SindhUniv. Res. Jour. (Sci. Ser.) Vol. 52 (04) 289-292 (2020)

http://doi.org/10.26692/sujo/2020.12.43

SINDH UNIVERSITY RESEARCH JOURNAL (SCIENCE SERIES)

Anthropometric and Biochemical Profile of Protein Caloric Malnutrition (PCM) Declared Patients at Taluka Hospital Mirpurkhas

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Received 20th January 2020 and Revised 16th July 2020

Abstract: Malnutrition termed as note worthy problematic condition recognized in WHO, that cause annual death of at least 5 million children worldwide. In South Asia, Pakistan declared as second for maximum kid and juvenile death rate. During present study, 256 children (males and females) aged between 06 months and 5 years were examined and declared as PCM patients at District and Tertiary care hospitals of Mirpurkhas. Anthropometric and Socioeconomic data were collected through standard questionnaire proforma, while blood samples were also collected. The anthropometric profile (weight, height and MUAC), Biochemical (Hb%, WBCs, Platelets, Albumin, Protein) and Micronutrient Profile (Na, Ca, Mg, Mn), clinical findings and symptoms among subjects of the current study has been revealed that the minimum MAUC level was measured 6, whereas; maximum level 11. The haemoglobin Level (7.1 % -11.4 %), albumin (1.8 – 2.9 g/dl) Protein (5.2-6.7g/dl) was observed in the 6 months to 5 years age group. In the present research work the important aspects (biochemical and micronutrient profile) of malnutrition were determined, the micronutrient deficiencies in the malnourished children at study area were admitted. Further, this study will also alarming the situation of severe malnutrition and recommended to reduce the micronutrient deficiencies by appropriate nutritional strategies.

Keywords: Anthropometric, Biochemical, Protein Caloric Malnutrition, Mirpurkhas.

1. INTRODUCTION

Protein Energy Malnutrition (PEM) is one of the major problem in the world. The malnutrition problem is particularly in developing (Pakistan) countries among the children. Among world the malnutrition is major peril influence which is alone is responsible for various ailments and demises, whereas the children are highly vulnerable for this risk. However malnutrition is not only affects the physical growth of children but it also retard the mental development in progressive dimension and increase disease ration as wellSubsequently there are number of causes of malnutrition among children alike frequent infections, meagre dietary status of moms,food insecurity, insufficient health services and proper care of neo-natal regarded asutmostvital factors (Chirwa and Ngalawa, 2008; Linnemayr, *et al.*, 2008). It is published in hitherto research that approximately fivemillion of the children lost their lives every year around the globedue to malnourishment either directly or indirectly hence the WHO suggests it as the utmost mortal (Sarraf, *et al., 2005*; WHO, 1995). Globally estimated malnutrition burden resulted as (35.8%)in the children of preschool in the technologically advanced nations with underweight, (9.2%) are wasted and (42.7%) are stunted (Onis, 1993). Other 2 situation are also frightening that is stunting and wastingin children which is due to chronic malnutrition that has been amplifiedin the period of 2001 to 2011years. According to a survey it wastestified that the rate of stunting is 44% (NNS-2011).

For proper mental development some of micronutrients are important but their deficiency causing a serious issue among children like impairment of cognitive, motor which is allied with cerebral palsy. Among all essential micronutrients the copper is chief element from the fatal life for development, however its absence in body can leaving adverse neurological effects like myelopathy, peripheral neuropathy, and optic neuropathy (Rao, *et al.*, 1981; Olaiya, 2006; Chakravarty, *et al.*, 2000).The current study determined the important aspects (biochemical and micronutrient profile) of malnutrition which were not previously strong-minded together.

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2. MATERIALS AND METHODS

46 malnourished children were declared as PCM Patients at Taluka Hospital and Basic Health Units of Mirpurkhas district (covering a large rural population). The anthropometric profile (Height, weight and the circumference of mid upper arm) were considered as per universal method, while the MUAC tape tied around the left arm for MAUC measurement, the arm was let relaxed and hanging down the side of the body with the tape neither pinching the arm nor left loose (Egbe, *et al.*, 2018). 5 ml whole blood obtain from all the subjects. The blood was centrifuged at 3000rpm for 5 minutes and the serum were separated and used for further Biochemical (serum total protein, serum albumin and haemoglobin) analysis and Micronutrients (Na, Ca, Mg and Mn) determination (Adegbusi, *et al.*, 2011).

3. RESULTS AND DISCUSSION

The undernourishment known as the resultant of high rate of poverty among people withhardlypossess any considerableincomes for their sustainable survival. Protein Energy Malnutrition (PEM) is one of the major problem in the world. Protein energy malnutrition manifest in a continuum of diseases with kwashiorkor and marasmus occurring at both ends of the specimen with other overlapping forms defined in-between; based on varying proportions of calorie and protein deficiency in children. This study shows that Anthropometric, Biochemical and Micronutrient profile of malnourished position of developingand undernourished kids, the factors are considerablylesseras compared to well-fed kids.

