PREVALENCE OF PROTEIN ENERGY MALNUTRITION IN TRIBAL PRESCHOOL CHILDREN

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Abstract

A cross sectional study was conducted in 10 Aanganwadi centres of Lemaru a tribal panchayat of Korba District in Chhattisgarh. 400 preschool children in the age group of 1-5 years were selected using stratified random sampling. The sample comprised of 182 males and 218 females belonging to Pahadi Korva, Manjhwar, Kanwar and Uraon tribes. Nutritional status was assessed by clinical assessment and anthropometric measurements using standard techniques. The study revealed that Protein Energy Malnutrition was prevalent in 67% of the studied population. The prevalence was higher in girl child with a prevalence rate of 70.6%. Similarly maximum cases of malnutrition 80.9% were seen in the age group of 1-3 years. Stunting was observed in 46.3% children, wasting in 41.5% children while substandard MUAC was observed in 50.4% children. However grade I malnutrition was observed in majority of girl child while maximum cases of grade II, grade III, grade IV were observed in male children. Majority of the children were suffering from various disorders like diarrhoea, scabies, worm infestation, anaemia and respiratory tract infections.

Introduction

"Healthy nation develop from healthy citizen", Healthy citizens develop from healthy children", so the health of nation is in the hands of the people!

Malnutrition is widely recognized as major public health problem in developing countries of the world. Severe PEM, often associated with infection contributes to high child mortality in underprivileged communities. Further, early malnutrition can have lasting effect on growth and functional status. The frequency of under nutrition cannot be easily estimated from the prevalence of commonly recognized clinical syndrome of malnutrition such as marasmus and kwashiorkor because these constitute only proverbial tip of the iceberg. Cases with mild to moderate under nutrition are likely to remain unrecognized because clinical criteria for their diagnosis are imprecise and difficult to interpret accurately.

Previous research has shown that children up to 5 years of age constitute the higher risk of protein-energy malnutrition. Moreover, without wishing to underestimate the value of clinical cases, most cases of malnutrition observed in India are mild or moderate in form and are therefore difficult to screen. The recognition of these forms is very important from a public.

In order to define the states of protein-energy malnutrition various authors have proposed some simple anthropometric criteria such as weight for age (GOMEZ et al, 1956), weight for height(WATERLOW, 1972), arm circumference for age (JELLIFFE, 1969) and ratio arm circumference

/head circumference (KANAWATI & MACLAREN, 1970). While it would be expected that these various measurements would yield the same data, recent publications by VIJAYA-RAGHVAN & GAURINATH-SHASTRI has shown that children classified as malnourished according to one test could be classified as normal according to another, especially in cases of moderate deficiencies. It thus seems that detection based on the single anthropometric test could lead to false or incomplete results and those more satisfactory results would be obtained if a battery of test were used. For this reason, we have chosen four anthropometric tests, biochemical variables and diet history in which levels decrease in severe forms of protein-energy malnutrition. In the recent work, we have attempted to define the possibilities of simultaneous utilization of several anthropometric tests as well as the possibility of using biochemical indicator to detect moderate and severe form of malnutrition.

The study involved 400 children from the forest and tribal region of Lemaru area under Korba district, Chhattisgarh. Stratified random sampling was performed in such a way as to assure the representation of all age group up to five years. Studies suggest that marasmus represents an adoptive response to starvation, whereas kwashiorkor represents a maladaptive response to starvation. Children may present with a mixed picture of marasmus and kwashiorkor and children may present with a milder form of malnutrition. For this reason, JELLIFFE suggested the term protein-calorie (energy) malnutrition to include both entities. Although protein-energy malnutrition affects virtually every organ system, this article primarily focuses on its cutaneous manifestation. Patients with   protein-energy malnutrition may also have deficiency of vitamins, essential fatty acids, and trace elements, all of which may contribute to their dermosis.

PEM occurs particularly in weaklings and children in the first year of life. It is not an important cause of childhood morbidity and mortality, but leads also to permanent impairment of physical and possibly, of mental growth of those who survive. The incidence of PEM in India in preschool age children is 1-2 percent. The great majority of cases of PEM nearly 80 percent are the "intermediate" ones that are the mild and moderate cases, which frequently go unrecognized. The problem exists in all the states and that nutritional marasmus is more frequent than kwashiorkor. The data provided by National Center for Health and Statistics (NCHS) and Center for Disease Control (CDC), USA is the currently accepted International Standards for Comparison.

