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EFFECT OF PARENTAL SOCIOECONOMIC STATUS ON CARDIOVASCULAR PARAMETERS IN SCHOOL GOING CHILDREN

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ABSTRACT

ABSTRACT: Aim: A cross sectional type of study was carried out to compare cardiovascular parameters among, 6-10 years old 750 school children of three different socioeconomic statuses during January 2014- January 2015. Children from three different schools one public primary school and two private schools having tuitions fees were selected randomly. They were categorized depending on per capita income of family in three different socioeconomic statuses, High socioeconomic status, Middle socioeconomic status and Low socioeconomic status using modified prasad's socioeconomic status classification. Method: Blood pressure was measured as per fourth report on diagnosis, evaluation and treatment of high blood pressure in children and adolescents by standard sphygmomanometer, and Heart rate was counted for 1 min .Analysis was done using ANOVA test with the help of graph pad software version5.0. Result: It was found that the differences among High middle and low socioeconomic statuses children in the mean systolic, mean diastolic pressures and mean heart rate was not statistically significant (NS) ($p > 0.05$). Conclusion: From results of present study we can conclude that in children socioeconomic status may not be the cause of hypertension, genetic factors and environmental factors might be the possible cause of hypertension in children.

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1. Introduction

Children are the wealth of any country. Special attention should be paid to meet the needs of this group, constituting one fifth of the country's population [1]. In the words of the 35th President of the United States, John F. Kennedy, "Children are the world's most valuable resource and its best hope for the future", it is indeed true that the future is in the hands of the children. Hence the health and well-being of children go a long way in nurturing them into better adults. [2]

Although the overall prevalence of hypertension is lower in children, studies suggest that it tends to develop during the first two decades of life. Children with higher blood pressure tend to maintain those levels of blood pressure in adulthood. Hypertension is a risk factor for ischemic heart disease. Thus, it is necessary to detect and effectively treat hypertension during childhood and adolescence. [3] Socioeconomic status has been reported to affect the blood pressure of adults. However, it is yet to be confirmed if it also affects the blood pressure of children. [4]

Balogun et al investigated the influence of parental socioeconomic status on casual blood pressures of Nigerian school children in 1990 [5]. They reported that parental socioeconomic status has no effect on the systolic and diastolic blood pressure, heart rate, and rate pressure product and pulse pressure of Nigerian children. They finally concluded that hypertension in

Nigerian children may not be attributed to socioeconomic factors alone, but genetic and environmental factors might also contribute to it. Adedoyin et al. reported that socioeconomic status had an inverse significant effect on the systolic blood pressure, heart rate and pulse pressure of adult Nigerians. They concluded that low socioeconomic status was associated with the development of hypertension among Nigerian adults. [6] Most of the research work that has been conducted on effect of socioeconomic status (SES) on cardiovascular parameters is limited to adults only. There is dearth of information on effect of socioeconomic status on cardiovascular parameters of school going children. Keeping this in view this study was conducted with the objective to assess the effect of socioeconomic status on cardiovascular parameters in school going children by assessing cardiovascular parameters blood pressure and heart rate

MATERIAL AND METHODS:

The cross sectional type of study was conducted among 750 apparently healthy school going children of Nanded city of India belonging to different Socio economic statuses, over a period of one year from January 2014 to January 2015. The 6- 10 year old children from three different schools one public primary school and two private schools having tuition fees was selected randomly. They were categorized depending on per capita income of family using modified Prasad's socioeconomic status classification in 3 different socioeconomic status High, Middle and Low socioeconomic statuses. [7]

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Cardiovascular parameters taken were

1) Heart rate: Before recording heart rate, the procedure was explained to children and sufficient time was given to allay anxiety and fears. The heart rate was measured by auscultation with the subject lying supine. The stethoscope was placed between the second and third intercostal spaces at the sternal border. And the earpieces of the stethoscope were placed in the ears and the sound was counted for one minute. The value obtained was heart rate per minute. [4]

2) Measurement of blood pressure: Standard methodology, as recommended by the fourth report on diagnosis, evaluation and treatment of high blood pressure in children and adolescents, was used to measure blood pressure. [8]. Before recording the blood pressure, children in groups of 10 were taken to a separate room away from noise, and they were explained in detail, the procedure of blood pressure recording and they were reassured that the procedure is neither painful, nor harmful. All efforts were made to eliminate factors which might affect the blood pressure such as anxiety, fear, crying, laughing, recent activities in order to facilitate the blood pressure recording under simulated "basal" or "near basal" conditions. Blood pressure was recorded only when the child had become accustomed to the observer, instrument and surroundings. After giving rest for 5-10 minutes blood pressure was recorded in sitting position with his back supported, feet on the floor and right arm supported with cubital fossa at heart level. Right arm was used for consistency and for comparison with standard tables and because of the possibility of coarctation of the aorta, which might lead to false (low) readings in the left arm. Auscultatory method was used and the 1st and 5th Korotkoff's sounds taken as indicative of the systolic and diastolic blood pressure respectively. Blood pressure recordings were expressed to the nearest 1 mm Hg. In children where a higher range of blood pressure was observed, the factors like anxiety and fear removed and re-recorded after one hour. Average of 3 BP readings was taken. Statistical analysis was done using ANOVA test by graph pad prism version 5.0.

