

Knowledge and Perception of Growth Monitoring among Caregivers Attending a Tertiary Level Health Care Facility

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Abstract

Background: Growth monitoring is one of the most effective measures for the prevention of malnutrition in childhood. **Aim:** The aim of this research was to determine caregivers' knowledge and value of growth monitoring in under-five children. **Materials & Methods:** This was a descriptive cross-sectional study in which Interviewer-administered questionnaires were used for data collection and growth charts were given to the caregivers to identify different growth patterns. **Results:** Under-fives sampled were 323. Males comprised 54.5%(176/323), females 45.2%(146/323). Mothers brought the children to the hospital 78.6%(254/323) of the time, fathers 10.2%(33/323), both parents 5.9%(19/323). Respondents who had heard of growth monitoring were 52.9%(171/323); 30.7%(99/323) had been taught how to use the growth chart; 53.6%(173/323) had seen a growth chart; 63.2%(204/323) were able to identify the growth charts correctly. Of those who had been taught to use the growth chart, 87.9%(87/99) were able to identify the charts correctly while 99.0%(98/99) believed that growth charting in childhood was important ($p=0.03$). **Conclusion:** While many parents appreciated the importance of growth monitoring in childhood, a small proportion of them had heard about growth monitoring or had actually been taught how to use the growth chart or were able to correctly identify the growth chart. A similar survey among health care professionals needs to be done in order to properly investigate the root of this problem. The importance of growth monitoring in childhood needs to be reemphasized and will go a long way to improve the health indices of children in Nigeria.

Keywords: Growth monitoring; Childhood; Nigeria

Introduction

According to the United Nations Children's Fund (UNICEF) "growth monitoring is the process of following the growth rate of a child in comparison to a standard, by periodic, frequent anthropometric measurements, in order to assess growth adequacy and identify faltering early. ^[1] Growth Monitoring (GM) is not the infrequent or one-time anthropometric assessment of a child to assess nutritional status without assessing growth velocity over time. UNICEF defines Growth Monitoring and Promotion (GMP) as "a preventive activity comprised of GM linked with promotion (usually counselling) that increases demand for other services, as needed, and serves as the core activity in an integrated child health and nutrition programme, when appropriate".

GM is one of the effective measures for the prevention of malnutrition, especially mild and moderate malnutrition, which are vital to reducing childhood mortality. About 45% of deaths in under-fives can be attributed to nutrition-related factors. ^[2] These deaths occur in children who are mildly or moderately malnourished, due to the large number of such children, compared to those who are severely malnourished. ^[1]

The practice of measuring the growth of children in the clinics in developing countries was introduced in the 1960s and the use of growth charts became standard practice in the 1970s. ^[3] During the same period and precisely in 1978, the World Health Organization promoted the international use of growth chart and under-five growth monitoring was included as one of the key components of UNICEF's GOBI (Growth monitoring, oral rehydration therapy, Breastfeeding, Immunization) approach in Child Survival Development of the early 1980s. ^[3] Subsequently, growth monitoring and promotion emerged in the 1980s and linked growth monitoring outcomes with an action to be taken for the child.

GM is often a vital ongoing link between healthcare workers and a child's caregivers through the use of the growth chart. ^[4]

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The use of the latter is no longer restricted to healthcare workers as caregivers are expected to understand and interpret it, in order to contribute in the necessary actions, as part of the child's care. The idea of educating caregivers about their child's growth and motivate them to take appropriate action also hinges on their understanding of the growth charts. [4-6]

Studies on the knowledge, perception, and use of growth charts among caregivers have principally been in developing countries. [7] In spite of the impact of nutrition related morbidity in childhood in developing countries, few studies till date, has explored the concept of growth monitoring among caregivers. Adhikary [4] in a cross-sectional descriptive study among 100 rural women in Bangladesh found that only 36% of the subjects were aware of the growth chart and only 10% had ever used it to plot their child's weight. As much as 64% of the subjects could not interpret any of the three growth charts they were shown, despite a literacy rate of 40% among them. A similarly low level of awareness of growth charting among caregivers was found by Upadhyay et al. [8], in the rural area of Amritsar district, India. The study, found that only 38.17% of caregivers were aware of growth charting. Awareness was significantly higher among more educated caregivers and caregivers from a higher socioeconomic status.