Objectives of the Study:

The objectives of the study are as follows:
a)   The study is to ascertain the prevalence of protein energy malnutrition among children under 1-5 years.
b)   To identify risk factors associated with the occurrence of PEM among these subjects.
c)   To identify PEM in specific ethnic caste.
d)   To find out if there is any relationship between poor nutrition status and marasmus and kwashiorkor.
e)   To assess the nutritional knowledge, attitude and behavior of mothers regarding infant feeding, weaning practices and nutritional care of baby.

Research design and methodology

Research design and setting:-

The study was conducted over ten Anganwadi's center of area Lemaru of Korba block in the Korba district of Chhattisgarh. The study involved 400 children from the forest region of the range Lemaru.

Sampling was performed in such a way as to assure the representation of all age group up to 5 years. Stratified random sampling procedure was adopted to select approximately four hundred children for present study. The parents were interviewed to get the necessary information. A door to door survey was done and general information like name of the child, fathers name, age and sex of the child, type of family, parents occupation, educational status, ethnic caste, living standards, dietary information and history was collected the head of each house hold. Birthdays were taken from the birth certificates in Anganwadi workers/ Kotwar of village/ parents.

This was a cross-sectional study, descriptive in nature that sought to construct a profile of the nutritional status of preschool-aged children enrolled in a structured daycare setting. This study represented the nutritional status of preschool-aged children living in Lemaru, (Korba).

Descriptive study was taken, in fact seek to delineate the magnitude of problem in different population groups say in terms of prevalence and incidence, or to establish normal or abnormal levels of measurements and this study reveals demographic and life style variables such as age and sex distribution, socioeconomic status, family structure including marital status and number of single parent families, racial, ethnic and religion composition, consumption of various foods, supplements, medicines etc. The total number of population of the study area was 13470. After selecting the sample size/sampling our study were started. In Anganwadi center, the selected child and their mothers were invited for study or nutritional assessment at 8am to 12pm at one center. In the presence of Sarpanch, Anganwadi worker, health worker, schoolteacher and members of village Mahila mandal's our studies were performed.

Methods, Tools and Techniques:-

We have chosen two methods for assessing the nutritional status. Indirect method involved the assessment of mortality rates, morbidity rates, various socioeconomic, cultural and geographical variables, and other available health statistics and dietary data such as food production, food availability and food consumption. Direct assessment of nutritional status means when the individual or community were investigated directly and it includes methods such as nutritional anthropometry. The following four anthropometric criteria were chosen; weight for age, weight for height, arm circumference for age and the ratio of arm and head circumference. All the measurement was performed according to standard procedure described by JELLIFFE (1966).

Instruments / tools to be needed for assessed anthropometric measurement that have to be taken were followed.

Assessment of height – non-stretch tap, vertical measuring rod called anthropometer, a microtoise, a stadiometer (technique – at first subject stand up as straight as possible on flat surface, head should be hold erect with eyes front and should be read to the nearest 0.1cm.

Assessment of weight – Salter scale / spring scales (technique were based on the principle of spring balance and can be used to measure a maximum weight of 25kg. subject should be weighed in nude or minimal clothing. Scale should be placed on flat surface and it should read zero when no one is standing on it.

Assessment of mid-upper arm circumference – non-stretchable tape (technique –should be taken on left hand, the midpoint between tip of the shoulder bone and the tip of the forearm with the arm bent at elbows

and marked with pen and measure by tap in cm. the reading and calculation taken according to NCHS standard values.

The results were expressed as percentage of Harvard Standard expected (STUART & STEVENTION, 1959) for weight criteria and Wolanski's Standard JELLIFFE (1966) for arm circumference for age. For each of these criteria the children were classified as normal, malnourished / PEM category I, II, III, IV. Finally, we determined by for each criterion a threshold beneath which a state of moderate malnutrition could be suspected. The level of these thresholds were chosen among all those corresponding to moderate anthropometric deficiencies to be obtained a maximum of agreement between all criteria when paired. It should be recalled that a level of agreement is defined as the percentage of children who are simultaneously classified by two criteria in the categories "well to do healthy children" or malnourished according to the threshold tested. Thus, the greater agreement between two criteria the more precise is the definition of a state of under nutrition according to these criteria. The thresholds are the following: weight for age 80% of the standard; weight for height 90%, arm circumference for age 85%, and ratio of arm/head circumference 0.290. The significant of this threshold will be discussed in relation to the biochemical test.

