WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Prevalence of Paradoxical Malnutrition in Post- COVID Era and Its Potential Psychobehavioural Repercussions.

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ABSTRACT:

Background: Almost 2% children in India belong to the obese group and on the contrary they are deficient in other micronutrients. Hence, the name paradoxical malnutrition is given to such kind of nutrition. This paradoxical malnutrition is not only having physical but psychobehavioural effects also on the children. So, the current study was planned to draw the attention of the policy makers to this upcoming health problem in children.

Materials & Methods: The present study was conducted in the sub-urban areas of Jammu as well as the outpatient department of ASCOMS & Hospital Sidhra Jammu. A total of 300 children were included in the study. All these children along with their guardians were briefed regarding the study and an informed consent was taken. All these subjects and their guardians were given a pre formulated Questionnaire, their response was recorded and subjected to statistical analysis.

Results: The observations of present study concluded that prevalence of paradoxical malnutrition was more in pre-adolescent age group followed by adolescent and middle childhood age group. The most common variant responsible for obesity was lack of physical activity and more on screen time. The physical effects most commonly seen in these subjects were snoring at night (90%), slow response (78%) and shortness of breath (70%). The psychological changes most commonly seen were apprehension about the looks (80%), lack of confidence (78%) and lack of social interaction (75%).

Conclusion: Paradoxical malnutrition is the tip of iceberg of great health problem which has to be brought to the notice of general masses otherwise it is not going to affect our physical but mental health also.

INTRODUCTION:

Malnutrition has been the age old health demon with which the healthcare professionals have been dealing. In post independence era, it was the protein energy malnutrition which remained the prime concern but as economic development and urbanization proceed globally, the coexistence of under- and over-nutrition within the same household, sometimes termed 'paradoxical' or 'dual burden' malnutrition is increasingly being reported [1]. It is estimated that India is the top most country with the largest number of children being stunted (46.6 million) and wasted (25.5 million). India and China are also home to 2% and 7% of overweight children respectively [2]. Paradoxical malnutrition is the other name for obesity and is defined as the paradoxical state of malnutrition, which despite excessive energy consumption is associated with a shortage of individual micronutrients. Micronutrient deficiency may include not only incorrect dietary choices and insufficient access to nutrient-rich foods but also changes in the absorption, distribution or excretion of nutrients, and altered micronutrient metabolism resulting from systemic inflammation caused by obesity. Deficiency or lack of homeostasis of essential micronutrients can significantly affect daily performance, intellectual and emotional state, but also the physical state of the body [3]. Paradoxical malnutrition in childhood and adolescence not only increases the risk for hypertension, mental health issues, and poor achievements at school in young children but it may also lead them to suffer from obesity throughout life, cardiovascular diseases, type 2 diabetes mellitus, and other diseases that can lead to complications or even death [4].

In post- COVID era, where our children are heading a step towards new normal life; also they are facing a serious health issue of overweight and obesity. A study across India during this pandemic revealed that there is a severe deterioration in eating patterns and proper food consumption by many children and adolescents, along with eating unhealthy food such as snacks and eating more than necessary [5]. The closing of schools led to decreased physical activity, which affected the mental health of children. The closing of schools increased children's sedentary time from five to 8-10 hours due to online classes. Thus, less time was spent outside doing any physical, social, or productive activity by children. This decreased intensity of doing any physical work, completing homework, or studying. Along with these, sedentary behavior, decreased social interaction, fear of attending canceled

exams, and social distancing during the closing of schools also caused depression and stress. This increase in anxiety may lead to overeating, causing obesity, decreased social interactions and further psychological issues, and low self esteem in the future [6].

Thus the current study was planned to address the repercussions associated with the paradoxical malnutrition with a psychobehavioural outlook and it is paramount for the health authorities that immediate preventive and management plans should be instituted to effectively deal with childhood and adolescent obesity that inevitably will have a repercussion on their life course with potential development of adult obesity and psychosocial effects.

