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Original Research Article

Factors associated with preschool attendance by children aged 12 to 59 months: a cross-sectional analytical study in the peri-urban environment of the city of Kisangani, Democratic Republic of Congo

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ABSTRACT

Background: The aim of this study was to identify the factors associated with attendance at pre-school consultations by children aged 12-59 months in the peri-urban areas of Kisangani.
Methods: A cross-sectional analytical study was conducted from 15 June to 15 July 2024 on 850 mother-child pairs selected by multi-stage cluster sampling. Factors associated with pre-school consultations attendance were analysed using logistic regression with a stepwise degressive approach at the 10% threshold.
Results: The rate of attendance at pre-school consultations was 28.9%. Factors favoring attendance included: the mother's knowledge of the age at which HPC should be started (aOR=9.11; CI95%: 3.01-27.54), the organization of HPC early in the day by the health care facility (HCF) (aOR=5.34; CI95%: 1.18-24.09), the mother's participation in health education sessions (aOR=25.99; CI95%:16.89-42.35), receiving a recommendation from the HSE team to continue pre-school consultations after vaccination (aOR=3.32; CI95%: 1.10-10.02), a waiting time ≤3 hours (aOR=2.3; CI95%: 3.66-25.30) and having a source of income (aOR=5.40; CI95%: 2.39-12.20). In contrast, input stock-outs reduced attendance (aOR=0.18; CI95%: 0.08-0.42).
Conclusions: Attendance at SPCs remains low in the peri-urban area of Kisangani. Improving the availability of inputs and considering the factors that have a positive influence on attendance could increase mothers' adherence to SPCs.

Keywords: Pre-school consultation, Attendance, Associated factors, Mothers, Kisangani, Democratic Republic of Congo

INTRODUCTION

Children's growth and development are major public health issues in low- and middle-income countries.[1] Growth monitoring involves regular monitoring of weight and height, as well as interventions such as nutritional advice, supplements and medical check-ups.[2] These measures aim to improve the nutritional status and survival of children by promoting breastfeeding, complementary feeding and the use of child health services (vaccination, supplementation).[3]

Malnutrition remains a global priority for achieving the Sustainable Development Goals (SDGs) by 2030.[4] The

World Health Organisation (WHO) is aiming for a 40% reduction in child stunting.[5] In 2020, the United States Agency for International Development (USAID) and its partners revised growth monitoring strategies by integrating them into child health services from birth.[6] Despite these advances, malnutrition remains a concern in sub-Saharan Africa (SSA), with an average prevalence of stunting of 41.1% in 33 countries studied.[7] This situation increases the risk of infant mortality due to diarrhoea, pneumonia, malaria and measles.[8]

In SSA, a number of factors influence the monitoring of child growth: poor communication between providers and clients, lack of skills on the part of health workers, age of the child, early visits, financial situation, use of family health cards, proximity of health facilities, insufficient family support, cultural barriers, inadequate awareness, long waiting times, lack of transport and money for meals before sessions.[9-13]

In the Democratic Republic of Congo (DRC), pre-school consultations (CPS) are a key health and nutrition intervention, mainly carried out in health centres.[14] It is used to monitor growth and prevent disease, but attendance remains low. CPS facilitates exchanges between health services and families to guarantee child survival and integrate low-cost interventions.[14]

The DRC is facing an alarming nutritional crisis. According to the 2017-2018 MICS-Palu survey, 42% of children under five suffer from stunting, with a rate of 52% among children in the poorest households.[15] This stunting affects even infants under six months of age, compromising their cognitive and physical development.[15] A 2019 study revealed a 35.2% prevalence of stunting and 9.2% of wasting.[16] In 2023-2024, the demographic and health survey (EDS) found a prevalence of chronic malnutrition of 45%, 7% wasting and 25% underweight among children under five.[17]

