

Original Research Article

Knowledge, Attitude and Practice of Growth Monitoring among Caregivers in Yenagoa Local Government Area, Bayelsa State, Nigeria

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Abstract: Background: Growth monitoring (GM) is a strategy that enables early identification and timely intervention in children who are not growing according to the expected pattern through periodic measurement of some growth indicators preferably weight. The aim of this study was to assess the knowledge, attitude and practice of growth monitoring among mothers and other caregivers in healthcare facilities in Bayelsa State. **Materials and methods:** The study was a descriptive, cross-sectional design involving 313 caregiver-child pairs recruited from selected health facilities in Bayelsa State. Data were analysed using IBM Statistical Product and Service Solutions (SPSS) version 25.0 Armonk, NY. **Results:** Questionnaires from 313 caregiver-child pairs were analysed, 97.8% of the responders were mothers to the children they brought, and 51.1% of them were aged 28-37 years. Majority 140 (44.7%) of the respondents were from a low socioeconomic class. Two hundred and forty-eight of the children (79.2%) were aged 0-11 months, 52.1% were males, and 47.9% were females. Eighty-three responders (25.6%) demonstrated good knowledge of GM with scores of $\geq 75\%$, 132(42.2%) had poor knowledge score of $< 50\%$, while 98(31.3%) had fair knowledge scores of $50\% - < 75\%$. The growth chart appreciation scores were also unsatisfactory as 75.4% (236/313) of the study population showed poor appreciation of the chart, 11.5% (36/313) fair and 13.1% (41/313) good appreciation. Only 47 respondents (15%) had ever been taught how to use the growth chart and 76.6% of these were taught by nurses. Average scores for good, fair and poor attitudes were 39.3%, 59.7% and 1% respectively. On Utilisation, 308(98.4%) children had the Road to Health cards but the rate of appropriate Utilisation of Growth Monitoring in this study was 25.6% as only 80 children had $\geq 75\%$ of their weights duly charted according to their ages. **Conclusion:** Knowledge of child health cards and their utilisation by caregivers in Bayelsa State is poor. Adequate awareness of recommended program and schedule should be created using appropriate means including language in order to enhance utilisation.

Keywords: Knowledge, child health card, utilisation, growth monitoring.

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1. BACKGROUND/INTRODUCTION

Growth monitoring (GM), is a strategy that enables early identification and timely intervention in children who are not growing according to the expected pattern. It involves periodic and sequential measurement of certain growth indicators in a child over time, comparing them to growth standards or references, with some specified remedial actions if the weight is abnormal (Panpanich & Garner, 2000; Mangasaryan *et al.*, 2011). The World Health Organisation (WHO) child growth

standards released in 2006 which provides a single international standard for all children from birth to 5 years worldwide is usually used (WHO, 2008). Recommended indicators for growth monitoring in these children below 5 years are weight for age, length/height for age and weight for length/ height. Weight for age is the most commonly used indicator because weight changes more rapidly than length with deterioration or improvement in a child's condition and is considered the most sensitive measure of growth (WHO, 2006; WHO,

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2008; Van Zadelhoff, 2014). GM is a core component of the child survival strategy and should be implemented in every Well Child Clinic. The child's weight is measured, plotted in a weight for age growth chart in the child's Road to Health Card (RTHC), analysed by interpreting it using the growth standard employed, and action related to the analysis taken such as counselling the mother or caregiver, providing nutritional supplements or examining the child for disease (WHO, 2008; Lui *et al.*, 2017). It is important because malnutrition in children may not be easily recognised by a mother or care giver until it becomes severe and more difficult to reverse. Early identification of faltering in children at risk for malnutrition and timely intervention is expected to help reduce the prevalence of malnutrition (Ashworth *et al.*, 2008; Griffiths & Rosso, 2007). It also enables classification of malnourished children, guides decisions on management and referral, and provides a forum for education of parents and care givers on the child's feeding and other child care practice (WHO, 2006).

Childhood malnutrition includes undernutrition (wasting, stunting, underweight), micronutrient-related malnutrition (also called hidden hunger), and overweight/obesity with the triple often coexisting in same country and sometimes same family (UNICEF 2020). Undernutrition is a major burden globally especially in middle- and low-income countries (MLIC) (Amoroso, 2016; UNICEF, 2019; WHO, 2021). It underlies about 45% of under-five mortality and in 2020, 149.2 million under-five children were reported to be stunted globally, 45.4 million wasted, and 38.9 million overweight with the number of stunted children reducing in all continents except Africa (World Bank Group, 2021). In Nigeria, about 2 million children have severe acute malnutrition, the national prevalence of stunting in under-five children is 32%, making Nigeria the country with the second highest burden of stunted children worldwide (UNICEF, 2015). Sadly, recent estimates show that progress towards reducing malnutrition has been slow and inadequate to meet various global nutrition targets in most countries (Global Nutrition Report, 2022). Chronic undernutrition in early childhood also results in diminished cognitive and physical development with negative impacts on adult life. Undernutrition is associated with increased child mortality from severe infections; it renders children more vulnerable to death from common childhood illnesses such as diarrhoea, measles and pneumonia, and contributes to over one-third of deaths in children less than 5 year of age. (UNICEF, 2009). Malnutrition has serious and lasting developmental, economic, social, and medical consequences, for the children, their families, communities and the entire country thus the need for early identification and intervention.

While the frequency of growth monitoring should be determined by countries according to local needs and resources, earlier recommendations was that children be weighed monthly from 0-5years (Dialogue

on diarrhoea, 1986); current international recommendation however is that children be weighed monthly from birth to 2 years then every 3 months from 2 to 5 years (WHO, 2014). This can be carried out in a health facility or any designated place in the community during outreach services using appropriate tools. It is also recommended that the opportunity of growth monitoring be used to provide other services and interventions to a child such as child assessment, treatment, vaccination, Vitamin A supplementation, deworming and psychosocial support. Parents and care givers should be educated on GM and encouraged to be actively involved in the process in order to enhance the growth and wellbeing of their children.

