Medicine

CORRELATION BETWEEN PHYSICAL ACTIVITY LEVEL AND BODY MASS INDEX (BMI) AMONG INDIAN CHILDREN AGED BETWEEN 8 TO 14 YEARS.

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ABSTRACT

BACKGROUND- The WHO has identified India as one of the nations that is going to have most lifestyle disorders in the near future. In India, the rapid economic development and increasing westernization of lifestyle in the past few decades and prevalence of obesity has reached alarming promotions among Indians.

OBJECTIVE- To study correlation between Physical Activity Level and Body Mass Index (BMI).

STUDY DESIGN- A cross sectional study design.

METHODS-: Sixty children fulfilling the inclusion and exclusion criteria were allowed to participate in the study. Parental consent and assent was taken from children. Height and weight were measured using standardized inch tape and digital weighing machine to calculate BMI. Physical Activity Questionnaire (PAQ-C) scores were noted. The data was analysed using Karl Pearson Coefficient Correlation to correlate between PAQ-C scores and BMI scores.

RESULT – Participants shows high scores in physical activity level and low (underweight =less than 18.5 BMI) weight status score in BMI. Data analysis indicated no correlation between the physical activity and the body mass index.

CONCLUSION – The study concluded that physical activity level and BMI are weakly associated and show negative correlation.

KEYWORDS : Body Mass Index, Physical Activity Level.

INTRODUCTION:

The WHO has identified India as one of the nations that is going to have most lifestyle disorders in the near future. In India, the rapid economic development and increasing westernization of lifestyle in the past few decades and prevalence of obesity has reached alarming promotions among Indians.[1]

OBESITY AND OVERWEIGHT:

According to WHO obesity and overweight are defined as abnormal or excessive fat accumulation that may impair health.

BMI:

BMI is a number calculated from an individual's weight and height. BMI values are calculated with the respective values of height and weight using the standard formula:

$$BMI = WEIGHT/HEIGHT^2 (kg/m^2).$$

For children BMI from 18.5 to 24.9 is considered as normal weight and BMI above 25 is overweight and above 30 is considered to be obese. Studies have shown that once a child becomes obese he/she is more likely to stay obese and have increased risk of developing short and long term health conditions.[2] In the last few decades, childhood obesity has tripled and has reached epidemic levels in developed countries.[3] According to WHO, 22 million children (under 5 years of age) are overweight.[4] About 10% of school children aged between 5 to 17 years around the globe are overweight out of which 70% grow up to become obese adults.[5] Studies on urban Indian school children from selected regions report a high prevalence of overweight and obese children.[6]

Obesity has a significant impact on both physical and psychological health of the child, such as increasing hypertension, sleep disturbances, orthopedic problems and psychological and social disorders like poor self-esteem, depression increase in obese children.[3] The rising trend of overweight and obesity in developing countries is probably due to rapid mechanization and urbanization which leads to reduction in energy expenditure along with increase in energy intake in the form of high calorie food.[8] Many different factors may contribute to being overweight ranging from environmental influences to genetic variations.[9]

PHYSICAL INACTIVITY:

Inactivity can be defined as a state in which bodily movement is minimal.[10] Societal changes in recent decades have led to concerns that young people spend too much time being sedentary, for example watching television and playing computers or video games that they are more sedentary than previous generation. Sedentary behaviour is defined as behaviours done while sitting or lying (but not sleeping) that results in low energy expenditure. Children generally spend 30-35 hours per week sitting in class and also engage in many other sedentary activities outside of school hours that serve important social and cognitive developmental needs including homework, sitting with friends, hobbies, chatting and reading.[11] Sedentary habits tend to persist in adult life and are associated with weight gain and the development of several chronic diseases, including osteoporosis, type 2 diabetes and cardiovascular diseases.

Playing online games and watching videos are very popular leisure pursuits among children. Coupled with easy access to internet and mobile phones, children need not even leave home to maintain contact with their friends outside the school hours. As a result there is speculation that activities undertaken by children are predominantly sedentary in nature. Children who spend more time in sedentary behaviors are suspected to increase the likelihood of poor fitness, raised cholesterol and being overweight in adulthood.

Thus, there develops a trend for sedentary lifestyle across most of the developed world. Children are at risk as a result of their susceptibility to a technologically changing environment and issues concerning their perceived safety.