Another study found that only 60.7% of mothers whose children were on the routine immunisation schedule had attended the CPS in the last three months.[18] This could partly explain why, in 2024, only 21% of Congolese children aged 12-23 months had been fully vaccinated and 23% had not received any vaccine.[17] Child health remains a major issue in the peri-urban areas of Kisangani, where nutritional and vaccination indicators reveal worrying shortcomings. According to the 2023-2024 DHS, 45% of children under five in Tshopo province are stunted, 9% are emaciated and 26% are underweight. In addition, vaccination coverage remains very low: only 4.9% of children aged 12-23 months are fully vaccinated, while 27.9% have not received any vaccine according to the national calendar.[17]

In this context, limited access to health services in peri-urban areas compromises the continuity of care after the phase of systematic vaccination against measles and yellow fever, provided for by the Expanded Programme on Immunisation (EPI). The Preschool Health Consultation (PHC), which should provide regular monitoring of children's health up to the age of five, remains largely unknown and little used after the initial vaccination period.

Given the paucity of local data on this issue, it is essential to identify the factors that positively influence attendance at pre-school clinics in order to guide effective interventions. The aim of this study is to measure the rate of attendance at pre-school consultations by children aged between 12 and 59 months in the peri-urban area of Kisangani, and to identify the associated factors, with a view to improving the coverage and quality of preventive care for this vulnerable age group.

METHODS

Study site

The study was conducted in the peri-urban areas of Kisangani, Tshopo province in the DRC, where the target population consisted of mother-infant pairs (12-59 months).

Type and period of study

This was an analytical cross-sectional study conducted from 15 June to 15 July 2024.

Sample size

The sample size was calculated using the Daniel de Schwartz formula, adapted for cross-sectional community surveys.

$$n = \frac{Z^2.p(1-p)}{d^2}$$

Assuming a CPS attendance rate of 50%, a confidence level of 95%, a margin of error of 5%, a contingency of 10% and a design effect of 2.

$$n = \frac{(1{,}96x1{,}96).0{,}50(1-0{,}50)}{(0{,}05)^2} = \frac{0{,}9604}{0{,}0025} = 384 \text{ x } 2$$

The minimum size required was 845 subjects, adjusted to 850 mother-child pairs.

Sampling technique

Multi-stage probability cluster sampling was used to randomly select three health zones out of the five in the city of Kisangani: Kabondo, Makiso-Kisangani, Tshopo; select nine health areas, three per health zones; and randomly draw 30 clusters (villages/avenues) in proportion to the demographic weight of the selected health areas. Households were systematically selected after a census, with the first household randomly selected between 1 and the sampling step (k=N/n) by following

the direction indicated by throwing a pen, then the following households according to the sampling step. If a household could not be reached, it was replaced by a neighbour. If a household had several eligible children, the youngest was selected.

Inclusion criteria

All mothers/caregivers of children aged between 12 and 59 months living in the selected household and who had voluntarily agreed to take part in the survey were included.

Variables of interest

Dependent variable

Mothers' use of CPS services (good if ≥1 visit/month for 12-23 months, ≥1 visit/quarter for 24-59 months).

Independent variables

Sociodemographic and economic: age (12 to 23 months and 24 to 59 months), gender (male and female), marital status (with a spouse and without a spouse), level of education (none and primary vs. secondary and higher), having a source of income (yes and no),

Maternal knowledge: age at which SPC starts (yes, if at birth and no, if other) and stops (yes, if at 59 months and no, if other), activities organised during SPC (yes, if weighing weight, measuring height, vaccination, vitamin A supplementation, deworming, nutritional education, ...and no, if none and other answers); benefits of SPC (yes, if growth monitoring, disease prevention, good nutrition,... and no, if none and other answers).

Factors related to health services: distance from the CPS structure (less than or equal to 5 Km or greater than 5 Km), organisation of CPS early in the day (yes or no), participation in information, education and communication (IEC) sessions, possession of CPS booklet (yes or no),

Health worker-related factors: perceived quality of service (good or bad, interaction with mothers (welcoming or less welcoming), feeling comfortable at the CPS (yes or no); making appointments (yes or no); respecting the order in which appointments are made (yes or no); waiting time (less than or equal to 3 hours or more than 3 hours).

Data collection

Data were collected using face-to-face interviews with a structured questionnaire. A pre-test was carried out with 43 mothers/caretakers of children aged 12-59 months, corresponding to a 5% sample, in a peri-urban SA in the city of Kisangani, which was not involved in the study. To ensure mutual understanding of the main objectives and the data collection instrument, intensive one-day training was provided by the principal investigator to the interviewers, and the completeness and consistency of the questionnaires collected were checked daily during the data collection period.

