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Prevalence of Stunting and Wasting among Children Aged 6-24 Months in Mosul City

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ABSTRACT

Background: Growth of a child is frequently utilized as a nutritional status indicator. Inadequate or excessive nutritional intake, an imbalanced intake of essential nutrients, or poor nutrient utilization are characteristics of malnutrition, which include undernutrition (wasting, stunting, and underweight) and overnutrition (overweight, obesity), among other conditions (WHO, 2022). The aim of this research was to identify the rate of stunting and wasting among children aged [6–24 months] in Mosul city. **Methods and materials**: The current study used a cross-sectional (descriptive) study design and involved 616 samples of children who visited the vaccine units in centers for primary healthcare from period (15th November 2022 to 20th May 2023). Data was collected using (a questionnaire) designed by the researchers, and information related to the distribution of growth measurement for children includes (weight and length). [The statistical package for social sciences (SPSS)] was used for analyzing the data. **Results**": The study showed that the majority of the study sample (39.3%) were ages (6–11) months. The mean of age was 13.05 (±4.97) months. (52.9%) of the study sample were boys, while (47.1%) were girls. Also, the study showed that 8.6% of the study sample were wasted, 3.1% were severely wasted, 14.5% were stunted, and (3.1%) were severely stunted. **Conclusions**": The study revealed the early introduction of complementary feeding and giving unhealthy or inadequate foods were the main factors associated with stunting and wasting in the present study. In Mosul city, children aged 6 to 24 months have high prevalence rates of (stunting and wasting).

1. Introduction

Growth of a child is frequently utilized as a nutritional status indicator. Inadequate or excessive nutritional intake, an imbalanced intake of essential nutrients, or poor nutrient utilization are characteristics of malnutrition, which include undernutrition (wasting, stunting, and underweight) and overnutrition (overweight, obesity), among other conditions (WHO, 2022). Numerous factors, in addition to nutrient intake or consumption of specialty foods, are the main causes of malnutrition and are essential for nutritional status (Ersado, 2022).

Long-term dietary deprivation leads to stunting, which frequently has negative effects on performance in school, intellectual capacity, and delayed mental development. As a result, this has an impact on the nation's economic productivity.

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Child stunting refers to a child who is too short for his or her age and it occurs when brought on by chronic or persistent malnutrition. One risk factor for child mortality is stunting. Children with disabilities do not develop to their full physical and mental capacity. Child stunting is one of the World Health Assembly's nutrition target indicators (WHO, 2022).

The WHO Conceptual Framework on Childhood Stunting states that a complex interaction of familial, environmental, social, and cultural factors contributes to stunting. A chronic nutritional condition known as stunting can be caused by a number of variables, including socioeconomic status and maternal nutrition during pregnancy. Other factors include bad lifestyle choices and prolonged periods of lack of nutrition in infancy, which can result in infants growing shorter (Laksono et al., 2022).

Child wasting is the term used to describe a child who is too thin for his or her height as a result of recent rapid weight loss or an inability to gain weight. A child who is moderately or severely wasted has an increased risk of death. However, there are treatments possible for children who are moderately or severely wasted. One of the World Health Assembly's nutrition target indicators is child wasting (WHO, 2023).

Wasting is a symptom of severe undernutrition in children, usually as a result of a lack of food or an increased incidence of infectious diseases, especially diarrhea (WHO, 2023). Poor nutrient intake and/or illness can result in wasting in children, which is life-threatening. Particularly in situations of severe wasting, children with wasting have compromised immune systems, are more likely to experience long-term developmental deficits, and are at higher risk of dying. To survive, these kids need immediate medical attention and care (Gebremaryam et al., 2022).

2. Materials and methods

Before starting to collect data, letters of approval were obtained from the Deanship of the College of Nursing, University of Mosul, to obtain a facilitated approval letter. After that, approval letters were obtained from the College Committee for Medical Research Ethics and from the Nineveh Health Department Committee for Ethical Research.

Design of the Study:

To meet the study's aim and objectives, a quantitative (non-experimental), cross-sectional (descriptive) study design was used. from the period 15th November 2022 to 20th May 2023.

Setting of the Study

The study was conducted at six centers for primary healthcare in Mosul city, Iraq affiliated with the Nineveh Health Department after obtaining approval from the ethical and scientific committees.