Clinical Examination- For clinical examination we have used instrument were stethoscope, tongue depressor, thermometer, torch, gloves, syringe, cotton, pen, pencil, measuring tape etc. For biochemical, test blood was taken by venous puncture in the vein of forearm from elbow area. Using a system of 'vacutainer' tubes. Urine was collected once in the morning. After collecting the sample, we send to laboratory from Lemaru to Korba laboratory center for examination.

Dietary Assessment - Now dietary assessment was conducted with the help of diet surveys. The patients/Child mothers were questioned about their diet history and their knowledge according to the nutrition that we need much need. All the mother's was evaluated by rating scales through some questionnaire like-how effective was the nutrition education session and that was outcome for nutrition topic. Also assessed by some observation, which was done by participation of all mothers and by using methods of interviews.

Survey of family diet it to be taken essentially and taking assessment of dietary intake of individual by oral questionnaire (24- hour recall method and food frequency questionnaire); including qualitative diet survey is much important.

A "qualitative" individual dietary history form is presented. A family-based form would be quite similar: enquired about foods prepared for the family (as proposed to merely those consumed by the child) and vomit question about breast-feeding. Major categories of food but only few specific items are indicated. The final choice of food items to be listed depends upon local circumstances.

Observation & Result

The overall occurrence of PEM under 5 year's children was observed to be 67 %. However, it was to be significantly higher in female child 70.6 % and in the age group of 1-3 year was about 80.9 % as compared to the other age group. This age group also exhibited higher prevalence ($x = 14.67$, $p<0.05$) of grade I, II, III PEM Sen et. al. also reported a higher prevalence in the age group of 1-3 years , however Saxena et. al. (1997) reported a higher prevalence in the age group of 0-1 year. It was found that female had on overall higher prevalence of PEM (70.6 %) as also grade I PEM (36.6 %) in comparison to males who had overall

higher prevalence of PEM and grade I PEM as 62.6 % and 19.7 % respectively. Contradictory results were reported by Saxena et. al. (1997) and Srivastava (1985) as overall higher prevalence among males. However grade I, II and IV PEM was found to be significantly higher (x = 1.41, p<0.05) in males (27.4 %, 10.9 % and 4.3 %) respectively than in females (23.8 %, 7.3 %, and 2.7 % respectively).

Height and weight are significantly lower with increasing the grading accordingly NCHS standards. The overall PEM prevalence was seen to be higher among the children of illiterate mothers whereas grade II, III, IV PEM was higher amongst children of mothers having primary education according to table. Significant difference (x =12.53, <0.005) was found between the percent of PEM in children of mother who are illiterate or having primary education in comparison to those of having education upto the middle school and/or above. Other researchers have also reported similar observation studies shows that children of labourer and farmers are mostly suffers which 77.70% and 68.8% contributing respectively while the occupation of father was linked with skilled profession likely lower the PEM.

As sizable percentage of children with grade I and grade II PEM was found among the children of labourers. Significantly difference (x =11.04, P<0.05) was found in prevalence of PEM among the children of labourers/farmers in comparison to those who are in service/ business/ skilled profession. Srivastava (1985) also reported of higher prevalence grade I PEM amongst children belonging to labour class.

Table -1 Prevalence of PEM amongst under 5 year old children

	Age Group (Year)	Total children studied	Normal	Grade -I	Grade-II	Grade-III	Grade-IV	Total
c^2 = 14.67, df =2, p<0.05 for age wise					Malnourished			
	Age wise							
	1-3	252	85(33.7)	81(32.1)	53(21.03	23(9.1)	10(3.9)	167(66.2)
c^2 = 1.41, df = 1, p< 0.05 for sex wise	3-5	148	61(41.2)	40(27.02)	31(20.9)	11(7.4)	5(3.3)	87(58.7)
	Grand Total	400	146(36.5)	121(30.2)	84(21.0)	34(8.5)	15(3.75)	254(63.5)
	Sex wise							
	Male	182	68(37.3)	36(19.7)	50(27.4)	20(19.9)	8(4.3)	114(62.6)
	Female	218	64(29.3)	80(36.6)	52(23.8)	16(7.3)	6(2.7)	154(70.6)
	Grand Total	400	132(33.0)	116(29.0)	102(25.5)	36(9.0)	14(3.5)	268(67.0)

