Determinants of Growth Monitoring and Promotion (GMP) Services Utilisation among Caregivers in Kisumu County, Kenya

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Abstract

Background: Growth Monitoring and Promotion (GMP) is a multifaceted healthcare program that involves tracking the growth and welfare of children under five years through regular assessment of nutritional and physical health. Despite the apparent importance, GMP uptake remains low in low- and middle-income countries. The current study aimed to determine uptake patterns of GMP services for children 0-59 months among caregivers in Nyakach sub-county.

Methodology: A community-based descriptive cross-sectional study design was employed, using a multi-stage sampling technique to select 407 caregivers. Data were collected through questionnaires and analysed using descriptive and inferential statistics in SPSS version 28. Furthermore, multivariable logistic regression analyses were performed with adjusted odds ratio (aOR) [95% CI] used to assess the strength of association.

Results: The median (IQR) age of caregivers was 28 (22, 34) years, and 27 (17, 40) months for the children aged under five years. GMP services utilisation was at 47.7%; however, the major barriers included long distances to health facilities (56.3%) and extended waiting times (47.9%). Most caregivers (91.2%) had good knowledge of GMP, and 84.0% had a positive perception of the services. Several factors were significantly associated with GMP services utilization, namley, children's age 24-35 months (aOR= 6.6; 95%CI= 2.7-16.2); Employed caregivers (aOR= 1.92; 95%CI= 1.08-3.42), Caregivers who received all GMP service components (aOR=2.27; 95%CI=1.31-3.94), Caregivers with good maternal knowledge (aOR=5.01; 95%CI= 1.67-15.05); Caregiver with good perception (aOR=4.96, 95%CI= 2.20-11.17); Waiting time for at least 60 minutes (aOR=0.11,95%CI= 0.05-0.28), and time taken to the facility for at least 60 minutes (aOR=0.03,95%CI= 0.01-0.14).

Conclusion and Recommendation: GMP services utilisation among the under-fives remains low post-immunisation completion. Several key barriers to the utilisation of GMP services included long distances to health facilities, long waiting times, a negative perception, low caregiver knowledge, and working caregivers reported difficulties in finding time to attend GMP sessions. Conversely, high caregiver education levels, a positive perception of GMP services, and shorter distances to health facilities were associated with higher utilisation rates. It is important to enhance community-based health education and strengthen routine follow-up mechanisms to improve consistent visits.

Keywords: *Growth Monitoring and Promotion (GMP), Child Health, Nutritional Assessment, Kenya, Public Health Intervention, Malnutrition, Child Growth Tracking, Primary Healthcare*

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Introduction

A global child malnutrition survey conducted in 2020 showed that there are 144 million children who are stunted, 47 million who are wasted and 14.3 million who suffer from severe wasting (1). Most children with malnutrition live in Africa and Asia. Growth monitoring promotion (GMP) is a high-impact primary public health intervention for tracking the growth of children aged 0-59 months, by routinely measuring the size of the child's weight, height/length, and head circumference to record the growth in contrast to a standard periodic anthropometric measurement (2). By 2018, 186 countries globally practised GMP, and 154 countries used the growth chart. The GMP components help reduce childhood malnutrition rates, improve diagnosis and provision of essential treatments for childhood illnesses, allow early detection of growth faltering and health issues in children, and facilitate regular interactions between caregivers and health providers through information, education, communication, and basic medical responses (2,3). Implementing the GMP program in many lower- and middle-income countries has enhanced the diagnosis and monitoring of early-stage child growth issues through nutrition counselling and health-promoting actions. Despite its benefits, the GMP participation rates among caregivers remain suboptimal in low- and middle-income countries (LMICs). In Kenya, the national GMP service utilisation stands at approximately 40% (4). This low uptake undermines the potential benefits of GMP (2, 5, 6). Understanding the drivers and barriers to caregiver utilisation of GMP could help strengthen its implementation and coverage.