Debuo et al. [9] in a study of 300 caregivers in Lawra district of Ghana found that only 53% of the subjects had good knowledge of GMP. Up to 94% had a good attitude towards GMP, though perception towards some of the components was poor. Only 25% practiced GMP. Similar to the findings of Adhikary in Bangladesh, only 18.7% of the respondents were able to interpret the four growth charts they were shown correctly.

The earliest Nigerian study on this subject matter was by Fagbule et al. [10] in Ilorin, North Central Nigeria in 1990. Five hundred and eighteen mothers were studied to assess their knowledge, utilization, and understanding of growth chart. Fifty-three per cent of the mothers had heard about growth charts. This awareness was significantly influenced by maternal age, educational status and parity. Only 33.6% of the mothers correctly interpreted the plotting on a growth chart; 22% of the respondents considered growth chart useful for immunization record, nutrition advice, clinic appointment days and assessment of developmental milestones.

In another study, in South-east Nigeria, Ibekwe et al. [11] found that only 12.2% of mothers had a good comprehension of the growth chart. Notably, education, parity and occupation had no influence on maternal understanding of the growth chart. Health workers were virtually the only source of information about growth chart. Etim-Una [12] in Kaduna State, Nigeria, found that only 38.1% of caregivers had heard about growth chart; 11.7% of these caregivers got the information from health workers, which was in contrast to the finding of Ibekwe et al. Just 30% of the caregivers could interpret the growth chart correctly. The ability of the mothers to interpret the growth chart was significantly influenced by their age, educational status, level of income, and number of living children.

This study explored the awareness and perception of growth monitoring among caregivers of under-five year olds. This is

necessitated by the paucity of data on this subject and the need to establish the current state of affairs concerning these important concepts in the Nigerian context, which have an influence on the co-operation of caregivers in activities to promote and maintain good health and nutrition of under-fives.

Materials and Methods

This study was carried out in the Children out Patient Clinic (CHOP) and Child Welfare Clinic of Nnamdi Azikiwe University Teaching Hospital (NAUTH) in Nnewi, Anambra State South-East Nigeria. Nigeria is a developing country in West Africa.

NAUTH is the only Federal tertiary hospital located in the state and receives referrals from surrounding states in the sub region. On the average, 359 and 100 children are seen monthly in CHOP and the Child Welfare Clinic respectively. Data was acquired from August 2018 to August 2019.

This was a descriptive cross-sectional study. Caregivers of children aged 0 years (birth) to 5 years attending the CHOP Department and Child Welfare Clinic of NAUTH, Nnewi were recruited for the study. Inclusion criteria were caregivers of children from birth to 5 years attending the Children Outpatient Department and Child Welfare Clinic of NAUTH, Nnewi.

Exclusion criteria were caregivers of children who declined participation in the study.

Sample size of 323 was arrived at using the formula

$$n = Z^2 \frac{PQ}{d^2}$$

Total number of under-five children seen on the average, monthly in both the CHOP department and Child Welfare clinics: 359+100=459

Proportionate sampling was used to arrive at the number of caregivers to be sampled from CHOP and the Child Welfare Clinic; 253 and 70 respectively.

Consecutive sampling was used to recruit participants and the average monthly attendance of fewer than 5 children at the Children out patient and Child Welfare clinics served as the sampling frame. Caregivers were asked of any prior enrolment into the study before being recruited in order to avoid recruiting an individual multiple times. Pretested and structured interviewer administered questionnaire was used for data collection.

Two sets of Child Health Cards were used to test the caregivers' ability to interpret the growth chart. The first was used to test the caregivers' ability to recognize the growth chart on the card. The second set of cards had growth patterns plotted on them and labelled from A to D. Graph A depicted excessive growth, graph B—no growth/plateau, graph C—reduction in growth and graph D showed normal growth. These individual graphs were used to test caregivers' ability to identify the major growth patterns than can occur in childhood. Data was analysed using SPSS 21, Chicago, USA. P value of <0.05 was considered to be significant.

