Malnutrition and its Determinants: A population based study among children of 5-59 months at District Swat, Pakistan.

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ABSTRACT

Background: Globally, malnutrition is one of the major public health problems and affects all ages. This cross-sectional study was conducted to estimate the frequency and potential determinants of malnutrition among the children of age 5-59 months at District Swat, Pakistan.

Material & Methods: A cross-sectional study was conducted among children of age 5-59 months at Swat, Pakistan, from October, 2018 to April, 2019. After ethical approval, 200 children were assessed to estimate the frequency of malnutrition and the potential determinants related to malnutrition. A structured questionnaire was used for data collection. Strict inclusion and exclusion criterion was followed and individuals on the basis of BMI were categorized into normal, under-nutrition and over-nutrition classes. The data was analyzed by SPSS version 19.0. Finally, results were presented in tabular form.

Results: The prevalence of malnutrition was 48%. The prevalence of under nutrition was 40.5% and over nutrition 11.5%. Moreover, 43% had mild; 21% had moderate and 17% had severe malnutrition. Approximately, 49% had age above 24 months; 46.5% were illiterate; 30% had monthly income > PKR40000, 79.5% were breastfed; 14.5% were bottle-fed; 39.5% used pre-lacteals; 59.5% had history of infections; and 52% started weaning at correct time.

Conclusions: The prevalence of malnutrition was high (48%) among 5-59 months children and showed relationship with monthly income, mothers literacy, family size, and BMI of mothers and children. Moreover, malnutrition also revealed strong relationship with breast feeding, weaning, and acute and chronic infections. Thus, effective mother and child health-care (MCH) services along with growth and monitoring measures were needed to improve the nutritional status of the community.

Key words: Frequency, Malnutrition, Underweight, Illiteracy, Breast Feeding, Weaning, Swat

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INTRODUCTION

Malnutrition is still considered as an important public health issue in most of the developing and developed countries; chronic malnutrition showed strong relationship with many communicable diseases and thus resulting in high deaths among children of less than five years.[1] Malnutrition is a direct tool to assess and check the nutritional health of a community. According to 2013 statistics, approximately 16.8% of children less than five years were below normal weight.[2] The low and middle income countries still face high chronic as well as acute under-nutrition in children.[3] Moreover, all high-income countries had a much higher prevalence of obesity than under-nutrition.[4] In the least developed nations, malnutrition is recognized as one of the preventable factors responsible for death of children. Approximately more than 70% malnourished children are living in South-East Asia region and nearly 80% child deaths among these nations were due to moderate and severe malnutrition.[5]

The double burden of nutrition problem i.e. obesity and overweight affects 41 million children and is responsible for approximately 1.2 M deaths annually.[6,7] The high death prevalence rates among the children are due to under nutrition, mostly reported from third world countries; are

further aggravated by the reduce nutrient intake due to communicable diseases and socio-economic status i.e. poverty among the families.[8] Beside these direct factors, the other indirect factors resulting in malnutrition were age of children, gender, breast feeding and supplementary food quality, communicable diseases, mothers literacy level, mothers height and weight, location of residence, and the socio- economic status of the families and communities.[9,10,11]

In 2016, the United Nations General Assembly passed a resolution that Uno will celebrate this decade as a Nutrition decade, as combating nutrition crisis is one of the important global nutrition challenge and is linked with economic development, rate of urbanization, diet diversity and nutrition-related determinants. According to 2016 statistics, an approximately 39 Million children less than five years were obese or overweight, while 149 Million had chronic malnutrition.[12] Moreover, poor sanitation, lack of hygienic practices, worm infestation, under-privileged, illiteracy and unemployment, large family size, and recurrent infection showed strong relationship with malnutrition.[13]

Globally, approximately 2.2 million deaths among 0-59 months of age are attributed to malnutrition, and thus represent the status of health and health-care practices. Many factors can cause malnutrition like poor diet, severe and repeated infections, poor environmental conditions, poor housing and poor health-care.[14]

In 2010, approximately 43 million children less than five years were obese and overweight.[15] Lower rates were reported by Germany (6.1%) and France (21%); higher rates by Romania (37%), Vietnam (19%) and Turkey (31.8%); and the highest rates by Iran (67.07%).[16] The proximate factors of malnutrition were age of the child, gender, inappropriate food consumption and communicable diseases. Beside these factors; secondary determinants i.e. socio-economic status of the families and physical and social habitat had a great role in food quality and availability, and also access to financial opportunities and literacy.[17] The indirect risk factors associated were lack of maternal education, underweight mothers, low birth weight, and sub-optimal complementary feeding practice in children aged 6-11 months.[7] Moreover, low GDP (Gross Domestic Product), illiteracy and large family size also affect nutritional status of a family. Thus, breastfeeding, food and water accessibility are the major significant determinants of malnutrition.[18,19] In 65th World Health Assembly (WHA) conducted back in 2012, the international public health specialists agreed that various forms of under nutrition and over nutrition be

reduced by 2030.[20] Maternal over-nutrition (BMI ≥ 25) is associated with infant mortality and childhood obesity;[21] which has indirect relationship between body mass index (BMI) of mothers and nutritional outcome.[20]