In Kenya, the challenges of GMP service utilisation vary between urban and rural areas. Health facility data indicate that while urban caregivers may have better access to health facilities, they often face constraints such as long waiting times and competing work commitments. In contrast, rural caregivers encounter barriers such as long travel distances, limited healthcare infrastructure, and an inadequate number of trained health personnel. These factors contribute to irregular and inconsistent attendance among caregivers of children 0-59 months, leading to missed opportunities for primary healthcare interventions (4).

Effective GMP programs are crucial for early detection of growth faltering and other developmental issues, ensuring timely intervention and support for children's growth and development (7). Therefore, by reinforcing the importance of GMP services and addressing the barriers to utilisation, healthcare systems can improve coverage and effectiveness, ultimately contributing to better health outcomes for children in LMICs.

Methodology

Study design and site

This cross-sectional study was conducted in Nyakach sub-county, in Kisumu County, Kenya. Nyakach Sub- County covers an area of 358.6 km2, including approximately 71km^2 of the lake water surface, with a total of five wards.

Study population

Participants comprised caregiver–child pairs residing in Nyakach Sub-County. Each pair consisted of caregivers and a child aged 0 to 59 months, regardless of whether they had previously utilised GMP services. Caregivers and the children had to be residents of Nyakach Sub-County for the last three months, and consenting caregivers. Caregivers who did not provide consent, caregivers with children under five years who had not resided in the area for less than three months, and those who were unwilling or unable to comply with the study procedures were excluded from the study. In households where a caregiver had more than one eligible child, only one caregiver-child pair was included in the study to avoid clustering effects. In such cases, the youngest eligible child was selected since younger children are prioritised for GMP services and require frequent monitoring

according to national and WHO guidelines.

Sample size

The sample size for this study was determined using Cochran's Formula, n = z^2pq/d^2, with a 95% confidence level (Z = 1.96), an assumed population proportion of 0.5, and a margin of error of 5%. The minimum sample size was 384. To account for a 6% anticipated non-response rate, the sample size was adjusted to 407 caregivers.

Sampling criteria

Nyakach Sub-County was purposively selected due to the limited availability of localised evidence on GMP services utilisation. Of the five wards of Nyakach Sub-County, North Nyakach and South East Nyakach were purposively chosen for the study based on their relatively high population size, both in terms of general population and the number of children under-five, compared to other Wards in Nyakach Sub-County, making them ideal settings for capturing a sufficient number of eligible caregivers. Community Health Units were mapped, and the Community Health Promoters assisted in developing a list of all households with children aged 0-59 months. The list (N=6510) was entered into STATA, where each household was assigned a unique identification number. A computer-generated randomisation procedure was then applied to get 407 households with caregivers. This process ensured that all eligible households had an equal and independent probability of being selected for inclusion in the study.

Data collection methods and procedure

A pretested interviewer-administered questionnaire was used to collect data. The questionnaire captured socio-demographic factors, Frequency and interval of visits of GMP, caregiver knowledge of GMP, caregiver perception of GMP, availability of and access to service components provided during GMP visits and their uptake. A pre-test was conducted in Central Nyakach Ward to assess the clarity and practicality of the questionnaire. 41 questionnaires were administered using simple random sampling. Based on the validity concerns, the questionnaire was slightly adjusted. Questionnaire reliability was checked using Cronbach's alpha coefficient (0.86), which was within an acceptable range.

Data analysis

The data downloaded from KoboToolbox was imported into the Statistical Package for the Social Sciences (SPSS) version 28 for analysis. Quantitative data were analysed using means, frequencies, and percentages and presented using tables. At a 95% confidence interval, multivariable binary logistic regression analysis was performed to identify factors associated with GMP service utilisation. All variables with a *p*-value less than or equal to 0.25 in the bivariable logistic regression analysis were entered into the multivariable logistic regression model. The statistical significance was set at a *p*-value of less than or equal to 0.05 at a 95% CI.

Ethical considerations

Ethical approval was obtained from the Board of Postgraduate Studies at Jaramogi Oginga Odinga University of Science and Technology, JOOUST Ethical Review Committee(ERC 39/09/23-42), the National Commission for Science, Technology & Innovation (NACOSTI/P/23/30138), and the Kisumu County Department of Health and Sanitation, which authorised the study implementation. Participants were recruited voluntarily. Confidentiality of the information was safeguarded by de-identification.