Results

Three hundred and twenty-three children under the age of 5 years were sampled, 78.3%(253/323) were recruited from CHOP

and 21.7%(70/323) from the child welfare clinic of NAUTH, Nnewi. Median age of the children was 8 months, modal age 1 month. Males comprised 54.5% (176/323) with a M:F ratio of 1.2:1. Mothers brought the children to the hospital 78.6% (254/323) of the time and fathers 10.2% (33/323), [Table 1]. Children who had up to date immunization status were 89.5% (289/323). All immunizations as listed on the National Program of Immunization in Nigeria had been missed at some point or the other in children with incomplete immunization. Caregivers of middle class were 60.7%(196/323).

Fifty-two point nine percent of the respondents (171/323) had heard of growth monitoring. Among these, the health facility was their highest source of information (34.1%,110/323), [Table 2]. Caregivers who believed growth changes in childhood should be monitored were 89.2% (288/323), 53.6% (173/323) had seen a growth chart and 63.2% of the respondents (204/323) were able to identify the growth charts correctly, [Table 3].

Table 1: Socio-demographic characteristics of the study participants.

Socio-demographic characteristic	Frequency (%) (n=23)
Child's age (months)	
0–11	203 (62.8)
12–23	66 (20.4)
24–35	27 (8.4)
36–47	18 (5.6)
48–59	9 (2.8)
Child's gender	
Male	176 (54.5)
Female	146 (45.2)
Unknown	1 (0.3)
Caregiver's relationship with child	
Father	33 (10.2)
Mother	254 (78.6)
Both parents	19 (5.9)
Sibling	2 (0.6)
Grandparent	7 (2.2)
Other	8 (2.5)
Socioeconomic class	
Low	88 (27.2)
Middle	196 (60.7)
High	39 (12.1)
Immunization for age	
Complete	289 (89.5)
Incomplete	27 (8.4)
Don't know	7 (2.2)
Nationality	
Nigeria	322 (99.7)
Other	1 (0.3)
Ethnicity	
Igbo	309 (95.7)
Hausa	2 (0.6)
Yoruba	4 (1.2)
Others	8 (2.5)
Religion	
Christianity	321 (99.4)
Islam	1 (0.3)
Other	1 (0.3)

Table 2: Knowledge of caregivers on growth monitoring.

Variable	Frequency (%) (n=323)
Have you heard of growth monitoring?	
Yes	171 (52.9)
No	136 (42.1)
Can't remember	16 (5.0)
Have you ever seen a growth chart?	
Yes	173 (53.6)
No	134 (41.5)
Don't know	16 (5.0)
Which is most adequate for documenting growth measurement?	
Hospital card	45 (13.9)
Hospital folder	36 (11.1)
Growth chart	135 (41.8)
Others	26 (8.0)
Don't know	81 (25.1)
Where do you think is the most appropriate place to monitor growth?	
Home	61 (18.9)
Health clinic	215 (66.6)
Others	31 (9.6)
Don't know	16 (4.9)
Do you think growth changes should be monitored?	
Yes	288 (89.2)
No	8 (2.5)
Don't know	27 (8.4)
Who do you think should document growth changes?	
Caregivers	81 (25.1)
Health professional	201 (62.2)
Others	35 (10.8)
Don't know	6 (1.9)
How often do you think growth changes should be monitored?	
Only at birth	4 (1.2)
During all health visits	132 (40.9)
Regularly	135 (41.8)
When care givers feel like	11 (3.4)
Others	18 (5.6)
Don't know	23 (7.1)
Have you ever been taught how to use a growth chart?	
Yes	99 (30.7)
No	197 (61.0)
Can't remember	27 (8.3)
Do you think growth monitoring is important?	
Yes	311 (96.3)
No	3 (0.9)
Don't know	9 (2.8)
What in your opinion is the significance of growth monitoring?	
To promote health	172 (53.3)
To prevent malnutrition	83 (25.7)
For record keeping	5 (1.5)
Others	57 (17.6)
No idea	6 (1.8)

Thirty point seven percent of the caregivers (99/323) had been taught how to use the growth chart; 87.9% (87/99) of those who

had been taught to use the growth chart were able to identify the charts correctly. Mother's parity had no significant association with being taught how to use a growth chart ($p=0.34$, 99% CI=0.33 to 0.35). Among those who had been taught to use the growth chart, 99% (98/99) believed that growth charting in childhood was important ($p=0.03$, 99% CI=0.02 to 0.03). Feeding practice, immunization, diarrheal illnesses among others were some of the factors the caregivers cited that could affect the growth pattern in childhood.

