Volume : 5 | Issue : 9 | September 2016 • ISSN No 2277 - 8179 | IF : 3.508 | IC Value : 69.48

Original Research Paper

Study of Children admitted in PEM Treatment Unit at Jodhpur

Medical Science

KEYWORDS : Protein Energy Malnutrition, under weight, under nutrition

Dr. Santosh Singh Gehlot — Ex. Joint Director, Medical & Health, Govt. of Rajasthan

Dr. Girdharee Lal Saini — Assistant professor in Department of PSM, Dr. S. N. Medical College, Jodhpur

Dr. Pratibha Chauhan — Professor in Department of Biochemistry, S. M. S. Medical College, Jaipur

ABSTRACT

Background: *Several Diseases affect the children, causes of which may be genetic, infectious, metabolic, or nutritious. Out of all the causes, nutritional cause is the commonest one throughout the world, primarily due to poverty and ignorance particularly in the underdeveloped and developing countries. Of the nutritional causes, protein calorie malnutrition is the most common problem.*

Objectives: *The present study was undertaken:-*

1. *To provide detailed sex wise and age wise distribution of PEM in children upto the age of six years.*
2. *To assess the prevalence of PEM in children below the age of 6 years in different religion and castes.*

Materials and methods: *This is a Hospital based study and was conducted at PEM treatment Unit at Jodhpur from 30th May 2014 to 29th September 2014. All the children who have been admitted in the PEM treatment Unit at Jodhpur upto and below the age of 6 years are included in the study.*

Results: *During our study period of 4 months, a total of 46 children below the age of 6 years had been admitted in PEM treatment Unit. Out of this, number of the female children with PEM was higher 28 (60.86%) than the number of Male PEM children, 18 (39.13%). Majority of the PEM children, 65.21% (30) admitted in the PEM treatment unit during our study period were from Hindu religion and 34.78% (16) children were from Muslim religion.*

Introduction:

Protein energy malnutrition (PEM) refers to "An imbalance between the supply of protein and energy and the body's demand for them to ensure optimal growth and function". [1] It is one of the important major public health problems in preschool children in India. Its dire consequences range from decrease physical and cognitive growth and increased susceptibility to infection. This affects the child at the most crucial period of time of life which can lead to permanent impairment in later life. [2, 3]

PEM is measured in terms of underweight (low weight for age), stunting (low height for age) and wasting (low weight for height). The prevalence of stunting among under five is 48% (moderate and severe) and wasting is 20% (moderate and severe) and with an underweight prevalence of 43% (moderate and severe) [4]. The majority of children suffering from undernutrition (80%) are having mild and moderate forms which may go unnoticed [3]. In comparison to the global reference standards, the weight for age distribution of Indian children falls to the left of the curve.

Causes of PEM:

Cause of PEM may be Ante natal and post-natal, Low birth spacing, Feeding practices, Rural Urban distribution, Gender preference, Infections & environment, Literacy, Socioeconomic status of family and others.

Aims and objectives:

(1) To provide detailed sex wise and age wise distribution of PEM in children upto the age of six years. **(2)** To assess the prevalence of PEM in children below the age of 6 years in different religion and castes. **(3)** To assess the association between duration of stay at PEM treatment unit and improvement in the weight of children.

Study design and setting:

This is a Hospital based study and was conducted in PEM treatment Unit at Jodhpur from 30th May 2014 to 29th September 2014.

Materials and Methods:-

Study Population:

All the children upto and below the age of 6 years who had been admitted at PEM treatment unit Jodhpur.

Consent:

Informed oral consent of the participant's Parents/ attendants had been taken after explaining them about the purpose of the study and for doing clinical examination.

Study instruments:

A pre designed and tested questionnaire was used for the collection of details of the study subjects. After physical examination of the participants, with the help of parents/ attendants of the study subject's, other details were obtained. Weight, length/ Height, and MAC of all the children were recorded.

Result:

During our study period of 4 months, a total of 46 children below the age of 6 years had been admitted in PEM treatment Unit. Out of this, number of the female children with PEM was higher 28 (60.86%) than the number of Male PEM children, 18 (39.13%). Majority of the PEM children, 65.21% (30) admitted in the PEM treatment unit during our study period were from Hindu religion and 34.78% (16) children were from Muslim religion.

