

Knowledge of Measles among Mothers of Children under 5 Years in the Municipality of Parakou, 2024

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Abstract

Introduction: Measles is a highly contagious, serious and re-emerging disease. This study assessed the knowledge of measles among mothers of children under 5 years in the municipality of Parakou in 2024. **Methods:** We conducted a descriptive cross-sectional study with analytical objectives over a 5-month period. The study population consisted of mothers of children under 5 years of age in the municipality of Parakou, selected using systematic random cluster sampling. Data were collected using a structured questionnaire on the KoboCollect application. Prevalence ratios (PRs) with 95% confidence intervals were used to assess associations. A p-value < 0.05 was considered statistically significant. **Results:** The study included 390 mothers of children under five years of age; 57.69% had a good level of knowledge about measles. Factors statistically associated with the level of knowledge about measles were age (p < 0.001), profession (p = 0.022), monthly income (p = 0.020), possession of information on epidemic-prone diseases (p < 0.001), history of eruptive diseases in the offspring (p < 0.001), and access to social networks (p = 0.012). **Conclusion:** To eradicate measles and prevent its resurgence, health education interventions must be strengthened, communication strategies improved, and community stakeholders more actively engaged to raise parental knowledge about measles.

Keywords

Measles, Knowledge, Mothers of Children under 5 Years, Benin

1. Introduction

Measles, a highly contagious airborne disease, caused approximately 2.6 million

deaths annually before measles vaccination was introduced in 1963 [1]. It remains responsible for hundreds of thousands of deaths and severe illnesses among children worldwide [2]. Although the number of cases drastically decreased thanks to vaccination, a global resurgence of cases has been observed since 2019, linked to the COVID-19 pandemic which weakened health systems and fostered vaccine-related misinformation [3] [4].

To protect populations against the spread of measles, the World Health Organization (WHO) recommends at least 95% vaccination coverage. However, this target remains out of reach in many African countries. Between January 2020 and April 2021, nearly 17 million African children missed measles vaccine doses. Vaccination coverage had been hovering between 70% and 75% for a decade, risking dangerous gaps in immunity [6]. In the long run, this could lead to an increase in potentially fatal cases and push measles eradication further away, leaving millions of children vulnerable to this disease [4]. Measles incidence is often used as an indicator of a health system's capacity to deliver essential pediatric vaccines [5]. In Benin, 28 measles outbreaks were reported in 2018, and 14 municipalities reached their epidemic threshold [7]. According to the fifth Demographic and Health Survey (DHS-V), measles vaccination coverage in Benin was 68% in 2018 [8], indicating a high level of vulnerability among children. Childhood vaccination is influenced by parental decision-making. Parents base vaccination decisions on their knowledge of vaccines and related factors [9].

The objective of this study was to assess mothers' knowledge of measles with the ultimate aim of contributing to reductions in infant and child mortality.

2. Methods

This was a descriptive cross-sectional study with analytical objectives over a 5-month period (1 April to 31 August 2024). The study population consisted of mothers of children under 5 years of age in the municipality of Parakou, selected by systematic random cluster sampling. The inclusion criteria were: (1) residence in Parakou for at least six months, and (2) having at least one living child under five years of age. The minimum sample size was calculated using Schwartz's formula: $n = z\alpha^2pq/i^2$ with $\alpha = 5\%$ (type I error rate), hence $z\alpha = 1.96$; $p = 53.6\%$: proportion of people with good knowledge of measles and its vaccine in a study in Lubumbashi [10]; $q = 46.4\%$; $i = 5\%$: margin of error or desired precision. Calculated $n = 382$ mothers of children. This size was increased by 10%, so the final size was $n = 420$ mothers of children.

The calculated sample size was 420 mothers. Knowledge level was assessed using an ad hoc composite scoring grid developed by the research team. The dependent variable was the level of knowledge about measles, assessed using nine sub-variables scores developed by the research team based on the members' experience in managing measles: knowledge that measles is a childhood disease; knowledge of at least two symptoms (e.g., cough, coryza, conjunctivitis, maculopapular rash); understanding that measles is communicable; knowledge of