Less than 50% of the caregivers were able to identify individual growth graphs correctly, Figure 1. Greater than 50% of the caregivers had no idea of the dietary modifications that would be best suited to the identified growth graphs, [Table 4]. Socio-economic class did not have a significant association with being taught to use the growth chart ($p=0.53$, 99% CI=0.52 to 0.54), [Table 5].

Discussion

Growth monitoring is essential in the care of any child, more

Table 3: Caregivers' identification of the growth chart and growth patterns in under-five children.

Variable	Frequency (%) (n=323)
Identification of the growth chart	
Proper identification	204 (63.2)
Wrong identification	116 (35.9)
No identification	3 (0.9)
Identification of growth patterns on the growth chart	
Identified all 4 correctly	95 (29.4)
Identified 3 correctly	55 (17.0)
Identified 2 correctly	50 (15.5)
Identified 1 correctly	24 (7.4)
Identified non correctly	99 (30.6)

Table 4: Respondents' applicable dietary/behavioral modification suitable for the observed growth patterns.

Modification	Frequency (%) (n=323)
Graph A – Excessive growth	
Exercise	40 (12.4)
Increased feeding	37 (11.5)
Fasting	4 (1.2)
Reduced intake of fast foods	26 (8.0)
Continue present feeding	29 (9.0)
Others	11 (3.4)
Don't know	176 (54.5)
Graph B–No growth	
Exercise	5 (1.5)
Increased feeding	87 (26.9)
Fasting	1 (0.3)
Reduced intake of fast foods	3 (0.9)
Continue present feeding	18 (5.6)
Others	2 (0.6)
Don't know	207 (64.1)
Graph C–Reduced growth	
Exercise	2 (0.6)
Increased feeding	72 (22.3)
Fasting	8 (2.5)
Reduced intake of fast foods	3 (0.9)
Continue present feeding	15 (4.6)
Others	2 (0.9)
Don't know	221 (68.4)
Graph D–Normal growth	
Exercise	5 (1.5)
Increased feeding	45 (13.9)
Fasting	2 (0.6)
Reduced intake of fast foods	4 (1.2)
Continue present feeding	75 (23.2)
Others	1 (0.3)
Don't know	191 (59.1)

Table 5: Association between 'being taught to use the growth chart' and some variables in the caregivers.

Variable	Have you been taught how to use a growth chart			Total (%)	X	P-value	99% CI
	Yes (%)	No (%)	Can't remember (%)				
Do you think growth monitoring is important							
Yes	98 (99.0)	190 (96.5)	22	310 (96.0)	13.12	*0.027	0.023 to 0.031
			-81.5				
No	1	1	1	3			
	-1	-0.5	-3.7	-0.9			
Don't know	0	6	4	10			
	0	-3	-14.8	-3.1			
Total	99 (100.0)	197 (100.0)	27	323 (100.0)			
			-100				
Have you ever seen a growth chart							
Yes	91 (91.9)	70 (35.5)	12	173 (53.6)	98.275	*<0.001	0.000 to <0.001
			-44.5				
No	6	118 (59.9)	9	133 (41.2)			
	-6.1		-33.3				
Don't know	2	9	6	17			
	-2	-4.6	-22.2	-5.2			
Total	99 (100.0)	197 (100.0)	27	323 (100.0)			
			-100				
Identification of the growth chart							
Correct identification	87 (89.7)	106 (54.1)	11	204 (63.2)	41.753	*<0.001	0.000 to <0.001

Wrong identification	10 (10.3)	89 (45.4)	-36.7	15	114 (35.3)			
No identification	0	1	-50	4	5			
	0	-0.5	-13.3		-1.5			
Total	97 (100.0)	196 (100.0)	30	323 (100.0)				
			-100					
SEC								
Low	31 (31.3)	52 (26.4)	5	88 (27.2)	3.173	0.53	0.518 to 0.543	
			-18.5					
Middle	59 (59.6)	120 (60.9)	17	196 (60.7)				
			-63					
High	9	25 (12.7)	5	39 (12.1)				
	-9.1		-18.5					
Total	99 (100.0)	197 (100.0)	27	323 (100.0)				
			-100					

*: Significant, CI: Confidence Interval, SEC: Socio-Economic Class, X: Chi square.