[Table No. 1]

In Hindus, Majority of the children 30.43% (14) were from Scheduled Caste, whereas Scheduled Tribe children were the least common 4.34% (2).

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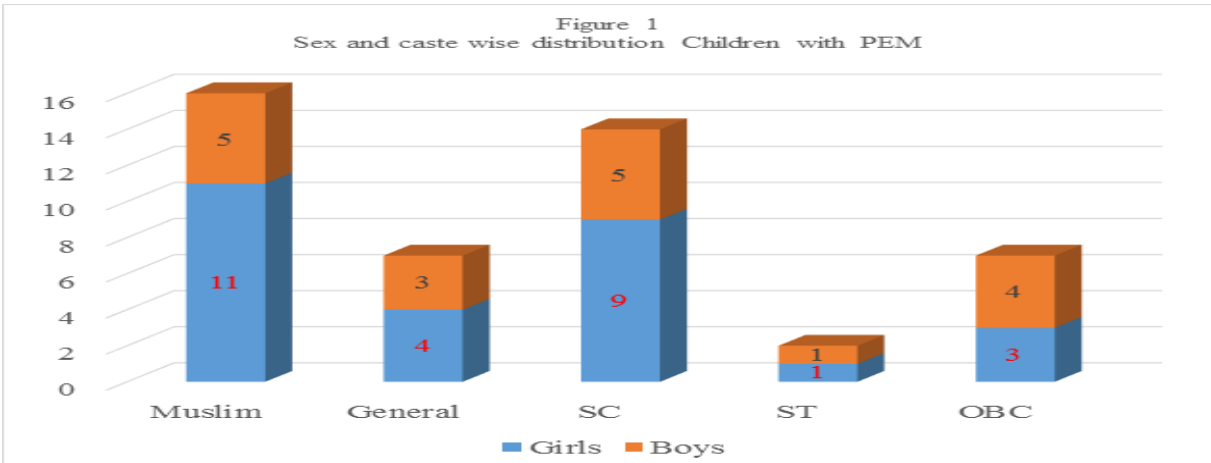
Table No. 1
Caste wise distribution of study subjects

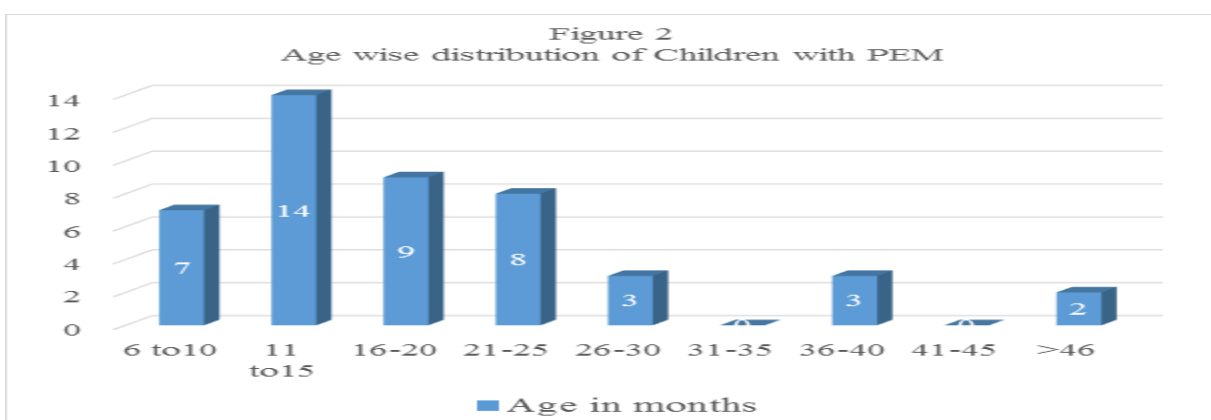
	Hindu Children				Total Hindu Children	Muslim Children	Total
Sex	General	SC	ST	OBC			
Girls	4	9	1	3	17	11	28
Boys	3	5	1	4	13	5	18
Total	7	14	2	7	30	16	46
Percentage	15.21	30.43	4.34	15.21	65.21	34.78	100



The most common age of children with PEM was 11 to 15 months age group. 30.43% (14) of the study subjects were in this age group and this was followed by the 16-20 months age group children.

