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Research Article

PREVALENCE OF ANEMIA AND MALNUTRITION IN NEWBORN AGED 2 – 12 MONTHS WHO FEED ON COW'S MILK INSTEAD OF NATURAL MOTHER FEEDING IN RURAL AREA OF DAWRAN TOWN OF THAMAR GOVERNORATE

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ABSTRACT

One hundred new born aged (2-12) months (mean 6 months) were randomly selected from hospitals of Dawran Town of which 50 new born were have cow's milk feeding without breast feeding on daily basis, and other 50 new born were haven't cow's milk feeding and have natural breast feeding as control group. This study was surveyed in the Anthropometric profile then laboratory tests. The 2011 UNICEF malnutrition reference tables were used to evaluate the anthropometric data. Veinblood sample were drawn from each new born. HB, HCT, and RBC were measured automatically by Beckman coulter® LH500 series system. The malnutrition index of all new born in this study showed that the average of malnutrition degree is (1+) and the percentage of new born suffer from malnutrition are 52%, 8% in cow's milk new born and breast milk new born respectively. Using WHO criteria for the diagnosis of anemia, the prevalence of anemia in this study was 33.0%. The blood haemoglobin, haematocrit and red blood cell count were significantly lower in cow's milk new born when compared with non-cow's milk new born. This study revealed that loss natural breast-feeding has significant effect on Hbvalue and nutritional status of newborn.

INTRODUCTION

The World Health Organization (WHO) states that 'breastfeeding is an unequalled way of providing ideal food for the healthy growth and development of infants. Breastfeeding is beneficial to infants, mothers, families and society, and is viewed as the biological and social norm for infant and young child feeding. Breastfeeding is the natural, biological way of providing babies and young children with nutrients required for healthy growth and development ([4]). Exclusive breastfeeding is defined as an infant's consumption of human milk with no other supplementation of any type meaning no water, juice, nonhuman milk, or foods. Breastfeeding enhances mother, baby emotional attachment, and contributes to optimal short and long-term health outcomes for both. Statistically a baby who is not breastfeeding has more health care needs than its breastfed counterparts do. The health effects of breastfeeding are well recognized and apply to mothers and children in developed nations such as the United States as well as to those in developing countries. Breast milk is uniquely suited to the human infant's nutritional needs and is a live substance with unparalleled immunological and anti-inflammatory properties that protect against a host of illnesses and diseases for both mothers and children ([1, 2]). There are 4 million of the 130 million babies born each year die in the first four weeks of life , the one of the most causes contribute in this problem is the loss of natural breast feeding([1,2])

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MATERIALS AND METHODS

Methods

Protocol of the study

In this study 80 new born aged less than 1 year were selected from Dawran hospital , these child arrive to hospital from different rural regions of Dawran, Thamar and divided into 2 groups:

- **Group1:** include 50 boys with mean age 6 months that were classified as cow's milk consumptive (on daily basis for at least 3 times/day and for at least six month).
- **Group2:** include 50 boys that were classified as non-cow's milk consumptive with mean age 6 months (control).

Exclusion criteria

Those boys with previous chronic diseases, anemia, a history of medication, were excluded from the study by information which available from his partners, to prevent the interference with all parameters measurements. Those new born aged less than one month are excluded because they have high normal HB value which wide difference from remain study sample and hence it affect the mean value, also they may have no absorbable effects of milk in this early life.

Anthropometric measurements

The partners were given a detailed briefing about the purpose of the study. The recorded parameters were age, height and weight. All information was obtained from the partners. Two well-trained nurses collected the anthropometric data at hospitals. Weight was measured using a calibrated digital scale electronic Balance for all new born with an accepted error of 0.1 kg. Height was measured for all newborn using a wall-mounted stadiometer with an accepted error of 0.1 cm.

Weight measurement

Weights were measured to the nearest 0.1 kg; the scale pointer was calibrated before taking a measurement. Each newborn was weight with minimum clothing.