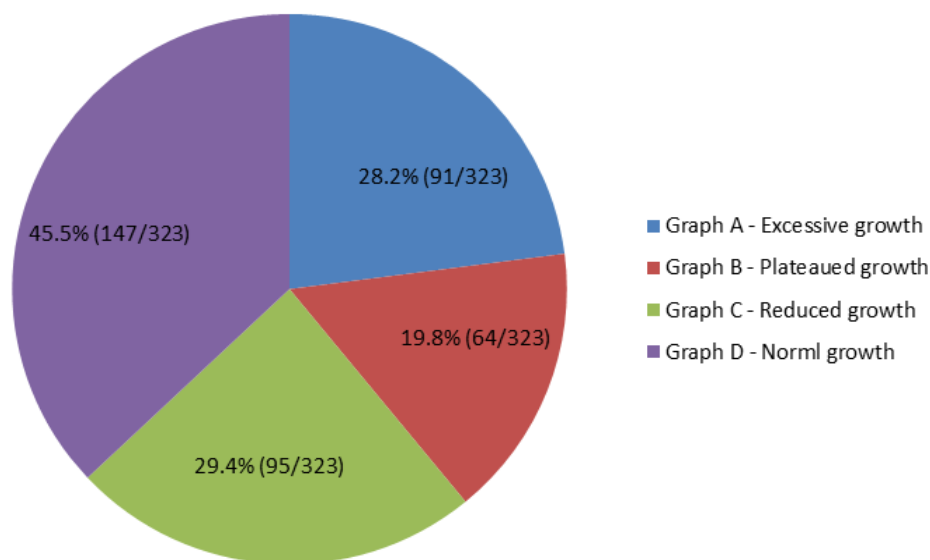


Figure 1: Proper identification of the individual growth graphs by the caregivers.

so under-five year olds. The caregiver awareness of the concept of growth monitoring found in this study (52.9%) was similar to the findings by Fagbule et al. [10] (53.7%) and Etim-Una [12] (38.1%) in Nigeria, Upadhyay et al. [8] (38.17%) in India and Adhikary [4] (36%) in Bangladesh. The current study's finding implies that as many as 47.1% of caregivers had not heard of growth monitoring; a worrying statistic given the pivotal role of growth monitoring in the prevention of malnutrition.

A little over half of the participants in our study agreed to having seen a growth chart. This is bearing in mind those mothers, who happen to be the bed rock of child care, constituted more than three quarters of these caregivers. A greater (41.8%) but suboptimal proportion knew that growth should be charted on a growth chart. Most believed growth should be monitored in a health facility (66.6%) versus home (18.9%); by health professionals (62.2%) versus care givers (25.1%); 40.9% believed growth should be monitored during all health visits while 41.8% believed this monitoring should be done regularly. All these reflect suboptimal knowledge on growth monitoring in the care givers.

Of the caregivers who were aware of growth monitoring, only about one third got the information from health workers in contrast to the finding by Ibekwe et al. [11] where health facilities were the major source of this awareness. This is grossly unsatisfactory as this low value might be reflective of lapses in information transmission on the part of health care workers, also bearing in mind that this research was conducted in a tertiary level health facility. This highlights the need to re-orientate health care providers towards sharing this important information with caregivers.

A greater percentage of the care givers interviewed in this study were of middle (60.7%) and low (27.2%) socio-economic class. Out of pocket expenditure constitutes the greater part of health care financing in Nigeria. [13,14] As a result, the low percentage of respondents (52.9%) who had heard of growth monitoring might reflect limited access to health care facilities due to cost implications. Immunization which is free in Nigeria, had a high coverage (89.5%). Though this is not as optimal as anticipated, it further buttresses the impact of cost on access of health care services. If growth monitoring were limited to only when care

givers could afford health visits, this could be deleterious to child growth and development.