OBSERVATIONS AND RESULTS:

Table 16: socioeconomic statuswise (SES) distribution of cardiovascular parameters.

		high SES	middle SES	low SES	p value	F	R	Significance
SBP	Mean	98.82	98.73	98.42	0.1726	1.761	0.0047	NS
	SD	2.44	2.328	2.653				
DBP	Mean	61.75	61.53	61.65	0.5415	0.614	0.0016	NS
	SD	1.695	2.538	2.227				
HR	Mean	89.58	89.54	89.76	0.8245	0.193	0.0005	NS
	SD	4.378	4.305	4.375				

Note: SBP: Systolic Blood pressure, DBP: Diastolic Blood pressure HR: Heart Rate

DISCUSSION:

Socioeconomic status has been reported to affect the blood pressure of adults. However, it is yet to be confirmed if it also affects the blood pressure of children. Almost all the studies involving evaluation of the relationship between parental socioeconomic status and blood pressure of children had been done outside India so there is dearth of information on effect of socioeconomic status on cardiovascular parameters of Indian school going children. Since the Indian economy is still in

transition, it is intuitive to correlate the present parental economy of school children with their cardiovascular parameters. The objective of present study was therefore to investigate the effect of parental socioeconomic status on the cardiovascular parameters of school children.

The socio-economic status of the children was assessed according to Modified Prasad's Scale. Every effort was made to assess the socio-economic status as accurately as possible based on the information obtained from school documents and information obtained from the parents. There were 255 children belonging to High socioeconomic status, 257 children belonging to Middle socioeconomic status & 252 children belonging to Low socioeconomic status. For analysis we considered 250 children of each High middle and low socioeconomic statuses.

In present study the mean systolic blood pressures was found to be 98.82 ± 2.440 mm of Hg, 98.732 ± 2.328 mm of Hg, 98.424 ± 2.653 mm of Hg of High, Middle, & Low socioeconomic status children respectively and mean diastolic blood pressure was found to be 61.75 ± 1.695 mm of Hg, 61.532 ± 2.538 mm of Hg, & 61.648 ± 2.227 mm of Hg of High, Middle, & Low socioeconomic status children respectively. & The mean heart rate of high, middle & low socioeconomic status was 89.58 ± 4.378 beats per minute, 89.536 ± 4.305 beats per minute, & 89.76 ± 4.375 beats per minute respectively. It was found that the differences in the mean systolic, mean diastolic pressures & mean heart rate in different classes were less than 1 mm Hg. In between high, middle and low socioeconomic statuses There was no statistically significant difference ($p > 0.05$) in the mean systolic blood pressure, mean diastolic blood pressure & mean heart rate.

The observation of present study agrees with those of studies conducted by GaAdedeji Mo Egwu et al in 2011 [4]. They carried out study on 1026 students of age group 6-14 years out of which 191 students were of upper class, 367 students were of middle class & 468 students were of lower class. The mean systolic blood pressures was found to be 98.8 mm of Hg, 98.6 mm of Hg, & 98.6 mm of Hg of High, Middle, & Low socioeconomic status children respectively and mean diastolic blood pressure was found to be 63.4 mm of Hg, 62.9 mm of Hg, & 62.9 mm of Hg of High, Middle, & Low socioeconomic status children respectively. & The mean rate of high, middle & low socioeconomic status was 87.6 beats per minute, 90 beats per minute, & 87.3 beats per minute respectively. They found that there was no significant relationship between parental socioeconomic status and the cardiovascular parameters.

Similarly Balogun J A et al 1990 [5] found that parental socioeconomic status had no effect on systolic blood pressure, diastolic blood pressure & heart rate in Nigerian school children. They finally concluded that hypertension in Nigerian children may not be attributed to socioeconomic factors alone, but genetic and environmental factors might also contribute to it.

Similarly Zenong Yin, Marlo Michelle et al [9] found that family income was not related to blood pressure & heart rate & other biological cardiovascular risk factors.

Dr. Sanjay Joshi, Dr. M Ahirrao, Dr. S Dhole, et al [10] found that Socio-economic status did not contribute to any statistically significant difference in blood pressure readings in school children of 3-18 years age of Dhule city. It can be seen from the above findings that in majority of the studies there was no significant relationship between blood pressure status and socio-economic status.

However, this finding is contrary to the report from the study conducted in a homogeneous population by Adedoyin et al In 2005 [6] among adult Nigerians. The study reported a significant inverse relationship between socioeconomic status and systolic blood pressure ($r = -0.131$, $P < 0.01$) in adult Nigerians. The differences in the findings may be due to differences in the ages of the subjects used in each study. The age range in present study was 6 to 10 years, while age range in Adedoyin et al. was 30 to 60 years.

From above results we can conclude that in children socioeconomic status may not be the cause of hypertension. Genetic factors and environmental factors might be possible cause of hypertension in children.

According to Vasan, RS; Beiser et al [11] in almost all contemporary societies, blood pressure rises with aging and the risk of becoming hypertensive in later life is considerable. Hypertension results from a complex interaction of genes and environmental factors. Numerous common genetic variants with small effects on blood pressure have been identified as well as some rare genetic variants with large effects on blood pressure. . Several environmental factors also influence blood pressure.

Possible causes of hypertension in children:

The prevalence of high blood pressure in the young is increasing. Most childhood hypertension, particularly in preadolescents, is secondary to an underlying disorder. Aside from obesity, kidney disease is the most common (60–70%) cause of hypertension in children. Adolescents usually have primary or essential hypertension, which accounts for 85–95% of cases. [11]

Molecular basis of primary hypertension:

Abundant evidence suggests that primary hypertension develops as a result of multiple interacting genes and environmental influences. In the premolecular era it was well recognized that primary hypertension had a genetic component. It was suggested that genetic factors accounts for 60- 70% of familial hypertension. [12]

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