Section: Paediatrics

Original Research Article

ASSESSMENT OF COGNITIVE FUNCTIONS AND SLEEP QUALITY IN UNDERWEIGHT SCHOOL CHILDREN

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ABSTRACT

Background: Underweight is a global issue in all developing countries. A huge number of deaths were reported in the underweight population. However, the studies related to the underweight children and their sleep patterns and cognitive functions were not studied much. Hence, the present study was undertaken. The present study was undertaken to assess the effects of cognitive functions and sleep quality in underweight school children.

Materials and Methods: The present study was a cross-sectional study that recruited 60 underweight school children after obtaining written informed consent. Sixty age- and gender matching healthy children were part of the study. Spatial memory and verbal memory scores were recorded to assess spatial and verbal memory. A 100-pin test was performed to assess the coordination. Sleep quality was assessed using the insomnia severity index.

Results: Significantly lower scores of spatial and verbal memory were observed in the underweight children compared to healthy children. The 100-pin test time was significantly longer in underweight children. Poor sleep quality was observed in the underweight children.

Conclusion: The study results support that the underweight individuals' memory and sleep quality were significantly affected. Further detailed studies are recommended in this area.

Keywords: Underweight children, Stress, Sleep, Memory, cognitive functions.

INTRODUCTION

Underweight is a global issue in all developing countries. A huge number of deaths were reported in the underweight population.[1] The immune system of the underweight is compromised, and these children will be more prone to infections. Some studies reported that underweight is also associated with a delay in the maturation of the reproductive system. It is well known that the physical health and the cognitive functions children develop during childhood play a key role in their adolescence. Poor mental development leads to poor performance in academics.[2,3] The reasons for the underweight in these children were poverty, malnutrition, and lack of medical facilities.[4] It was reported that malnutrition is linked with suboptimal development of the brain and, hence, the cognitive functions.[5] This developmental delay especially affects to the areas of the brain that are associated with brain functions such as language, reading and memory. The mechanism was reported to be associated with the genetic level. Along with other factors that affect the genetic factors involved in brain development, nutrition also influences these genetic mechanisms.[6] Interestingly, the children with malnutrition were reported to have high rates of mortality and morbidity.[7] Earlier studies reported that sleep duration is associated with body weight.[8,9] However, the studies related to the underweight children and their sleep patterns and cognitive functions were not studied much. Hence, the present study was undertaken.

Aim and objectives: The present study was undertaken to assess the effects of cognitive functions and sleep quality in underweight school children.

MATERIALS AND METHODS

The present study was a cross-sectional study that recruited 60 underweight school children after obtaining written informed consent. Sixty age and gender matching healthy children were part of the

study. The study protocol was approved by the institutional human ethics committee. Willing, underweight school children, whose parents were ready to give consent, were part of the study. Those who were not willing and those with any severe complications were excluded from the study. After the recruitment, the participants were underwent general physical examination Soon after the cognitive functions and sleep quality were recorded in the healthy and underweight participants and compared. Spatial memory and verbal memory scores were recorded to assess the spatial and verbal memory. 100 pin test was performed to assess the coordination. Sleep quality was assessed using the insomnia severity index. The data was entered into the excel sheet and compared after the analysis. Student t test was used to observe the significance of difference between the groups. A probability value of less than 0.05 was considered as significant.

RESULTS

Significantly lower scores of spatial and verbal memory were observed in the underweight children compared to healthy children. The 100-pin test time was significantly longer in underweight children. Poor sleep quality was observed in the underweight children [Table 1].

Table 1: Comparison of the cognitive and sleep quality among the underweight and healthy children.

Parameter	Underweight children	Healthy children	P value
Spatial memory	4.33±0.78	6.15±0.55	0.0001
Verbal memory	3.23±0.93	4.23±0.44	0.0018
100-pin test time	5.13±0.64	4.21±0.80	0.002
ISI score	11±2.88	7±1.56	0.0001

Data was presented as mean and SD.

DISCUSSION

There exist many studies relating sleep and obesity. It was reported that sleep quality and quantity are both associated with body weight. It was reported that the children who slept less than the standard duration were obese. Other studies supported this concept even in adolescents.[12] However, detailed information about these sleep habits and body weight is not very clear. The studies connecting sleep disorders and underweight are comparatively fewer. Hence, the present study was undertaken. Significantly lower scores of spatial and verbal memory were observed in the underweight children compared to healthy children. The 100-pin test time was significantly longer in underweight children. Poor sleep quality was observed in the underweight children. Another study reported that longer sleep duration was inversely associated with weight status.[13] That means the longer is sleep, the less the weight, and the shorter the sleep more is weight. Some longitudinal studies assessed the sleep duration as reported by the parents.[14] It was explained that sleep can regulate body weight via the hormones that are associated with the digestive functions, absorption. It was reported that the studies related to sleep and body weight are limited. Tonsillar hypertrophy was reported in the underweight children, and it may contribute to the development of obstructive sleep apnea.[15] It was reported that obesity is associated with a decline in cognitive functions.[16] The association between the BMI and cognitive functions was well established in adults, but the same was not the case in children.[17] Especially, the cognitive functions are essential in children as they are essential for their academic achievements. These cognitive functions include memory, learning, attention, executive function, and reaction time.[18] Hence, body weight, especially underweight, is also a point of discussion, and children have to be screened according to their nutritional basis and their memory and sleep status, and proper management measures must be implemented for the well-being of the children.

CONCLUSION

The study results support that the underweight individuals' memory and sleep quality were significantly affected. Further detailed studies are recommended in this area.

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