Data on knowledge, attitude and utilisation of GM by mothers/ caregivers is available from many countries but sparse for Nigeria. This is surprising considering the persisting huge burden of malnutrition in sub-saran Africa including Nigeria. There is thus need to ensure that mothers/caregivers in our various localities are fully informed of GM and its benefits, and are willing to embrace and utilise it effectively to enable the children benefit optimally from this strategy. This study thus aims to evaluate the knowledge, attitude and practice of growth monitoring among mothers and caregivers in some healthcare facilities in Bayelsa state to ascertain how informed they are, their attitude towards it, and how the service is being utilised in order to ensure its being optimised to help prevent malnutrition among under 5 children in the state.

2. MATERIALS AND METHODS

Study Site

The study was carried out at the Well Child's Clinics of Federal Medical Centre, Yenagoa, Niger Delta University Teaching Hospital, Okolobiri and Dieta Koki Memorial Hospital, Opolo in Yenagoa Local Government Area (LGA) of Bayelsa State, Nigeria. The first two are tertiary health facilities in the LGA while, the 3rd is a general hospital. All the facilities used are highly utilised for maternal and child healthcare services for the people.

Yenagoa is a Local Government Area and the capital city of Bayelsa State situated in an area of swamps and mangroves in the tropical rain forest of the Niger Delta region of Southern Nigeria. It has an area of 706 km² and a projected population of 470,800 as of 2016. It is a traditional home of the Ijaw people who form the majority in the state. The people are mainly fishermen, farmers and traders but the exploitation of petroleum and natural gas deposits in this area has brought some diversification. The local languages include Epie-Atissa, Ekpetiama, Gbarian, Buseni and Zarama which are basically Ijaw dialects. English is the official language.

Study Design

The study was a descriptive, cross-sectional study in which proportionate sampling was used to split the study group among the selected study sites and subjects enrolled consecutively from each site until the sample size for the site was met. A structured questionnaire was administered to parents and care-givers at well child's clinics in Yenagoa LGA, Bayelsa State. The study was carried out over a period of 4 months. The aim of the study was explained to the parents/caregivers and a hard copy of this was also given to them. Informed consent was obtained before recruitment into the study.

Study Population

These were Parents / Caregivers of children aged 0 days to 5 years who attended the well child clinics of any of the 3 study sites and gave informed consent for the study.

Sample size

A minimum of 270 mother/child pairs as derived from the formula below were enrolled from each healthcare facility to ensure a true representation of the population in each centre and a result that can be for Yenagoa. A non-response rate allowance of 10% was added.

$$n = \frac{z^2 \times p \times (q)}{d^2}$$

Where n is the sample size; z is the z-score (reliability coefficient) of 1.96 at 95% confidence level; p the estimated proportion of an attribute present in the population (CEIC Data, 2021) Nigerian national prevalence of underweight in under-fives) of 19.4% (0.194) prevalence rate of underweight children in Nigeria in 2015; q is 1-p, and d the desired level of precision which is 5% (0.05). Calculated sample size was 245, with 25 from 10% non-response added, this gave a total of 270 subjects.

Data Collection:

Data collection was done using an interviewer-administered structured questionnaire with contents that addressed the research questions. A Growth chart with different growth curves was also shown to each respondent to explain. The questionnaire was in 5 parts, Part 1 was on bio-data and socio-demographic characteristics of the respondents, Part 2 was on data related to the index child, Part 3 addressed Knowledge and had 3 parts, 3a with 12 measures of GM knowledge, and 3b with 6 measures of growth chart appreciation based on responses or interpretation of findings in the exhibited growth charts. 3c had 2 questions that assessed the source of GM knowledge. Part 4 assessed attitude and consists of 4a with 9 measures of attitude and 4b with 6 questions that assessed possible reasons for poor attitude. Part 5 addressed utilisation/practice and consists of 5a

with 5 measures of practice/utilisation and 5b which assessed utilisation/practice objectively by direct observation of weight entries in the card, determining how many times the weight should have been plotted based on child's age and calculated as follows:

1. **Growth Monitoring Utilisation Score** = Observed No. of times child's weight was charted / No of times it should have been charted based on child's age x 100
2. **Rate of Utilisation of Growth Monitoring Chart** = No of Parents/Caregivers with growth monitoring score $\geq 75\%$ / total number of questionnaires completed x 100

Pretesting

Reliability of the questionnaire was assured by pretesting it on 30 mothers of under-fives recruited from a health centre in another LGA of Bayelsa State which was not one of the study sites.

Data analysis

Data obtained were entered into Excel Microsoft Office 2019, cleaned and exported into IBM Statistical Product and Service Solutions (SPSS) version 25.0 (Armonk, NY) for analysis. Categorical variables were summarised in frequencies and percentages. Symmetrical continuous variables were summarised in means and standard deviation and asymmetrical variables in median and interquartile range.

Measures of knowledge, attitude and utilisation of Growth Monitoring, as well as measures of Growth Chart appreciation, were analysed independently and their scores displayed.

Total Average Scores for knowledge, attitude and utilisation were independently obtained by assigning a score of 1 to each correct question and 0 to incorrect ones with a maximum total score of 12/12 (100%) for GM Knowledge, 6/6(100%) for Growth Chart appreciation, 9/9(100%) for attitude, and 6/6(100%) for utilisation. GM Knowledge Scores of 75% and above were graded as good, 50-<75% fair and < 50% poor. For the growth chart appreciation with a total of 6 measures, scores of 0-2 were graded as poor, 3-4 fair, and 5-6 good.