Pakistan is a developing country and having high prevalence of malnutrition with high infant and child morbidity and mortality rates. Due to high population growth, poor socio-economic conditions, illiteracy, local customs & faulty practices, the nutrition status of the communities were compromised. Therefore, this cross-sectional study was conducted to estimate the frequency of malnutrition, and to investigate the potential determinants of malnutrition among the children of 5 to 59 months of age in District Swat, Pakistan.

METHODOLOGY

After taking ethical approval from the Ethical Review Committee, a cross-sectional study was conducted among the children of District Swat, Pakistan, from October, 2018 to April, 2019. After informed consent, a total of 200 mothers (n=200) of less than five years children (5-59 months) were selected. A structured questionnaire was used to collect data regarding the continuous and categorical variables. Malnutrition was categorized in terms of over nutrition (overweight) and underweight, with further categories of mild, moderate and severely underweight. The potential determinants, as evident from the literature, were assessed in relation to the dependent variable of malnutrition. The inclusion criterion was all the married women of District Swat with at least one child; and those who were not permanent residents of District Swat were excluded. The data was analyzed by SPSS version 19.0. Finally, results were presented in the form to tables.

RESULTS

The frequency and percentage of malnutrition assessment among children (n=200) ages 5-59 of District Swat Pakistan was shown in *Table No.1*.

The demographic characteristics of malnutrition assessment among children (n=200) ages 5-59 months of District Swat Pakistan was shown in *Table No.2*.

The various determinants of malnutrition assessment among children (n=200) ages 5-59 months of District Swat Pakistan was shown in *Table No.3*.

Category of Malnutrition	BMI kg/m²	f (%)
Severely underweight / malnourished	< 15	17 (8.5)
Mild to moderately underweight / Malnourished	15 - 15.99	21 (10.5)
Mildly underweight / malnourished	16 - 18.49	43 (21.5)
Normal (healthy weight)	18.5 - 24.99	96 (48)
Overweight	25 & above	23 (11.5)

Table 1. Frequency and percentage of Malnutrition assessment among children (n=200) of District Swat Pakistan

Demographics	Variables	F (%)
Age groups	5-12 months	57 (28.50)
	12-24 months	45 (22.50)
	24-36 months	39 (19.50)
	36-48 months	31 (15.50)
	48-59 months	28 (14.00)
Monthly income	< 20000	97 (48.50)
	20000 - 40000	43 (21.50)
	> 40000	60 (30.00)
Educational status	Illiterate	93 (46.50)
	Middle/Secondary	49 (24.50)
	Inter & above	58 (29.00)
House structure	Cemented	131 (65.50)
	Mud etc.	69 (34.50)
No of children per family	1 & 2	113 (56.50)
	3 & 4	54 (27.00)
	> 4	33 (16.50)
BMI of mothers	Normal	51 (25.50)
	Underweight	87 (43.50)
	Overweight	62 (31.00)
Birth weight	Underweight	63 (31.50)
	Normal	137 (68.50)

Table 2. Demographic characteristics of malnutrition assessment among children (n=200) ages 5-59 months of District Swat Pakistan

Variables	Response	F (%)
Type of initial feeding	Breastfed	159 (79.5)
	Bottle-fed	29 (14.5)
	Mixed	12 (6.0)
Any pre-lacteals given before breast milk	Yes	79 (39.5)
	No	121 (60.5)
Total duration of breast feeding	4 months	13 (6.5)
	6 months	19 (9.5)
	9 months	29 (14.5)
	12 months	22 (11.0)
	18 months	56 (28.0)
	24 months	61 (30.5)
Weaning started at age	4 months	61 (30.5)
	5 months	43 (21.5)
	6 months	59 (29.5)
	8 months	24 (12.0)
	12 months	13 (6.5)
Type of weaning food given	Mixed	113 (56.5)
	Rice	36 (18.0)
	Potato	17 (8.5)
	Yogurt	8 (4.0)
	Cereals	26 (13.0)
History of acute or chronic infection	Yes	119 (59.5)
	No	81 (40.5)
Carbohydrates preference	Yes	73 (36.5)
	No	127 (63.5)
Protein preference	Yes	57 (28.5)
	No	143 (71.5)

Table No 3. Determinants of malnutrition assessment among children (n=200) ages 5-59 months of District Swat Pakistan

DISCUSSION

According to our study results, 48% of children had normal nutritional status and 52% of the children had malnutrition. Thus, our study findings were consistent with international studies which showed 49.3% and 52.7% of malnutrition among the children.[8,16] Moreover, our study findings were more as compared to studies of Amatya & Shrestha, 2017, and Kinyoki *et al.*, 2015.[3,17]