The attitude of caregivers towards growth monitoring was good as majority of the responders believed growth should be monitored and actually adduced growth monitoring as an important principle in child care. This finding is in keeping with earlier results from Etim-Una^[12] in Nigeria and Debuo et al.^[9] in Ghana. It might be safe then to imply that these caregivers who agree with the need for growth monitoring might be receptive to teaching on its interpretation. However, only about 30.7% of our study population had been taught how to use the growth chart in the past.

Our study found a worrying low level of the practical knowledge of growth monitoring among caregivers similar to the findings of Fagbule et al.^[10], Ibekwe et al.^[11] and Etim-Una.^[12] in Nigeria, Debuo et al.^[9] in Ghana and Adhikary^[4] in Bangladesh. Two thirds of the respondents were able to identify the growth chart correctly on the Child Health Card. A very disappointing 29.4% could identify all four major growth patterns represented on the growth chart properly. These data reflect suboptimal knowledge and consequently poor use of the growth chart in child care. Out of those who had been taught to use the growth chart, 89.7% were able to identify the growth chart correctly. This lays credence to the importance of proper health information transmission.

Though almost half of the caregivers were able to correctly recognize a normal growth chart, there was poor identification of the individual growth graphs reflecting different types of growth change in children. The care givers also had very poor knowledge on general modalities of care applicable to these observed growth changes [Table 4]. As a result, children who manifest with abnormal growth will most likely be missed early at which pointed preventive and even curative measures would be most effective. This could explain the spectrums of malnutrition identified in children in Nigeria.^[15] The interpretation of the growth chart tracings is very crucial as it is the basis for appreciating what action is needed. When caregivers are able to do this, they will be better allies in ensuring that the right actions are carried out to maintain their children's nutrition.

Being taught to use a growth chart had a significant association with positive perception of the importance of growth monitoring, having seen a growth chart and being able to correctly identify a growth chart. This buttresses the importance of health education in child care and the pivotal role of health care professionals in adequate and prompt transmission of health information.

Socio-economic class had no significant association with being taught to use a growth chart. This was probably so because basic health care's services are available to all social classes in Nigeria. Parity had no significant association with being taught to use a growth chart. This was a surprising find as one would have expected women of higher parity, who would have had more contact with antenatal and under five/well child clinics, to have more exposure to basic information on health care practices. This also brings to fore the deficits in transmission of health information.

Conclusion

In conclusion, the awareness of growth monitoring among caregivers in Nigeria is still poor but when engaged, an encouragingly high proportion of caregivers have a positive attitude to growth monitoring. This positive attitude is yet to translate into an improvement in practical knowledge as only about one third of caregivers have been taught about growth chart and only about one third can correctly interpret growth chart tracings

We therefore recommend a survey among healthcare providers to better understand the limitations to engaging caregivers on the important subject of growth monitoring and potentially a re-orientation of healthcare providers to improve the communication of this important concept to caregivers.

Ethical Considerations

Ethical approval was obtained from the Ethical Review Committee of NAUTH, Nnewi with reference number NAUTH/CS/66/VOL.10/153/2017/072. Participation was entirely voluntary and free of charge. Participants were free to withdraw from the research at any point. All information obtained was properly coded to ensure confidentiality. Involvement or otherwise in the study did not influence the attention given to the caregivers' wards in the hospital.

Author Contributions

The requirements for authorship as stipulated by the journal have been met by all authors and each author believes that this manuscript represents honest work. All authors made substantial contributions to conceptualization and research design, critical revision for important scientific content, have read and approved the final draft of this manuscript. OOC, ECE, ECO, ONG, UNO acquired data. OOC, ANC cleaned up and analyzed the data. UTO, EJC, OOC, ANC interpreted data. OOC, ANC, ECO contributed to manuscript write up. OOC is the corresponding author and guarantor.

Conflict of Interest

All authors declare no conflict of interest.

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