MATERIALS AND METHODS:

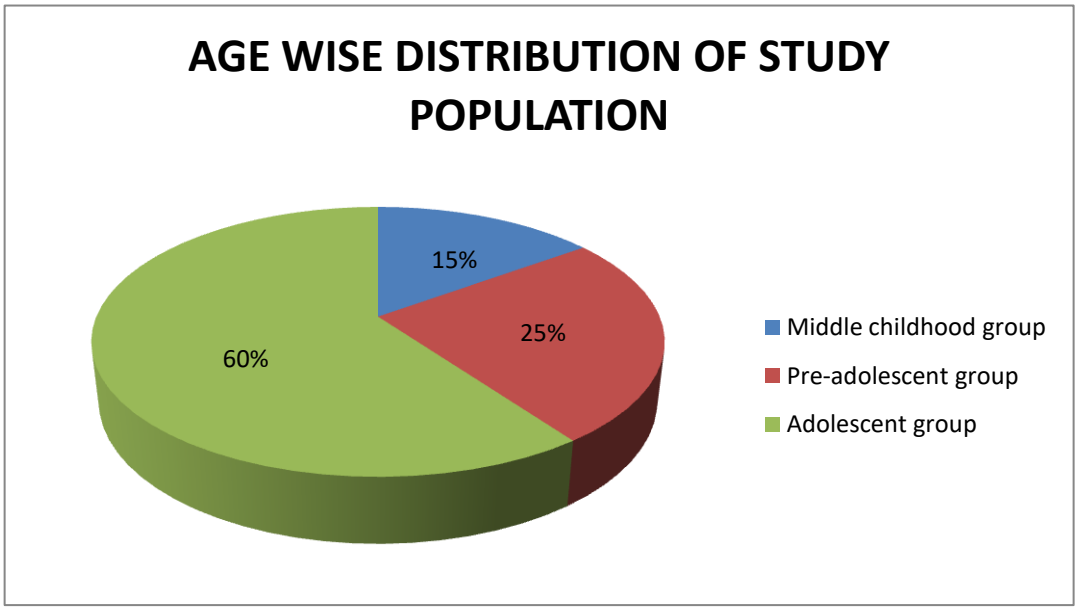
The present study was conducted in sub urban areas of Jammu as well as the outpatient department of ASCOMS & hospital Sidhra, Jammu. The data was collected from 300 children, among whom 100 were from the sub urban areas and 200 were surveyed while they were attending the Pediatric OPD of ASCOMS & Hospital Sidhra, Jammu. A questionnaire was formulated after standardization of the questions from the statistician. The subjects were selected and briefed after taking proper consent of the parents or the guardians accompanying the subjects. The response was recorded and the subjected to the statistical analysis.

OBSERVATIONS:

The present study was conducted on 300 children belonging to suburban areas of Jammu along with the OPD patients of pediatric department of ASCOMS & hospital Sidhra Jammu. The subjects were classified into various groups depending upon the age of the subject. These groups were middle childhood group (6-9 years) constituting 45 (15%) subjects, preadolescent group (9-12 years) comprising of 75 subjects (25%) and adolescent age group comprising of 180 (60%) subjects (Table 1).

Age Groups	No. of Subjects	Percentage
Middle Childhood Group	45	15%
Pre- adolescent Group	75	25%
Adolescent age group	180	60%

