



E-ISSN: 2706-9575
P-ISSN: 2706-9567
IJARM 2024; 6(2): 36-41
Received: 21-01-2024
Accepted: 28-02-2024

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Assessing growth monitoring practices in primary healthcare centers: A study in Baghdad, Iraq, 2022

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DOI: <https://doi.org/10.22271/27069567.2024.v6.i2a.551>

Abstract

Background: Growth monitoring is a cornerstone of pediatric care, using growth charts to identify potential problems early and promote optimal development. This study aimed to assess growth monitoring practices within primary healthcare centers in Baghdad, Iraq.

Methods: A cross-sectional study design with analytic elements was employed. Child health records from six randomly selected centers (n = 124) were reviewed for children born in 2017. Data on the availability of growth charts, documented visits compared to the recommended schedule, and growth trend documentation were collected and analyzed.

Results: This study in Baghdad, Iraq, evaluated growth monitoring practices in primary healthcare centers. The analysis of the child archived files (n=124) revealed shortcomings. Growth charts were present in only 67.7% of the files, with some variation between centers. There was a significant discrepancy between the recommended and documented growth monitoring visits. Only a small fraction of the children completed the recommended visits in all age groups. Furthermore, a concerning lack of documented growth trends was identified (50.8% of the files). Among the documented trends, a concerning pattern emerged with a high prevalence of negative trends in various growth parameters. These findings suggest potential gaps in program implementation and the need for improvement.

Conclusions: This study revealed limitations in growth monitoring practices in primary healthcare centers in Baghdad, including low availability of growth charts, infrequent documented visits, and the lack of growth trend documentation. Variation was also observed between the centers. A multifaceted approach is recommended that emphasizes policy enforcement, healthcare worker training, standardized record keeping, and program monitoring to improve growth monitoring and facilitate early detection of child growth problems.

Keywords: Growth monitoring, PHCs, growth charts, compliance

Introduction

The nutritional status of a child is a critical indicator of overall health. Adequate dietary intake is directly linked to a reduced risk of disease. Growth monitoring, a cornerstone of pediatric care, utilizes growth charts to continuously assess a child's growth trajectory and identify potential problems early ^[1].

Malnutrition encompasses a spectrum of conditions, including undernutrition (Wasting, stunting, and underweight), micronutrient deficiencies, overweight, and obesity. Undernutrition, particularly due to its various forms (Wasting, stunting, and underweight), has a detrimental impact on the physical, mental, and social development of a child ^[2]. Early identification and intervention are essential to mitigate the long-term consequences of malnutrition.

The monitoring of growth in childhood is based on anthropometry, measurement of weight, height/length, and head circumference. These measurements are plotted on standardized World Health Organization (WHO) growth charts, categorized by sex (Boys and girls) from birth to five years of age. The percentile curves on these charts represent the distribution of body measurements in healthy children under optimal growth conditions. Monitoring trends over time, rather than isolated measurements is crucial to accurate assessment ^[3].

WHO growth charts typically include four key indicators: weight for age, length/height for age, weight for height, and body mass index (BMI) for age. These charts allow healthcare professionals to identify potential deviations from expected growth patterns, suggesting a

decline in growth or the risk thereof [4].

In cases of abnormal growth patterns, healthcare providers must collaborate with caregivers to determine the underlying causes. Timely intervention strategies are then critical to address these issues. The effectiveness of growth assessments depends on the implementation of appropriate response programs in conjunction with data collection [5].

Growth monitoring programs play a vital role in the early detection of deviations from normal growth patterns. By comparing a child's measurements with standardized growth reference curves, health professionals can identify potential issues related to undernutrition or overnutrition. Early detection facilitates timely intervention and the implementation of appropriate management strategies. Growth charts offer a multifaceted approach to nutritional assessment. For example, wasting (low weight-for-height) indicates acute malnutrition or recent weight loss. Stunting (Low height for age) reflects chronic malnutrition or impaired linear growth. Underweight (low weight for age) can suggest a combination of acute and chronic malnutrition [6].

