distribution of blood pressure among obese children

SECTION C: RELATIONSHIP BETWEEN BLOOD PRESSURE AND SLEEP APNEA AMONG OBESE CHILDREN.

Table 4: Correlation between Blood pressure and sleep apnea among obese children.

N = 100

Variables	Mean	S.D	Karl Pearson's Correlation Value
Systolic BP	150.26	11.32	**r = 0.403**
Sleep Apnea	17.47	2.78	**p=0.0001, S*****
Diastolic BP	98.08	8.11	**r = 0.419**
Sleep Apnea	17.47	2.78	**p=0.0001, S*****

***p<0.001, S – Significant

The above table 4 shows that the mean score of systolic BP was 150.26±11.32 and the mean score of sleep apnea was 17.47±2.78. The calculated Karl Pearson's Correlation value of r = 0.403 shows a moderate positive correlation between systolic BP and sleep apnea which was found to be statistically significant at p<0.001 level. This clearly infers that when systolic BP increases then the sleep apnea among obese children also increases.

The above table 4 also shows that the mean score of diastolic BP was 98.08±8.11 and the mean score of sleep apnea was 17.47±2.78. The calculated Karl Pearson's Correlation value of r = 0.419 shows a moderate positive correlation between systolic BP and sleep apnea which was found to be statistically significant at p<0.001 level. This clearly infers that when diastolic BP increases then the sleep apnea among obese children also increases.

SECTION D: ASSOCIATION OF LEVEL OF BLOOD PRESSURE AND SLEEP APNEA OBESE CHILDREN WITH SELECTED DEMOGRAPHIC VARIABLES.

Table 5: Association of level of Blood pressure and sleep apnea among obese children with their selected demographic variables.

N = 100

Demographic Variables	Systolic BP	Diastolic BP	Sleep Apnea
	One Way ANOVA / Unpaired 't' test	One Way ANOVA / Unpaired 't' test	One Way ANOVA / Unpaired 't' test
Age (in years)	F=1.036 p=0.359 N.S	F=0.671 p=0.514 N.S	F=1.718 p=0.185 N.S
6 – 8 years			
8 – 10 years			
10 – 12 years			
Gender	t=0.866 p=0.389 N.S	t=0.286 p=0.776 N.S	t=0.844 p=0.401 N.S
Male			
Female			
Religion	F=0.613 p=0.544 N.S	F=1.011 p=0.368 N.S	F=0.535 p=0.588 N.S
Hindu			
Christian			
Muslim			

Educational status	F=0.699 p=0.499 N.S	F=0.001 p=0.999 N.S	F=0.676 p=0.511 N.S
Primary school			
High school			
Higher secondary			
Residency	F=0.094 p=0.910 N.S	F=0.861 p=0.426 N.S	F=1.085 p=0.342 N.S
Urban			
Rural			
Economic status	F=1.158 p=0.318 N.S	F=0.324 p=0.724 N.S	F=1.991 p=0.142 N.S
Upper class			
Middle class			
Lower class			
Type of family	F=2.311 p=0.104 N.S	F=1.187 p=0.310 N.S	F=0.185 p=0.831 N.S
Nuclear family			
Joint family			
Extended family			
Dietary habit	t=1.208 p=0.240 N.S	t=0.966 p=0.346 N.S	**t=2.201** **p=0.038** **S***
Vegetarian			
Non-vegetarian			
BMI	**t=2.316** **p=0.023** **S***	t=1.825 p=0.071 N.S	**t=2.193** **p=0.031** **S***
Normal weight (18.5 – 24.9)			
Overweight (25 – 29.9)			
Obesity (30 and above)			

*p<0.05, S – Significant, N.S – Not Significant

The table 5 shows that the demographic variable BMI **(t=2.316, p=0.023)** had shown statistically significant association with level of systolic BP among obese children at p<0.05 level and the other demographic variables had not shown statistically significant association with level of systolic BP among obese children.

The table 5 shows that none of the demographic variables had shown statistically significant association with level of diastolic BP among obese children.

The table 5 also shows that the demographic variables dietary habits **(t=2.201, p=0.038)** and BMI **(t=2.193, p=0.031)** had shown statistically significant association with level of sleep apnea among patients with obese children at p<0.05 level respectively and the other demographic variables had not shown statistically significant association with level of sleep apnea among obese children.

CONCLUSION

The findings of the study revealed that **"There is a significant association of sleep apnea and blood pressure among obese children with their selected demographic variable".** The study concluded that the sleep apnea obese children will have high risk to get the high blood pressure.

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AUTHORS CONTRIBUTION

All the authors actively participate in the work of study. All the authors read and approved the final manuscript.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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