Sample of the Study:

A simple random sampling technique was carried out in many primary health care centers of the Nineveh Health Department within the right and left primary care sectors in Mosul, Iraq, to achieve the objectives of the study from the period 15th November 2022 to 20th May 2023. The total sample included 616 samples from the children who visited the vaccine units in primary health care centers.

Tools of the Study

- **Part One:**

This part of the questionnaire contains the Socio-demographic characteristics of the child, which include the child's age and gender, type of feeding, and initiation of complementary feeding).

- **Part two:**

This part of the questionnaire contains information related to the distribution of growth measurements for children, including (weight and Length).

Procedure of the Measurement

Length was measured according to WHO standards using a chart or table recognized by the World Health Organization for anthropometry to measure growth patterns and determine the rate of growth problems or the normal growth rate of children. Length measurements by the UNICEF measuring board should be recorded to the nearest 0.1cm using a consistent unit over repeated measurements (two measurements). eight was measured by a trusted calibrated weighting device (Seca 874 digital flat Scale, made by Seca Germany Corporation and approved by the WHO and UNICEF). Body mass index (BMI) was calculated according to the formula BMI = weight (kg)/length $(m)^2$. BMI-for-age is the

indicator that can be used continuously for children to determine waste (-2 SD) and severe waste (-3 SD). Length for age (LAZ) is the indicator that can be used continuously for children to determine stunted (-2 SD) and severe stunted (-3 SD).

Data Analysis

Using the Statistical Package for Social Science" (SPSS) Version (26) for Windows 10, Both data entry and analysis were completed. Descriptive statistics were applied in the analysis as frequency, percentage, mean, and SD. Chi-square A test of significance was used, in which the level of significance is $P < 0.05$ and highly significant if the P value is < 0.001.

3. Results

Table (1) Socio demographic characteristics of the children (No. 616).

Gender	**No.**	**%**
Male	326	52.9
Female	290	47.1
Total	**616**	**100%**
Age	**No.**	**%**
From 6 to 11 months	242	39.3
From 12 to 17 months	206	33.4
From 18 to 24 months	168	27.3
Total	**616**	**100%**
Mean age 13.05 (±4.775)		
Timing of initiation of complementary feeding	**No.**	**%**
Less than 6 months	301	48.9
6 months	232	37.7
More than 6 months	83	13.5
Type of milk feeding	**No.**	**%**
Breast feeding	313	50.8
Bottle feeding	218	35.4
Mixed feeding	85	13.8
Total	**616**	**100%**

The table (1) shows that the total sample was 616 children, and the ratio of (boys) and (girls). Boys accounted for more than half (52.9%) of the participants, while girls accounted for (47.1%). divided into three age groups when a third of the participants were aged [6–11] months (33.6%), whereas [12–17] and [18–24] months were represented by (36.0%) and (30.4%), respectively. The mean age was 13.05 months (±4.97).

Relating to when to start complementary feeding, approximately half of the study sample (48.9%) receives complementary feeding before 6 months, approximately one-third of them (37.7%) receives

complementary feeding in 6 months, and 13.5% of them receive complementary feeding after 6 months. Also, nearly half (50.8%) of the children receive breast feeding, whereas, (35.4% receive bottle feeding, and (13.8% receive mixed feeding.