transmission via coughing, sneezing, or saliva; awareness of the existence of a measles vaccine; knowledge of the recommended vaccine age (9 months); understanding that there is no age limit for contracting measles; knowledge that measles can be fatal; and knowledge of the role of vitamin A in the body. Each sub-variable was scored from 0 to 1. Overall scores were calculated and expressed as percentages: $\geq 70\%$ = good; 40% - 69% = moderate/acceptable; $< 40\%$ = poor. Independent variables included sociodemographic, socioeconomic, sociocultural, and organizational factors. Data were collected using a structured questionnaire on the KoboCollect application by a team of final-year bachelor students from the National School for the Training of Higher Technicians in Public Health and Epidemiological Surveillance (ENATSE), over a two-week period (5-20 May 2024). For quantitative variables, measures of central tendency (mean \pm standard deviation) were used. For qualitative variables, proportions with 95% confidence intervals (CIs) were reported. For analytical purposes, the three categories of the dependent variable were dichotomized into: good knowledge (good + acceptable levels) and poor knowledge (poor level). Prevalence ratios (PRs) with 95% CIs were used to assess associations. A p-value < 0.05 was considered statistically significant.

Ethical and deontological considerations: The protocol was submitted to the ENATSE validation committee for approval. Authorization was obtained from the Coordinating Physician of the health district. Verbal informed consent was obtained from all participating mothers, and anonymity and confidentiality of collected data were maintained.

3. Results

Of the 420 mothers targeted, 390 were surveyed, representing a participation rate of 92.85%.

Based on nine sub-variables, 225 mothers (57.69%; 95% CI: 52.74% - 62.50%) had a good level of knowledge of measles (**Figure 1**).

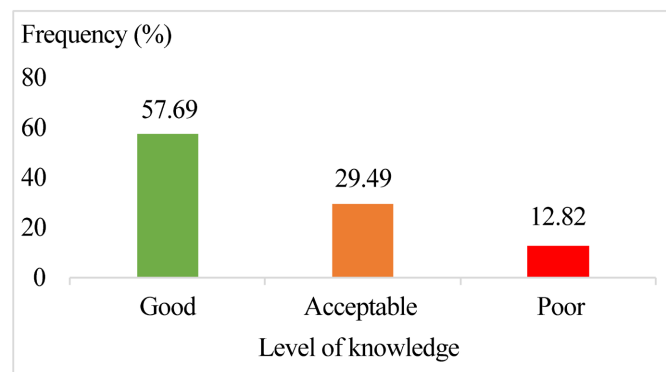


Figure 1. Distribution of mothers of children under five years in the municipality of Parakou in 2024 according to their level of knowledge about measles.

For the sub-variables: 88.97% recognized measles as a childhood disease, 82.05% identified at least two symptoms, and 75.13% were aware of the vaccine.

Table 1 shows the distribution of mothers according to their knowledge of measles.

Table 1. Distribution of mothers of children under 5 years in the municipality of Parakou in 2024 according to their knowledge of measles.

	Size (n)	%	95% CI
Knowledge that measles is a childhood disease	347	88.97	(85.48 - 91.71)
Knowledge of at least two symptoms of measles	320	82.05	(77.94 - 85.54)
Understanding that measles is communicable	333	85.38	(77.94 - 85.54)
Knowledge of the transmission route	168	43.08	(40.11 - 50.78)
Awareness of the measles vaccine	293	75.13	(70.61 - 79.16)
knowledge of the recommended vaccine age (from 9 months)	179	45.90	(41.02 - 50.86)
Knowledge that it can be fatal	289	74.10	(69.53 - 78.20)
Understanding that there is no age limit for contracting measles	314	80.51	(76.29 - 84.14)
Knowledge of the role of vitamin A in the body (fight against infectious diseases, especially measles)	220	56.41	(51.45 - 61.25)

3.1. Independent Variables

Table 2. Distribution of mothers of children under 5 years in the municipality of Parakou in 2024 according to sociodemographic characteristics.