Height measurements

The boys were required to remove their shoes, stand erect, looking straight in a vertical plane with feet together and knees straight. The heels, buttocks, shoulder blades and the back of the head should touch against the wall. Height was recorded to the nearest 0.1cm.

Malnutrition index calculation

Directly by table provided from UNICEF figure 1.4, it full printed in appendix. Malnutrition index (weight for height), are used to evaluate underweight and overweight in comparison to normal value and degree of malnutrition.

Analytical procedure

Sample collection and preservation

With all aseptic precautions 1 ml of blood samples were drawn from ant cubical vein of each boy between 8-12 am. And put in EDTA labeled testtube for Hematologicalevaluation which were stored at -2ºC for later analysis within 12 of collection.

Assays

Beckman coulter LH 500 analyzer system and reagents estimated Blood Hemoglobin, Hematocrit testes with Red blood cell count.

Assay of CBC

Principles of coulter® LH series diluents reagent: The chemical composition of coulter® LH series diluentprovides an isotonic solution with bufferingcapacity for cell component stabilization and measurementof hemoglobin. Biocides are included for productpreservation against microbial growth. Alkaline saltsprovide a suitable osmolality so as not to adversely affectcell volume (iso-osmotic) .In this capacity, the diluent is useful for the determinationof red blood cell and platelet measurements. Whencombined with coulter ® lyse s® iiidiff lytic reagent, the diluents is usefulin the enumeration of leukocytes and the determination ofhemoglobin. In conjunction with differential pack reagents on instruments using impedance, radio frequency, andlaser light scatter (vcstechnology), it is useful in thedifferentiation of leukocytes into five subpopulationneutrophils, lymphocytes, monocytes, eosinophils and basophils.

Principles of procedure of Coulter ® lyse s® iii diff lytic reagent

It is clear, aqueous solution containing potassium cyanide and quaternary ammonium salts. When the lytic reagent is added to a diluted whole-blood sample, the surface-active properties of the quaternary ammonium salts destroy the red cell membranes, thus lysing the red blood cells (Stromatolyzation) and releasing the hemoglobin. The released hemoglobin chemically reacts with potassium cyanide to form a stable hemochromagen that is quantitatively measured at an absorbance wavelength. As the lytic reagent is destroying the red cell membranes to release the hemoglobin, it reduces the size of the resulting cellular debris to a level that does not interfere with the leukocyte (white blood cell) counts. On coulter hematology analyzers with histogram differential, the lytic reagent causes differential shrinkage of the leukocytes into predictable volume components, namely lymphocyte, mononuclear cells, and granulocytes. Additionally, the reaction of the quaternary ammonium salts to reduce the amount of protein buildup in the sensing orifices of the instrument. Blood cell analysis comprises diluting a whole-bloodsample with a solution that functions as diluents. Thediluents provide the ability to analyze portions of thediluted blood sample for different blood cell types, such asred blood cells and platelets. When combined with thecyanide-free lytic reagent, the diluents are useful in thedetermination of hemoglobin, the enumeration ofleukocytes (white blood cells), and the derivation ofleukocyte subpopulations.

Procedure

Sampling, reagent delivery, mixing, processing, and printing of results automatically performed by the Beckman coulter LH 500 analyzer.

Assay of blood film study

Make giemsa blood film and show morphology of cells microscopically.

Statistical analysis

Data were analyzed by using the SPSS Version 11.5 (Social Package of Statistical Science) computer program by LEAD Technologies; Inc. USA (1991-2000). Data were checked for normally distribution, and were expressed as Mean ± SD. Differences in variables were tested by using Independent sample T-test. The significant interrelationships between parameters were, analyzed by Pearson Correlation coefficient test. The significant differences were indicated if P-value < 0.05.