Results

Socio-demographic characteristics of the respondents

A total of 407 caregiver–child pairs, comprising caregivers and their children aged 0–59 months in Nyakach Sub-County, participated in this study, with a 100% response rate. The results in Table 1 show that the median age (IQR)

of the children was 27(17, 40) months, and almost half (50.4%) of them were female. More than three-quarters (82.1%) of the caregivers were married, and about half (53.1%) had at most a primary level of education. More than half (58.4%) of the caregivers were unemployed/housewife.

Frequency and interval of GMP visits

In Table 2, more than half (52.6%) of the caregivers were still taking their children for GMP services, while 47.4% stopped taking their children for GNP services. Of those who were still attending GMP services, the majority (86.9%) took their children every month, 1.4% took their children bimonthly (every two months), 8.4% attended the GMP services quarterly, and 3.3% attended at most three times a year.

Caregiver knowledge of GMP services

Caregivers' knowledge of GMP services was assessed using a five-item GMP knowledge questionnaire.

Table 1
Socio-Demographic Characteristics of Children and Caregivers in Nyakach Sub-county (N=407)

Variables		Frequency	Percent
Age of the child in months, Median(IQR)= 27(17,40)	0-11	53	13.0
	12-23	99	24.3
	24-35	119	29.2
	36-47	77	18.9
	48-59	59	14.5
Gender of the child	Female	205	50.4
	Male	202	49.6
Marital status	Married	334	82.1
	Single/Separated/widowed	73	17.9
Level of education	None/ Primary	216	53.1
	Secondary/ Tertiary	191	46.9
Occupation	Casual worker	29	7.1
	Formally employed	12	2.9
	Self employed	119	29.2
	Unemployed/Housewife	238	58.4
	Other	9	2.2
Main source of income	Employment salary	24	5.9
	Own employment	277	68.1
	Other	106	26.0

Table 2
Frequency and Interval of Visits for GMP Services by Caregivers of Children 0-59 months

Variables		Frequency	Percent
Still take your child for GMP?	No	193	47.4
	Yes	214	52.6
Interval for child GMP visits (N=214)	Monthly	186	86.9
	After 2 months	3	1.4
	After 3 months	18	8.4
	More than 3 months	7	3.3
Frequency of GMP attendance, (N=214)	Once a month	179	83.6
	Twice in a quarter	11	5.1
	Not regular	6	2.8
	Don't know	18	8.4

Caregivers who correctly answered and received a score of 80% or above were considered to have good knowledge of using GMP services; caregivers who received a score of less than 80% were considered to have poor knowledge.

In Table 3, more than two-thirds (91.2%, n=371) of the caregivers with children 0-59 months had good knowledge of GMP services. The majority (92.6%, n =377) of the caregivers knew the main reason for GMP, 95.6% (n =388) knew the eligible age for GMP. Most (96.6%, n=393) of the caregivers were aware that the starting age for GMP services should be at birth. The majority (95.3% and 89.4%) of the caregivers were aware that it is important to take a child for GMP services regularly, and it is important to continue taking a child for GMP services past the immunisation schedule, respectively.

Determinants of growth monitoring and Promotion utilization among caregivers of children 0-59 months

In Table 4, for the bivariate analysis, age of the child, caregiver's level of education, caregiver's knowledge on GMP, caregiver's perception/attitude towards GMP services, waiting time, time taken to travel to the health facility and availability of GMP service components were statistically significant factors determining utilisation of GMP services.

In multivariate analysis, caregivers of children aged 24-35 months (aOR=6.64, 95%CI=2.72-16.18, P=<0.001) had higher odds of utilising GMP services compared to caregivers of children aged 48-59 months. Employed caregivers were about twice as likely (aOR=1.92, 95% CI=1.08-3.42, P=0.026) to utilise GMP compared to those with non-employment. The odds of GMP utilisation were significantly higher among caregivers who had good knowledge of GMP services (aOR=5.01, 95%CI=1.67-15.05, P-value=0.004) and those who had good perception/attitude about GMP (aOR=4.96, 95%CI=2.20-11.17, P <0.001). Caregivers who waited for 31 to 60 minutes to receive GMP services had lower odds (aOR=0.51, 95% CI=0.29-0.91, P=0.023) of utilising GMP as compared to those who took less than 30 minutes. Similarly, the odds of utilising GMP services were less (aOR=0.11, 95%CI=0.05-0.28, P<0.001) than for those who waited for less than half an hour.

