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ASSESSMENT OF NEURO COGNITIVE DISORDER IN ADOLESCENTS WITH OBESITY

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ABSTRACT

Background: Obesity is a major problem nowadays in young individuals due to our recent life style modifications. These life style changes of eating with high fat consumption at younger age affects their cognition to a greater level resulting in impaired memory, poor concentration among younger individuals. There is an association of inflammatory changes in brain due to high fat consumption which leads to cognitive impairment. So this study is aimed to assess the relation of cognition with eating habits and Body Mass index. **Objectives:** The aim of this study is 1. To assess the Neuro cognitive function of the individual using the MMSE (MINI MENTAL SCALE EXAMINATION). 2. To correlate the body mass index with the Neuro cognitive functioning of the individual. **Methodology:** A pilot study conducted among 30 individuals of 18 & 19 years age group in both genders, in Allied Health Students of Sree Balaji Medical College and Hospital, Chromepet, Chennai. The purpose of the study was explained and informed written consent was obtained from the subjects. The students were scaled with MMSE (Mini Mental Scale Examination) questionnaires. Institutional Ethical Committee permission was obtained before conducting the study. The subject's socio -demographic details like age, gender, occupation, body mass index, eating habits, family history were obtained at the time of study. Statistical analysis done using Microsoft excel and also with SPSS software version 20. **Result:** There is a significant correlation between the Body Mass Index of the students and one of the sector of MMSE i.e attention and calculation. The other sectors of MMSE scale are not significantly correlating with BMI. **Conclusion:** The study result says that the attention and calculation of these students is affected by increased body weight. The lack of attention also affects the academic achievements of the students. And the language, recall, orientation skills are not correlating with the BMI.

KEYWORDS: Neurocognition, Adolescents, Body Mass Index.

INTRODUCTION

Obesity is a major problem nowadays in young individuals due to our recent life style modifications. High fat consumption at younger age affects their cognition to a greater level resulting in impaired memory, poor concentration among younger individuals. There is an association of inflammatory changes in brain with high fat consumption which leads to cognitive impairment.[1] Family-based behavioral treatment (FBT) for childhood obesity typically results in weight loss in the participating child; However, data on the long-term outcomes and maintenance of these programs show that only one-third of participating children have a healthy weight in adulthood.[2]

Neurocognitive functioning, which influences cognition, emotions, and behaviors linked to obesity, may be an important, yet under-emphasized factor, in informing existing and future weight-loss interventions.[2]

An extensive literature has identified an important relation between obesity and cognition. Healthy obese people show poor performance on cognitive tests when compared with normal weight–matched control subjects, in particular, on memory and executive function–related tasks.[3]

MATERIAL AND METHODS

A pilot study was conducted among 30 individuals of 18&19 years of age groups in both the sexes (of which 25 were girls 5 were boys.), of the Allied health science students of Sree Balaji Medical College and Hospital, Chrompet, Chennai. The study was explained in detail and informed written consent was obtained. The study was conducted in break hours of the college for which the consent was obtained from the Dean of the institution. The neurocognitive function of the individuals was scaled by means of MMSE scale. The questionnaire included the sectors like Attention & Calculation, Registration, Orientation, Recall, Language

and Praxis. Each sector consists of 2-3 questions, which were asked to the individuals and their reply was recorded as response. The socio- demographic status like age, sex, height, weight was obtained. Family history of psychiatry illness, poor memory and past history of psychiatry illness and poor memory was asked. Any history of head trauma was asked The Blood Pressure and Pulse Rate of the individual were recorded in the sitting posture in a relaxed state. Then the Body Mass Index was calculated from the formula, weight(kg)/height (m^2). The BMI obtained was correlated with the total score of MMSE scale. The Pearson correlation was done to correlate the body mass index with the neurocognition of that individual.

RESULTS

Results have been discussed in five sectors like orientation, registration, attention & calculation, recall, language and praxis. The body mass index mean and the standard deviation of the study participants is **23.12 ± 4.56.**

Orientation

The orientation of the individual is assessed by asking questions like the day, date, city, country, place of the building. The P value was **0.78** which is not significant.

Registration

The registration of the individual was assessed by asking the person to keep in mind some of the words told by the instructor to keep it in mind. The P value was **0.76** which is not significant.

Attention & Calculation

This was done by asking the the person to say the given vocabulary word in reverse. Then to count the numbers reverse starting from 100 as the multiples of 7. The P value was **0.03** which is significant.

Recall

Recall of the person's memory was done asking the vocabulary word already told by the instructor to recollect and reproduce. The P value was **0.60** which is not significant.

Language and praxis

The person was asked to make a sentence of his own without any grammatical error. Then asked to copy a set of the diagram given in the questionnaire. The P value was **0.70** which is not significant.

The mean and standard deviation of the BMI with the MMSE scale score was calculated as 23.12 ±4.56. The P value was significant for Attention & Calculation sector of the MMSE scale about 0.03 (0.05). The other sectors like Registration, Orientation, Recall, Language & Praxis doesn't show any significant correlation with the BMI.

MMSE SCALE	BMI P VALUE	SIGNIFICANCE
ORIENTATION	**0.78**	**NS**
REGISTRATION	**0.76**	**NS**
ATTENTION & CALCULATION	**0.03**	**S**
RECALL	**0.60**	**NS**
LANGUAGE & PRAXIS	**0.70**	**NS**

NS- not significant; S- significant.

DISCUSSION

Overall, obesity in youth is associated with poor cognitive functioning as measured by neurocognitive tasks and self-report measures.[1] This review showed that there is stronger and more consistent evidence supporting a relationship between obesity and deficits in the areas of executive functioning (22 out of 30 studies), attention (7 out of 10 studies), visuo-spatial skills (2 out of 2 studies), and motor skills (17 out of 20 studies). Findings were mixed in the areas of general cognitive functioning (4 out of 7 studies), learning and memory (3 out of 6 studies), language (2 out of 5 studies), and academic achievement (4 out of 7 studies). Obesity-related behaviors such as increased intake, disinhibited eating, sedentary activity, and lower physical activity are generally related to greater executive dysfunction, poorer motor skill, and lower academic achievement.[2]

The Body Mass Index of the students is significantly correlating with one of the sector of MMSE i.e attention and calculation. The other sectors of MMSE scale are not significant. Similar to our study, Lokken et al study says that the Obese adolescents had lower performance compared with normative data on tests of attention. The language skills, recall, orientation are not significantly correlating with Body Mass Index in our study. Some studies with young children and adolescents shows, there was no relationship among BMI, verbal fluency, and verbal ability.[4] The study result says that attention and calculation of the students are affected by increased body weight. So, the lack of attention also affects the academic achievements of our students. And the language, recall, orientation skills are not correlating with the BMI.

Thus food intake, physical activity, health comorbidities and underlying brain mechanisms may mediate or moderate the relationship between neurocognitive functioning and obesity.[4]

An extensive literature has identified an important relation between obesity and cognition. Healthy obese people show poorer performance on cognitive tests when compared with normal weight–matched control subjects,

in particular, on memory and executive function–related tasks.[5]

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