Ethical considerations

Ethical approvals were obtained from the Ethical Committees of the Hospitals and from the State Ministry of Health. The purpose of the study and what it entails was explained to the parents and care givers in a language they could understand and a written document also given to them. Written informed consent was then obtained from them. To ensure patient confidentiality, the questionnaire was coded with no personal identifier traceable to any responder. The research assistants were trained to avoid any breaches to data privacy.

RESULTS

Questionnaires from three hundred and thirteen (313) caregiver–child pairs were analysed. About half of the respondents were between 28-37 years. Over 98.4 % of the respondents were females and less than 2% were males. Three hundred and six (97.8%) were mothers to the children they brought. Two hundred and eighty-seven (91.7%) of the respondents were married and the rest were single or co-habiting. Three hundred and six (97.8%) were Christians and the rest were Muslims. The Ijaws, the predominant tribe in Bayelsa State made up 47.3% of the respondents, the Ibo's 23.0%, Yoruba 3.8%, and Hausa 6% while the rest were captured under the broad group others. One hundred and forty (44.7%) of the respondents belonged to the lower socio-economic, 42.8% to the middle and 12.5% to the upper socio-economic class (Table 1a).

Socio-demographic Characteristics:

Results of the socio-demographic characteristics of the index child's details obtained are shown in Table 1b. Almost 80% of the children belonged to the 0-11 months age group and none to the 48-59 months group. Males made up 52.1% of the children, and females 47.9%. Two hundred and thirty-six (75.4%) of the children were delivered in a healthcare facility, 12.5% at home, 9.6% in the homes of traditional birth attendants, and the rest in the church or other places such as in a vehicle or tricycle. Two hundred and thirty-five (75.1%) of the respondents had 1-3 children in their household while 22.7% had 4-7 children. The birth order of the children showed that 39% of them were 1st born children, 24.3% were 2nd born and the others from 3 and above.

Table 1a: Socio-demographic characteristics of parents/caregivers

Variables	Frequency (N-313)	Percentage
Gender		
Male	5	1.6
Female	308	98.4
Who is answering?		
Mother	306	97.8
Father	5	1.6
Caregiver	1	0.3
Others (Aunt)	1	0.3
Age Category (years)		
18 – 27	116	37.1
28 – 37	160	51.1
38 – 47	22	7.0
48 – 57	15	4.8
Marital status		
Married	287	91.7
Cohabiting	16	5.1
Single	10	3.2
Religion		
Christianity	306	97.8
Muslim	7	2.2
Ethnicity		
Ijaw	148	47.3
Ibo	72	23.0
Yoruba	12	3.8
Hausa	2	0.6
Others	79	25.2
Social class		
Upper	39	12.5
Middle	134	42.8
Lower	140	44.7

Table 1b: Index child's relevant details

Variables	Frequency	Percentage
Child's age (months)		
0 – 11	248	79.2
12 – 23	59	18.8
24 – 35	1	0.3
36 – 47	5	1.6

Variables	Frequency	Percentage
48 – 59	0	0
Child's sex	-	-
Male	163	52.1
Female	150	47.9
Place of delivery	-	-
Healthcare Facility	236	75.4
Home	39	12.5
Traditional birth attendant	30	9.6
Church	6	1.9
Others (Road, tricycle)	2	0.6
Number of children in a household	-	-
1 – 3 children	-	-
4 – 6 children	235	75.1
≥ 7 children	71	22.7
Birth order	7	2.2
Number 1	122	39.0
Number 2	76	24.3
Number 3	56	17.9
Number 4	37	11.8
Others (Number 5,6 and 7)	37	11.8
	22	7.0-

Knowledge of growth monitoring:

Data on growth monitoring knowledge obtained are shown in Tables 2a to 2f. Table 2a shows the 12 knowledge measures assessed and the responses obtained. Out of the three hundred and thirteen mothers /caregivers interviewed, only one hundred and ninety-two (61.3%) of them had heard of growth monitoring before, one hundred and sixty-seven responders (53.4%) gave correct response to the meaning of growth monitoring, 148 (47.3%) of the responders knew the importance of GM while about 50% did not. About 50% of the responders had heard about the growth chart before, 42.2% had seen it before while 43.1% knew the importance of the chart. One hundred and sixty-one responders (51.4%) knew there that the child's RTHC

had a growth chart but only 15% had ever been taught how to use it. One hundred and eighty-nine responders (60.4%) knew that their children's weight should be monitored regularly. Only 10.2% of the study population knew that GM was for children up to 5 years of age while 50.2% responded that it was for children up to 1 year. On the frequency of GM, only 25% responded fairly correctly to this, 28.4% simply stated that they didn't know while over 26.8% of the responders linked it to immunisation visits even when this was not one of the options given. Two hundred and four responders (65.2%) knew the child's weight should be plotted on the chart after it is taken but only 36.7% knew they should be counselled as appropriate after the child is weighted.

Table 2a: Result of knowledge measures of Growth Monitoring

Variables	Frequency	Percentage
Have you heard about growth monitoring before?		
Yes	192	61.3
No	121	38.7
What do you understand by growth monitoring?		
Regular immunizations	19	6.1
Regular weighing, charting and assessing my child's weight pattern to ensure he/she is growing well.	167	53.4
Checking my child's weight only when he/she is sick and brought to the hospital.	7	2.2
Treating a child when the child is sick	0	0
I don't know	111	35.5
Other (specify)	8	2.6
What is the importance of growth monitoring?		
To know the number of children that came for immunization	6	1.9
To plot and analyze my child's weight periodically, and offer counselling/treatment to help prevent or treat malnutrition.	148	39.6
To get information for the government for election purposes	7	2.2
I don't know	156	49.8
Other (specify)	20	6.4
Have you ever heard of the growth chart?		