RESULTS

This study included 100 new born aged between two months and one year were arrive to hospital randomly selected from

rural regions of dawran town and divided into two groups; first group was include 50 new born with mean age 6 months that were classified as cow's milk consumptive (on daily basis for at least 3 times/day and for at least six month) and Group2 include 50 boys that were classified as non- cow's milk consumptive (breast feeding group) with mean age 6 months (control). Table1 give general information about study sample. Those new born with previous chronic diseases, anemia, a history of medication, were excluded from the study by information which available from his partners, to prevent the interference with all parameters measurements. All control group have normal breast-feeding. In this study when we say "cow's milk new born", we mean who feeding on cow's milk instead of breast milk while when we say "non-cow's milk new born" we mean the control group who depend on natural breast milk. The malnutrition index of all new born in this study showed that the average of malnutrition degree is (1+) and the percentage of new born suffer from malnutrition are 52% , 8% in cow's milk new born and breast milk new born respectively (Table 2). In the present study, the results of table 3 showed that the average frequency of diarrhea, colic, and vomiting were (70%, 20%), (62%, 10%), (32%, 5%), in cow milk boys and non-cow milk boys respectively.

Table 1. General information about studied newborn

Information	Group 1 n.= 50	Group 2 n.= 50
Cow's milk feeding	50	0
Breast feeding	0	50

Table 2. A comparison of malnutrition index result between cow's milk new born and non-cow's milk new born

Malnutrition index	Normal		Malnutrition (1+)		Malnutrition (2+)	
	No.	%	No.	%	No.	%
Cow's milk n=50	24	48	20	40	6	12
Breast feeding n=50	46	92	4	8	0	0
Total	70	70	24	24	6	6

Table 3. Comparison between the average frequency of diarrhea, colic, and Vomiting in cow's milk new born and non-cow's milk new born

Questionnaire data	Cow's milk n=50		Breast feeding n=50		Total n=100	
	No.	%	No.	%	No.	%
Diarrhea	35	70	10	20	45	45
Colic	31	62	5	10	36	36
vomiting	16	32	3	6	19	19

Table 4.A comparison of anemia between cow's milk new born and non-cow's milk new born

HbIndex	Cow's milk n=50		Breast feeding n=50		Total n=100	
	No.	%	No.	%	No.	%
Anemia	24	48	9	18	33	33
Normal	26	52	41	82	67	67

The prevalence of anemia between study sample and comparison between two groups of new born in table 4 that show the prevalence of anemia are (48%,18%) , in cow milk boys and non-cow milk boys respectively. The results of table 5 showed mean±sd of the Hb, and PCV results of new born were less than one year are 10.1 gm/dl and 12.2 g/dl respectively.

Table 5. A comparison of hematological parameters between cow's milk new born and non-cow's milk new born

Tests	Cow's milk (mean±SD)	Breast feeding (mean±SD)	P. Value
Hb 11-15 g/dl			
PCV 0.32- 0.49 %			

Data are, expressed as means ± S.D, vs. control: (*p < 0.05) Significant.

Table 6. A comparison of blood film study result between cow's milk new born and non-cow's milk new born

Blood film -Index	Cow's milk n=50		Breast feeding n=50		Total n=100	
	No.	%	No.	%	No.	%
Microcytic hypochromic anemia	23	46	7	14	30	30
Normocytic normochromic anemia	1	2	2	3	3	3
Normal	26	52	41	82	67	67

According to 2007 WHO reference HB values for new born and criteria for the diagnosis of anemia [35], the prevalence of anemia in this study (table4) was 33% (Table 3). A comparison of HB conc. results between cow's milk new born and non-cow's milk new born showed that forty-eight of cow's milk new born had anemia (48%) compared to nine of non-cow's milk new born (18%). According to UNICEF malnutrition values, the result of malnutrition index is showed that twenty (40%) of cow's milk new born had malnutrition of degree (1+) in comparison to only four (8%) of breast-feeding new born. In addition, there are six (12%) of cow's milk new born had malnutrition of degree (2+) in comparison to zero of breast-feeding new born.