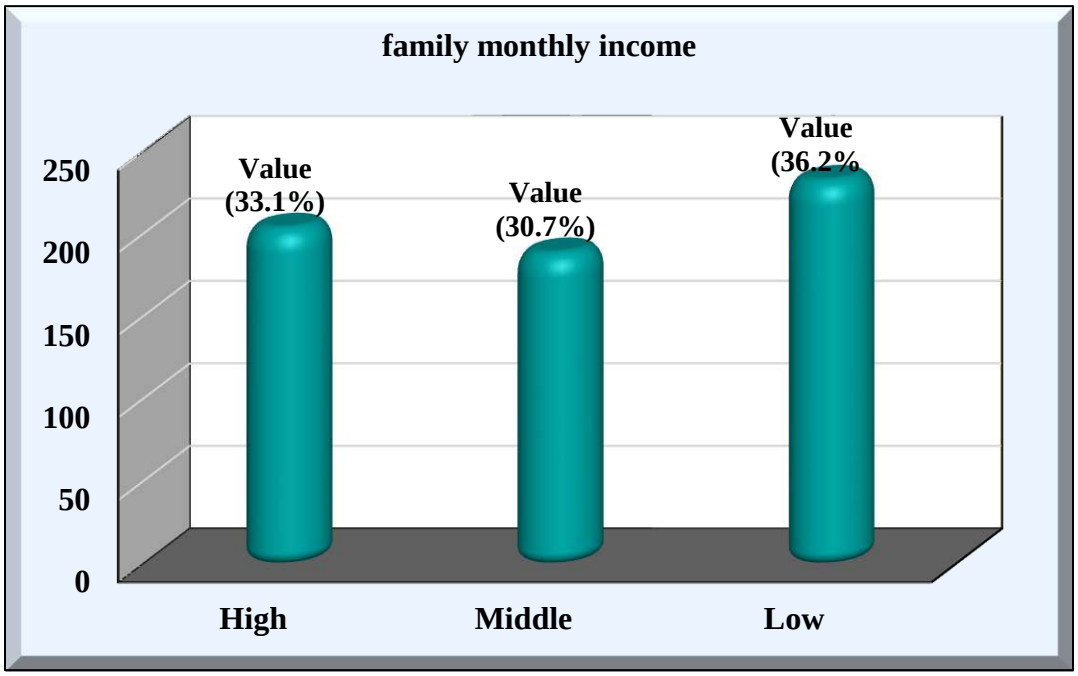

Figure (1) Distribution of family monthly income.

Figure (1) revealed the family monthly income, the study showed that 33.1% about third of the mother had high monthly income, 30.7% about third of the mother had middle monthly income and 36.2% about third of the mother had low monthly income.

Table (2) Prevalence of Stunting and Wasting by Z-Score (No. 616)

BMI to age	Z-score	Boys No. (%)	Girls No. (%)	Total No. (%)
Obesity	3 SD	34 (5.5)	23 (3.8)	57 (9.3)
Overweight	2 SD	75 (12.2)	70 (11.3)	145 (23.5)
Normal weight	0 SD	176 (28.6)	166 (26.9)	342 (55.5)
Wasted	-2 SD	29 (4.7)	24 (3.9)	53 (8.6)
Sever wasted	-3 SD	12 (2)	7 (1.1)	19 (3.1)
Total		**326 (53)**	**290 (47)**	**616 (100)**
P-Value Chi- Square=0.685, df=4				
Length to age	**Z-score**	**Boys No. (%)**	**Girls No. (%)**	**Total No. (%)**
Normal length	0 SD	263 (42.7)	243 (39.4)	506 (82.1)
Stunted	-2 SD	51(8.3)	38 (6.2)	89 (14.5)
Sever Stunted	-3 SD	12 (2)	9 (1.4)	21 (3.40)
Total		**326 (53)**	**290 (47)**	**616 (100)**
P-Value Chi- Square=0.601, df=2				

Table (2) explain rate (Stunting and Wasting) among children ages [6–24] months. The table clearly reveals that (8.6%) were wasted, (3.1%) were severely wasted, (14.5%) were stunted, and (3.1%) were severely stunted.

4. Discussion

Socio demographic characteristics of the children

Among the 616 participants in the study, there were nearly equal proportions of boys and girls. Boys outnumbered girls among the participants by a ratio of (52.9%) to (47.1%). when divided into three categories based on age. One third (33.6%) of the participants were between the ages of 6-11 months, while (36.0%) and (30.4%) were, respectively, between the ages of 12-17 months and 18-24 months. The mean age was 13.05 months (±4.97). The result of the study is similar to that of a study done in Northern Ghana by Anin, Saaka, et al., (2020), where there were (581) children who participated in the study overall, and boys and girls were almost equally represented. (51.8%) of the population were boys. whereas girls made up (48.2%). Were the three age groups: 6–11 months (41.7%), 12–17 months (31.8%), and 18–24 months (26.5%). The mean age was 13.25 months (±5.09). Also, in the study that has nearly reached finding result study, which was conducted in Ethiopia, by Rumicha and Gemede (2021) boys and girls were about equally represented among (410) children who participated in this study. (51.2%) of the sample were boys, whereas (48.2%) were girls. 6–8 months (20.5%), 9–17 months (49.3%), and 18–24 months (30.2%).