Table 3

Caregivers' Knowledge on GMP Services for Children 0-59 Months in Nyakach Sub-county (N=407)

		Frequency	Percent
The meaning of GMP is to follow the growth of the child	No	30	7.4
	Yes	377	92.6
Children eligible for Growth Monitoring Promotion	Children 0 to 5 years of age	388	95.3
	Children >2 years of age	15	3.7
	Don't know	1	0.2
	Sick children	3	0.7
Starting age for Growth Monitoring Promotion	After 2 years of age	3	0.7
	At 1 month of age	7	1.7
	At 1 year of age	1	0.2
	At birth	393	96.6
	Don't know	3	0.7
It is important to take your child for GMP services regularly	No	19	4.7
	Yes	388	95.3
It is important to continue GMP visits beyond the immunisation schedule	Yes	364	89.4
	No	31	7.6
	Don't know	12	3.0

Time taken to travel to the health facility was a significant determinant of GMP utilisation as caregivers who took at least 60 minutes to travel to the health facility were 0.03 times less likely to utilise GMP as compared to those who took less than 30 minutes (aOR=0.19, 95% CI=0.01-0.14, P<0.001). Caregivers of children who received all GMP service components were 2.27 times more likely to utilise GMP services than those who did not receive all GMP services (aOR=2.27, 95% CI=1.31-3.94, P=0.004).

Discussions

Growth Monitoring and Promotion (GMP) utilisation rate was 47.7%, reflecting a moderate uptake, compared to the Kenya national uptake estimates from the 2022 Kenya Demographic and Health Survey (KDHS) (8).

Table 4

Factors Determining GMP Utilisation among Caregivers in Nyakach Sub-County, Kenya (N=407)

	Utilisation of GMP		Bivariate analysis	Multivariate analysis	
Variables	**Yesn (%)**	**No n (%)**	**COR(95%CI)**	**AOR(95%CI)**	**P-value**
Age of the child in months					
0-11	44(83.0)	9(17.0)	53.45 (15.91-179.55)	121.01 (27.91-524.58)	<0.001**
12-23	64(64.7)	35(35.3)	12.25 (5.54-27.09)	22.42 (8.44-59.52)	<0.001**
24-35	51(42.9)	68(57.1)	4.59 (2.17-9.69)	6.64(2.72-16.18)	<0.001**
36-47	18(23.4)	59(76.6)	1.53(0.67-3.51)	1.45(0.57-3.70)	0.440
48-59	9(15.2)	50(84.8)	1.00	1.00	0.239
Gender of the child					
Male	94(46.5)	108(53.5)	1.00	1.00	
Female	92(44.9)	113(55.1)	0.94(0.63-1.38)	1.12(0.66-1.89)	0.681
Marital status					
Married	147(44.0)	187(56.0)	0.69(0.14-1.13)	1.05(0.51-2.19)	0.888
Single/Separated/Widowed	39(53.4)	34(46.6)	1.00	1.00	
Caregiver's level of education					
Primary/None	82(38.0)	134(62.0)	1.00		
Secondary/Tertiary	104(54.4)	87(45.6)	1.95(1.32-2.90)	1.61(0.93-2.78)	0.087
Employment status					
No employment	112(46.1)	131(53.9)	1.00	1.00	
Employed	74(45.1)	90(54.9)	0.96(0.65-1.43)	1.92(1.08-3.42)	0.026*
Maternal knowledge of GMP					
Poor knowledge	5(13.9)	31(86.1)	1.00	1.00	
Good knowledge	181(48.8)	190(51.2)	5.91(2.25-15.52)	5.01(1.67-15.05)	0.004*
Caregiver's perception					
Bad perception	15(23.1)	50(76.9)	1.00	1.00	
Good perception	171(50.0)	171(50.0)	3.33(1.80-6.16)	4.96(2.20-11.17)	<0.001*
Waiting time in minutes					
0-30	106(52.2)	97(47.8)	1.00	1.00	
31-60	69(46.6)	79(53.4)	0.80(0.52-1.22)	0.51(0.29-0.91)	0.023*
60+	11(19.6)	45(80.4)	0.22(0.11-0.46)	0.11(0.05-0.28)	<0.001*
Time to facility in minutes					
0-30	98(47.6)	108(52.4)	1.00	1.00	
31-60	85(48.3)	91(51.7)	1.03(0.69-1.54)	0.60(0.34-1.03)	0.065
60+	3(12.0)	22(88.0)	0.15(0.04-0.52)	0.03(0.01-0.14)	<0.001*
Received all GMP services					
No	91(39.6)	139(60.4)	1.00		
Yes	95(53.7)	82(46.3)	1.77(1.19-2.63)	2.27(1.31-3.94)	0.004*