Variables	Frequency	Percentage
Yes	158	50.5
No	155	49.5
Have you ever seen a growth chart?		
Yes	132	42.2
No	181	57.8
What is the importance of the growth chart?		
To know the number of children that came for immunization	17	5.4
To document when my child gets worm medicine	0	0.0
To plot and compare my child's weight with certain standards to detect when he/she is not growing well.	135	43.1
To chart when my child receives Vitamin A	1	0.3
I don't know	148	47.3
Other (specify)	12	3.8
Do you know that your child should be weighed periodically, and the weight followed up for GM?		
Yes	189	60.4
No	124	39.6
Do you know that your child's Road to Health Card (RTHC) has a growth chart?		
Yes	161	51.4
No	152	48.6
Which group of children should have routine GM?		
Children from birth to 1year	157	50.2
Children from birth to 2years	26	8.3
Children from birth to 5years	32	10.2
I don't know	48	15.3
Other (specify)	50	16.0
Other (N=50)	-	-
<i>Children receiving vaccinations (immunisation)</i>	22	44.0
<i>All children</i>	9	18.0
<i>Underweight/malnourished children</i>	7	14.0
<i>Sick children</i>	6	12.0
<i>It depends (on the child, on many things)</i>	6	12.0
How often should GM be done for your child?		
Weekly	4	1.3
Monthly + at all health visits & as advised	72	23.0
Every 2 months	21	6.7
Every 3 months	23	7.3
I don't know	89	28.4
Other (specify)	104	33.2
Others (N=104)	-	-
Any time	9	2.9
Every 6 months	6	1.9
At least every year	5	1.6
During Immunisation /Vaccination	84	26.8
Do you know your child's weight should be plotted in the growth chart when taken?		
Yes	204	65.2
No	109	34.8
Do you know you should be counselled on your child's weight after it is taken?		
Yes	115	36.7
No	198	63.3

Table 2b: Summary of Growth Monitoring Knowledge

Variables		Frequency	Percentage
< 50% (Scores 0-5)	Poor	132	42.2
50 – <75% (Scores 6-8)	Fair	98	31.3
≥ 75% (Scores 9-12)	Good	83	26.5
Total		313	100.0

The average GM knowledge scores are shown in Table 2b. Out of the 313 respondents, eighty-three responders (25.6%) showed good knowledge of GM with scores of $\geq 75\%$, having responded correctly to at least 9 out of the 12 GM knowledge questions posed, one hundred and thirty two (42.2%) had poor knowledge score of $< 50\%$, while ninety-eight (31.3%) had fair growth monitoring knowledge score of $\geq 50\%$ but $< 75\%$.

Appreciation of the Growth Chart

Table 2c shows the result of 6 Growth Chart appreciation measures assessed. Only 32.6% of the

respondents were able to identify the child’s age on a growth chart, 27.2% were able to tell child’s weight for age on the growth chart, 18.2% were able to analyse child’s weight as normal, under or over, 13.4% were able to identify curve as normal in a series of plots, 12.8% were able to identify static curve as danger sign in a series of plots, and 10.2% were able to identify declining curve as very dangerous in a series of plots. The summary of growth chart appreciation scores is shown in Table 2d. Over 75% of the study population showed poor appreciation of the growth chart, 11.5% fair and 13.1% good.

Table 2c: Appreciation of the Growth Chart

Variables	Frequency	Percentage
Able to identify child’s age on the growth chart?		
Yes	102	32.6
No	211	67.4
Able to tell child’s weight for age on the growth chart?		
Yes	85	27.2
No	228	72.8
Able to analyze child’s weight as normal, under or over		
Yes	57	18.2
No	256	81.8
Able to identify curve as normal in a series of plots		
Yes	42	13.4
No	271	86.6
Able to identify static curve as danger sign in a series of plots		
Yes	40	12.8
No	273	87.2
Able to identify declining curve as very dangerous in a series of plots		
Yes	32	10.2
No	281	89.8

Table 2d: Summary of Child Growth Chart Appreciation

Variables	Frequency	Percentage
Scores 0-2 Poor	236	75.4
Scores 3-4 Fair	36	11.5
Scores 5-6 Good	41	13.1
Total	313	100.0

Source of Growth Chart Knowledge

Results of sources of growth chart knowledge are shown in Table 2e. Only 47 respondents (15%) of the

study population indicated that they had ever been taught how to use the growth chart and 76.6% of these were taught by nurses.

Table 2e: Source of Growth Chart Knowledge

Variables	Frequency	Percentage
Have you ever been taught how to use the growth chart?		
Yes	47	12.0
No	266	85.0
Who taught you how to use the growth chart?		
A nurse	36	76.6
A community health worker	4	8.5
A doctor	3	4.3
A friend	0	0
Mother/grandmother	0	0
Other (specify)	4	10.6
Total	313	100.0

Attitude of parents/caregivers to growth monitoring:

Findings on attitude are shown in Table 3a. The responders had good attitude to growth monitoring as 97.4% of responders indicated that growth monitoring was important and 99.4% were that they were willing to bring their children for GM as advised. However, only 59.4% of the responders were willing to bring their well children for GM on non- immunisation days and only 36.1% were willing to keep bringing their well children for GM till 5yrs of age. Two hundred and forty two responders (77.3%) ensure their children are weighed

when brought to the clinic, one hundred and seventy four (55.6%) of the study population ensure that weight obtained is charted but only 14.7% ensure they get feedback from the healthcare personnel in the form of counselling after the child is weighed. Three hundred and nine (98.7%) of the responders are willing to be trained on GM and the use of the Growth chart and 99% are willing to teach others about GM and the use of the Growth chart if they are trained. Average attitude scores are shown in Table 3b.