Table. 1. Anthropometric Profile of PCM Subjects

Area / Location	No: of Subjects	Age Group	Gender		Weight in Kg	Height in cm	MUAC
			Male	Female			
Taluka Mirpurkhas	19	6 months to 1 year	12	7	Min.1.2	Min.35	Min. 6 Max. 11
					Max.2.3	Max. 67	
	17	2-3 years	9	8	Min. 2.5	Min. 66	
					Max. 4.3	Max. 87	
	10	4-5 years	4	6	Min. 8.3	Min. 91	
					Max. 10.7	Max. 97	

Anthropometric Profile in PCM childrenis shown in the **(Table 1)**. It is investigated that 6 month to 1 year age group of child possessed maximum weight 2.3 kg and minimum 1.2 kg whereas same age group of child possessed maximum height 67 cm and minimum 35 cm. The maximum weight 4.3 kg and minimum 2.5 kg of 2-3 year age group of child whereas same age group of child possessed maximum height 87 cm and minimum 66 cm. the weight (8.3 to 10.7 kg) and height (91-97cm) among 4-5 years age group were recorded. Muscles wasting in the marasmic subjects results in significant reduction in MUAC as the proteins of the somatic compartments and subcutaneous fats are catabolized as an attuned response that serves provide the body with amino acids as alternative source of energy during calorie deprivation with the resultant atrophy of muscle mass reflected by reduced mid upper arm circumference (MUAC) values (Egbe, *et al.*, 2018). In the present research work the MUAC level (6-11) were measured in 6 month to 5 years age children at the study area the mean difference in MUAC between the well-fed and kwashiorkor subjects (4.37cm) was lower than that between the well-fed children and marasmic children (7.18cm) reported by (Richard *et al.*, 2018).

Table. 2 Biochemical Profile of PCM Subjects:

Area/ Location	No: of Subjects	Age Group	Hb% (g/dl)		WBCs (cmm)		Platelets (cmm		Albumin (g/dl)		Protein (g/dl)	
			Min	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Mirpur Khas	19	6 months to 1 year	7.1	11.4	7000	33500	100000	495000	1.8	2.9	5.2	6.7
	17	2-3 years	5.0	10.8	9200	43000	313000	490000	2.1	2.6	5.4	6.5
	10	4-5 years	5.5	12.5	3100	22100	37000	238000	2.7	3.4	5.9	6.8

Table 3. Micronutrients Profile of PCM Subjects

Area/ Location	No: of Subjects	Age Group	Na mg/dl		Mn ug/dl		Ca mg/dl		Mg mg/dl	
			Min.	Max	Min.	Max	Min.	Max	Min.	Max
Mirpur Khas	19	6 months to 1 year	77	114	BDL	BDL	2.5	5.2	2.8	6.0
	17	2-3 years	125	134.5	BDL	BDL	2.8	4.6	3.8	5.3
	10	4-5 years	129.5	136.8	BDL	BDL	3.1	7.3	2.0	4.8

(Table.2 and 3) shows the biochemical and micronutrient profile, serum haemoglobin in 6 months to 1 year, (7.1-11.4), 2-3 years (5-10.8), and 4-5 years are (5.5-12.5). White Blood Cells (WBCs)minimum level 7000 cm and maximum level 33500 were observed in 6 months to 1 year age group,in the 2-3 years are (9200-43000cmm) and 4-5 years age group the level of WBCs (3100-22100cmm). Platelets (100000-495000, (313000-490000cmm), (37000-238000). Albumin is common indicator for the diagnosing malnutrition. However, the cut-off point (3.5 g/dL) for serum albumin as an indicator of malnutrition. (Zhang *et al.,* 2017)

Thelower level of total protein(3.7) increases the risk of protein energy malnutrition, indicates the strong association of hypoproteinemia and protein energy malnutrition. (Zhang *et al., 2017*)

In present research work Albumin and protein were estimated in g / dl, the albumin level in the 6 months to 1 year age group (1.8-2.9), 2-3 years (2.1-2.6), 4-5 years (2.7-3.4). however,Protein value was ranged in the age group of 6months to 1year(5.2-6.7), 2-3 years (5.4-6.5), and4-5 years (5.9-6.8). Serum electrolytes (Sodium, Calcium, Magnesium, Manganese) were estimatedfrom serum in mg/dl, the Sodium level were observed in the 6 months to 1 years age group (77–114mg/dl), in 2-3 years (125-134.5) and 4-5 years age group contain the serum sodium level (129.5-136.8),similar findings reported by (Mishra *et al., 2009*) and concluded the nutritional status was not associated with Serum sodium concentration,. Whereas the calcium(2.5-5.2), (4.6-3.8), (2-4.8),Magnesium (2.8-6.0), (3.8-5.3), (2.0-4.8) and the Manganese was blow the detection limits(BDL). This researchreveals that the anthropometric, Biochemical and micronutrients profile to identify malnutrition risk among patients.Though, the usualuncertainty of domesticnourishment, mothers with little literacy rate and deprived socio-economic conditions was found to be the main reasons for the increase of undernourishment causes in the community.

4. CONCLUSION

Findings of present research indicates that due to micronutrients deficiency alarming situation has been created for the children that are the assets of the nation as the deficiency of micronutrients in early childhood parting adverse effects on their mental and physical health development along with reducing erudition aptitudes from primary level. Subsequently the research would help for many organizations working for community health that they may construct proper strategies for balance and required nutrition for children at initial developmental years.

5. ACKNOWLEDGMENT

This research work is the part of the Ph.D thesis work of the 1st author Gulzar Usman.

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