Table1: Showing age-wise distribution of the study population

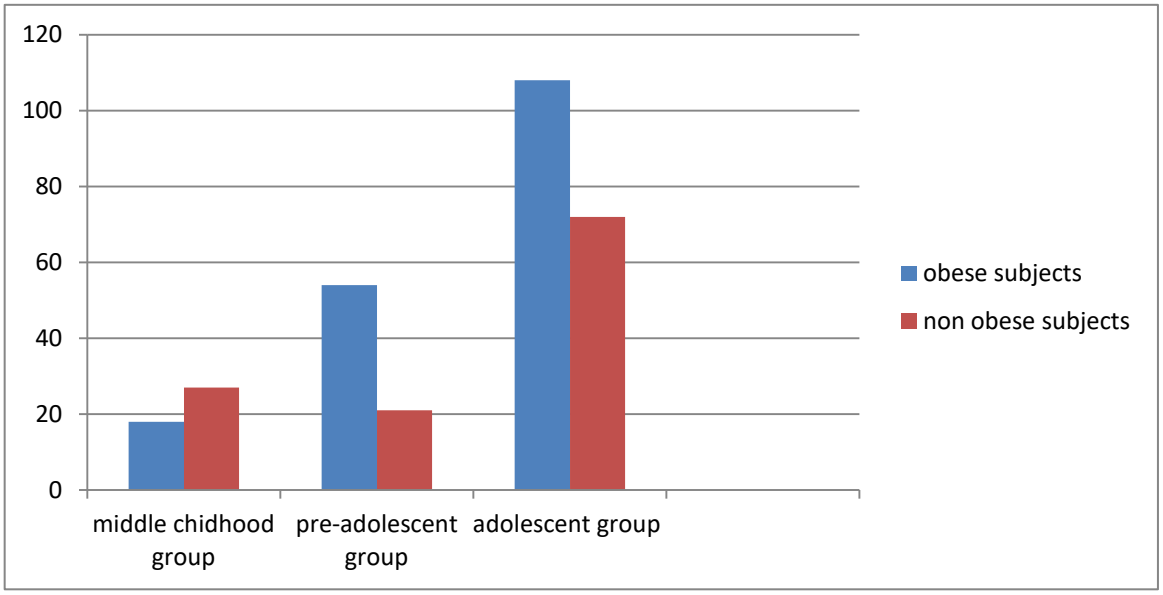


Pie Chart 1: Showing age-wise distribution of the study population.

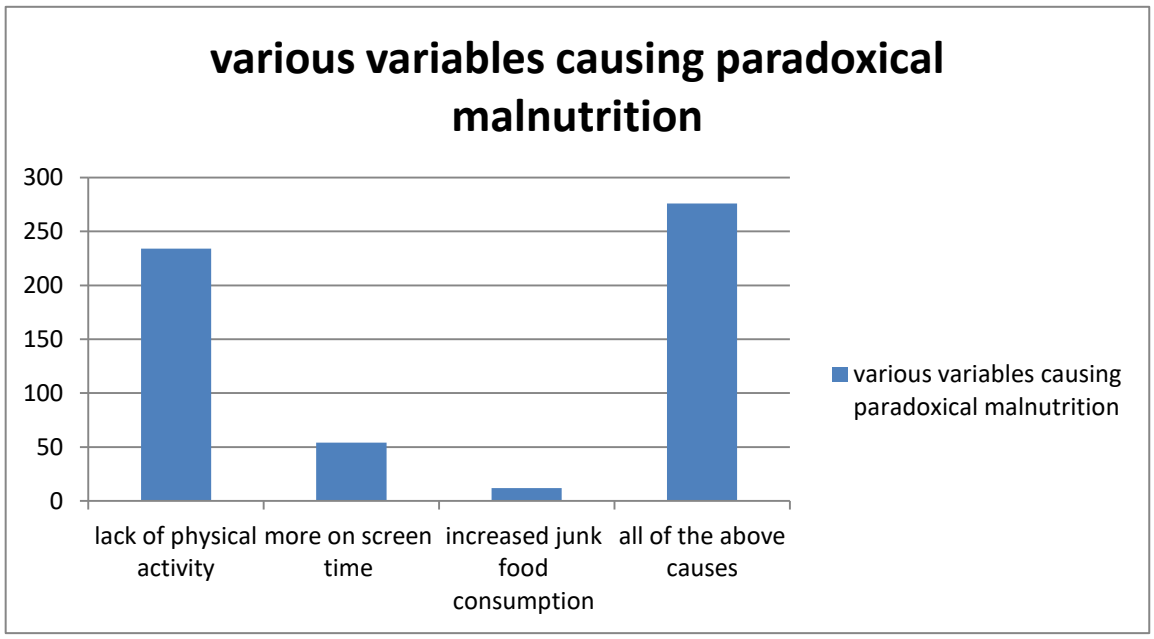
Among the middle childhood age group the prevalence of paradoxical malnutrition was less as compared to other age groups. In middle childhood age group, out of 45 subjects 18 were obese which constituted 40% and 27 subjects' belonged to non-obese group which constituted 60 %. Among preadolescent age group, the prevalence of obesity was highest with 54 subjects constituting 72% of preadolescent age group whereas amongst the adolescent age group only 60% of the subjects were obese (Table 2 & Bar Chart 1).