Table 3a: Measures of attitude of parents/caregivers to growth monitoring

Variables	Frequency	Percentage
Do you think growth monitoring is important?		
Yes	305	97.4
No	8	2.6
Will you be willing to bring your child regularly?		
Yes	311	99.4
No	49	0.6
Will you be willing to bring your well child to hospital for only GM outside vaccination days?		
Yes	186	59.4
No	127	40.6
Are you willing to continue taking your child for GM till 5years of age?		
Yes	113	36.1
No	200	63.9
Do you ensure your child is weighed when you bring him/her for immunization or for hospital visits?		
Yes	242	77.3
No	71	22.7
Do you ensure the weight is charted in the Growth Chart?		
Yes	174	55.6
No	139	44.4
Do you ensure you are counselled (get feedback from your healthcare provider on your child's weight) after your child is weighed?		
Yes	46	14.7
No	267	85.3
Are you willing to be trained on growth monitoring and the growth chart?		
Yes	309	98.7
No	4	1.3
Will you be willing to educate others on the importance of GM and the growth chart if you are trained?		
Yes	310	99.0
No	3	1.0
No0	3	1.

Table 3b: Summary of Attitude of growth monitoring among study population

Variables		Frequency	Percentage
< 50%	Poor	3	1.0
50 – 74.9%	Fair	187	59.7
≥ 75%	Good	123	39.3
Total		313	100.0

Practice/utilization of GM services in the study population.

The results of this is shown on Table 4. Three hundred and eight (98.4%) of the children had RTH cards, 47.9% of responders indicated that they bring their

child for GM regularly, 76.7% responded that their children are weighed each time they are brought for immunisation, 71.2% responded their children's weights are charted when taken but only 25% responded that they are counselled after the weight is taken.

Growth Monitoring Score for each child was obtained by ascertaining the number of times the weight was plotted against the number of times it should have been plotted based on the child's age and multiplying by 100. This score was $\geq 75\%$ in 25.6% of the cards

inspected, 50% – 74.9% in 27.5% and $<50\%$ in 47.0% of the cards.

The Rate of Utilisation of Growth Monitoring services in this study was thus = 25.6%

Table 4: Measures of practice/utilization of GM services in the study population

Variables	Frequency	Percentage
Does your child have a Road-to-health card?		
Yes	308	98.4
No	5	1.6
Do you bring your child regularly for growth monitoring?		
Yes	150	47.9
No	163	52.1
Is your child weighed every time you bring him/her for immunization/weighing?		
Yes	240	76.7
No	73	23.3
Is the weight usually charted after it is taken?		
Yes	223	71.2
No	90	28.8
Are you usually counselled after your child is weighed?		
Yes	79	25.2
No	234	74.8
Growth Monitoring Score		
Plotted weight $<50\%$ of expected for age	147	47.0
Plotted weight 50 – 74.9% of expected for age	86	27.5
Plotted weight $\geq 75\%$ of expected for age	80	25.6

3. DISCUSSION

The findings from this study that 26.5% of responders had good GM knowledge, while 31.3% and 42.2% had fair and poor knowledge respectively differs from that reported by Debuo *et al.*, (2017) in Ghana in which up to 53% of the responders had good knowledge of GM while only 2%, had poor GM knowledge and the remaining 45% had moderate (fair) knowledge of GM. Edet *et al.*, (2020) also reported higher GM knowledge of 69.59% among their study population in Itu, Nigeria but Daniel *et al.*, (2017) in Ethiopia reported that 53% of their responders had poor GM knowledge which is higher than was obtained in this study. It was also interesting to note that despite the fact that GM is a regular routine service that should be offered in all Well Child's Clinics in Nigeria, only 61.3% of the study population said that they have ever heard about growth monitoring, only 53.4% responded correctly to what it is and only 50.5% acknowledged that they have ever heard about the growth chart. This result is not too different from that reported by Ulasi *et al.*, (2021) from Nnewi in which only 52.9% of respondents had ever heard of growth monitoring, though lower than the result by Feleke *et al.*, (2017) in which 80.9% of the respondents did not know about the growth monitoring chart. The responders in the study by Debuo *et al.*, (2021) in Ghana were caregivers attending GMP service and may probably have been more informed on GM than those attending routine clinics. In the study by Edet *et al.*, (2020), GM was assessed along with other child survival

studies and the knowledge measures used were not stated.

Knowledge measures with rather poor scores included knowledge of the group of children that require routine growth monitoring to which only 10.2% of the study population responded correctly. This is lower than that reported in the study by Daniel *et al.*, (2017) where 36.9% of the study population correctly responded that GM is for children 0-5 years. Of concern was that about 50% of the study population indicated that GM was for children up to 1 year which could imply that about 50% of the study population are unlikely to bring their children for GM after 1 year of age. Knowledge of GM frequency was poor as only 23% of the study population responded correctly to this. This response rate is much lower than the 95.3% obtained in Debuo *et al.*, (2021) in Ghana but closer to 32.1% obtained by Daniel *et al.*, (2017) in Ethiopia. This finding that over 75% of the study population did not know how often their children should be brought for GM is a concern that should be urgently addressed. The association of GM frequency with routine immunisation by 84 responders (26.8%) is lower than reported in the study by Osero (2020) in Kenya in which about 50% of the respondents indicated that GM is done during immunisation. Only 36.7% of the responders knew they should be counselled on their child's weight after it is taken despite the fact that discussing growth patterns with parents/caregivers with tailored counselling on nutrition based on GM results is

a core component of GM for children less than 5 years (WHO, 2017).

