DETERMINANTS OF PRIMARY AND SECONDARY MALNUTRITION AMONG CHILDREN UNDER 5 YEARS OF AGE IN PAEDIATRICS DEPARTMENT OF MAYO HOSPITAL LAHORE

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Abstract:
Objective: Determinants of primary and secondary malnutrition among children under 5 years of age in pediatrics department of Mayo Hospital Lahore.
Study Design: Cross-Sectional.
Place and Duration of Study: Present research paper was completed in the period of eight months from December, 2014 to August, 2015 at the venue of Pediatrics Department of Mayo Hospital Lahore.
Material and Methods: The patients included in the study were 100 whose age ranged between two months to five years of age presented in pediatrics department Mayo hospital Lahore. A cross-sectional survey questionnaire assessed the patient's bio data, socioeconomic status, eating habits, poverty, infections, and educational status of mothers. It was a descriptive study and was conducted through a cross-sectional survey. Data was analyzed by SPSS version 20.
Results: Children in our study population were suffering from both primary and secondary malnutrition. After describing the demographic characteristics using frequency tables, simple logistic regression was applied.
Conclusion: Malnutrition is found to be significantly associated with the improper weaning, lactation failure, inadequate breast feeding, recurrent childhood infections, poor eating habits, Lack of food diversification, poverty, lack of education of mother and congenital disorders of children with respect to descending order in terms of importance and contribution to malnutrition.
Keywords: Malnutrition, determinants, children under 5, lactation failure, infections, lack of education.

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INTRODUCTION:

Malnutrition, insufficiency of one or more nutritional elements necessary for health and well-being [1]. Primary malnutrition is caused by the lack of essential foodstuffs—usually vitamins, minerals, or proteins—in the diet. In some areas of the world a poor economy or such regional conditions as drought or overpopulation cause a scarcity of certain foodstuffs, and a certain portion of the population is malnourished because essential nutrients are not available. However, even when food is plentiful, malnutrition can result from poor eating habits or poverty. Primary malnutrition, due to a lack of food or an inability to afford nutritious food, has been estimated to affect as many as a fourth of the world's children [2]. Secondary malnutrition is caused by failure of absorption or utilization of nutrients (as in disease of the gastrointestinal tract, thyroid, kidney, liver, or pancreas), by increased nutritional requirements (growth, injuries, burns, surgical procedures, pregnancy, lactation, fever), or by excessive excretion (diarrhea). Good nutrition is necessary for the growth and development of children under five years of age. Childhood malnutrition as a major public health problem among children in developing countries can affect physical and intellectual growth and is also considered as a main cause of child morbidity and mortality[3] Anthropometric measurements of the children were taken in rural Nigerian community and information about feeding practices, immunization and parental education was obtained from their mothers. Fifty-two percent were stunted, 30% were underweight and *25% were wasted* [4]. A study conducted Fars province of Iran suggested that the rates of stunting, underweight, and wasting were 9.53, 9.66, and 8.19%, respectively. Male children were more stunted. Compared to females (OR= 1.41, CI: 1.26-1.58). Also, stunting was significantly associated with lower family income (OR= 3.21, CI: 1.17-8.85) and lower maternal education (OR= 0.80, CI: 0.64-0.98). [5]Underweight (WAZ < -2) and stunting (HAZ < -2) occurred in 43.4% and 52.7%, respectively. WAZ and HAZ mean scores of the children were -0.91(SD = 0.43) and -0.83 (SD = 0.54), respectively. Boys were more underweight (48.8%) than girls (38.5%), and the difference was statistically significant (p = 0.024; p < 0.05). Conversely, girls tend to be more stunted (56.8%) compared to boys (48.4%) (p = 0.004; p < 0.05). Normal WAZ and HAZ occurred in 54.6% and 44.2% of the children, respectively. Using the 2007 World Health Organization BMI thinness classification, majority of the children exhibited Grade 1 thinness (77.3%), which was predominant at all ages (9-12 years) in both boys and girls. Gender wise, 79.8% boys and 75.0% girls fall within the Grade I thinness category. Based on the WHO classification, severe malnutrition occurred in 31.3% of the children.[6] Study conducted in rural Malaysian community suggested that 221 children who were assessed using anthropometric measurements, dietary questionnaires and other tools. *Weight-for-age*, *height-for-age*, *weight-for-height* were analyzed. Based on the NCHS standards, the overall prevalence of underweight, stunting and wasting was 46.2%, 18.1% and 30.3% respectively. Almost one-third of the 1-2 years old groups were malnourished. Univariate analysis identified household income └ MR750.00 as a significant risk factor of stunting and wasting. [7]Study conducted in Bostavana shows that the level of wasting, stunting, and underweight in children under three years of age was 5.5 %, 38.7 %, and 15.6 % respectively. Malnutrition was significantly (p < 0.01) higher among boys than among girls. The prevalence of underweight decreased significantly (p < 0.01) as family income increased. The higher the level of the mother's education, the lower the level of child underweight observed. Breastfeeding was found to reduce the occurrence of underweight among children. [8]A large minority (21.5%) of the children surveyed were found in poor health after clinical examination: 3.8% being classified as suffering from kwashiorkor and 5.7% with marasmus. A high proportion of children were stunted (23.8%), underweight (24.1%), or had low MUAC (21.6%).For stunting the risk factors were: age of the child, poor health, prolonged breastfeeding (from >18 months to <24 months), low socioeconomic status of the family, poor education of the mother of infants <12 months, lack of paraffin as fuel, consumption of food of low energy density (<350 kcal/100 g dry matter), presence of eye pathology, and consumption of small meals. Risk factors for low MUAC were poor health, lack of meat and cow's milk consumption, low intake of energy from fat, and less well educated and older mothers. [9]A study was conducted in Western Kenya and the prevalence of underweight, stunting and wasting were determined: 30 per cent were underweight, 47 per cent were stunted, and 7 per cent were wasted. Predictors of undernutrition were analyzed using logistic regression controlling for age, sex, and SES, and four major findings emerged. First, children in their second year of life. Second, children who were introduced to foods early. Third, up-to-date vaccinations were protective against stunting, while reports of having upper respiratory infections or other illness in the past month predicted underweight. [10] A Study was conducted in Dhaka City of Bangladesh and the Results of analysis of this study data revealed that the prevalence of stunting