S. no	**Age Group**	**Subjects with Paradoxical Malnutrition**	**Subjects without paradoxical malnutrition**
	Middle Childhood Group	18 (40%)	27 (60%)
	Pre- adolescent Group	54 (72%)	21(28%)
	Adolescent age group	108 (60%)	72 (40%)

Table 2: showing the prevalence of paradoxical malnutrition in various age groups.

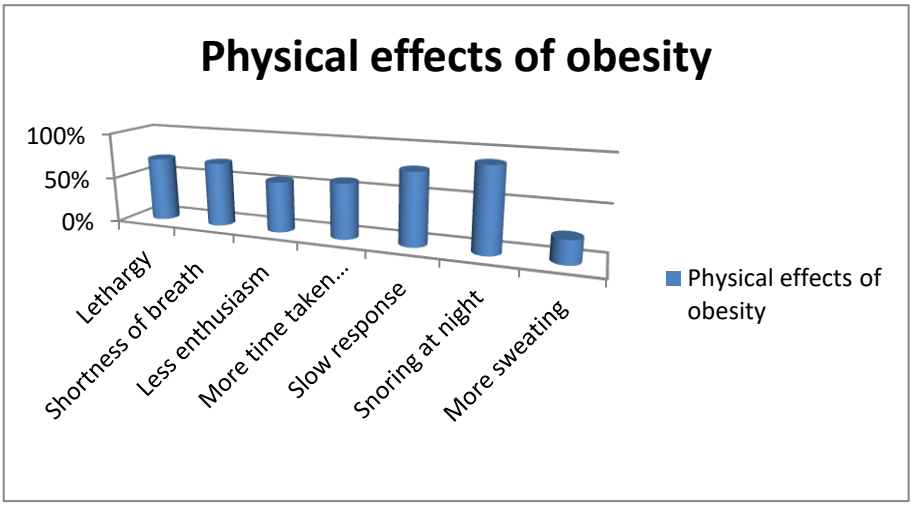


Bar Chart 1: showing distribution of prevalence of paradoxical malnutrition in various age groups.



Bar Chart 2: showing various variables causing paradoxical malnutrition.

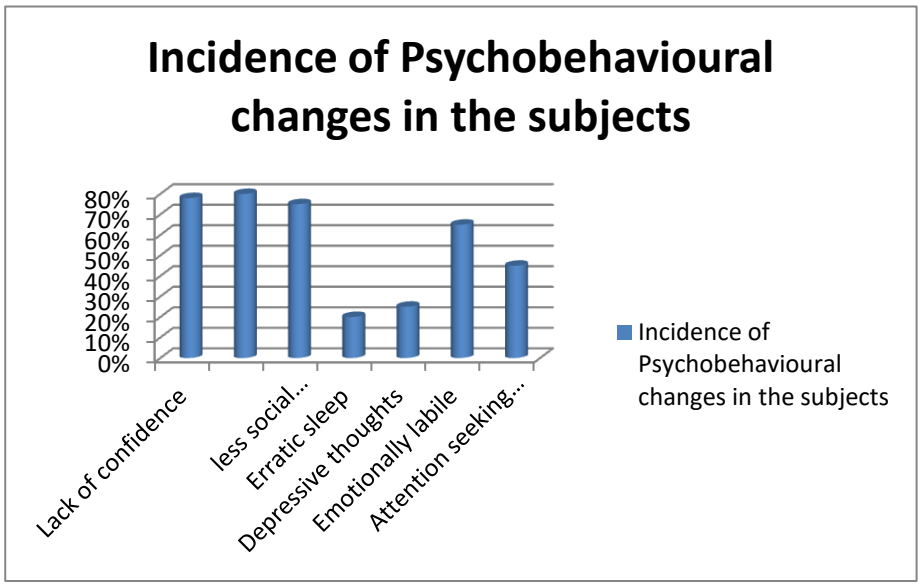
According to the parents, care takers and guardians of the subjects, the various variables causing paradoxical malnutrition, the top rated cause was reported to be the lack of physical activity among 78% individuals, followed by more on screen time in 18% subjects whereas increased consumption of junk food was seen in 4% cases and all the above causes were seen in about 92% of the subjects under observation (Bar chart 2).



Bar Chart 3: Showing incidence of physical effects of obesity in various subjects under study.

