

11th International Conference on

Hematology & Hematological Oncology

November 08-09, 2017 | Las Vegas, USA

Hematological profile and ascorbate deficiency among children of African descent with protein energy malnutrition in Sokoto, North Western Nigeria

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Protein energy malnutrition is the most widespread nutritional deficiency disorder of mankind and continues to be a major public health burden in developing countries. The aim of this case-control study was to determine the changes in some hematological parameters, ascorbic acid and pantothenic acid levels among children with Protein Energy Malnutrition (PEM) in Sokoto, North Western Nigeria. The study included a total of 90 children (47 subjects with PEM and 43 apparently healthy controls) aged 6 months to 5 years, admitted to the Pediatric Unit of Usmanu Danfodiyo University Teaching Hospital and Specialist Hospital, Sokoto. Some hematological parameters (packed cell volume, total white blood cell count and platelet count) were analyzed using the auto-hematology analyzer (Genesis, HA6000). Ascorbic acid levels were assayed by a standard chemical method. Nutritional status was determined using the Welcome Trust Classification. Data were analyzed using SPSS 22.0 statistical package. A p-value ≤ 0.05 was considered significant in all statistical comparisons. The result indicated that subjects with protein energy malnutrition had a lower mean packed cell volume ($25.50 \pm 6.83\%$) compared to controls ($32.73 \pm 6.85\%$) ($p=0.0001$). The mean total white cell count was significantly higher among subjects with protein energy malnutrition ($12.16 \pm 4.94 \times 10^9/l$) compared to controls ($7.59 \pm 3.20 \times 10^9/l$) ($p=0.0001$). There were no statistically significant differences in the mean value of platelet counts of subjects ($260.40 \pm 148.8 \times 10^9/l$) and controls ($1237.61 \pm 99.20 \times 10^9/l$) ($p=0.400$). The mean value of ascorbic acid was significantly lower among subjects (0.82 ± 0.27 mg/dl) compared to controls (1.06 ± 0.15 mg/dl) ($p=0.0001$). Children with Kwashiorkor had higher value of packed cell volume compared to those with marasmic-kwashiorkor ($p=0.0001$). Children with marasmic-kwashiorkor had a higher total white cell count when compared with other types of protein energy malnutrition ($p=0.0001$). Underweight subjects had lower ascorbic acid levels when compared with other types of protein energy malnutrition ($p=0.0001$). Platelet count and pantothenic acid levels showed no significant difference within the various types of protein energy malnutrition ($p=0.331$ and 0.391 , respectively). This study has shown that children with protein energy malnutrition have lower packed cell volume and ascorbic acid levels compared to controls. The total white cell count was higher among children with protein energy malnutrition compared to controls. Protein energy malnutrition was more prevalent among children from low socioeconomic class whose mothers have no formal education. Marasmus was the most common type of protein energy malnutrition. Children with kwashiorkor have a higher packed cell volume compared to other types of protein energy malnutrition. Total white blood cell count of children with marasmic-kwashiorkor was significantly higher compared with other types. Immune boosters (vitamins and other micronutrient) should be provided for school children particularly children with protein energy malnutrition. There is need for infant feeding practice to be strengthened by promoting exclusive breast feeding. There is need for increased enrollment of women in schools, enlightenment on nutritional education and empowerment so as to improve their socioeconomic status.

Biography

Erhabor Osaro is a Professor of Hematology, Blood Transfusion Medicine and Laboratory Total Quality Management. He has received his PhD in Immuno-Hematology from the Rivers State University of Science and Technology in Port Harcourt, Nigeria. He is also an Alumni of University of Greenwich in the United Kingdom and Francis Tuttle College of Technology in Oklahoma, USA. Currently, he is a Professor in Usmanu Danfodiyo University, Sokoto, Nigeria, where he teaches best practices in hematology, blood transfusion science and laboratory total quality management. He has more than 200 published articles in both local and international journals, 5 scientific books and 5 chapters of scientific books. He is on the Editorial Board of several reputable local and international journals and Editor-in-Chief of the renowned *Sokoto Journal of Medical Laboratory Science*. He is an expert reviewer to several international scientific journals. He has recently bagged the Specialist Certificate in Blood Transfusion Science Practice (SCTSP) from the British Blood Transfusion Society in the United Kingdom. He is a recipient of several awards and honors including the Margaret Kenwright Award from the British Blood Transfusion Society (BBTS). He is the President of Board of Directors of Nelon Medical Limited, UK.

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