[Table No. 2]
Table No. 2
Age wise distribution of study subjects

Age in Months	06-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	>46	Total
Number of Children	7	14	9	8	3	0	3	0	2	46
Percentage	15.217	30.43	19.56	17.39	6.52	0	6.52	0	4.35	100



Determinants of PEM:
Appropriate child feeding behavior goes a long way in preventing and overcoming malnutrition and determining a child's growth.[2] As feeding practice changes with age, a fourfold increase in the prevalence of undernutrition is seen from 15.4% (0-6 months) to 52.6% (12-23 months).[10] This can be attributed to early initiation of complementary feeds in the earlier months and late weaning and inadequate amount of complementary feeds in the later months.[11] A delay in the initiation of breast feeding, lack of colostrum and inappropriate complementary feeding were significantly associated with underweight and stunting.[12]

Inappropriate feeding practices are closely related to cultures and beliefs. Mothers feed their children with prelacteal feeds to cleanse their intestines and did not initiate complementary feeds thinking that it will lead to infections.[13] Beliefs like considering colostrums as witch's milk and cultural practices of prelacteal feeds exposed the child to infections which contributes to undernutrition.[14] The feeding practices come up as a major concern in combating undernutrition with hidden cultural values and beliefs.

Maternal Malnutrition:
Maternal nutritional status has a direct relation to the child's nutritional status.[15] An undernourished mother gives birth to a low birth weight baby, who grows up with compromised feeding and infections to become a stunted child and adolescent and carries this vicious life cycle and approach by giving birth to an underweight child.[16] Women with height <145 cm and body mass index <18.5 are likely to give birth to low birth weight children.[15]

Infection:
The vicious cycle of infection and undernutrition go hand in hand. With inadequate dietary intake, the immune response gets weaker and increases susceptibility to infections. A single episode of infection is easy to regain but if the child suffers from repeated infections without adequate dietary intake, it becomes very difficult to regain normal growth. Infection was commonly diagnosed in children suffering from under-nutrition.[17] One of the first studies to associate infection and malnutrition was cited from India where children developed diarrhea during the weaning period which resulted in growth faltering (Gordon *et al*., 1964; Scrimshaw *et al*., 1968 cited in Gragnolati *et al*.[2]). 46.8% of infants suffering from acute diarrhea were underweight and it was worse for those children having persistent diarrhea (83.35%).[18] Respiratory infections were found to be the second common infection. [19] Measles and helminthic infections too contribute to undernutrition by increasing demand for proteins and calories but reducing its absorption and utilization.[3] It shows that infection and undernutrition complements the effect of each other and cannot be managed separately.

Gender:
National Family Health Survey II (NFHS II) reported an underweight prevalence of 48.9% among girls compared with boys (45.5%). Even the proportion of severe underweight was higher for girls (18.9%) than boys (16.9%) (NFHS II, 1998-99 cited in Gragnolati *et al*.[2]). Similar findings were noticed in West Bengal where undernutrition among girls (54.8%) exceeded those of boys (46.8%) and the difference was higher for moderate and severe forms.[20] However, these differences are not merely biological but the care and feeding practices makes up for the difference. Timely feeding and continuation of breast feeding was seen more among boys than girls.[21] The median duration of breast feeding was 2 months longer for boys than girls. Early weaning of the girl child was done to increase chances of having a boy in the next pregnancy.[15] Therefore, the gender inequality of male preference over female among the care givers is responsible for the difference in prevalence of undernutrition.

Mother's Literacy Status:
A decreasing trend in all forms of undernutrition is observed where the literacy status of mother increased.[22] Children of illiterate women were twice as likely to show signs of underweight and stunting as those who had at least completed high school. Children whose mothers were illiterate showed 3 times higher prevalence of wasting than literate mothers.[15, 23, 24] Increasing literacy status of a mother has a positive effect in reducing undernutrition since she is the first contact of care for the child and a more informed and literate mother is at a better position to take care of her child.