Data processing and analysis

The data were entered into Excel and then analysed using STATA 13. Categorical variables were presented in the form of proportions (%) and, for those with more than two modalities (mother's and child's age group, level of education, marital status), a dichotomisation was carried out. Factors associated with attendance at pre-school consultations (CPS) were analysed by calculating odds ratios (OR) with their 95% confidence intervals. In order to control for potential confounding factors, variables showing a significant association in bivariate comfortable at the CPS (yes or no); making appointments (yes or no); respecting the order in which appointments are made (yes or no); waiting time (less than or equal to 3 hours or more than 3 hours). analysis were included in a multivariate logistic regression model using a degressive approach, with a significance level of 10%. The factors that were finally independently associated were presented with their adjusted odds ratios (ORa), their 95% confidence intervals, and the p-values from the Wald Chi-square test, assuming a significance level of 5%.

Ethical considerations

The study was approved by the Faculty of Medicine and Pharmacy of the University of Kisangani **(**N° FMP/06/2024**)** and authorised by the Tshopo Provincial Health Division **(**N°701/DPS/TSHOPO/IBB/SEC/ 0336/2024**).** Informed verbal consent was obtained from participants, with respect for anonymity and voluntary participation.

RESULTS

Socio-demographic characteristics of respondents associated with SPC use

Of the 850 mothers/guardians of children aged 12-59 months surveyed, 246 (28.9%) had attended the CPS. Analysis of the factors influencing attendance at pre-school consultations showed that a lack of inputs significantly reduced use of the services, while the presence of a source of income twice increased attendance (Table 1).

Knowledge variables associated with SPC use

Table 2 shows that mothers' knowledge of the age at which they started, stopped and took part in CPS activities, their possession of a CPS card and their recommendation to continue after complete vaccination were all associated with CPS attendance (Table 2).

Table 1: Socio-demographic characteristics of respondents and determinants of CPS attendance (n=850).

Variables	Total	Attendance at CPS		P value
		Yes N (%)	OR (IC 95%)	
Class age of child				0.622
12 to 23 months	642	183 (28.5)	1	
24 to 59 months	208	63 (30.2)	0.92 (0.64 - 1.31)	
Child's gender				0.384
Male	457	138 (30.2)	1	
Female	393	108 (27.5)	1.14 (0.84 - 1.56)	
Mother's age				0.263
From 15 to 30 years old	645	193 (29.9)	1	
31 to 55 years	205	53 (25.9)	1.22 (0.85 - 1.78)	
Level of study				0.656
None and primary	510	149 (29.2)	1	
Secondary and higher education	340	97 (28.5)	1.03 (0.76 - 1.41)	
Civil status				0.991
Married	639	185 (29.0)	1	
Unmarried	211	61 (28.9)	1.00 (0.70 - 1.44)	
Distance from the structure				0.388
≤ 5 Km	478	144 (30.1)	1	
>5 Km	372	102 (27.4)	1.14 (.084 - 156)	
Break in inputs				<0.001
Yes	271	114 (42.1)	1	
No	579	132 (22.8)	0. 41 (0.30 - 0.56)	
Mode of transport to the CPS				0.637
With a means of transport	539	159 (29.5)	1	
No means of transport	311	87 (28.0)	1.08 (0.78- 1.48)	
Transport costs				0.298
Yes	221	70 (31.7)	1.93 (0.84 - 1.68)	
No	629	176 (28.0)	1	
Having a source of income				0.000
Yes	506	130 (25.7)	1	
No	344	116 (33.7)	2.04 (1.49 - 2.79)	

Table 2: Association between knowledge variables and SPC attendance (n=850).