Furthermore, the guardians of these subjects when enquired about the physical effects of obesity elaborated snoring at night as most common effect with incidence of about 90%, succeeded by slow response in about 78%, lethargy and shortness of breath seen in 70% subjects each, more time taken to work in 65% subjects, less enthusiasm in 50% subjects and excessive sweating in 25% subjects (Bar chart 3).

Additionally, some psychobehavioural changes were also reported in these subjects with most common change being apprehension regarding the change in appearance in 80% subjects, this has resulted into lack of confidence in 78% subjects, less social interaction in 75% subjects, emotional labiality in 65% subjects, attention seeking behavior in 45% subjects, depressive thoughts in 25% subjects and erratic sleep in 20% subjects (Bar chart 4).



Bar Chart 4: Showing incidence of Psychobehavioural changes in the study subjects.

Discussion:

The current study was planned to bring into light the rampant problem of obesity in post covid era which has created a huge iceberg of physical and psychobehavioural changes in children and we as a society are able to see the tip of the iceberg only.

The observations of afore mentioned study concluded that prevalence of paradoxical malnutrition was more in pre- adolescent age group followed by adolescent and middle childhood age group which was positively supported by Ochoa-Moreno I et al. who reported that overweight and obesity prevalence in children aged 10-11years persisted and was 4% higher than expected[8]. Also, review study conducted by Nour TY et al. and Suiraoka IP et al. concluded that physical inactivity, sedentary lifestyle and poor eating habits were considered as cause of obesity [10, 11]. Likewise, Ruopeng An (2020) also reported that the impact of COVID-19 on childhood obesity was larger among boys as compared to girls [4].

According to the conclusions made in ongoing study, main cause of childhood obesity stood out to be lack of physical activity followed by increased screen time and this cause was again quoted by Ferentinou E et al. [7], Texas research to policy collaboration project [9], MC D et al.[12].

Considering the psychobehavioural changes in the subjects under study, it was observed that most common change was apprehension regarding ones appearance (80%) followed by lack of confidence (78%) and less social interaction (75%). Erratic sleep and depressive thoughts were the least observed changes. Erratic sleep and depressive thoughts were quoted as the common psychobehavioural change by various authors [7, 10, and 12].

Henceforth, the aim of current study was to bring this fact to the notice of the community as well as health care authorities that our new generation is being physically as well psychologically challenged in post- COVID era and various steps should be taken to help the young generation.

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QUESTIONNAIRE :

1. What is the estimated weight of your child?
2. Do you think your child has gained more weight during the COVID period?
3. Do you think your child is still gaining weight in the post COVID period?
4. What according to you are the causes of putting on weight (tick mark the below mentioned options)? {multiple options can be corrected}

I. Increased on screen time
II. No outdoor playing
III. Unhealthy eating habits (consumption of fast food, baked goods, vending machine snacks, chocolates, toffees, etc.)
IV. Binge eating
V. Non involvement in household activities
VI. Altered sleeping habits
VII. Underlying medical condition (if any)
VIII. Genetics

1. Is your child conscious about his or her weight gain?
2. What kind of physical effects you observe in your child due to obesity (tick mark the below options)? {multiple options can be corrected}

I. Lethargy
II. Shortness of breath
III. Less enthusiasm to participate in physical activities.
IV. Taking more time to complete any work.
V. Slow response
VI. Snoring in night or trouble sleeping
VII. Sweating more than usual
Inability to perform simple physical tasks which child could easily perform before weight gain

1. What kind of psychological effects you observe in your child due to obesity (tick mark the below options)? {multiple options can be corrected}

I. Lack of confidence and low self esteem.
II. Concern about the physical appearance
III. Less interaction with friends, schoolmates, relatives etc.
IV. Erratic sleep
V. Depression and negative thoughts
VI. Has become more emotionally labile
VII. Attention seeking behavior
VIII. Inability to perform simple tasks without help of the family members
IX. Irritability

1. How much is the on screen time of your child?
2. For how long your child spends time in any sort of physical activity?
3. What kind of game does your child like? (indoor/ outdoor)
4. Does your ward have friends in your locality?
5. Does your child easily fight with his siblings?
6. Does your child is extrovert and makes friends easily?
7. How do you think you can help improve your child's behavioral changes?