

## CORELATIONAL STUDY BETWEEN BODY MASS INDEX, BALANCE AND QUALITY OF LIFE IN OBESE PAEDIATRIC POPULATION

### STUDIU DE COTELAȚIE ÎNTRE INDICELE DE MASĂ CORPORALĂ, ECHILIBRU ȘI CALITATEA VIEȚII LA COPIII OBEZI

Gauri S. Kulkarni<sup>1</sup>, Trupti Joshi<sup>2</sup>

**Keywords:** Paediatric Balance Scale, Body Mass Index, Paediatric Quality of Life Scale

**Cuvinte cheie:** scala pediatrică de echilibru, indicele de masă corporală, scala pediatrică pentru calitatea vieții

#### Abstract

**Background.** In developed and developing countries, obesity has been widespread concern over the increase in overweight and obesity in children. Obesity may lead to balance impairments. Childhood obesity may lead to impaired cognitive & physical development reducing the quality of life of individuals. Childhood obesity is a growing epidemic in family medicine with few clinical treatment options. Very few studies could be found related to correlation.

**Aim.** Hence, purpose of the study was to observe influence of obesity on balance and quality of life

**Method.** Sample size - 35 obese paediatric populations at Schools in & around Pune were evaluated after consent for Body Mass Index (BMI), balance and quality of life scale. Then the correlation was determined on the basis of scores of above scales. Further statistical analysis was done.

**Outcome Measures.** body mass index, Paediatric Balance Scale, Paediatric quality of life scale (Peds QL)

**Results.** positive correlation of 0.6648 between Pediatric Balance scale & Pediatric Quality of Life scale  $p$  value is 0.0001 (S,  $p$  value<0.05). Negative correlation of -0.6543 between BMI & Pediatric Balance scale  $p$  value is 0.0001 (S,  $p$  value<0.05). Correlation of BMI & Pediatric Quality of Life scale is -0.7583 with  $p$  value 0.0001 (S,  $p$  value<0.05) which is negative.

**Conclusion.** Balance is adversely affected in obese children. Obesity also affects Paediatric Quality of Life. Balance impairments again lead to reduce the Quality of Life in paediatrics.

#### Rezumat

**Introducere.** În țările dezvoltate și în curs de dezvoltare, obezitatea este un factor major de îngrijorare, datorită creșterii numărului de copii supraponderali și obezi. Obezitatea poate determina tulburări de echilibru. Obezitatea în copilărie poate duce la tulburări de dezvoltare cognitivă și fizică, reducând astfel calitatea vieții acestei categorii de copii. Numărul copiilor obezi aflați în evidența medicilor de familie este în creștere, aceasta fiind o condiție cu puține opțiuni de tratament. Doar câteva studii au ca subiect o astfel de corelație.

**Scop.** De aceea, scopul acestui studiu este de a observa influența obezității asupra echilibrului și calității vieții.

**Metodă.** Grupul de studiu - 35 copii obezi, școlari, din regiunea Pune au fost evaluați după obținerea consimțământului, pentru indicele de masă corporală, (IMC), echilibru și calitatea vieții. Apoi s-a determinat corelația pe baza scorurilor acestor scale. S-a efectuat analiza statistică de rigoare.

**Mijloace de evaluare.** Indicele de masă corporală, scala pediatrică de echilibru, scala pediatrică pentru calitatea vieții (Peds QL).

**Rezultate.** Există o corelație pozitivă de 0.6648 între scala pediatrică de echilibru & scala pediatrică pentru calitatea vieții, valoarea  $p$  este 0.0001 (S,  $p$  value<0.05). Există o corelație negativă de -0.6543 între IMC & scala pediatrică de echilibru, valoarea  $p$  fiind de 0.0001 (S,  $p$  value<0.05). Corelația dintre IMC & scala pediatrică pentru calitatea vieții este -0.7583, cu valoarea lui  $p$  de 0.0001 (S,  $p$  value<0.05), care este negativă.

**Concluzii.** Echilibrul este influențat negativ de obezitate, la copii. Obezitatea le afectează de asemenea calitatea vieții. Tulburările de echilibru determină reducerea calității vieții la copiii obezi.