Study Objectives

This study aims to evaluate growth monitoring practices within a specific healthcare setting, focusing on three key objectives.

- 1. Availability of Growth Charts:** Assess whether growth charts are readily available and consistently included in child health care files.
- 2. Frequency of Visits:** Evaluate the number of visits documented in the archived charts against the recommended schedule for growth monitoring.
- 3. Growth Trend Documentation:** Determine if growth trends (illustrated by lines connecting measurements across visits) are documented within the archived document.

Materials and Methods

Study design: This study employed a cross-sectional design with analytic elements to assess a child growth monitoring program in primary healthcare centers within Baghdad, Iraq. Data collection occurred between 9 August 2022 and 30 December 2022.

Sampling technique and sample size

A convenient sample of archived child health booklets (Child files) was utilized. These booklets contain a comprehensive record of a child's health, growth, and development. The study focused on children born in 2017 who had reached five years of age at the end of the study period, allowing researchers to track their growth trajectories over five years. Six primary healthcare centers were chosen by simple random sampling from various sectors of Baghdad. Three centers were selected from Al-Karkh and three from Al-Rusafa. The specific centers included Al-Adhamiya 3rd, Al-Mustansiriya, Al-Baladiaate, Al-Salam, Al-Mansour, and Al-Eadl. The inclusion criteria included archived files for children who had reached 5 years of age (Born in 2017). To follow up on the work of a growth monitoring program in terms of the growth charts availability (There are growth charts), number of visits required by schedule, and growth trends outcomes (the line between 2 visits or more).

Data Collection

The primary data source was the Child Health Booklet, which contained information on a child's weight and height measurements. These measurements were plotted on four standardized growth charts: weight-for-age, height or length-for-age, weight-for-height, and BMI-for-age. Comparisons were made with established normal ranges to provide diagnoses based on each chart and facilitate appropriate interventions.

The Child Health Booklet served as a questionnaire, providing data on the following

- **Availability of growth charts:** Documented presence or absence within the archived files.
- **Number of visits:** The number of visits documented in the child's health booklet compared to the recommended schedule (4 visits during the first year, twice during the second year, and once annually during the third, fourth, and fifth years of life).
- **Growth trends:** The results of the growth trend for each growth chart, are assessed according to the growth monitoring program.

Data Analysis

Data management and statistical analysis were performed using Microsoft Excel and IBM SPSS (Statistical Package for the Social Sciences) version 26. Descriptive statistics were used to summarize data by frequency and percentage. Chi-square tests were used to assess possible relationships between various determinants and the number of documented visits, as well as growth trends over the five-year. In this study, Results were considered statistically significant at $p < 0.05$.

Ethical Considerations

The study was granted ethical approval by the relevant health authority within the Ministry of Health. Permission to conduct the study in selected PHCCs was secured from the entire Directorate of Health and all data collection adhered to strict anonymity procedures to ensure confidentiality.

Data availability

Due to ethical considerations and privacy concerns, the data of individual participants cannot be publicly shared.

Pilot Study

A pilot study was conducted at the 3rd Al-Adhamiya Primary Healthcare Center to evaluate the reliability of the study instruments (Growth charts) and their availability within child health booklets. Data from this pilot study (10 child files) were excluded from the final analysis, as the questionnaire underwent some modifications based on the pilot findings.

Results

Sample Characteristics and Availability of Growth Charts (Table 1)

This study investigated growth monitoring practices within primary healthcare centers in Baghdad, Iraq. 124 child healthcare files were included from six primary health centers within the health directorates of Al-Rusafa and Al-Karkh. The sample comprised a nearly equal distribution of male (54.8%) and female (45.2%) children who had reached five years of age.

