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Double Burden of Malnutrition in Mothers of Children with Severe Acute Malnutrition

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Abstract

Backgrounds: The co-occurrence of under nutrition and obesity is a reality of developing and third world countries. It is also referred as "double burden" of malnutrition.it is a comparatively innovative term and it explains irony of malnutrition coexisting as under nutrition and overweight/obesity in the same population. There are emerging trends of obesity in adult female population of Pakistan but these women are still suffering from micronutrient deficiencies and malnutrition and wasting still persists in the community especially in children. The status of malnourished children In Pakistan is alarmingly high. According to National Nutritional survey 2011, 17% of under five year children are wasted.

Objectives

- To assess the nutritional status of mothers of severely malnourished children at stabilization center Multan.
- To evaluate the factors associated with inadequate caloric intake of children with Severe Acute Malnutrition (SAM) versus sufficient caloric intake by mothers.

Study design: A cross section descriptive study was designed.

Settings: Nutrition Stabilization Centre, Department of Pediatric Medicine, Children Hospital & the Institute of Child Health, Multan.

Duration: After approval of synopsis the duration of this study was six months from January to June 2016.

Methods: This study included nutritional status assessment of total of 100 females that were mothers of severely malnourished children admitted for treatment at stabilization center for malnourished children at Children hospital and institute of child health, Multan. Body mass index (BMI) was used to assess the nutritional status of mothers of severely malnourished children and classified according to WHO classification of BMI as underweight (less than18.5 kg/m^2), Normal weight (18.50-24.99 kg/m^2), over weight (more than or equal to 25 kg/m^2) and obesity (more than or equal to 30 kg/m^2).

A questionnaire was designed and all mothers were interviewed in detail after taking proper consent. A pre-designed questionnaire was used to evaluate dietary restriction during pregnancy and lactation, and regarding breastfeeding and complimentary feeding patterns of children. A 24 hour dietary recall was also taken to evaluate the daily caloric intake of women. Mothers were also examined for clinical signs of iron deficiency and anemia.

Results: In study mean age of sample was 25.7+/_ 3.4 years, out of 100 females, 20 (20%) were malnourished,51 out of 100 (51%) were of normal weight, 29 out of 100 (29%) females were overweight and obese.

The caloric intake of (26%) 26 out of total was less than 1500 kcal daily. (42%) 42 out of 100 were taking between 2000-2500 kcal per day and (32%) 32 out of total 100 were taking more than 2500 kcal daily. It was found that (67%) 67 out of total women were suffering from anemia. It was also found that 80 out of total (80%) women had some myths related with dietary restrictions during pregnancy and lactation and complimentary feeding of children. It was observed that only (23%) 23 out of total women breastfed their babies and (77%) 77 out of 100 were bottle-fed.

Conclusion: This study showed that only 25 women out of 100 (25%) had poor nutritional status while 75 out of 100 (75 % had either normal or had obesity trends that showed that most of them were either consuming adequate calories or more than what required for them while on the other hand their children were severely malnourished (weight/ height less than -3SD) and like other Asian countries there is a threat of emerging mixed burden of malnutrition in Pakistan. In underweight mothers availability of food is an issue that leads to SAM but in overweight and obese women the mothers are taking more than 2500 kcal daily but their children are suffering from SAM. It also depicts that the major risk factor in SAM children of overweight and obese children is not unavailability of food but food restrictions due to taboos and myths along with lack of lactation and sufficient complimentary feeding.

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Introduction

There is a recent emergence of 'double burden of malnutrition', which consists of under nutrition among children and over nutrition in adults specially women. This alarming shift from under nutrition in childhood to over nutrition in adulthood is the result of speedy economic development, globalization, urbanization, lifestyle changes, and high caloric diets and reduced physical activity. thus over nutrition and under nutrition simultaneously occurs among different age groups of same population [1]. This double burden of malnutrition has been noticed at country, household, and even individual level. The more pronounced and visible pattern is an overweight or obese mother with a malnourished and underweight child. Although poverty is linked with under nutrition among children, it can also cause obesity among adults. Moreover under nutrition in childhood also escalates the possibility of obesity in adulthood if the environmental factors are obesogenic. both under nutrition and over nutrition possibility issues for chronic diseases [2] Low socioeconomic level and poverty both contributes and are most affected by this double burden of malnutrition [3].

