

# Correlation Between Body Mass Index and Plank Holding Time in Rural Children

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## ABSTRACT

**Background:** Core stability is the ability to control the trunk posture and movements in reaction to internal and external perturbations. Slight alterations in body composition may affect Core stability.

**Purpose of the study:** To find the correlation between lumbar Core muscle stability and BMI.

**Methodology:** A study was conducted on 200 children with age between 6 – 12 years. Body Mass Index has been calculated for all the children. Plank test was conducted on them to measure the lumbar core muscle stability.

**Results:** The result was analysed using Microsoft Excel 2016. The statistical tool used was Pearson correlation. The Pearson correlation for Body Mass Index and Plank time was -0.3975. The P-Value is < .00001. The result is significant at  $p < .05$  level between Body Mass Index and plank time.

**Conclusion:** The study concludes that there is a weak negative correlation between Body Mass Index and core stability.

**Keywords:** Core muscle, Plank, Body mass index, Children, Rural

## INTRODUCTION

The “core” has been described as a box with the abdominals in the front, paraspinals and gluteals in the back, the diaphragm as the roof, and the pelvic floor and hip girdle musculature as the bottom.<sup>1</sup>

There are several reliable and easy to use methods have been proposed to assess core musculature function. These include the prone bridging test, the Biering-Sorensen test, the double leg lowering test, prone plank stability, the side plank bridging test, the front abdominal power test (FAPT), the side abdominal power test (SAPT) and the flexion-rotation test.<sup>2</sup>

BMI is a risk factor for pediatric falling. Furthermore, obese children are less potent to an extent that they may expose to injury than normal weighted children in activity of

daily life especially in activities that require stability in standing posture. Such problems correlated with childhood adiposity may affect the core stability.<sup>3</sup>

The main aim of the study is to assess correlation between BMI and Plank holding time in rural children.

## METHODOLOGY

A study was conducted on 200 children with age between 6-12 years from the rural area. Body Mass Index has been calculated for all the children. Verbal & visual explanation of study was given to all students. Plank test was conducted on them to measure the lumbar core muscle stability. Ethical clearance was taken from institutional ethical committee.

### Inclusion Criteria:

- School going children- age (6-12 years)
- Both genders [boys & girls]
- Willing to participate in study

### Exclusion Criteria:

- Children having Low back pain
- History of recent trauma to upper limb, lower limb and spine.
- Children with any spinal pathology.
- Have physical disabilities

### MATERIALS

- Stop Watch
- Exercise mat measuring 2 feet by 6 feet by 2 inches thick

- Stadiometer

- Weighing machine

### PROCEDURE

After taking permission from school's principals, study was conducted on the students. Lumbar core muscle stability was measured using prone plank. Body mass index was measured. Students were instructed to do trial and then ask to perform prone plank. Time was recorded in seconds where the participants could hold a static position of maximum seconds. Students began and end the test with word start and stop and time was recorded with Stopwatch.



Figure :1 Prone Plank Test

### RESULTS

The result was analysed using SPSS 16. The statistical tool used was Pearson correlation. The Pearson correlation for Body Mass Index and Plank Holding time is -0.42657. The P-Value is < .00001. The result is significant at  $p < .05$  level between Body Mass Index and plank time.

| Correlations   |                     | BMI Kg/m2 | PLANK -MIN-SEC |
|----------------|---------------------|-----------|----------------|
| BMI Kg/m2      | Pearson Correlation | 1         | -.426**        |
|                | Sig. (2-tailed)     |           | .000           |
|                | N                   | 200       | 200            |
| PLANK -MIN-SEC | Pearson Correlation | -.426**   | 1              |
|                | Sig. (2-tailed)     | .000      |                |
|                | N                   | 200       | 200            |

\*\* . Correlation is significant at the 0.01 level (2-tailed).

### DISCUSSION

This study shows that the correlation is negative, i.e., as the Body Mass Index

increases the plank holding time i.e., the core muscle stability decreases and vice versa. As weight status increased, children

and adolescents had more difficulty performing tests that involved moving their body mass or holding it in position.<sup>4</sup> King AC et.al., studied increased body fat mass has a negative impact on postural stability. Ervin et al. studied the relationship of core, upper and lower body strength with body mass status in children and adolescents. They reported that increasing body mass negatively impacted on front bridge times in children and adolescent boys and girls. This result is similar with what previous studies concluded from Portuguese, Greek, Taiwanese, and Flemish as they concluded that obese children showed poorer performance in abdominal endurance compared with normal weight.<sup>5,6,7</sup> Centers for Disease Control and Prevention (CDC) also reported that the increase in fat mass in children and adolescents has occurred concomitantly with a decrease in time of activity in aerobic exercises.<sup>8</sup>

## CONCLUSION

The study concludes that there is a negative correlation between Body Mass Index and core muscular strength i.e., as the Body Mass Index increases the core muscular strength decreases and vice versa.

## Clinical Implication:

The children with good plank holding have good core stability so less chances of back related or other injuries. Those who have more BMI, need to control weight so can have good core stability.

## Declaration by Authors

**Ethical Approval:** Approved

**Acknowledgement:** None

**Source of Funding:** None

**Conflict of Interest:** The authors declare no conflict of interest.

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