among preschool children in Dhaka city was 39.5%, with 25% severely stunted and 14% moderately stunted (p<0.001). Results of bivariate analysis revealed that socioeconomic and demographic factors were most significantly associated with the stunting of children. [11]A Study was conducted in Vavuniya srilanka to describe the factors associated with degree of malnutrition among hospitalized malnourished children in general hospital vavuniya. The rate of moderate acute malnutrition was 14.8% and severe acute malnutrition was 8.7%. SAM was associated with lower maternal education p<0.001, lower paternal education p<0.001, low family income p=0.022 and mother being a house wife p=0.009. [12]A Study was conducted in Bangladesh and the analyses revealed that 45 percent of the children under age five were suffering from chronic malnutrition, 10.5 percent were acutely malnourished and 48 percent had under-weight problem. The main contributing factors for under five malnutrition were found to be previous birth interval, size at birth, mother's body mass index at birth and parent's education .[13]

All the variables associated with primary and secondary Malnutrition were not covered under the previous studies. We will try to study the variables which were not covered under the previous studies. Moreover no statistics are available in Punjab for children under 5 years of age, this study will provide the logistics for the Mayo Hospital Lahore, Punjab. Different causes of Malnutrition can be determined and patients can be made aware of them via this study.

MATERIAL AND METHODS:
Study Designs:
Cross-sectional.
Setting:
Pediatrics Department of Mayo Hospital Lahore

Duration:
3 months after the approval of synopsis.
Sample Size:
A total of 100 children will be taken in this study.
SAMPLE SELECTION CRITERIA
Inclusion Criteria:
Children under 5 years of age.
Children having below normal Height to Age Ratio, Height to Weight Ratio and
 Weight to Age ratio.
Exclusion Criteria:
Children above 5 years of age.
Healthy children with normal Height to Age Ratio, Height to Weight Ratio and
Weight to Age ratio.
Children with other diagnosed pathologies.
Data Collection Procedure:
After approval of synopsis from board of study and IRB from King Edward Medical
University, all 100 children fulfilling inclusion criteria will be selected. A
questionnaire containing all the questions necessary for the assessment of
malnourishment will be formulated according to the determinants and will be filled by the parents of the children. The results will be compiled and analyzed.
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RESULT AND DISCUSSION:
All collected data is entered and analyzed in computer program SPSS version 20. Frequency and determinants are calculated. Children in our study population were suffering from both primary and secondary malnutrition. After describing the demographic characteristics using frequency tables, simple logistic regression was applied. hildren in our study population were suffering from both primary and secondary malnutrition. After describing the demographic characteristics using frequency tables, simple logistic regression was applied.

Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	less than 6 months	17	17.0	17.0	17.0
	6 months-1 year	25	25.0	25.0	42.0
	1-2 year	26	26.0	26.0	68.0
	2-5 years	32	32.0	32.0	100.0
	Total	100	100.0	100.0	

Age of weaning

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no breast feeding	8	8.0	8.0	8.0
	weaning not yet started	26	26.0	26.0	34.0
	6 months	35	35.0	35.0	69.0
	1-2 year	31	31.0	31.0	100.0
	Total	100	100.0	100.0	

Duration of breastfeeding

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no breast feeding	8	8.0	8.0	8.0
	breast feeding continues	29	29.0	29.0	37.0
	breast fed up to 6 months	31	31.0	31.0	68.0
	breast fed for 1 to 2 year	32	32.0	32.0	100.0
	Total	100	100.0	100.0	

Formula fed in diet

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	47	47.0	47.0	47.0
	Yes	53	53.0	53.0	100.0
	Total	100	100.0	100.0	

Change in eating habits

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	61	61.0	61.0	61.0
	yes	39	39.0	39.0	100.0
	Total	100	100.0	100.0	

Number of meals

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 meal per day	3	3.0	3.0	3.0
	2 meals per day	8	8.0	8.0	11.0
	more than 3 meals per day	89	89.0	89.0	100.0
	Total	100	100.0	100.0	

Type of food

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	junk	24	24.0	24.0	24.0
	healthy	74	74.0	74.0	98.0
	both	2	2.0	2.0	100.0
	Total	100	100.0	100.0	

Monthly income

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Up to 5000 Rs.	2	2.0	2.0	2.0
	Up to 10000 Rs.	24	24.0	24.0	26.0
	Up to 15000Rs.	36	36.0	36.0	62.0
	Up to 20000 Rs.	38	38.0	38.0	100.0
	Total	100	100.0	100.0	

Failure of absorption

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	not present	39	39.0	39.0	39.0
	infection	46	46.0	46.0	85.0
	metabolic disorder	13	13.0	13.0	98.0
	trauma	2	2.0	2.0	100.0
	Total	100	100.0	100.0	

Bowel habits

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	abnormal	43	43.0	43.0	43.0
	normal	57	57.0	57.0	100.0
	Total	100	100.0	100.0	

Consistency

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	normal	52	52.0	52.0	52.0
	watery	38	38.0	38.0	90.0
	hard	10	10.0	10.0	100.0
	Total	100	100.0	100.0	

Change in appetite

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no change	49	49.0	49.0	49.0
	decreased appetite	43	43.0	43.0	92.0
	increased appetite	8	8.0	8.0	100.0
	Total	100	100.0	100.0	

Education of mother

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	educated	45	45.0	45.0	45.0
	uneducated	55	55.0	55.0	100.0
	Total	100	100.0	100.0	

Immunization

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	11	11.0	11.0	11.0
	yes	89	89.0	89.0	100.0
	Total	100	100.0	100.0	

Congenital disorder

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	83	83.0	83.0	83.0
	yes	17	17.0	17.0	100.0
	Total	100	100.0	100.0	

Weight for age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	weight up to 5 kg	25	25.0	25.0	25.0
	weight up to 10 kg	58	58.0	58.0	83.0
	weight up to 15 kg	17	17.0	17.0	100.0
	Total	100	100.0	100.0	

Height for age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	50 cm - 60 cm	18	18.0	18.0	18.0
	60cm - 70 cm	21	21.0	21.0	39.0
	70cm - 90 cm	42	42.0	42.0	81.0
	90cm - 120cm	19	19.0	19.0	100.0
	Total	100	100.0	100.0	