Mothers' knowledge of SPC variables	Total	Attendance at CPS		
		Yes N (%)	OR (IC95%)	P value
Knowledge of age of onset CPS				<0.001
Yes	316	112 (35.5)	1	
No	534	134 (25.1)	1.64 (1.20 - 2.24)	
Knowledge of the age of the CPS stop				0.015
Yes	769	232 (30.2)	1	
No	81	14 (17.3)	2.07 (1.12 - 4.06)	
Knowledge of CPS activities				<0.001
Yes	774	239 (30.9)	1	
No	76	7 (9.2)	4.40 (1.98 - 11.51)	
Knowledge of the benefits of the CPS				0.755
Yes	373	110 (29.5)	1	
No	477	136 (28.5)	1.05 (0.77 - 1.43)	
Possession of a CPS card				<0.001
Yes	38	20 (52.6)	1	
No	812	226 (27.8)	2.88 (1.41 -1.42)	
Recommendation to continue after vaccination				0.003
Yes	561	181 (32.3)	1	
No	289	65 (22.5)	1.64 (1.17 - 2.32)	

Table 3: Association between variables in perception of the organisation and SPC attendance (n=850)

Variables in the organisation of the CPS	Total	Attendance at CPS		
		Yes N (%)	OR (IC95%)	P value
Organisation of SPCs early in the day				<0.001
Yes	755	238 (31.5)	1	
No	95	8 (8.4)	5.00 (2.38 - 12.14)	
Participation in EIC sessions				<0.001
Yes	352	217 (61.6)	1	
No	498	29 (5.8)	25.10 (16.63 - 41.41)	
Agent behaviour at CPS				0.064
Welcoming	246	229 (93.1)	1	
Unwelcoming	766	17 (2.2)	1.68 (0.95 -3.12)	
Perceived quality of service				<0.001
Good	707	225 (31.8)	1	
Wrong	143	21 (14.7)	2.71 (1.64 - 4.66)	
Felt comfortable at CPS				0.022
Yes	684	210 (30.7)	1	
No	166	36 (21.7)	1.60 (1.06 -2.47)	
Respecting the running order				<0.001
Yes	553	189 (34.2)	1	
No	297	57 (19.2)	2.19 (1.54 - 3.12)	
Waiting time				0.008
Less than 3 hours	188	69 (36.7)	1	
3 hours or more	662	177 (26.7))	1.59 (1.11 - 2.27	

Table 4: Multivariate analysis of factors associated with attendance at CPS services by children aged 12-59 months.

Factors	Variables	Total (%) n=850	Attendance at CPS	aOR [IC95%]	P value
			Yes n=246		
Knowledge of age at start of CPS	Yes	316	112 (35.5)	1	<0.001
	No	534	134 (25.1)	9.11 [3.01-27.54]	
Time of day for CPS	Before noon	755	238 (31.5)	1	0.029
	Afternoon	95	8 (8.4)	5.34 [1.18-24.09]	
Participation in IEC sessions	Yes	352	217 (61.6)	1	<0.001
	No	498	29 (5.8)	25.99 [16.89 -42.35]	
Recommendation to continue CPS after vaccination	Yes	561	181 (32.3)	1	0.034
	No	289	65 (22.5)	3.32 [1.10-10.02]	
Number of hours waiting at the CPS	< 3 hours	188	69 (36.7)	1	<0.001
	3 hours or more	662	177 (26.7))	2.3 [3.66-25.30]	
Input shortage at CPS	Yes	271	114 (42.1)	0.18 [0.08-042]	<0.001
	No	579	132 (22.8)	1	
Have financial resources	Yes	506	130 (25.7)	1	<0.001
	No	344	116 (33.7)	5.40 [2.39-12.20]	

Service organisation variables associated with SPC use

In Table 3 below, we found that the timing of SPCs, a warm welcome for mothers, participation in education, information and communication (IEC) sessions and respect for the order of arrival and reduced waiting times encouraged attendance at SPCs (Table 3).

Multivariate analysis: Binary logistic regression

Our multivariate analyses after model adjustment showed that several factors significantly influenced attendance at pre-school consultations (CPS). Knowledge of the age at which SPCs begin, the organisation of the SPC during the day, participation in IEC sessions, the recommendation to continue after vaccination, waiting times of 3 hours or less and the availability of financial resources favoured

attendance at SPCs. On the other hand, input stock-outs reduced attendance at CPSs (Table 4).

