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RISK FACTORS OF MALNUTRITION AMONG LESS THAN FIVE IN MOSUL CITY

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ABSTRACT

Background: Malnutrition in children under the age of five considered one of the most serious health problems in the world, particularly in countries with low and middle incomes. It is a major cause of childhood morbidity and mortality, delayed physical growth, delayed cognitive development, and lower productivity in later life. **Objectives:** Is to analyze the risk factors for malnutrition among children under the age of five in Mosul/Iraq. **Methods:** The study is an observational, descriptive, case control study. It was conducted between the 5th of August 2025 to the 15th of December 2025 at Ibn Sina Teaching Hospital in Mosul city. The study included 100 patients divided into two groups (50 cases and 50 controls). The questionnaire was composed from two parts. The first part related to family risk factors, while the second part for child risk factors. **Results:** The mean age ± standard deviation of the study participants is 13.32 ± 7.30 months. Male: Female ratio was 1.127:1. Statistically significant difference between them regarding their history of having more than one child with malnutrition (P value < 0.001), mother educational level (P value < 0.001), family socioeconomic state (P value <0.001), and family residence (P value < 0.001). Moreover, statistically significant difference between them regarding their type of feeding (P value <0.001) and presence of past medical condition (P value <0.001). **Conclusion:** This study established that both maternal and patient related factors contributed to the risk of malnutrition among children aged less than five years. According to the current study's findings, having another child with malnutrition, poverty, poor educational level of mother, rural residence; as well as, depending on bottle or mixed feeding and the presence of past medical condition significantly linked to malnutrition.

KEYWORDS: Factors, Five, Iraq, Risky, Mosul, Nutrition.

1. INTRODUCTION

Malnutrition in children under the age of five considered one of the most serious health problems in the world, particularly in countries with low and middle incomes.[1] It is a major cause of childhood morbidity and mortality, delayed physical growth, delayed cognitive development, and lower productivity in later life.[2] Malnutrition is defined by the World Health Organization (WHO) as deficiencies, excesses, or imbalances in a person's energy and nutrient intake, with undernutrition including wasting, stunting, and underweight being the most common type in young children.[3] Children under the age of five are particularly vulnerable to malnutrition because of their high development needs, immature immune systems, and dependence on caregivers for proper nutrition and health care.[4] Children under the age of five are particularly vulnerable to malnutrition because of their high development needs, immature immune systems, and dependence on caregivers for proper nutrition and health care.[5] Inadequate nutrition during this vital stage of life has consequences that can last into adulthood, increasing the risk of chronic diseases, low educational achievement, and intergenerational cycles of poverty and malnutrition.[6]

Childhood malnutrition is a major public health concern in Iraq, despite recent advances in health-care facilities. Decades of armed conflict, financial instability, population migration, and infrastructure degradation have harmed food security, access to health care, clean water, and sanitation. These causes have adversely impacted women and children, especially those living in rural areas, conflict zones, and internally displaced persons (IDP) camps. Recurrent humanitarian crises have reduced family coping strategies, resulting in insufficient nutritional intake and poor child feeding practices.[7] Malnutrition in Iraqi children under the age of five is caused by a complex interplay of causes. Poverty, poor household income, parental unemployment, and food insecurity are all significant socioeconomic variables. Maternal variables such as low education, poor nutritional status, young maternal age, high parity, and short birth intervals have been substantially linked to childhood malnutrition. Furthermore, incorrect infants and young children feeding practices, such as delayed starting of breastfeeding, non-exclusive breastfeeding, early or late introduction of supplementary meals, and a lack of dietary diversity, considerably increase the risk of malnutrition.[8-9]

Health-related factors worsen malnutrition in Iraqi children. Frequent episodes of infectious disorders, notably diarrhea, severe respiratory infections, and parasite infestations, contribute to poor food absorption and higher metabolic needs.[8] Malnutrition identification and management are further complicated by a lack of access to excellent primary health care, insufficient vaccine coverage, and poor growth monitoring services. Environmental problems, such as contaminated drinking water, poor sanitation, and inadequate hygiene habits, increase infection risk and impair nutritional status.[10] Understanding the risk factors for malnutrition among Iraqi children under the age of five is critical for designing effective preventive and intervention plans. Identifying these determinants will assist health professionals, and humanitarian organizations in developing targeted, evidence-based programs to improve child nutrition, strengthen maternal education, increase food security, and reduce preventable childhood morbidity and mortality. As a result, the aim of this study is to analyze the risk factors for malnutrition among children under the age of five in Mosul/Iraq, with the ultimate objective of enhancing public health planning and improving child health outcomes.

2. PATIENTS AND METHODS

The study is an observational, descriptive, case control study. It was conducted between the 5th of August 2025 to the 15th of December 2025 at Ibn Sina Teaching Hospital in Mosul city. The study included 100 patients divided into two groups (50 cases and 50 controls).

The investigators conducted direct interviews with parents to complete self-administered questionnaires. The questionnaire was composed from two parts. The first part related to family risk factors; including maternal age at time of pregnancy, birth interval, having more than one child with same complain, educational level of mother, family socio-economic state, residency and parenteral jobs. The second part for child risk factors; including, age, gender, birth weight, type of feeding, previous medical and surgical operation if present.