Regarding the availability of growth charts, 67.7% (84) of the files contained growth charts documented within the child's records. This translates into a higher prevalence of documented growth charts for males (36.2%) compared to females (31.5%). In particular, the availability of growth charts varied between healthcare centers. Al-Rusafa had a lower prevalence (33%) compared to Al-Karkh (34.6%). The distribution between individual centers revealed the highest availability in the Al-Eadl (15.3%) and Al-Adhamiya 3rd (13.7%) centers, while the lowest was observed in the Al-Baladiaat (4%) and shared equally by the Al-Munsour and Al-Salam centers (9.7% each). These findings suggest a potential association between growth chart availability and specific healthcare centers, with no significant correlation with child sex.

Frequency of visits compared to the recommended schedule (Table 2)

The analysis of the archived files revealed a significant discrepancy between the actual number of documented visits and the recommended growth monitoring schedule. Only a small fraction of the children completed the recommended number of visits in different age groups:

- **First year:** 8.8% (11)
- **Second year:** 9.6% (12)
- **Third year:** 2.4% (3)
- **Fourth year:** 4.8% (6)
- **Fifth year:** 5.5% (7)

In contrast, a significant majority (Ranging from 39.5% to 97.5%) did not have documented growth monitoring during the first year, and this percentage increased in subsequent years. This substantial disparity highlights a potential gap between recommended practices and the actual implementation of growth monitoring programs. Furthermore, a statistically significant association was found between the number of documented visits, the age of the child, and the specific healthcare center.

Relationship between the number of required visits and documented visits (Table 3)

Table 3 reinforces the findings of Table 2 by demonstrating a weak correlation between the required number of visits and those documented in the child files. It reiterates the low completion rates for recommended visits in all age groups.

Documentation of growth trends and association with healthcare centers (Tables 4 and 5)

Analysis of growth trend documentation revealed a concerning lack of recorded trends in all growth charts. A significant portion (50.8%, 63 files) did not have any documented growth trends. Among those with documented trends, a worrying pattern emerged:

- Height/length for age: 39.5% (49) with bad trends, 9.7% (12) with good trends.
- Weight for age: 28.2% (35) with bad trends, 21% (26) with good trends.
- Weight for height: 31.5% (39) with bad trends, 17.7% (22) with good trends.
- Body mass index for age: 28.2% (35) with bad trends, 19.4% (24) with good trends.

These findings indicate a prevalence of negative growth trends across various growth parameters, suggesting potential nutritional deficiencies or slowing growth. Additionally, a statistically significant association was observed between documented growth trends and the specific healthcare center where the child received care. This suggests that certain centers may have more robust growth monitoring practices compared to others.

Discussion

This study in Baghdad, Iraq, evaluating growth monitoring practices in primary healthcare centers, revealed concerning shortcomings. Here, we discuss these findings in the context of similar research conducted in various geographical settings. The study found that only 67.7% of the child health records reviewed contained growth charts. This aligns with the findings of other studies in low- and middle-income countries (LMIC). Research in Tanzania ^[7] reported an availability rate of 62%, while a study in Ethiopia ^[8] documented a rate of as low as 42%. These figures suggest a global challenge in terms of consistent utilization of growth charts in primary healthcare settings, particularly in resource-limited environments.

There was a significant discrepancy between the recommended growth monitoring schedule and the documented number of visits. Only a small fraction of children completed the recommended visits, highlighting a potential gap between policy and practice. Similar observations were made in studies conducted in Kenya ^[9] and Pakistan ^[10]. These studies attributed low completion rates to factors such as limited availability of healthcare workers, long waiting times in clinics and transportation difficulties for caregivers.

The study identified a worrying lack of documented growth trends within child health files. More than half (50.8%) did not have documented trends, limiting the effectiveness of growth monitoring for the early detection of potential problems. This finding resonates with research from Ethiopia ^[11] that reported inadequate training for healthcare workers to interpret growth charts and document trends.