Table-2 Prevalence of PEM in relation to educational status of mother

Educational Status of mother	Total Children studied	Normal	Grade-I	Grade-II	Grade-III	Grade-IV	Total
				Malnourished			

Educational Status of Mother

Educational Status of mother	Total Children studied	Normal	Grade-I	Grade-II	Grade-III	Grade-IV	Total
Illiterate	232	52(22.4)	74(31.8)	74(31.8)	26(11.2)	6(2.5)	180(77.5)
Primary	60	20(33.3)	12(20.6)	20(33.3)	4(17.2)	4(17.2)	40(66.6)
Middle School	74	40(54.0)	24(32.4)	4(5.4)	4(5.4)	2(5.8)	34(45.9)
Above	34	20(58.8)	6(17.6)	4(11.7)	2(5.8)	2(5.8)	14(41.1)
Grand Total	400	132(33.0)	116(29.0)	102(25.5)	36(9.0)	14(3.5)	268(67.0)

c^2 = 12.53, df- -3, p<0.05 for educational status of mother

Table-3 Prevalence of PEM in relation to occupation of father

Occupation of father	Total Children studied	Normal	Grade-I	Grade-II	Grade-III	Grade-IV	Total
				Malnourished			

Occupation of father

Occupation of father	Total Children studied	Normal	Grade-I	Grade-II	Grade-III	Grade-IV	Total
Labour	162	36(22.2	58(35.8)	44(27.1)	20(12.3)	4(2.4)	126(77.7)
Farmer	90	28(37.1)	30(33.3)	24(26.6)	6(6.6)	2(2.2)	62(68.8)
Service	74	36(48.6)	14(18.9)	16(21.6)	4(5.4)	4(5.4)	38(51.3)
Business	34	12(35.2)	8(23.5)	10(29.4)	2(5.8)	2(5.8)	22(64.7)
Skilled Professional	40	20(50.0)	6(15.0)	8(20.0)	4(10.0)	2(5.0)	20(50.0)
Grand Total	400	132(33.0)	116(29.0)	102(25.5)	36(9.0)	14(3.5)	268(67.0)

c^2 = 11.04, df- 4, p<0.05 for occupation of father.

Table-4 Frequency distribution of Malnutrition of children over specific ethnic group/ caste of this study area.

Ethnic group/ caste	Total children studied	Normal	Malnourished	
			Number	Percent (%)
Pahadi Korva	33	4	29	87.87
Manjhwar	120	26	94	78.33
Kanwar	96	35	61	63.54
Uraon	104	58	46	44.23
Others	47	23	24	51.06
Total	400	146	254	100

Discussion

Nutritional deficiencies are widely prevalent in India in the rural areas, particularly among the poor families. We might have come across in our day – to – life is read in popular publication about nutritional disorders occurring due to either deficiency of macronutrients e.g.-energy and proteins or micronutrients like vitamin A and B-complex. Human beings require balance diet to live, thrive and survive to carryout various activities. Any imbalance or inadequacy in food and nutrients could cause ill health, lead to nutritional disorders and even cause death. Nutritional status of children is an indicator of nutritional profile of the entire community.

In our study the overall occurrence of PEM in under 5 year children was observed to be 67%, however it was found to be significantly higher 87.87%in ethnic group Pahadi korva which is danger alarming outcome for these community. We have seen remarkably higher percentage about 80.9% in the age group of 1-3 years (Table1.11) as compared to the other groups of our study. Previous expert studies shows that the population of children under three years of age who were underweight decreased from 53 percent in National Family Health Survey-1 (NFHS-1) conducted in 1992-93 to 47 percent in NFHS-2 (1998-99) and the proportion of severely underweight decreased from 12 percent to 18 percent. Our studies find out sex wise differences in protein-energy malnutrition of children. In a female child was significantly higher prevalence rate (70%) as compared to male child (62.6%). This is due to because of ignorance of female child and careless about the girl in the community. According to grading of PEM finds out result shows 29.0%, 25.5%, 9.0% and 3.5% respectively PEM I, II, III, and IV. Grade I was higher prevalent in female child (36.6%) while that of grade II, III and IV was more prevalent in male child. Contradictory results were reported by Saxena et. al (1997) and Srivastava (1985) as overall higher prevalence among males.