DISCUSSION

The present study discussed the hematological status of newborn from two months to oneyear in the rural area and the effect of cow's milk feeding on HB value and nutritional status of them surveyed in the following order:

- Anthropometric profile.
- Laboratory tests for hematological markers profile.

Anthropometric profile

The results of anthropometric measurement showed that the mean height, and weight of new born , 57.7 cm, 4.9 kg respectively and the mean malnutrition value at (1+). There are 52% of cow's milk new born suffer from malnutrition in cooperation with only 8% of breast-feeding new born. The main cause of malnutrition in this study suspect loss of normal breast-feeding and in second degree due to cow's milk consumption. These results accepted by WHO report 2011, whichsay,"Loss of breast feeding is one of the most common causes of malnutrition and anemia in the world ([23]). Also it accepted by the UNICEF report 2011 which suspected anemia prevalence among Yemeni children is 50 %.([37])

Laboratory tests for hematological markers

By using WHO criteria for diagnosis of anaemia [49] the prevalence of anaemia in these study was 39% (Table 3.3). The WHO proposed a scheme for classification of public health severity of anemia and anemia was considered as mild if prevalence is 1-9%, moderate if it is 10-39% or severe problem if it is more than 40%. Accordingly, the present study showed that anemia of moderate severity among the studied adolescents

was considered a health problem. The one of main cause of anemia in tropical countries are malnutrition, associated particularly with iron deficiency anemia, hypochromic, microcytic anemia. Chronic disease wereruled out in the present study and hence under-nutrition appeared to be the chief cause of anemia. One of the main causes of malnutrition in newborn is loss of breast-feeding; also, cow's milk used in absence of breast-feeding is risk factor for anemia. New born are at risk of developing iron deficiency and iron deficiency anemia because of the increased iron requirements for growth. Infectious diseases such as pneumonia ,bacterial gastroenteritis , and others affect new born baby, contributing to anemia by affecting the absorption of or increasing the loss of iron through intestinal blood loss due to irritation of GIT which usually common with cow's milk.

Nutritional anemia is one of the major causes of growth retardation especially in developing countries. A comparison of Hemoglobin parameter between cow's milk new born and non-cow's milk new born (Table 3.4), where the results showed that the cow's milk new born had higher frequency of anaemia 24 versus only 9 of non-cow's milk new born. Higher frequency of anemia in cow's milk new born had in compared to non-cow's milk new born may be due to the nutritional deficiency risks associated with persistent or long cow's milk feeding instead of natural breast feeding or modified milk formula, where iron is required for the synthesis of heme portion of hemoglobin[(49)]. This study agreed with other studies which found that the levels of HB significantly decreased by absence of breast feeding but no study about cow's milk. All Results in this study demonstrated that cow's milk new born was observed to have great effect on HB levels of new born through decrease in all above parameters and it may be attributed to, loss of natural breast feeding and cow's milk often complain of symptoms suggestive of persistent diarrhea , recurrent abdominal pain , and recurrent vomiting. We need to make more study about cow's milk in cooperation to control of new born who feed on other artificial formula (non-breast feeding).

Conclusion

Absence of breast feeding is one of the most important causes of, malnutrition, and anaemia in new born in rural area of Darwintown inThamar governorate.Cow's milk feeding is usually common in rural area of Darwintown inThamar governorate.New born who feed on cow's milk in absence of mother's milk have increased rates of anaemia and malnutrition than others in rural area of Darwin town in Thamar governorate.

In this study, cow's milk new born was observed to have great negative effect on health status of newborn through

- The malnutrition rate are significantly increased among cow's milk new born more than the breast-feeding new born.
- Cow's milk new born had higher percentage of anemia than non-cow's milk new born. The blood level of Hemoglobin, Hematocrit and Red blood cell count were lower in cow's milk new born as compared to non-cow's milk new born significantly.
- Cow's milk new born are suffering from abdominal pain, diarrhea, and vomiting problems more frequently than non-cow's milk new born.

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