BMI

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	5-10	22	22.0	22.0	22.0
	10-13	46	46.0	46.0	68.0
	13-16	32	32.0	32.0	100.0
	Total	100	100.0	100.0	

Sclera of eye

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	normal	86	86.0	86.0	86.0
	pale	13	13.0	13.0	99.0
	blue	1	1.0	1.0	100.0
	Total	100	100.0	100.0	

Skin color

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	normal	51	51.0	51.0	51.0
	pale	48	48.0	48.0	99.0
	blue	1	1.0	1.0	100.0
	Total	100	100.0	100.0	

Tongue

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	normal	94	94.0	94.0	94.0
	white	5	5.0	5.0	99.0
	red	1	1.0	1.0	100.0
	Total	100	100.0	100.0	

Muscle wasting

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	absent	81	81.0	81.0	81.0
	present	19	19.0	19.0	100.0
	Total	100	100.0	100.0	

DISCUSSION:

Both Primary and secondary malnutrition in children are a common problem of our society especially in children below five years of age. This study is an attempt to analyze the effects of apparent risk factors on malnutrition in children aged up to 5 years. Previous studies on malnutrition suggested that children from 6 months to 2.5 years of age are more prone to malnutrition as compared to other age groups. Our supporting article which is a study conducted in Peru about malnutrition strongly suggests this fact.

In our study age from 2-5 years was found to be significantly associated with malnutrition with 32% of children having it while according to age of weaning 35% of children under 6 months of age were suffering from malnutrition. Study conducted at Peru also suggested that early childhood before the age of two years is a particularly critical time for growth faltering. This window of time corresponds to weaning and introduction of complementary foods and if proper diet, may it be natural milk or the formula diet, (adequate quantity issues or lack of proper dilution) is not available to children then they suffer from severe malnutrition which leads to many other pathologies which cannot be recovered throughout the life. In our study 53% of children under 5 years of age have consumed formula diet with proper dilution and in proper quantity but rest of the 47% are lacking in this aspect.

61% of the children did not have significant change in eating habits according to growth requirements which contributes to their malnutrition.

89% of children were taking more than 3 meals /day and 74% of them were on healthy food but 46% of these children suffered from mal absorption due to different childhood infections. 43% have abnormal bowel habits and 38% have presented with watery consistency of stool although 89% of children in our study population were properly immunized. Only 11% were not immunized properly according to the recommendations of WHO. A study in Peru also suggested that infections were very high in preschool children. A study in Zanzibar by Stoltzfus (2004) demonstrated that 31.3% of children under 30 months of age were infected with parasites. Thus, infections are a major issue in children which is one of the major causes of secondary malnutrition and therefore becomes the major variable in our study.

Poverty is an important factor contributing to malnutrition. 38% of our study population have monthly income of just PKR 20,000 while 62% were even below that. Study in Peru also suggested that children living in areas of greatest poverty suffered the most from health and social inequities due to increased disease burden and lack of access to necessary health interventions and services.

Another important determinant of malnutrition is education of mother. Our study suggested that 55% of mothers are uneducated. Previous studies and our supporting article do not comment on this variable which in our study has appeared to be an important factor of malnutrition. Uneducated mothers mostly are unaware of the growing needs of young children.

17% of our study population was suffering from congenital disorders. This variable has not been mentioned in previous studies.

46% of children in our study population have BMI <13kg/m2 (which is less than the WHO recommended growth chart for children under 5 years of age). 22% have BMI <10kg/m2 which gives a clear indication that they are suffering from malnutrition. On GPE, 48% of children were pale, 13% have yellow sclera and 19% have muscle wasting. The study conducted in Peru in 2004 also supports this.

CONCLUSION:

All collected data is entered and analyzed in computer program SPSS version 20. Frequency and determinants are calculated. Children in our study population were suffering from both primary and secondary malnutrition. After describing the demographic characteristics using frequency tables, simple logistic regression was applied. hildren in our study population were suffering from both primary and secondary malnutrition. After describing the demographic characteristics using frequency tables, simple logistic regression was applied. Malnutrition is found to be significantly associated with the improper weaning, lactation failure, inadequate breast feeding, recurrent childhood infections, poor eating habits, Lack of food diversification, poverty, lack of education of mother and congenital disorders of children.

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