Under nutrition is a danger factor for many chronic diseases. such as respiratory illnesses, osteoporosis, along with diabetes, hypertension, and cardiovascular diseases[4,5]. Under nutrition is also a risk factor for the top four preventable diseases related to child mortality i.e. acute respiratory diseases, diarrhea, neonatal sepsis and malaria [6]. Almost 35% of child mortality is linked to macro and micro nutrient deficiencies [7]. In addition to its effect on mortality, under nutrition also affects human development in many aspects, The World Bank estimates that the annual cost burden of malnutrition to the worldwide economy is approximately $80 billion [8].

Similarly obesity also drastically effects health and it is an independent factor for diseases e.g. cardiovascular diseases, hypertension, type-11 diabetes mellitus, hyperlipidemia , osteoarthritis, and a few type of cancers [9,10]

There are is a rapid rise in obesity in adult female general population of Pakistan and yet wasting in children still proceeds. According to National Nutritional Survey 2011, Pakistan is also facing double burden of malnutrition. Female obesity is on rise and on the other hand 24% children are severely stunted [11]. On one side the average female is consuming more calories than required and are still facing significant micronutrient deficiencies such as iron, calcium and vit A and D. Almost half of adult women population is anemic [12].

Body mass index (BMI) was used to assess the nutritional status of mothers of extremely malnourished children and according to WHO order of BMI as underweight (less than18.5 kg/m^2), Normal weight (18.50-24.99 kg/m^2), over weight (more than or equivalent to 25 kg/m^2) and obesity (more than or equivalent to 30 kg/m^2) [13].

Method

This study was conducted at Children Hospital and Institute of Child Health, Multan. This is a Descriptive study. This study included nutritional assessment of total 100 females that were mothers of severely malnourished children admitted for treatment at stabilization center for malnourished children at Children hospital and institute of child health, Multan.

Body mass index (BMI) was used to assess the nutritional status of mothers of severely malnourished children and classified according to WHO classification of BMI as underweight (less than18.5 kg/m^2), Normal weight (18.50-24.99 kg/m^2), over weight (more than or equal to 25 kg/m^2) and obesity (more than or equal to 30 kg/m^2).

A questionnaire was designed and all mothers were interviewed in detail after taking proper consent. A pre-designed questionnaire was used to evaluate dietary restriction during pregnancy and lactation, and regarding breastfeeding and complimentary feeding patterns of children. A 24 hour dietary recall was also taken to evaluate the daily caloric intake of women. The 24 hour recall was evaluated using Pakistan Food Composition Tables.

Mothers were also examined for clinical signs of iron deficiency and anemia. Risk factors associated with SAM children were further evaluated in percentages according to underweight and overweight women.

Results

This study included nutritional status assessment of total of 100 females that were mothers of severely malnourished children admitted for treatment at stabilization center for malnourished children at Children Hospital and Institute of Child Health, Multan. Body mass index (BMI) was used to assess the nutritional status of mothers of severely malnourished children and classified according to WHO classification of BMI as underweight (less than18.5 kg/m^2), Normal weight (18.50-24.99 kg/m^2), over weight (more than or equal to 25 kg/m^2) and obesity (more than or equal to 30 kg/m^2).

In study mean age of sample was 25.7+/_ 3.4 years. Out of 100 females, 20 (20%) were malnourished, 51 out of 100 (51%) were of normal weight, 29 % females were overweight and obese out of 100. And according to BMI classification (21%) 21 females were overweight and (8%) 8 out of 100 were obese.

The caloric intake of (26%) 26 out of total was less than 1500 kcal daily.(42%) 42 out of 100 were taking between 2000-2500 kcal per day and (32%) 32 out of total 100 were taking more than 2500 kcal daily. It was found that (67%) 67 out of total women were suffering from anemia. It was also found that 80 out of total (80%) women had some myths related with dietary restrictions during pregnancy and lactation and complimentary feeding of children. Most commonly foods like eggs, meat and dry fruits were avoided during pregnancy and lactation by mothers to avoid miscarriage and complications. These dietary restrictions during pregnancy lead to poor nutritional and health status of babies at birth. It was observed that only (23%) 23 out of total women breastfed their babies and (77%) 77 out of 100 were bottle-fed.