COR: Crude odds ratio; AOR: adjusted odds ratio; CI: confidence interval; GMP: growth monitoring promotion
A p-value of less than 0.05 was considered significant.

However, the rate observed from these findings falls significantly below the 80% coverage recommended by UNICEF (9), highlighting significant gaps in service uptake at the community level. The utilisation rate observed in this study is lower than findings from studies in Nairobi (58.1%) and Nyamira (53.3%) (10, 11), This differences could be attributed to several possible factors for example, urban counties like Nairobi may benefit from better physical accessibility to health facilities, higher health worker-to-population ratios, better infrastructure, and more frequent health education activities, all of which facilitate higher GMP utilization. In contrast, Nyakach's rural geography, poor road networks, and longer distances to health facilities may act as barriers, discouraging frequent GMP visits.

Notably, the caregivers' knowledge, employment status, and perception, which the study identified as significant predictors of GMP utilisation, may differ across regions. In Nairobi, for instance, caregivers may have more exposure to child health messaging and higher education levels, enabling them to recognise the importance of consistent GMP participation beyond immunisation schedules. Regionally, these findings are higher than those in Afar Region, Ethiopia (15.9%) and Southern Ethiopia (16.9%) (3,12). The observed higher utilisation compared to Ethiopia may be attributed to ongoing health programs, which actively support maternal and child nutrition interventions targeting children under five years. However, the lower utilisation compared to other Kenyan countries, such as Ghana (60%-64%) (13, 14) and South Africa (70%) (15), suggests the presence of barriers that need to be addressed to improve service uptake. In comparison, counties with the highest GMP utilisation in Kenya include Kericho (75.5%), Embu (53.1%), and Turkana (56.1%), while counties with the lowest utilisation include Mandera (5.7%), Bomet (3.1%), and West Pokot (17.9%) (3).

Additionally, 52.6% of caregivers took their children for GMP services, with the majority (86.9%) attending monthly visits. However, utilisation declined as the child got older, with younger children (0-11 months) having significantly higher odds of attending GMP services compared to older children (48-59 months). This finding aligns with existing literature, which suggests that caregivers are more vigilant about monitoring the growth of younger children, as this period is crucial for detecting early growth faltering and implementing timely interventions (16). Studies by Seidu and Dagne also observed a similar trend, where GMP utilisation significantly dropped as children grew older (17,18). This decline may be attributed to GMP services being integrated with routine immunisation schedules in early infancy, making it more convenient for caregivers to attend.

One notable observation in this study was the wider confidence interval (CI) for the effect of child age on GMP utilisation. This could be attributed to sample size and distribution issues, particularly among older children (48–59 months). Since caregiver attendance at GMP declined as children grew older, fewer observations were recorded in the older age groups. This reduced sample size increased the variability of the estimates, resulting in wider confidence intervals. This highlights the need for targeted strategies to encourage GMP attendance for older children, ensuring continued monitoring of their growth and development post-immunisation.