NEED OF THE STUDY –

Overweight and obesity has been called a global epidemic by the world health organization. Studies have shown that sedentary behaviors will lead to lifestyle disorders in the near future. Even if these conditions or disorders are not manifested in childhood, being overweight in childhood increases the risk of illness in adulthood. There are very few studies conducted in India which focused on identifying the role of physical activity as a causative factor in childhood obesity. Hence it is essential to know if physical activity affects the body mass index of children and adolescents or not.

AIM:

To study correlation between Physical Activity Level and Body Mass

Index (BMI) among Indian children aged between 8 to 14 years.

OBJECTIVES:
To study the physical activity level

To calculate Body Mass Index among Indian children aged between 8 to 14 years.

METHODOLOGY:
Sixty children fulfilling the inclusion and exclusion criteria were allowed to participate in the study. Parental consent and assent was taken from children. Height and weight were measured using standardized inch tape and digital weighing machine to calculate BMI. Physical Activity Questionnaire (PAQ-C) score was noted. Statistical analysis was done of the collected data and results were concluded.

RESULTS AND DATA ANALYSIS:
TABLE 1: Shows PAQ-C and BMI scores for 60 subjects included in the study sample

PAQ-C and BMI scores					
	N	Minimum	Maximum	Mean	Std.
BMI	60	12.22	28.06	18.9930	4.30868
PAQ_C	60	1.85	4.81	2.8743	.62351

TABLE 2: Shows Correlation Between Physical Activity Level And BMI Of 60 Subjects Included In The Study Sample

		PAQ-C	BMI
PAQ-C	Pearson Correlation	1	-.183
	Sig. (2-tailed)		.162
	N	60	60
BMI	Pearson Correlation	-.183	1
	Sig. (2-tailed)	.162	
	N	60	60

P-value (probability value) = 0.162 ,Level of significance (alpha) = 0.05

Since, P-value (0.162) > level of significance (0.05), we accept the null hypothesis H0.

I.e. there is no correlation between the physical activity and the body mass index. The direction of the relationship is negative (that is they are negatively correlated), meaning, As the PAQ-C increases, the BMI decreases. The strength of the correlation is approximately weak $(0.1 < mode(r) < 0.3)$

DISCUSSION:
The objective of this study was to find the correlation between the physical activity level and body mass index of children between age group 8 to 14 years. Total 60 children were evaluated for the study. As per statistical analysis, p – value (0.162) > level of significance (0.05), the direction of the relationship is negative (that is the physical activity level is negatively correlated to body mass index) and the strength of correlation is approximately weak.These findings were also revealed in other studies such as; Hemmingsson E, et al.'s study on association between physical activity and body mass index concluded that association between physical activity and BMI was weak in non- obese individuals. If reader reviews BMI distribution among the sample population, most of the children were from underweight and normal weight category, which can be the reason of weak correlation between the variables. However, Cross- sectional study by Consuelo Belmonte Gonzalez- Suarez, Karen Grimmer- Somers' revealed that physical activity and fitness scores were strongly correlated with childhood obesity. Sample size for this study was 380 children aged 11 to 12 years from randomly selected schools from San Juan, Metromanila, Philippines. Hence, additional research is indicated to further explore the discrepancy between multiple similar researches regarding strength of coefficient correlation. In 2012, Sharifah Nur Umairah, et al. conducted a study to explore relationship between dietary pattern and BMI among primary school children. As per this study type of food intake was showed to have a significant association with overweight and obesity status of selected primary school children but breakfast consumption and no. of meals per day failed to have significant association.

According to a study **"Prevalence and correlates of overweight and obesity among school children in an urban district in Ghana"** by Theodosia Adom, Anniza De Villiers, Puoane, André Pascal Kengne T.

et al. It revealed that a number of modifiable risk factors were associated with overweight and obesity few of which were television watching time, transport mode and sleep duration.[15] These studies show that physical inactivity is not the only causative factor, there are many other factors such as dietary patterns, television watching time, sleep duration etc. contributing to overweight in children and adolescents for which further studies are indicated.

CONCLUSION
This study was conducted to analyze the correlation between physical activity level and body mass index among Indian children aged 8 to 14 years. From the results obtained, we may conclude that if physical activity is high then prevalence of childhood obesity will be low hence health programs should be encouraged that will help in maintaining healthy BMI thus preventing childhood obesity. However physical inactivity is not the exclusive factor causing obesity in children and adolescents. Further study is suggested to analyze other causative factors for obesity in children and adolescents and significance of each factor against physical activity.

LIMITATIONS:
PAQ-C measures the physical activity level of past 7 days; there is a possibility that children might be involved in physical activity prior to 7 days and not during past 7 days, which can alter the findings.

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