<sup>1</sup> Associate Professor, PES Modern College of Physiotherapy, Pune, Maharashtra, India

**Corresponding author:** Phone: +919422229285 Corresponding Author: Email: gaurik138@gmail.com

<sup>2</sup> Student, PES Modern College of Physiotherapy, Pune, Maharashtra, India

## Introduction

Childhood obesity is a condition where excess body fat negatively affects a child's health or wellbeing. Due to the rising prevalence of obesity in children and its many adverse health effects it is being recognized as a serious public health concern. [1] The first problems to occur in obese children are usually emotional or psychological. [2] Some of the other disorders would include liver disease, early puberty or menarche, eating disorders such as anorexia and bulimia, skin infections, and asthma and other respiratory problems. [3]

Obese children often a target of bullied than their non-obese peers. [4, 5] Some are harassed or discriminated by their family. [6] Stereotypes abound and may lead to low self-esteem and depression. [8] Globally, in 2010 the number of overweight children under the age of five is estimated to be over 42 million. Close to 35 million of these are living in developing countries. [9] Obesity during adolescence has been found to increase mortality rates during adulthood. [10] Few population-based studies have assessed the relationship between BMI & motor skills in young children. [11] Obesity may lead to balance impairments. [12] This may lead to significant reductions in global self-esteem [13]

Hence, childhood obesity is a growing epidemic in family medicine with few clinical treatment options. Very few studies could be found related to correlation.

## Aim

To observe the correlation between balance and quality of life related to obese pediatrics population.

## Method

The study design was an observational study with the main objective of exploring a correlation between body mass index (BMI), balance and quality of life. Prior beginning the study ethical committee consent it was obtained.

The inclusion criteria were a school going obese children according to BMI score. Age- 8 to 12 years. [14, 1] The exclusion criteria were non-obese children, children with congenital deformities and disorders and age less than 8 and more than 12. Children with acute infection, trauma, lower limb fractures, genetic and psychological disorder. Children on medications causing obesity or balance impairments or disorders are excluded. [1, 15] Study set up was at schools in and around in Pune. Informed consent obtained from subjects along with details about the use of the study and also the test procedure to be performed as a part of the study. It is sure that the study will not cause any harm to them in any aspect. The consent is followed by a selection of the population on the basis of inclusion criteria.

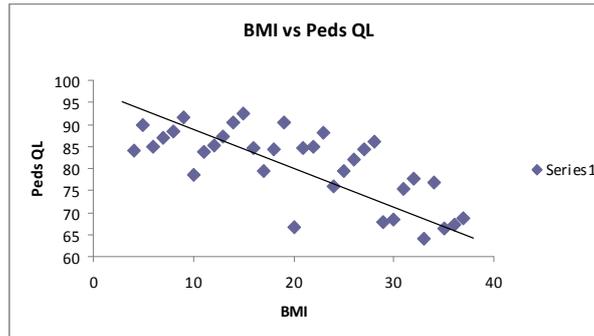
## Assessment tools

BMI it was calculated on by measuring weight, height and calculating the formula ( $\text{weight}/\text{height}^2$ ) [15]. The material used was weighing machine, height chart. As per the scoring of BMI and Paediatric Balance Scale was explained and the scores were calculated by performing certain tests. It includes 14 items graded from 0-4 & maximum scoring is 56. [16] Quality of Life was assessed according to the pediatric quality of life scale. The scale has two reports that are filled by both children, as well as parents. It includes 23 items in child report and 23 items in parent report graded from 0-4. The maximum score for child report and parent report is 0-100 respectively. [17] A total number of 35 obese pediatric subjects were selected. After score assessment, correlation was calculated using statistical analysis methods.