Results on the appreciation of the growth chart by mothers was also poor as less than 35% of mothers could correctly identify any of the 6 parameters that were assessed. This is comparable with the findings by Nyavani *et al.*, (2016) in South Africa where only 29.2% of the mothers could give correct interpretation of the information on the chart. It is higher than the result from the study by Seidu *et al.*, (2021) in Ghana in which only 9% of the mothers could correctly interpret the directions of the growth curves but lower than that reported by Zoaka *et al.*, (2002) in Jos, Nigeria where the 40.6%, 37.2% and 45.3% of the mothers could interpret a rising, flat and falling curve respectively. Mabesa *et al.*, (2022) in their study also noted that only 10% of the study population could correctly interpret all four of the test growth charts assessed despite good theoretical knowledge of GM. The results obtained in this study is also in line with the findings in a literature review of 20 studies worldwide by Roberfroid *et al.*, (2007) which showed that one-third to three-fourths of carers in developing countries do not understand the growth charts.

The finding in this study that only 15% of the study population had been taught how to use the growth chart was lower than the finding by Ulasi *et al.*, at Enugu where 30.7% of the mothers said they had been taught, and 54.2% reported from South Africa but comparable to the finding in the study by Mabesa *et al.*, (2022) in in KwaZulu-Natal, South Africa where only 11% of the respondents were taught how to interpret plotted weights. Healthcare providers were the commonest sources of the growth chart information in this study, this was same in the study by Yeshaneh *et al.*, (2021) but interestingly 88% of the few responders who had knowledge of the interpretation of the growth chart in the study by Osero (2020) were self-taught. This again highlights the need for better engagement of careers by healthcare personnel.

With regards to attitude towards GM, the finding that over 90% of the mothers responded that GM was important and that they were willing to bring their children for GM regularly was comparable to the findings many Debou *et al.*, (2021) in Ghana, Daniel *et al.*, (2017) in Ethiopia and Ulasi *et al.*, (2021) in Nigeria. However, when further questions on their willingness to bring their children for GM on non-immunisation days, and up to 5 years of age was posed, the lower responses were obtained. This was also true with questions on ensuring the child is weighed, the weight plotted and career counselled as appropriate contributing to the total attitude score. Thus, on the average, 39.3% of the mothers had good attitude towards GM, 58.7% had fair attitude while 1% had poor attitude. These values are comparable to the study by Daniel *et al.*, (2017) which reported that 42.6% of the mothers had poor attitude and 57.4% had good attitude. Favourable attitude of 83.1%

and unfavourable attitude of 16.9% among mothers in their study population was also reported by Dagne *et al.*, (2020) while Endale *et al.*, (2020) in Ethiopia reported favourable attitude towards GM of 56.2% and unfavourable attitude of 43.8% by mothers/caregivers.

Growth monitoring utilisation rate of 25.6% obtained in this study is comparable to the finding of 28.5% reported by Seidu *et al.*, (2021) and 25.2% reported by Tufa *et al.*, (2022). It is however higher than the GMP rate of 16.9% reported by Feleke *et al.*, (2019) and the very low rate of 01.84% reported by Joshi *et al.*, (2017) from Aurangabad but lower than 32.9%, (Endale *et al.*, 2022) 38.9% reported by Yeshaneh *et al.*, (2022) and 70% high practice of GMP reported by Dubuo *et al.*, (2017). Various researchers used different measures and definition of utilisation of GM and it is likely that these impacted on their results. Counselling after weighing the children was poor in this study as only 25.2% of the study population responded that they are usually counselled after the children are weighed. This finding is higher than reported in the study by Charlton *et al.*, (2009) where only 41 (6%) out of 698 mother/caregiver interviewed reported that they received any form of counselling on how to improve child's weight from the healthcare providers. GM knowledge and inadequate counselling of mothers/caregivers at GM sessions have also been shown to impact negatively on the utilisation of GM services (Endale *et al.*, 2020; Daniel *et al.*, 2017). It is however commendable that 98.4% of the children in this study had the RTH card at the time of the study, this is comparable to finding by Yeshaneh *et al.*, (2022) where 100% of the children had RTH chart unlike in the study by Mabesa *et al.*, (2020) where 100% of the children had the cards but only 89% cards were available for review and over 40% of the study population for various reasons did not have their growth cards.

CONCLUSION

Knowledge of the various measures of Growth monitoring in this study was low, and so was the appreciation of the growth charts and appropriate utilisation of the GM services. This calls for an urgent review of the various measures assessed since they directly or indirectly impact utilisation. While some attitude measures had excellent scores, the overall average scores remained sub-optimal having been marred by low scores of other attitude measures such as willingness to bring children for GM outside immunisation days, willingness to continue to bring the child for GM till 5 years of age, not seeking for counselling following weighing. These all need to be critically reviewed, and root causes identified and addressed bearing in mind the need to have a realistic, acceptable, GM program that will not impact negatively on the benefits of GM.

Improvement in the effective utilisation of GM may be difficult when over 75% of the caregivers as shown in this study, do not know the GM schedule.

Adherence to schedule may also be a challenge if local realities are not adequately considered. WHO (2008), advised that countries review and recommend suitable and realistic GM schedules for their populations taking into consideration their key local realities and it is important that all countries key into this. Factors such as staffing, accessibility, and cost of transportation to healthcare facilities should be taken into consideration. Adequate awareness of recommended program and schedule should be created using appropriate means including language. Mothers, caregivers, groups and communities should be adequately engaged on the benefits of GM and involved in planning GM programs and schedules. Re-organising GM visits according to Immunisation schedule with additional visits in-between as recommended by the Canadian Position Statement (2004) may be considered. Review of GM schedule for older children to a more acceptable schedule may also be considered. In depth review of gaps identified in this study with a structured action plan to address them is crucial if improvement in the utilisation of GM services in our country must be made.