Poverty and income:
Undernutrition is more commonly observed in lower socioeconomic groups and even if malnutrition is present in the upper income group, it is limited to the milder forms. [22] There is over representation of "backward" caste and socially excluded groups in the society among the poor people, which exposes them to further disadvantages of poverty, food insecurity and undernutrition.[25] NFHS II findings suggest a twofold increase in undernutrition among children belonging to households with low standard of living than with a high standard of living. [15] Though 26% of people live below the poverty line in India, 46% of under three children are suffering from undernutrition.[26] This shows that the prevalence of poverty solely cannot be responsible for undernutrition but is an underlying cause of factors like inadequate dietary intake, large family, infection, unhygienic environment and illiteracy which contributes to undernutrition among low income group.

Urban-rural difference:
NFHS data shows that except Tripura, the prevalence of undernutrition is higher in rural than urban children in all states.[10] The urban and rural variations are large with prevalence of 50% in rural when compared with 38% in urban children.[2] Stunting was seen more among the rural children (74.5%), but undernutrition was lower among urban children, majority were wasted (30.3%).[27] It shows that rural undernutrition is related more towards food insecurity whereas the problem of undernutrition is more acute in urban areas.[28] However with 26% below the poverty line in urban areas, it is catching up with the rural areas (29%) and undernutrition might not remain only a rural problem.[29]

Child feeding practices:-
The child feeding practices of the mother and care givers affect the dietary intake of the child.

Health care Services:
The Integrated Child Development Services (ICDS) scheme has an empirical role in combating undernutrition whose services include supplementary nutrition, health checkups and growth monitoring. But even after 39 years of its initiation, the problem of undernutrition still persists and the decrease in the prevalence is relatively low. The program has given more attention to coverage rather than quality-of-care. It has neglected aspect of educating parents on improving nutrition through proper child care and feeding behavior within the family budget, but focused more on food distribution. In addition to it, inadequate skills of the staff, lack of logistics and poor supervision has added to the problem.[2]

Biological
[a] Age:
Prevalence of underweight rapidly increased from 11.9% (<6 months) to 37.5% (6-11 months) to 58.5% among 12-23 months old children. Stunting prevalence also rose from 15.4% (<6 months) to 57.5% among 12-23 months.[15] A study in Jhansi found an increase in undernutrition from 52.3% (0-1 years) to 80.9% among 1-3 years children.[30] These variations are not just due to increasing age, but the dietary changes have a positive role in affecting nutritional status.

[b] Birth order and birth interval:
The proportion of undernutrition in higher birth order (>3) was more at risk of undernutrition than those with first birth order.[22] NFHS II observed that lower birth orders were an advantage.[15] The prevalence of undernutrition declined from a birth order of 3 (48.5%) to 1 (20.38%). Severe undernutrition was not seen in children with first

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birth order.[22] A decrease in the prevalence of underweight is seen when the birth interval widens from 24 months (52.2%) to 47 months (45.1%) as well as for stunting with an 8% decrease with increasing interval. Mothers belonging to households with many children did not have time to care and feed each one of them.[31] Frequent childbirth at short interval does not allow the mother to regain her heath for the next pregnancy resulting in a low birth weight child and short intervals of childbirth results in early weaning of the earlier child from breast milk.

Conclusion:

India stands at a very vulnerable position with one of the highest prevalence of under-nutrition in the world in spite of improvement in food availability and poverty alleviation. There are numerous other determinants which play important role in causation of this. The interplay of these determinants and their complementary effect makes it difficult to isolate one key factor in causing under-nutrition.

For example, age cannot be dealt in isolation since faulty feeding practices have a complementary effect in causing undernutrition. The socio-cultural factors play an important role wherein, it affects the attitude of the care giver in feeding and care practices. The compromised nutritional status of the mother comes up as a direct determinant in producing a low birth weight baby, worse if the child is born to a large and poor family. This further worsens the condition with susceptibility to infections and lack of proper health care services to the needy.

The MDG goal of halving the prevalence of underweight by 2015 was a distant target if the determinants are dealt in isolation. It requires a holistic approach due to the complex interrelation of factors in causation of PEM, which has continued to haunt India as a silent crisis.

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