The waiting times, as well as the distance to the facility, significantly affected the frequency and interval of GMP visits. Caregivers who travelled longer distances or waited longer for services were less likely to utilise GMP services at regular intervals compared to those who had shorter travel times. This finding is supported by studies conducted by Ahmed *et al* (19). Long wait times and travel times may be

perceived as inconveniences by caregivers, discouraging them from attending GMP visits regularly due to time restrictions or conflicting obligations. This implies that knowledge acquisition may not necessarily be enough to practice GMP. Thus, interventions should not only concentrate on educating the mothers, but they should also support them to overcome barriers to utilising GMP services. This finding is supported by studies in Kenya and other sub-Saharan African countries (11,20,21).

The caregivers with good knowledge of GMP were more likely to utilise the GMP services. Previous findings confirmed that caregivers with comparatively greater knowledge of child growth and nutrition utilised GMP services more frequently (12, 14, 22). Kenyan studies indicate that caregivers with better child nutrition knowledge are more likely to adhere to recommended breastfeeding and supplemental feeding standards (10, 23). However, despite the evident awareness and understanding of GMP services, the study also identified a notable pattern, where 47.4% discontinued these visits (22), which suggests the presence of underlying factors influencing caregivers' decision-making processes regarding the sustained use of GMP services.

In the current study, the likelihood of using GMP services was higher among caregivers who had a positive perception of GMP services. This observation is supported by a study conducted in Northern Ethiopia (24). Caregivers who are knowledgeable about GMP may be better equipped to make informed decisions regarding their child's health and well-being. They understand the importance of regular growth monitoring in assessing their child's development, detecting potential health issues early, and taking appropriate actions to address them. Caregivers with limited knowledge may face barriers to service utilisation. Conversely, positive caregiver perceptions are associated with favourable behaviour change, including regular attendance at GMP sessions, whereas negative perceptions are linked to non-attendance.

Caregiver perception emerged as a significant determinant of GMP utilisation in this study. Caregivers with a positive perception of GMP services were nearly five times more likely to utilise GMP services compared to those with negative perceptions (25). This finding underscores the critical role that attitudes and beliefs play in health-seeking behaviour. Positive perceptions may come from caregivers recognising the benefits of regular growth monitoring, trusting healthcare providers, and having prior positive experiences with GMP services. Conversely, negative perceptions potentially influenced by long waiting times, inadequate service delivery, or misconceptions about the necessity of continued GMP visits beyond infancy may discourage caregivers from attending. These findings align with studies in Northern Ethiopia and Ghana, which found that caregivers with favourable attitudes were significantly more likely to adhere to GMP schedules (22). Additionally, Debuo and Harris reported a strong relationship between caregiver perception and adherence to GMP services, highlighting the importance of community engagement and education in sustaining positive attitudes (14,24). Strengthening health promotion efforts and addressing service delivery gaps can improve caregiver perceptions and ultimately enhance GMP utilisation.

Limitations of the study

There is a range of factors that may influence the practice of continued GMP over time. This information was not captured in this study because it was cross-sectional in nature. There was a lack of adequate information regarding GMP practices in the study area.

Conclusions

The utilisation of GMP services in the study area was moderately low. Factors such as child age, caregiver knowledge and perception, employment status, waiting time, distance, and

availability of GMP service components significantly influenced GMP utilisation. Caregivers with good knowledge and a positive perception were more likely to utilise GMP services, while longer waiting and travel times reduced GMP attendance.

Recommendations

Strengthening community-based health education is essential to improve caregivers' understanding of the importance of GMP services and adherence to the recommended visit schedules. Health systems should enhance routine follow-up mechanisms, such as defaulter tracing, to promote continuity and consistency of GMP visits. Lastly, further decentralisation of GMP services through greater involvement of Community Health Promoters could improve service accessibility.

For future research, there is a need to investigate the barriers that hinder caregivers from adhering to recommended GMP visit schedules. Qualitative studies exploring personal, social, and economic factors influencing regular attendance would provide deeper insights and inform the design of context-specific interventions.

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Author's contribution

FD, EO, and DA wrote the proposal and played a part in the drafting of the paper. AO, JO, and AT participated in data collection and data analysis. All the authors read and approved the final manuscript.

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