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REFERENCES

- Ashworth, A., Shrimpton, R., & Jamil, K. (2008). Growth monitoring and promotion: review of evidence of impact. *Maternal & child nutrition*, 4(1), 86-117. <https://doi.org/10.1111/j.1740-8709.2007.00125.x>
- Amoroso, L. (2016). The second international conference on nutrition: implications for hidden hunger. *Hidden Hunger*, 115, 142-152. doi:10.1159/000442100. Epub 2016 May 19. PMID: 27197665.
- CEIC Data. (2021). Nigerian national prevalence of underweight in under-fives. <https://www.ceicdata.com/en/nigeria/health-statistics/ng-prevalence-of-underweight-weight-for-age--of-children-under-5#:~:text=19.400%20%25%20for%202015.-,Nigeria%20NG%3A%20Prevalence%20of%20Underweight%3A%20Weight%20for%20Age%3A%20%25,low%20of%2019.400%20%25%20in%202015.>
- Charlton, K. E., Kawana, B. M., & Hendricks, M. K. (2009). An assessment of the effectiveness of growth monitoring and promotion practices in the Lusaka district of Zambia. *Nutrition*, 25(10), 1035-1046. <https://doi.org/10.1016/j.nut.2009.03.008>.
- Daniel, B., Tesfaye, N., Mekonin, E., Kassa, A., Mensur, K., Zerihun, E., ... & Yeheyis, T. (2017). Knowledge and attitude on growth monitoring and its associated factors among mothers/guardians of children less than two years in Areka town, southern Ethiopia, 2017. *Journal of Nutritional Disorders & Therapy*, 7, 216. doi: 10.4172/2161-0509.1000216 .
- Debuo, T. D., Appiah, P. K., Kweku, M., Asalu, G. A., Ahiabor, S. Y., Takramah, W. K., & Duut, A. B. (2017). Caregivers knowledge, attitude and practices on child growth monitoring and promotion activities in Lawra District, Upper West Region of Ghana. *Science Journal of Public Health*, 5(1), 20-30. doi: 10.11648/j.sjph.20170501.13.
- Dagne, S., Aliyu, J., Member, Y., Wassihun, Y., Petrucka, P., & Fentahun, N. (2021). Determinants of growth monitoring and promotion service utilization among children 0–23 months of age in northern Ethiopia: Unmatched case-control study. *BMC nutrition*, 7(1), 1-9. <https://doi.org/10.1186/s40795-021-00470-y> doi:10.1177/20503121221133936.
- Dialogue on diarrhoea. (1986). Growth Monitoring. Health Basics: A supplement to Issue no. 24 - March 198. Online The international newsletter on the control of diarrhoeal diseases. <https://rehydrate.org/dd/su24.htm#:~:text=Most%20methods%20of%20growth%20monitoring,to%20five%20years%20of%20age.>
- Edet, I. V., Effiong, J. H., Udoh, I. A., Bassey, U. S., & Emem, A. (2020). Knowledge and practice of child survival strategies among mothers attending postnatal clinic in Itu, a sub-urban area of South Nigeria. *International Journal of Health Sciences and Research*, 10(1), 1-8.
- Endale, G., Melis, T., Dendir, A., Lentiro, K., & Sahle, T. (2022). Growth monitoring service utilization and its associated factors among mothers of children less than 2 years in Muhir Aklil district, Gurage zone, Southern Ethiopia, 2020. *SAGE Open Medicine*, 10, 20503121221133936. doi:10.1177/20503121221133936
- Ezeala-Adikaibe, N. P., Eze, J., Ezeanosike, O. B., Ayuk, A., & Ezeala-Adikaibe, B. (2021). Knowledge, availability and utilization of growth monitoring facilities in urban and rural health facilities in Enugu State, South East Nigeria: A survey of nursing mothers. *Annals of Clinical and Biomedical Research*, 2(2). <https://doi.org/10.4081/acbr.2021.155>
- Feleke, F. W., Adole, A. A., & Bezabih, A. M. (2017). Utilization of growth monitoring and promotion services and associated factors among under two years of age children in Southern Ethiopia. *PloS one*, 12(5), e0177502. <https://doi.org/10.1371/journal.pone.0177502>
- Garner, P., Panpanich, R., & Logan, S. (2000). Is routine growth monitoring effective? A systematic review of trials. *Archives of Disease in Childhood*, 82(3), 197-201.
- Girma, D., Teshome, D., Kaso, A. W., & Kaso, M. (2023). Growth monitoring and promotion services utilization and associated factors among children less than two years of age in Digelu Tijo district, south central Ethiopia. *Clinical Epidemiology and Global Health*, 19, 101203. <https://doi.org/10.1016/j.cegh.2022.101203>.
- Global Nutrition Report. (2022). The burden of malnutrition. <https://globalnutritionreport.org/reports/global-nutrition-report-2018/burden-malnutrition/>.
- Griffiths, M., & Rosso, J. D. (2007). Growth Monitoring and the Promotion of Healthy Young Child Growth: Evidence of Effectiveness and Potential to Prevent Malnutrition. Retrieved from http://www.manoffgroup.com/documents/GMP_U_NICEF_Nov_1608.pdf
- Joshi, B. P., Mahajan, S. M., Tayade, D. N., & Dase, R. K. (2017). A study of awareness and utilization of growth charts among mothers of children aged 9 to 24 months attending the immunization OPD of a tertiary care teaching hospital in Aurangabad. *Int J Health Sci Res*, 7(5), 11-16.
- Mabesa, T., Knight, S., & Nkwanyana, N. (2022). Completeness of the road-to-health card and factors