In a study conducted internationally, mild, moderate and severe malnutrition was 39%, 12% and 1.7%; where as in our study it was 43%, 21% and 17% respectively.[16] Many international studies reported varied range of under-nutrition, ranging from 12.5% to 60.42%;[3,5] where as in our study about 40.5% had under-nutrition. Thus our study results were higher as compared to *Hoseini et al.*, 2015, and

Amatya & Shrestha, 2017;[2,3] and was lower as compared to Rahman & Hakim, 2016, and Vellakkal *et al.*, 2015.[5,22] Moreover, in our study, the double burden of malnutrition i.e. under-nutrition and over-nutrition was 52% among the children as was reported by international studies of Eze *et al.*, 2017, and Kosaka & Umezaki, 2017.[23,24] Interestingly, our study results were consistent with, and thus supported, the findings of Laghari *et al.*, 2015,[8] which showed 47.2% of malnutrition among children.

According to our study results, approximately 11.5% of study population was found overweight/ obese and thus had higher prevalence as compared to many international studies.[5,13,23] Moreover, our study findings supported the findings of a study conducted in Brazil by Kosaka & Umezaki,

published in British Journal of Nutrition, in 2017, which showed 9% overweight.[24]

Many international studies revealed strong association of malnutrition with acute and/or chronic infections, and showed prevalence of 61.5%, 66%, 54.5% and 43%;[5,7,16,17] while in our study, approximately 59.5% had history of acute and chronic infections. Thus, our study findings supported the results of Rahman & Hakim, 2016; and Mawa & Lawoko; in 2018;[5,7] whereas our results showed higher prevalence as compared to Kapçı *et al.*, 2015; and Kinyoki *et al.*, study of 2015.[16,17] Moreover, in our study, 43.5% had 3 or more than 3 children and similar findings were revealed by international studies which showed strong relationship of family size with malnutrition among children.[5,11,17]

In our study, 48% had normal nutrition status as were found in international studies which showed 41% and 78.9% normal nutritional status among the studied population.[13,23] According to our results, only 25.5% had completed the breast feeding duration of 24 months and 23% were given 18 months of breastfeeding along with complementary feeding as was reported by Hosein *et al.*, 2015 and Aheto *et al.* study of 2015;[2,11] which showed suboptimal and longer duration of breastfeeding.[2,11] Moreover, 85.5% of children were breastfed whereas in an international study 99.1% were found breastfed.[14]

In our study, 30.5%, 21.5% and 29.5% had correct time for starting complementary food at 4, 5 and 6 months respectively, as was reported by Teferi *et al.*, 2016,[14] which showed that 25.9% had started complementary feeding at 6 months.[14] Moreover, in our study, suboptimal weaning was found among 18% of children as was reported by an international study conducted by Mawa & Lawoko in 2018.[7]

Many international studies revealed strong relationship between mothers' BMI and their children[7,9] as was supported and confirmed by our study findings, with high prevalence of malnutrition among children (52%) showing that 25.5% of mothers had normal BMI whereas 74.5% of the mothers had either under-nutrition (43.5%) or over-nutrition (31%).

In our study, 46.5% of mothers were illiterate, as was reported by many international studies, which found a strong relationship of malnutrition with maternal education.[7,21] Moreover, in our study, approximately 48.5% had monthly income of less than PKR 20000, as was reported by a study published in American Journal of Health Research in 2018, which also revealed strong relationship of malnutrition and monthly income of families.[7]

In our study, 60.5% of mothers gave colostrum soon after birth and considered that breast milk be the first food given to newborn, whereas in a study conducted in Lahore revealed that 72% of the mothers were aware of importance of colostrum but was practiced very less by the mothers.[25] Moreover, in our study, approximately 39.5% of mothers gave pre-lacteal feeds that consisted of honey, Qahwa, tea etc. whereas according to Pakistan Demographic Health Survey (PDHS) of 2012-13, 75% of the babies were given pre-lacteal feed.[26] Furthermore, our study findings were consistent with a study conducted in Karachi, which reported 35%.[27]

In our study, the most common weaning foods found were Khitchree, rice, vegetables, bananas and mixed variety of home based weaning food items, whereas similar findings were revealed by different international studies conducted by Khaliq *et al.*, 2017, and Maiti *et al.*, 2015.[28,29]

CONCLUSION

It was concluded that the prevalence of malnutrition was high among the children of ages 5-59 months. Malnutrition showed strong relationship with parent's education, monthly income, family size and BMI of mothers. Moreover, malnutrition also revealed relationship with breast feeding and weaning practices, and acute and chronic infections, therefore effective MCH services, parent's awareness along with proper growth and monitoring measures were needed to improve nutritional status of the community.

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