Original Article

A study of clinical and haematological profile of paediatric patient with protein energy malnutrition

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Abstract

Introduction: Protein Energy Malnutrition (PEM), is defined as a spectrum of diseases arising as a result of an absolute, or relative deficiency of calories and or protein in the diet **Aims and Objectives:** To Study Clinical and Haematological Profile of Paediatric patient with Protein energy malnutrition. **Material and Methods:** After approval from Institutional ethical committee a cross-sectional study of Malnutrition in less than six year children was carried out in one Year from January 2015 to January 2016 at Department of Paediatrics of a tertiary health care centre. As per the WHO Charts total 49 patients found to be Malnourished. These patients investigated for various Haematological parameters like Hb., MCV and MCHC etc. Details of clinical history and examination was done. All the Children above the 6yrs of Age were excluded from study. The Statistical analysis done by Chi -Square test and ANOVA test calculated by SPSS 17 software. **Result:** The majority of the Patients were in the age group of 4-5 i.e. 42.86 % followed by 2-3 i.e. 18.37 %, in 3-4 and 5-6 Yrs. i.e. 12.24%, and in <1 Yrs. Were 10.20% and in 1-2 Yrs. Were 4.08%. The majority of the Patients were Males i.e. 67.35 % followed by Females 32.65 %. Out of Total Grade I Malnourished Children 33.37% were Anaemic, in Grade II 68.97% were Anaemic and 90.90% Grade III Malnourished Patients were Anaemic. This increasing trend was Statistically Significant. (P=0.02*, df=2, $X^2 = 7.546$). The MCV (Mean ±SD) was 71.71 ± 7.28, 69.34± 7.23 and 65.23 ± 6.8 respectively in Grade I, Grade II, Grade III Malnutrition. This decrease in MCV was statistically significant (One way ANOVA, P<0.05*).The MCHC (Mean ±SD) was 23.61 ± 2.8, 21.87± 1.9 and 20. 56 ± 2. respectively in Grade I, Grade II, Grade III Malnutrition. This decrease in MCV was statistically significant (One way ANOVA, P<0.05*). Majority of the Patients showed Increased frequency of URTI/ LRTI (last 1 Yrs.) in 65.31 % Children, Increased frequency of Diarrheal diseases (last 1 Yrs.) 59.18%, Pallor present in 36.73%. **Conclusion:** It can concluded from our study that as the Grade of Malnutrition increases the prevalence of anaemia in children also increases and the haematological profile shows mostly iron deficiency anaemia. The most common clinical features observed were Increased frequency of URTI/ LRTI and Diarrheal diseases (in last 1 Yrs.).

Keywords: Protein energy malnutrition, MCV, MCHC, URTI/ LRTI, Diarrheal diseases.

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INTRODUCTION

Protein Energy Malnutrition (PEM), is defined as a spectrum of diseases arising as a result of an absolute, or relative deficiency of calories and or protein in the diet[1,2]. It is globally the most important risk factor for illness and death, with hundreds of millions of young children affected[3]. According to UNICEF in 2005, malnutrition was associated with approximately 50% of child deaths worldwide[4]. It has been estimated that PEM affect every fourth child in the developing world [4],with the regional prevalence for the severe forms ranging from 1-7%[5]. PEM as a range of pathological conditions arising from co-incidental lack in varying proportions of protein and

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calories occurring most frequently in infants and young children and commonly associated with infection.[6]

MATERIAL AND METHODS

After approval from Institutional ethical committee a cross-sectional study of Malnutrition in less than six year children was carried out in one Year from January 2015 to January 2016 at Department of Paediatrics of a tertiary health care centre. All the Under six children in One year were screened for Malnutrition by various tools like anthropometry and Growth Chart provided by WHO according to WHO growth chart the Children were classified inti Grade I (-1 SD to -2 SD), Grade II (-2 SD to -3SD), Grade III (>-3SD) of Malnutrition respectively. As per the WHO Charts total 49 patients found to be Malnourished. These patients investigated for various Haematological parameters like Hb, MCV and MCHC etc. Details of clinical history and examination was done. All the Children above the 6yrs of Age were excluded from study. The Statistical analysis done by Chi -Square test and ANOVA test calculated by SPSS 17 software.

RESULT

Table 1: Distribution of the Patients as per the Age

Age (Yrs.)	No.	Percentage (%)
<1	5	10.20
1-2	2	4.08
2-3	9	18.37
3-4	6	12.24
4-5	21	42.86
5-6	6	12.24
Total	**49**	**100.00**

From above table it is clear that the majority of the Patients were in the age group of 4-5 i.e. 42.86 % followed by 2-3 i.e. 18.37 %, in 3-4 and 5-6 Yrs. i.e. 12.24%, and in <1 Yrs. Were 10.20% and in 1-2 Yrs. Were 4.08%.

Table 2: Distribution of the Patients as per the Sex

Sex	No.	Percentage (%)
Male	33	67.35
Female	16	32.65
Total	**49**	**100.00**

The majority of the Patients were Males i.e. 67.35% followed by Females 32.65 %.

Table 3: Distribution of the Patients as per the Grade of malnutrition and Presence of Anaemia

Malnutrition	Anaemic	Normal	Total
Grade I	3 (33.37)	6 (66.67)	9 (100)
Grade II	20 (68.97)	9 (31.33)	29 (100)
Grade III	10 (90.90)	1 (10.10)	11 (100)
Total	**36 (73.46)**	**13 (26.54)**	**49 (100)**

(P=0.02*, df=2, χ^2 = 7.546; Percentages in Bracket indicates horizontal percentages)

Out of Total Grade I Malnourished Children 33.37% were Anaemic, in Grade II 68.97% were Anaemic and 90.90% Grade III Malnourished Patients were Anaemic. This increasing trend was Statistically Significant. (P=0.02*, df=2, χ^2 = 7.546).