DISCUSSION

The aim of this study was to identify the factors influencing attendance at pre-school consultation services (CPS) in the peri-urban areas of Kisangani. Our results show an attendance rate of 28.9%, well below the recommendations of the DRC's National Nutrition Programme, which stipulates that all children should attend CPS up to the age of 59 months in order to ensure their healthy growth.[14] This rate is still higher than those reported by Teklemuz et al (13.7%) in 2023 in Ethiopia and by Feleke et al (16.9%), but lower than those observed in Rwanda (33.0%) and Ghana (60%).[19-22] These disparities can be attributed to the different methodological frameworks, socio-demographic characteristics and targets involved in each study.

Our bi-variate analyses indicated that the presence of a source of income favours attendance at CPSs (OR: 2.04, IC95%: 1.49 - 2.79, p<0.001). This finding, supported by Yeshaneh, is in line with target 3.8 of the MDGs aimed at universal health coverage and reducing inequalities.[23,24] Access to financial resources makes it possible to overcome certain barriers to the use of healthcare services.

Knowledge of CPSs plays a key role in their use. Mothers who are informed about the age at which SPCs start and stop use them more regularly. These results agree with those of Teklemuz and contradict those of Feleke et al in Ethiopia.[19,20] Knowledge of the activities on offer, possession of a CPS card and recommendations from healthcare professionals have a positive influence on attendance. However, knowledge of the benefits of CPS did not show a significant link (p=0.755), unlike the study by Yeshaneh.[23] Mayhew in Afghanistan which suggest that professionals focus on anthropometric measurements without explaining the benefits of CPS to mothers.[24]

Participation in IEC sessions and a positive perception of the quality of care are factors associated with increased use of the CPS. These sessions give mothers a better understanding of the importance of the CPS and the services offered. Elements such as respect for the order of arrival (p<0.001), reduced waiting time (p=0.008) and a comfortable consultation environment (p=0.022) increase mothers' confidence in the healthcare system and reduce frustration and discrimination.

After adjustment in a multivariate model, several factors positively influenced attendance at CPSs. Knowledge of the right time to start CPS (aOR=9.11, CI95%: 3.01-27.54, p=0.000) and attendance at IEC sessions (aOR=414.48, CI95%: 106.48-1613.40, p=0.000) were major determinants. The time of consultation before midday also had a significant influence (aOR=5.34, CI95%: 1.18-24.09, p=0.029). In Ethiopia, a study showed that mothers attending growth and health promotion sessions were 6.53 times more likely to attend CPS.[19]

Receiving a recommendation from the HSE team to continue HPC after vaccination, reduced waiting time (<3 hours, aOR=2.30, CI95%: 3.66-25.30, p=0.000) also influenced attendance. Stock-outs of inputs were a major obstacle (aOR=0.18, IC95%: 0.08-0.42, p=0.000), which corroborates WHO recommendations on the importance of input availability in ensuring optimal access to care.[25] In addition, family financial resources play a decisive role (aOR=5.40, CI95%: 2.39-12.20, p=0.000). Other studies, such as those by Yeshaneh and Feleke, have identified similar factors such as a high wealth index and access to growth-promoting services.[20,23]

Limitations of the study

Being cross-sectional, this study cannot establish causality between the factors studied and attendance at SPCs. In addition, the data is declarative, which may introduce biases of memory or social conformity. The study was limited to peri-urban areas, which restricts the generalisability of the results to the city as a whole. The absence of a qualitative assessment prevents an in-depth analysis of perceptions and barriers. These limitations underline the need for further research to complement these results.

CONCLUSION

This study highlighted the relatively low rate of use of CPS and the factors that positively influence this use. Socio-demographic characteristics were not directly associated with attendance at CPSs. Maternal knowledge, participation in IEC sessions, post-vaccination recommendation, accessibility of services and availability of financial resources are key determinants. Conversely, input shortages are a major obstacle. It is essential to improve the organisation and accessibility of services by guaranteeing a regular supply of inputs, stepping up IEC sessions to raise mothers' awareness and optimising the management of waiting times. Specific efforts must be made to reach the most financially vulnerable families and ensure equitable health coverage.

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