Relating to when to start complementary feeding, the current study found that roughly half (48.9%) of the children, receive complementary feeding before the age of (six months), roughly one-third (37.7%) do so within the first six months, and fewer than one third (13.5%) do so after six months, for a mean age of 5.1 (±4.706) months. These results are consistent with a study that was carried out in northern Ethiopia, by (Reda, Teferra, et al,) (2019), which revealed (30.17%), (53.4%), and (16.42%) were given complementary feeding early, on time, and late, respectively. The mean age for the initiation of

complementary feeding was 6 months. These findings are in disagreement with a study done in Ethiopia by Gilano, Sako, et al. (2022), which explained that more over half (64%) of the infants started supplemental feeding either before 6 months or later than 8 months, with only (36.4%) of children starting it within the WHO's recommended time period. According to the researcher's opinion, one reason that the mother initiated complementary feeding before six months, as shown in these studies, was that the majority of mothers' responses (indicated that the infant's milk supply was insufficient to meet his or her needs, This is an indication of inadequate information about complementary feeding, which causes a rise in the number of children who are stunted and wasted..

Unfortunately, two-thirds (66.9%) of the participants in the study belonged to low and middle family socioeconomic status, and one-third (33.1%) of participants were in high family socioeconomic status, as shown in figure (1). These results concur with those of another study that has been done in urban Moshi, Northern Tanzania, by Masuke, Msuya, et al. (2021), which found that two-thirds (76.2%) of participants belonged to low and middle family socioeconomic status, and less than one-third (23.8%) of participants belonged to high family socioeconomic status.

Prevalence of Stunted and Wasted by Z-Score

In the current study, the prevalence ratios for stunting and wasting were (14.5%) and (7.5%), respectively. Additionally, gender and stunting and wasting have no relationship statistically (P-Value > 0.05). These results line up with the research that was done by Matee and Al-Jawadi (2011), which displayed the rate of stunting and wasting in children under 5 years of the, in Al-Hamdaniya District (Nineveh government), Iraq. On the other hand, the study was in disagreement presenting the outcomes of a research done in Kuwait by Al-Taiar, Alqaoud, et al. (2020), in which the rate of stunting and wasting was (7.5) and (2.4%), respectively. Also, these findings are similar to those of a study that has been conducted in Sudan by Dafaalla (2018), where the finding of stunting and wasting was (13.5%) and (17.6%), respectively. However, these results conflict with a study that has been performed in the Gaza Strip, Palestine, by Azzam (2019), where the rates of wasting and stunting were, respectively, (21.3%) and (22.6%). Also, which is in disagreement with the study done in Northern Ghana by Anin, Saaka, et al., (2020), the rate of stunting and wasting was (33.2%) and (14.1%) respectively. Additionally, the results of the current study are not concordant with the findings of the study that has been was don in Cameroon by Ngassa, Meriki, et al. (2022) according to study findings, stunting and wasting occur often (26.5% and 3.7%, respectively).

4. Conclusions and Recommendations

4.1 Conclusions

The findings found that early complementary feeding introduced and giving unhealthy or inadequate foods were the main factors associated with (stunting and wasting) in the present study. Additionally, the study revealed that most families have a low or middle monthly income level, which has a significant impact on the variety of complementary foods given to the child.

In conclusion, In Mosul city, children aged 6 to 24 months have high prevalence rates of (stunting and wasting) 6–24 months.

4.2 Recommendations

This study has investigated one of the hot clinical topics in nutrition, which is stunted and wasted among children age 6-24 month. The following recommendations are suggested depending on depending on results of the study results.

1. Optimal child feeding practices should be promoted in intervention attempts to improve the nutritional condition of infants through dietary changes and educational programs.
2. Interventional programs should focus on poorer households and mothers with lower educational levels to promote complementary feeding behaviors of mothers' regarding their children.
3. In order to prevent children's nutritional quality from declining as they develop, moms must be encouraged to provide children with ongoing, adequate care without regard to a child's gender.
4. The causes of stunting and wasting in children in Mosul city, Iraq, urgently need to be addressed with preventive interventions. here is still a need to strengthen existing policies on child nutrition.

5. Improvements to the intervention should concentrate on promoting improved child care, nutrition education, and family planning usage. There needs to be more study done on dietary evaluation.

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