The study observed a statistically significant association between growth monitoring practices and the specific healthcare center. This suggests potential variations in program implementation or capacity of healthcare workers in different facilities. Similar findings were reported in a Bangladesh study ^[12] that highlighted the importance of targeted interventions to strengthen monitoring practices within underperforming centers.

Unlike the limitations identified in this study, research conducted in developed countries such as the United States ^[13] and the United Kingdom ^[14] generally reports higher rates of availability of growth charts, documented visits, and documentation of growth trends. These studies often attribute this success to robust healthcare systems with well-trained staff, established electronic health records, and efficient appointment scheduling systems.

In general, this study adds to the existing body of knowledge on growth monitoring practices in LMICs by highlighting the challenges faced in a specific regional context (Baghdad, Iraq). The findings underscore the need for multifaceted interventions to improve growth monitoring programs in such settings.

Table 1: Sample characteristics and availability of growth charts

Variable	Available (n= 84) (67.7%)		Not available (n= 40) (32.3%)		Total n (%)
	n.	%	n.	%	
Directorate					
AL Rusafa	41	33.0	19	15.3	60 (48.4)
AL karkh	43	34.6	21	16.9	64 (51.6)
P value 0.892					
Primary healthcare centers					
Al-Eadl	19	15.3	3	2.4	22 (17.7)
Al-Albaladiaat	5	4.0	17	13.7	22 (17.7)
Al-Mansour	12	9.7	5	4.0	17 (13.7)
Al-Mustansiriya	19	15.3	1	0.8	20 (16.1)
Al-Salam	12	9.7	13	10.4	25 (20.2)
Al-Adhamiya 3rd	17	13.7	1	0.8	18 (14.5)
P value 0.000					
Gender					
Female	39	31.5	17	13.7	56 (45.2)
Male	45	36.2	23	18.5	68 (54.8)
P value 0.681					

Table 2: Frequency of visits compared to the recommended schedule

Visits No.	Al-Eadl	Al-Baldiaat	Al-Mansour	Al-Mustansiriya	Al-Salam	Al-Adhmiya	Total n. (%)
First year							
0	3	20	8	1	13	4	49 (39.5)
< 4	9	2	9	19	12	13	64 (51.6)
4 +	10	0	0	0	0	1	11 (8.8)
P value = 0.000							
Second year							
0	11	21	9	6	24	8	79 (63.7)
< 2	6	1	5	12	1	8	33 (26.6)
2 +	5	0	3	2	0	2	12 (9.7)
P value = 0.000							
Third year							
0	22	22	16	19	25	17	121 (97.5)
1+	0	0	1	1	0	1	3 (2.4)
P value = 0.000							
Fourth year							
0	21	22	16	18	25	16	118 (95.1)
1+	1	0	2	2	0	1	6 (4.8)
P value = 0.240							
Fifth year							
0	22	22	15	15	25	18	117(94.4)
1+	0	0	2	5	0	0	7 (5.5)
P value = 0.001							

Table 3: Relationship between the number of required visits and documented visits

Visits / Years	Complete visits				
	Frequency	%	Mean	SD	P value
(4) Times/ first year	11	8.8	1.23	1.312	0.000
(2) Times / second year	12	9.6	0.46	0.667	0.000
Once / third year	3	2.4	0.03	0.218	0.000
Once / fourth	6	4.8	0.05	0.215	0.000
Once / fifth	7	5.5	0.06	0.232	0.000

Table 4: Growth trend outcome in the archived child record

Trend	No.	%
Height or length for age		
Not done	63	50.8
Bad	49	39.5
Good	12	9.7
Weight for age		
Note done	63	50.8
Bad	35	28.2
Good	26	21.0
Weight for height		
Note done	63	50.8
Bad	39	31.5
Good	22	17.7
BMI for age		
Note done	63	50.8
Bad	37	29.8
Good	24	19.4