A study reveals that about 80% rural females avoid feeding of colostrums to newborn children. Colostrums have often discarded due to certain taboos (it is impure milk), it can came diarrhoea /dysentery and cause harmful to baby, that is why in this community where the prevalence of malnutrition continues to be high in India. Such result found that complementary food have introduced only after the

Childs completes the age of one year. Ultimately, the child is not getting adequate food even from a very young age. 30% mothers of child told that they were unknown about colostrums & their importance and benefits for baby. PEM prevalence has seen to be higher among the children of illiterate mothers. About 58% mothers were illiterate in their community and largely influenced by belief system of society and superstitious. Studies find out larger the family size, even if they spend their complete income or food with low purchasing power they would be unable to meet their requirements. About 15-20% mothers told that prolonged breast-feeding of children is rule of rural India, the amount of breast milk secreted in poor Indian mother is lower than either normal women or those of developed countries. Therefore, the infants may not be consuming adequate breast milk leading to inadequate nutrition. The percent of PEM in children of mothers who are just literate of having primary education and increasing the educational qualification respectively decreases the PEM child. Other researchers have also reported similar observation. Survey revealed that PEM is primarily due to dietary energy deficient arising because of insufficient food intake. The primary bottleneck in the dietaries of Indian children, who have given cereal-pulse based diet, is energy and not protein as, higher to believe. Data collected from rural mothers of their study area through interviews, observation, asking questions, rating scale reveals that improper childcare, either as a result of lack of knowledge or lack of time for mother, also contribute to the onset of PEM. In rural children low birth weight (<2500gm) was 35%. NFHS studied that about 30% of babies born in India are LBW. The status of low birth weight when high, the majority have suffered from fetal growth retardation. Low birth weight, maternal malnutrition and anemia appear to be significant risk factor in its occurrence. Among the other causes of LBW, we find out that was hard physical labor during pregnancy and illness especially infections, short maternal stature, very young age, high parity, smoking, close birth intervals was all associated factors. The proportion of infants born with LBW has been selected as one of the nutritional indicators for monitoring progress towards 'Health for All' by the year 2000. Prevalence of PEM in relation to the occupation of father was carefully studied and found that maximum 77.7% among those children whose father was labourers. In which 35.8% was grade I, 27.1% was grade II, 12.3%was grade III and 2.4% was grade IV classified of PEM, while serviceman or skilled professional were minimum 50%. Studies revealed the cause behind this the poor cannot purchase adequate amount of food of desired quality for meeting their and their families nutritional requirements. This deprivation adversely affects their capacity for physical work resulting in low earning and poverty. A vicious cycle is thus setup. In the new social milieu, completing demands for non-food expenditure, such as on housing, clothing and entertainment have gone up significantly often at the cost of the expenditure on food. Srivastava (1985) also reported of higher prevalence grade I PEM amongst children belonging to labour class.

Table1.10- represented frequency distribution of symptoms and/ or signs (morbidity picture) in children 0-5 year. 63.5% was detected under nutrition, 34.7% was worm infestation, 31.7% was pica, 25.7% was scabies infection and significantly 18% and 16.2% was upper respiratory infection and diarrhoea/ dysentery respectively. This data was really an alarming was malnourishment of children. Infection such as diarrhoea, pneumonia, malaria, measles, whooping cough and tuberculosis precipitate acute malnutrition and aggravate the existing nutritional deficit. During infections, child appetite is impaired. There may be iatrogenic restriction of food by the parents. The patient catabolizes his own tissues to produce additional heat energy, which is last during fever. Metabolic demands for protein during infections are higher. Protein may be lost because of tissue breakdown, and in pus and exudates. In addition, malnutrition may adversely affect the immune system/ status and make the malnourished individuals more vulnerable to infections, this set-up a vicious cycle of malnutrition- infection- malnutrition, and therefore such children loss weight.