The information gathered was processed, categorized, and evaluated using relevant statistical significance tests. Statistical analysis was conducted using SPSS version 30.0 (SPSS Inc., Chicago, USA). Quantitative data were presented as mean ± standard deviation. Qualitative data were presented as frequency and percentages. A p value of <0.05 was considered statistically significant.

RESULTS

The study includes 100 children, of them 50 patients with malnutrition matched according to the age with 50 normal children. The mean age ± standard deviation of the study participants is 13.32 ± 7.30 months. Male: Female ratio was 1.127:1.

Table 3.1 shows comparison between cases and controls regarding their family factors. Statistically significant difference between them regarding their history of having more than one child with malnutrition (P value < 0.001), mother educational level (P value < 0.001), family socioeconomic state (P value <0.001), and family residence (P value < 0.001).

Table 3.1: Comparison between cases and controls regarding their maternal factors (number=200).

Variable	Cases = 50 (%)	Controls = 50 (%)	P value
Maternal age at time of pregnancy, mean ± standard deviation	27.42 ± 5.51	26.81 ± 5.73	0.521
Birth interval between pregnancies in years, median (IQR)	1 (1-3)	1 (1-3)	0.731
History of having more than one child with malnutrition	7 (14%)	0 (0%)	<0.001
Mother educational level - Illiterate - Primary - Secondary - Higher education	 9 (18%) 27 (54%) 6 (12%) 9 (18%)	 2 (4%) 12 (24%) 15 (30%) 21 (42%)	<0.001

Family socio-economic state -Poor -Moderate -Good	 25 (50%) 16 (32%) 9 (18%)	 11 (22%) 32 (64%) 7 (14%)	 <0.001
Residency -Urban -Rural	 22 (44%) 28 (56%)	 39 (78%) 11 (22%)	 <0.001
Mother job -Housewife -Employee	 42 (84%) 8 (16%)	 39 (78%) 11 (22%)	 0.520
Father job -Free worker -Employee -Retired	 33 (66%) 11 (22%) 6 (12%)	 21 (42%) 22 (44%) 7 (14%)	 0.109

Table 3.2 shows comparison between cases and controls their patient related factors. Statistically significant difference between them regarding their type of feeding (P value <0.001) and presence of past medical condition (P value <0.001).

Table 3.2: Comparison between cases and controls regarding their patient related factors (number=100).

Variable	Cases = 50 (%)	Controls = 50 (%)	P value
Male gender	26 (52%)	25 (50%)	0.820
Birth weight, mean ± standard deviation	2.77 ± 0.34	2.91 ± 0.43	0.239
Type of feeding: -Breast feeding -Bottle feeding -Mixed	 11 (22%) 27 (54%) 14 (28%)	 29 (58%) 8 (16%) 13 (26%)	 <0.001
Positive past history of medical condition	14 (28%)	2 (4%)	<0.001
Positive past history of surgical condition	7 (14%)	3 (6%)	0.087

4. DISCUSSION

The study addressed family and patients related factors of malnutrition. Regarding family risk factors, the study found family history of another malnourished children in the same family significantly increases the risk from the chance of malnutrition in the presented child due to the fact that sharing underlying environmental, socioeconomic, and health factors, such as poor sanitation, food insecurity, lack of nutritional knowledge, or even abuse, creating recurring cycles of undernutrition that heighten vulnerability. This aligns with the results of several studies.[12-14] In same way children of poorly educated mothers shown to have significant malnutrition. Which runs with Amaha et al[15] and Iftikhar et al[16] study findings. This might due to the fact that uneducated mothers had lack of health literacy and poor feeding practices. While educated mothers had more autonomy within the household, allowing them to prioritize resources for child health.

Poverty is another factor found in this study having significant effect on children with malnutrition, due to interconnecting factors of financial constraints, poor sanitation and food insecurity, Siddiqui et al[17] and Ara et al[18] showed similar findings. Additionally, the current study illustrates that rural residency significantly had more malnutrition, this is linked to a combination of socioeconomic, environmental, and healthcare access factors. Salisu et al showed comparable results.[19]

On the other hand, the study found patients with malnutrition were significantly depend on bottle or mixed feeding, in contrast to control children were more depend on breast feeding. This is explained by the more evidence of infection related illnesses associated with bottle feedings, such as pneumonia and diarrhea, which ultimately can cause malnutrition. Tukeni et al[20] and Muse et al[21] findings.

Children with previous medical condition shown by the present study to have more malnutrition than control group. As disease-related malnutrition frequently results from higher nutritional demands, metabolic changes, and physical challenges with eating associated with chronic illnesses. Diamanti et al[22] showed consistent finding.

When evaluating the findings, the present study's limitations should be taken into account. First, the results may not be as easily generalized to other groups due to the small sample size. Second, the study was carried out at a single hospital, which would have decreased the results' external validity.

5. CONCLUSIONS AND RECOMMENDATIONS

This study established that both maternal and patient related factors contributed to the risk of malnutrition among children aged less than five years. According to the current study's findings, having another child with malnutrition, poverty, poor educational level of mother, rural residence; as well as, depending on bottle or mixed feeding and the presence of past medical condition significantly linked to malnutrition.

Conflict of Interest

The authors of this study report no conflicts of interest.

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