Table 5: Growth trend documentation and association with healthcare centers

Growth trends results	Not done		Good		Bad		Total	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Length or height for age								
Al Eadl	4	3.2	2	1.6	16	12.9	22	17.7
Al Baladiaat	22	17.7	0	0	0	0	22	17.7
Al Mansour	7	5.6	4	3.2	6	4.8	17	13.7
Al Mustansiriya	4	3.2	4	3.2	12	9.7	20	16.2
Al Salam	21	16.9	2	1.6	2	1.6	25	20.2
Al Adhamiya	5	4.0	0	0	13	10.5	18	14.5
Total	63	50.8	12	9.7	49	39.5	124	100.0
P value = 0.00								
Weight for age								
Al Eadl	4	3.2	8	6.5	10	8.1	22	17.7
Al Baladiaat	22	17.7	0	0	0	0	22	17.7
Al Mansour	7	5.6	3	2.4	7	5.6	17	13.7
Al Mustansiriya	4	3.2	6	4.8	10	8.1	20	16.2
Al Salam	21	16.9	2	1.6	2	1.6	25	20.2
Al Adhamiya	5	4.0	7	5.6	6	4.8	18	14.5
Total	63	50.8	26	21.0	35	28.2	124	100.0
P value = 0.00								
Weight for height								
Al Eadl	5		4		13		22	17.7
Al Baladiaat	22		0		0		22	17.7
Al Mansour	7		5		5		17	13.7
Al Mustansiriya	4		4		12		20	16.2
Al Salam	20		3		2		25	20.2
Al Adhamiya	5		6		7		18	14.5
Total	63		22		39		124	100.0
P value = 0.00								
BMI for Age								
Al Eadl	4	3.2	6	4.8	12	9.7	22	17.7
Al Baladiaat	22	17.7	0	0	0	0	22	17.7
Al Mansour	7	5.6	5	4.0	5	4.0	17	13.7
Al Mustansiriya	4	3.2	5	4.0	11	9	20	16.2
Al Salam	21	16.9	2	1.6	2	1.6	25	20.2
Al Adhamiya	5	4.0	6	4.8	7	5.6	18	14.5
Total	63	50.8	24	19.3	37	29.8	124	100.0
P value = 0.00								

Conclusions and Recommendations

In this study investigating growth monitoring practices in Baghdad's primary healthcare centers, analysis of child health files revealed concerns about gaps. Only two-thirds of the files contained growth charts, highlighting the underutilization of this crucial tool. There was a significant discrepancy between the recommended and documented

growth monitoring visits, with a very low percentage of children completing the recommended schedule. Furthermore, more than half of the files lacked documented growth trends, hindering the program's effectiveness. In particular, the study identified a statistically significant variation in growth monitoring practices across different healthcare centers. These findings suggest that a

multifaceted approach is necessary for improvement. Review and revision of the policy along with consistent implementation are crucial. Ideally, healthcare professionals are trained in the proper use of growth charts, communication with caregivers, and growth trend documentation is essential. Standardized recordkeeping procedures and regular program monitoring and evaluation are vital for accurate data and adherence to guidelines. Finally, community engagement with leaders and health educators can promote awareness and encourage caregiver participation in growth monitoring programs. By implementing these recommendations, Baghdad's healthcare authorities can significantly strengthen growth monitoring within primary healthcare centers, ultimately leading to earlier identification and management of potential growth problems and improved child health outcomes.

Conflict of Interest

Authors Mohsin Ahmed Jasim, Zainab Ghassan Lutfi, and Riyadh Shiltagh Al-Rudaini declare that there is no conflict of interest regarding the publication of this article.

Financial support

The study was self-funded by the researcher and there is no funding from any institution or organization.

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How to Cite This Article

Jasim MA, Lutfi ZG, Saud RF, Al-Awady MST, Al-Rudaini RS. Assessing growth monitoring practices in primary healthcare centers: A study in Baghdad, Iraq, 2022. *International Journal of Advanced Research in Medicine*. 2024;6(2):36-41.

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