The overall prevalence of PEM in specific ethnic groups studies were Pahadi korva contributes maximum rate (87.87%), Manjhwar (78.33%), Kanwar (63.4%), and Uraon (44.23%) (Table 1.11–

represented). The Pahadi korva was very poor and this community we find poverty, ignorance, insufficient education, lack of knowledge regarding the nutritive value of foods, inadequate sanitary environment, large family size and they were contraindicated for family planning by Govt. of India. Thus, lesser MCH care practices. These factors bear most directly on the quality of life and are the true determinants of malnutrition in society, while in ethnic caste Uraon have contributing only 44.23% due to because of high literacy rate, living of standard is good as compared to Pahadi korva and Manjhwar, short family size and better MCH care practices. Other associated factors present in this area were food habits, customs, beliefs, traditions and attitudes. Food habits are among the oldest and most deep psychological roots and are associated with love, affection, warmth, self-image and social prestige. Rice is only the staple cereal of this community. The story has told of a Philippine student who died of beri-beri after writing an essay explaining how the disease prevented. The crux of the problem is that many customs and beliefs apply most often to vulnerable groups, i.e. infants, toddlers, expectant and lactating women. Papaya avoided during pregnancy because it believed to cause abortion. In Gujarat, the nursing mother avoids valuable food such as dhal, leaf greens, rice and fruits. Certain foods are "forbidden" as being harmful for child. Then there are certain beliefs about hot and cold foods, light and heavy foods. In this remote area there have no properly immunization. Survey of the parents about immunization revealed that 40% child were immunizing ultimately results to various acute infection was entering in body and damage the immune status. Another drawbacks was draining away the rice water at the end of cooking, prolonged boiling of open pans, peeling of vegetables all influence the nutritive value of foods. Some child rearing practices also contributed this like premature curtailment of breast-feeding, the adoption of bottle-feeding and adoption of commercially produced refined foods. In Pahadi korva and Manjhwar, community men eat first and women eat last poorly. Consequently, the health of women in this society may be adversely affected. Chronic alcoholism is another factor, which may lead to serious malnutrition. This tribal area was more prone to infectious diseases and endemic for malaria, diarrhea/ dysentery, scabies, bronchitis/ acute upper respiratory infection. Sanitary water supplies were not properly meet. There is no definite sanitation of housing. Peoples work with bare foot all time and therefore suffered from injury, worm infestation that creates loss of appetite and delayed absorption of nutrients. The most of the Pahadi korva, Manjhwar were labourers and landless, that is why decreased food consumption. The per capita arable land for an average Indian is only 0.3 hectare (according to FAO), but increased food production will not solve the basic problem of hunger and malnutrition in much of the developing world. Scarcity of food, as a factor responsible for malnutrition, may be true at the family level; but it is not true on global basis, nor is it true for the most of the countries where malnutrition is still a serious problem. Health and other services were giving very little facility to the community. There are only one PHC at the area, which is running only by health workers.

Acknowledgements

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Authentication Certificate

STUDENT CERTIFICATE

The work embodied in this dissertation entitled "PREVALENCE OF PROTEIN ENERGY MALNUTRITION IN TRIBAL PRESCHOOL CHILDREN" Lemaru, Korba district; Chhattisgarh has been carried out by me under the supervision of DR. ARUNA PALTA.

This work is original and has not been submitted by me for the award of any other degree to this or any other University.

Date:

(AJAY KUMAR PATEL)

Place: RAIPUR

CERTIFICATE OF DISSERTATION COUNSELOR

I certify that the candidate Mr. AJAY KUMAR PATEL has planned and conducted the research study entitled "PREVALENCE OF PROTEIN ENERGY MALNUTRITION IN TRIBAL PRESCHOOL CHILDREN" Lemaru, Korba district, Chhattisgarh under my guidance and supervision and that the report submitted herewith is a bonafide work done by the candidate in Lemaru, Korba district, Chhattisgarh from Jan 2013 to Dec 2013.

Date

Place: RAIPUR

(DR. ARUNA PALTA)
Dissertation Counselor & Principal
Dr. R. B. Govt Navin Kanya Mahavidyalaya Raipur (C.G.)