- affecting knowledge and practices of growth monitoring and promotion in caregivers of young children in KwaZulu-Natal. *South African Journal of Clinical Nutrition*, 1-9. DOI: 10.1080/16070658.2022.2114405
- Ulasi, R. O., Ofiaeli, O. C., Azuka, N. C., Ebenebe, J. C., Ezeudu, C. E., Obichukwu, N. G., ... & Epundu, C. O. (2021). Knowledge and Perception of Growth Monitoring among Caregivers Attending a Tertiary Level Health Care Facility. *Annals of Medical and Health Sciences Research/ Volume, 11(5)*, 1464-1470.
 - UNICEF. (2009). Tracking Progress on Child and Maternal Nutrition: A Survival and Development Priority. www.unicef.pt/docs/Progress_on_Child_and_Maternal_Nutrition_EN_110309.pdf. USA: UNICEF
 - UNICEF. (2019). The State of the World's Children 2019 Children, food and nutrition: Growing well in a changing world. <https://www.unicef.org/reports/state-of-worlds-children-2019>.
 - UNICEF. (2020). New insights: 21st century malnutrition: Unpacking the triple burden for children nutritional wellbeing. <https://www.unicef.org/globalinsight/stories/new-insights-21st-century-malnutrition>.
 - UNICEF. (2015). Nigeria - Nutrition – The Challenge. Available from <https://www.unicef.org/nigeria/nutrition>.
 - UNICEF / WHO / World Bank Group. (2021) Levels and trends in child malnutrition - Joint Child Malnutrition Estimates. <https://data.unicef.org/resources/jme-report-2021/>
 - Use of growth charts for assessing and monitoring growth in Canadian infants and children: Executive summary. *Paediatr Child Health*. 2004 Mar;9(3), 171-84. doi: 10.1093/pch/9.3.171. PMID: 19655004; PMCID: PMC2720488.
 - Van Zadelhoff, S. J. N. (2014). *Child growth monitoring: how is it done in a changing world* (Doctoral dissertation, Master Thesis in International Health, Royal Tropical Institute, Vrije University, Amsterdam, The Netherlands).
 - WHO. (2008). Training Course on Child Growth Assessment WHO Child Growth Standards. <https://www.who.int/tools/child-growth-standards>
 - WHO. (2006). Introducing the New WHO Child Growth Standards. Report of a Regional Workshop Bangkok, Thailand, 5-7 June 2006.
 - WHO Multicentre Growth Reference Study Group. (2006). WHO Child Growth Standards based on length/height, weight and age. *Acta Paediatr Suppl*, 450, 76-85. doi: 10.1111/j.1651-2227.2006.tb02378.x. PMID: 16817681.
 - WHO. (2014). IMCI Integrated management of Childhood illnesses: Distance Learning: Module 9 Care of the well child.
 - WHO. (2017). Components of growth monitoring and promotion for children under 5. https://gateway.euro.who.int/en/indicators/gnpr_survey_5-components-of-growth-monitoring-and-promotion-for-children-under-5/
 - WHO. (2021). Malnutrition: Key Facts. <https://www.who.int/news-room/fact-sheets/detail/malnutrition>.
 - Mangasaryan, N., Arabi, M., & Schultink, W. (2011). Revisiting the concept of growth monitoring and its possible role in community-based nutrition programs. *Food Nutr Bull*, 32(1), 42-53. doi:10.1177/156482651103200105. PMID: 21560463.
 - Nyavani, S. M., Gertrude, M. X., & Fhumudzani, M. L. (2016). Caregivers' Interpretation of the Growth Chart and Feeding Practices of Children under Five Years: A Case of Greater Tzaneen Municipality, South Africa. *Journal of Food and Nutrition Research*, 4(6), 369-376.
 - Osero, J. O. (2020). Caregivers' Knowledge on Routine Growth Monitoring of Children Aged 9 Months in Nyamira County, Kenya. *Methods*, 72.
 - Panpanich, R., & Garner, P. (2000). Growth monitoring in children. *Cochrane Database Syst Rev*, (2), CD001443. doi:10.1002/14651858.CD001443. PMID: 10796794.
 - Roberfroid, D., Pelto, G. H., & Kolsteren, P. (2007). Plot and see! Maternal comprehension of growth charts worldwide. *Tropical Medicine & International Health*, 12(9), 1074-1086. doi: 10.1111/j.1365-3156.2007.01890.x. PMID: 17875018.
 - Seidu, F., Mogre, V., Yidana, A., & Ziem, J. B. (2021). Utilization of growth monitoring and promotion is highest among children aged 0–11 months: a survey among mother-child pairs from rural northern Ghana. *BMC Public Health*, 21(1), 910. DOI:10.1186/s12889-021-10980-w.
 - Yeshaneh, A., Fentahun, T., Belachew, T., Mohammed, A., & Adane, D. (2021). Utilization of growth monitoring and promotion services and associated factors among children aged 0-23 months in Banja District, Northwest Ethiopia 2020: A cross-sectional study. *PLoS One*, 16(11), e0259968. doi: 10.1371/journal.pone.0259968. PMID: 34780536; PMCID: PMC8592466.
 - Liu, Q., Long, Q., & Garner, P. (2017). Growth monitoring and promotion (GMP) for children in low and middle income countries. *The Cochrane Database of Systematic Reviews*, 2017(1), CD010102. doi: 10.1002/14651858.CD010102.pub2. PMCID: PMC6464995.
 - Seidu, F., Mogre, V., Yidana, A., & Ziem, J. B. (2021). Utilization of growth monitoring and promotion is highest among children aged 0–11 months: a survey among mother-child pairs from rural northern Ghana. *BMC Public Health*, 21(1), 910. *Gale OneFile: Health and Medicine*, link.gale.com/apps/doc/A665430634/HRC A?u=anon~426f2f87&sid=googleScholar&xid=218bf463. Accessed 13 June 2023.
 - Zoakah, A. I., Adeleke, A., Gbefwi, N. B., & Otokwula, A. A. E. (2002). Evaluation Of Nursing Mothers' Ability to Interpret the Growth Monitoring Chart in Primary Health Care Facilities in Jos. *Highland Medical Research Journal*, 1(1), 21-24. DOI: 10.4314/hmrj.v1i1.33794

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