Table 4: Distribution of the Patients as per the MCV and Grade of Malnutrition

Malnutrition	MCV (Mean ±SD)
Grade I (n=9)	71.71 ± 7.28
Grade II (n=29)	69.34± 7.23
Grade III (n=11)	65.23 ± 6.8

(One way ANOVA, P<0.05*)

The MCV (Mean ±SD) was 71.71 ± 7.28, 69.34± 7.23 and 65.23 ± 6.8 respectively in Grade I, Grade II, Grade III Malnutrition. This decrease in MCV was statistically significant (One way ANOVA, P<0.05*).

Table 4: Distribution of the Patients as per the MCHC and Grade of Malnutrition

Malnutrition	MCHC (Mean ±SD)
Grade I (n=9)	23.61 ± 2.8
Grade II (n=29)	21.87± 1.9
Grade III (n=11)	20. 56 ± 2.1

(One way ANOVA, P<0.05*)

The MCHC (Mean ±SD) was 23.61 ± 2.8, 21.87± 1.9 and 20. 56 ± 2. respectively in Grade I, Grade II, Grade III Malnutrition. This decrease in MCV was statistically significant (One way ANOVA, P<0.05*).

Table 5: Distribution of the Patients as per Common Clinical features

Clinical features	Percentage	Percentage (%)
Increased frequency of URTI/ LRTI (last 1 Yrs.)	32	65.31
Increased frequency of Diarrheal diseases (last 1 Yrs.)	29	59.18
Pallor	18	36.73
Skin infections	12	24.49
Koilonychia	9	18.37
Mouth ulcers	7	14.29
Worm infestation	6	12.24
Delayed milestones	5	10.20

As per the Clinical features majority of the Patients showed Increased frequency of URTI/ LRTI (last 1 Yrs.) in 65.31 % Children, Increased frequency of Diarrheal diseases (last 1 Yrs.) 59.18%, Pallor present in 36.73 %, Skin infections in 24.49%, Koilonychia in 18.37 %, Mouth ulcers in 14.29%, Worm infestation present in 12.24, Delayed milestones in 10.20%.

DISCUSSION

Protein Energy Malnutrition results in widespread alterations in organ and system function.[7] In haematological system, changes affect all the blood cells.

Some degrees of anaemia, changes in reticulocyte response, erythroid activity have been described in literatures. Hemopoiesis depends on the microenvironment of the marrow.[8,9,10] The sheer need for protein by the process of hemopoiesis could in itself justify the occurrence of anaemia and leucopenia which are frequently encountered in PEM. The lack of iron has been considered as being the main cause of anaemia in malnutrition. 6 However some studies demonstrate that a decrease in erythropoietin, occurring due to the reduced ingestion of protein and reduced red cell production in adaptation to a smaller lean body mass may also be responsible for anaemia[12,13,14] Leucopenia and leucocytosis are situations that have been describe d in literature as it is usually accompanied by infectious processes or chronic disease.[15,16,17] Protein deficiency leads to lymphopenia, thymus, spleen and lymph node involution, which is particularly intense in the thymus and spleen[18]. In our study we have found that From above table it is clear that the majority of the Patients were in the age group of 4-5 i.e. 42.86 % followed by 2-3 i.e. 18.37 %, in 3-4 and 5-6 Yrs. i.e. 12.24%, and in <1 Yrs. Were 10.20% and in 1-2 Yrs. Were 4.08% and the majority of the Patients were Males i.e. 67.35 % followed by Females 32.65 %. This is in confirmation with Haider Mohammed Basheir *et al*[19]. Out of Total Grade I Malnourished Children 33.37% were Anaemic, in Grade II 68.97% were Anaemic and 90.90% Grade III Malnourished Patients were Anaemic. This increasing trend was Statistically Significant. (P=0.02*, df=2, X^2 = 7.546). this could be because as the severity of Malnutrition increases it affects the haematopoiesis and also the factors responsible for Malnutrition are also common to anaemia. This is in confirmation to Saka A. O *et al*[20]. The MCV (Mean ±SD) was 71.71 ± 7.28, 69.34± 7.23 and 65.23 ± 6.8 respectively in Grade I, Grade II, Grade III Malnutrition. This decrease in MCV was statistically significant (One way ANOVA, P<0.05*), the MCHC (Mean ±SD) was 23.61 ± 2.8, 21.87± 1.9 and 20. 56 ± 2. respectively in Grade I, Grade II, Grade III Malnutrition. This decrease in MCV was statistically significant (One way ANOVA, P<0.05*). The low MCH and MCHC could be explained by underlying Iron deficiency secondary to intake or worm infestation. This is in confirmation to Saka A. O *et al*[20]. As per the Clinical features majority of the Patients showed Increased frequency of URTI/ LRTI (last 1 Yrs.) in 65.31 % Children, Increased frequency of Diarrheal diseases (last 1 Yrs.) 59.18%, Pallor present in 36.73 %, Skin infections in 24.49%, Koilonychia in 18.37 %, Mouth ulcers in 14.29%, Worm infestation present in 12.24, Delayed milestones in 10.20%.

CONCLUSION

It can concluded from our study that as the Grade of Malnutrition increases the prevalence of anaemia in children also increases and the haematological profile shows mostly iron deficiency anaemia. The most common clinical features observed were Increased frequency of URTI/ LRTI and Diarrheal diseases (in last 1 Yrs.).

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