Our study evaluated the risk factors leading to SAM in children of mothers consuming +/_ 2000 kcal daily because in spite of availability of adequate caloric diet at home all children were suffering from Severe Acute Malnutrition although (29%) 29 out of 100 women were overweight and obese. The risk factors observed were

Risk Factors Leading To SAM In Children	SAM Children Of Underweight Mothers	SAM Children Of Overweight And Obese Mothers
Lack of breastfeeding	32% (77 %)	45%
Lack of adequate complimentary feeding	28% (68%)	40%
Food restrictions due to myths/ taboos	33% (80%)	47%
Frequent infections i.e. Diarrhea	16% (40%)	24%
Pneumonia	12.2% (30%)	17.7%

Discussion

Pakistan is a developing country facing a "double burden'' of malnutrition. Although more than half our population is living under poverty line still we are facing a high ratio of obesity and overweight. This study also concludes that 29% of women who were mothers of SAM children in CH & ICH, Multan were overweight and obese. This double burden of malnutrition consists of disorders linked with under development subjects, significant to poor quality of life (infectious diseases and nutrition deficiencies) and preventable diseases secondary to urbanization or rapid industrialization [14].

In Pakistan adult obesity and overweight has become a public health hazard in last two decades. A study in Thailand have also shown similar results regarding alarming magnitudes of overweight and obesity in urban populations where females tends to have higher proportion of overweight and obesity than males of similar population [15]. Researches from Bangladesh and Indonesia have observed low physical activity and high caloric diets mainly composed of junk foods and less consumptions of fruits and vegetables further contributes to obesity [16,17]. Bhutta ZA, Hafeez A, Rizvi A., *et al*. also found similar results to this study that although most of the women are overweight/obese, more than half of women are still suffering from anemia and VIt A and D deficiencies, thus indicating the intake of excessive calories and low micronutrient intake in the diet of general women population of Pakistan [5,18] .

In a study conducted in several low income countries a growing problem of under nutrition and over nutrition was also found like in Pakistan .The children are dying because malnutrition and being underfed and the adults specially women are becoming more over weight and facing complications relating to obesity [19]. Another research done in Brazil slums also shows this contradictory co-occurrence of under nutrition and over nutrition in the same family, constantly undernourished and underfed children and their overweight and obese mothers [20]. It has been observed as a rising problem in many third world countries including Pakistan.

According to Khan S., *et al*. pregnancy and early childhood is a crucial time to provide a good base for adequate growth and development. The poor nutritional status in children under the age of five specifies the nutritional status and dietary intake of mothers during pregnancy and complimentary feeding after 6 months period preceding it. The obese mothers and SAM children trend indicates that although there is sufficient availability of food resources at home, the children are still not fed enough calories to provide adequate growth and development. The insufficient caloric intake of children is mainly due to lack of breastfeeding and intake of diluted formula via bottle. Similar trends were also supported by this study [21].

Related findings were observed in a report by UNICEF that children's diet is also lacking in vital nutrients due to certain myths and taboos regarding food intake during pregnancy, lactation and complementary food. Nutritious foods like meat, eggs and nuts and seeds are prohibited to pregnant and lactating women because of myths of miscarriage and complications associated with these foods. The children are often given commercially prepared expensive formulas and cereals in diluted forms because their concentrated forms

are believed to cause diarrhea. Due to these food myths and taboos, the child's diet is poor in calories and vital nutrients. Despite of sufficient availability of food sources at home [22,23]. In cases where both mothers and children are under weight, the cause can also be poverty and lack of adequate food sources along with poor lactation, complementary feeding and food myths and taboos. Frequent infections in children such as diarrhea and pneumonia were also contributing to SAM.

According to Jafar T, Qadri Z, Islam M., *et al.* there is also an increase in the rate of overweight and obesity among children although a reality that there is persistently high burden of under nutrition, the age-related rise in overweight and obese children in Pakistan is related with simultaneously decrease in physical activity, contributed as one of the main factors. The strategies must have interventions for the prevention of obesity among children by promoting physical activity and healthy dietary intake especially in schools [14,24].

Abrahams Z, Mchiza Z, Steyn NP also states that it is fundamental to recognize that both infant/child malnutrition and maternal obesity may have a common etiology, both of which are significantly associated with poverty and adverse conditions of their environment [25].

Conclusion

This study showed that only 25 women out of 100 (25%) had poor nutritional status while 75 out of 100 (75%) had either normal or had obesity trends that showed that most of them (74%) were either consuming adequate calories or more than what required for them while on the other hand their children were severely malnourished (wt/ht less than -3SD). The breastfeeding rates were also were low (22%) 22 out of 100. And most of the children were given diluted bottle feeding and insufficient complimentary feeding. There were many myths and taboos associated with dietary intake during pregnancy, lactation and complimentary feeding of children. Like other Asian countries there is a threat of emerging mixed burden of malnutrition in Pakistan. Further studies are required to find out the reasons for inadequate calories intake in children whose mothers are either normal weight, overweight or obese.

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