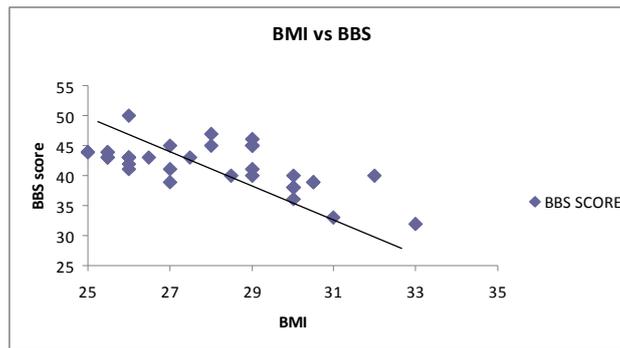
Results

**Table 1: Correlation of BMI, Pediatric Balance Scale, and Peds QL**

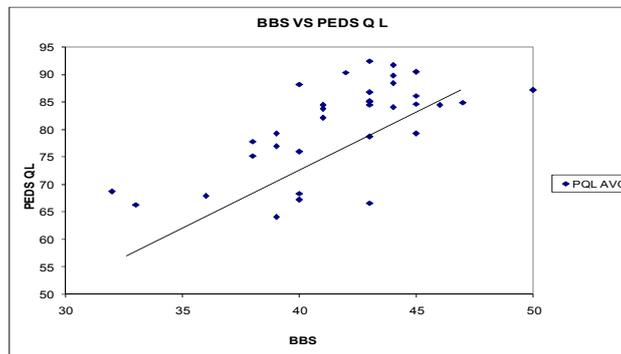
Sr. No.	Scale	Mean	Standard Deviation	N	Correlation 'r.'	p- value
1.	BMI	27.92	2.50	34	-0.7583	0.0001 S,p<0.05
	Peds QL	79.12	10.09	34		
2.	BMI	27.92	2.50	34	-0.6543	0.0001 S,p<0.05
	Pediatric balance scale	41.73	3.66	34		
3.	Peds QL	79.12	10.09	34	0.6648	0.0001 S,p<0.05
	Pediatric balance scale	41.73	3.66	34		



**Graph 1: Correlation between BMI & Peds QL**



**Graph 2: Correlation between BMI & Paediatric Balance Scale**



**Graph 3: Correlation between Paediatric Balance Scale & Peds QL**

The result shows positive correlation of 0.6648 between Paediatric Balance scale & Peds QL p-value is (S, p-value < 0.05). Negative correlation of -0.6543 between BMI & Paediatric Balance scale p-value is (S, p-value < 0.05). Correlation of BMI & Peds QL is -0.7583 with p-value (S, p-value < 0.05) which is negative. Hence, the results obtained are significant.

## Discussion

In the present study, 35 obese pediatric individuals were assessed between the age group of 8-12 yrs. Out of that, 26% were between 8-9 yrs and 74% between 10-12 yrs respectively. In age group 8-12, 43% were males and 57% were females. Children BMI score ranging between 25 and 33 were included in the study. Out 35 obese children, 46% were scoring in range 25-27, 37% in 28-30 and 17% ranging in 31-33. In this study, we have used Pediatric balance scale (PBS) for assessment of balance. It includes 14 items graded from 0-4 & maximum scoring is 56. Reliability of PBS is 0.89 to 1.0 [16] another scale i.e. pediatric Quality of Life (Peds QL) specially designed for assessing the quality of life in a pediatric population. The scale has two reports that are filled by both children, as well as parents. It includes 23 items in child report and 23 items in parent report graded from 0-4. The maximum score for child report and parent report is 0-100 respectively. Reliability of modified BBS is 4.0 and & reliability of Pediatric Quality of Life scale is 0.91 for child report and 0.93 for parent report [17]. The present study shows the mean of BMI and Peds QL was 27.92, 79.12 respectively.

Correlation between both scales was -0.7583 & p value was 0.0001 (S, p-value < 0.05) according to this, there is a negative correlation i.e. as BMI increases Peds QL decreases (BMI  $\alpha$  1/Peds QL). This study also shows the mean of BMI and PBS is 27.92, 41.73 respectively. Correlation between both scales was -0.6543 & p value was 0.0001 (S, p-value < 0.05) according to this, there is a negative correlation i.e. as BMI increases and balance decreases (BMI  $\alpha$  1/PBS). A similar type of study was conducted by Eva D'Hondt et al. to find out the relationship between BMI & motor skills in children [7]. The mean of Peds QL and PBS is 79.12, 41.73 respectively. Correlation between both scales was 0.6648 & p value was 0.0001 (S, p-value < 0.05) according to this, there is a positive correlation i.e. as Peds QL increases and PBS decreases (Peds QL  $\alpha$  PBS). The above data shows that, the study is significant by calculating 'r' value in Pearson's correlation [18]

Hence, it was observed that increase in BMI causing decrease in balance ability of children which was ultimately affecting the quality of life. Hence, preventing children from obesity can improve their quality of life and balance abilities. As the increase in BMI leads to psychological problems such as anxiety and depression which affects the quality of life [19]. A similar study was showing the relation between overweight, obese children and developmental co-ordination disorder (DCD) [20] [21]. Hence, to understand that the correlation between the objectives has got the vital importance and the present study was an effort for the same.

## Conclusion

The study shows that, there is a negative correlation between BMI and pediatric quality of Life along with BMI and Paediatric Balance Scale. There is a positive correlation between Pediatric Balance Scale & pediatric quality of life. Balance is adversely affected in obese children. Obesity also affects pediatric Quality of Life. Balance impairments again lead to reducing the Quality of Life in pediatrics. Thus, obesity affects balance and quality of life in an adult pediatric population.

**Conflict of interest:** None

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