	Size (n)	%	95% CI
Age groups (years)			
< 28	124	31.79	(27.37 - 36.58)
28-38	191	48.97	(44.05 - 53.92)
38-48	66	16.92	(13.53 - 20.96)
≥ 48	9	2.31	(1.22 - 4.33)
Number of children			
<3	172	44.10	(39.26 - 49.06)
≥3	218	55.90	(50.94 - 60.74)
Marital status			
Single	39	10.00	(7.40 - 13.38)
Cohabitation	18	4.62	(2.94 - 7.18)
Married	326	83.59	(79.59 - 86.93)
Widowed/Divorced	7	1.79	(0.87 - 3.66)
Place of residence			
Urban area	269	68.97	(64.22 - 73.36)
Rural area	121	31.03	(26.64 - 35.78)

The mean age of mothers was 30.95 ± 6.79 years, and the mean number of children was 2.8 ± 1.1 . Married mothers represented 83.59% of the sample, and 68.97% lived in urban areas. Traders or resellers represented 53.08% and 78.21% reported a monthly income less than 52,000 FCFA (≈ 87 USD). They had a secondary level of education in 39.74% of cases. The mothers were Muslims in 62.56% of cases and 30.00% belonged to the Bariba and related ethnic groups. At the organizational level, 92.56% of mothers used prenatal and postnatal care services, and 63.08% reported receiving information on epidemic-prone diseases. Regarding history of eruptive diseases in their children, 55.64% of mothers reported never having experienced such diseases in their offspring. Mothers of children reported having access to social networks in 56.41% of cases. **Tables 2-4** present the distribution of mothers according to sociodemographic, socioeconomic and sociocultural characteristics.

Table 3. Distribution of mothers of children under 5 years in the municipality of Parakou in 2024 according to socioeconomic characteristics.

	Size (n)	%	95% CI
Profession			
Housewife	59	15.13	(11.91 - 19.02)
Artisan	72	18.46	(14.92 - 22.61)
Trader/Reseller	207	53.08	(48.12 - 57.98)
Official	27	6.92	(4.80 - 9.89)
Pupil/Student/Apprentice	18	4.62	(2.94 - 7.18)
Other	7	1.79	(0.87 - 3.66)
Monthly income (USD)			
<87	305	78.22	(73.84 - 82.02)
87 - 167	76	19.49	(15.86 - 23.71)
≥ 167	9	2.32	(1.22 - 4.33)
Educational level			
None	71	18.21	(14.69 - 22.34)
Primary	115	29.49	(25.18 - 34.20)
Secondary	155	39.74	(35.01 - 44.68)
Higher	49	12.56	(9.64 - 16.22)

Table 4. Distribution of mothers of children under 5 years in the municipality of Parakou in 2024 according to sociocultural characteristics.

	Size (n)	%	95% CI
Religion			
Christian	145	37.18	(32.53 - 42.08)
Muslim	244	62.56	(57.66 - 67.22)
Endogenous/other religions	1	0.26	(0.05 - 1.44)

Continued

Ethnic groups			
Fon and related ethnic groups	91	23.33	(19.41 - 27.78)
Dendi and related ethnic groups	73	18.72	(15.16 - 22.89)
Bariba and related ethnic groups	117	30.00	(25.66 - 34.73)
Yoruba and related ethnic groups	54	13.85	(10.77 - 17.63)
Fulani	6	1.54	(0.71 - 3.32)
Otamari/Berba and related ethnic groups	19	4.87	(3.14 - 7.48)
Lokpa and related ethnic groups	14	3.59	(2.15 - 5.93)
Other	16	4.10	(2.54 - 6.56)

3.2. Associated Factors

Factors statistically associated with good level of knowledge of measles were age ($p = 0.0006$), profession ($p = 0.022$), monthly income ($p = 0.02$), possession of information on epidemic-prone diseases ($p < 0.001$), history of eruptive diseases in the offspring ($p < 0.001$) and access to social networks ($p = 0.012$). Mothers in the age group 38 and 48 years were more likely to have good knowledge of measles compared to those under 28 years ($p < 0.001$). In terms of profession, officials/employees were more likely to have a good level of knowledge of measles ($p = 0.022$) (Table 5).

Table 5. Relationship between sociodemographic, socioeconomic, organizational factors and level of knowledge of mothers about measles in the municipality of Parakou in 2024.

	Good level of knowledge					
	Total	N	%	PR	95% CI	p
Age (years)						0.0006
< 28	124	55	44.35	1		
28 - 38	191	116	60.73	1.36	(1.09 - 1.71)	
38 - 48	66	49	74.24	1.67	(1.31 - 2.13)	
≥48	9	5	55.55	1.25	(0.67 - 2.32)	
Number of children						0.66
<3	172	95	55.23	1		
≥3	218	130	59.63	1.08	(0.90 - 1.28)	
Marital status						0.58
Single	39	19	48.71	1		
Cohabitation	18	12	66.66	1.36	(0.86 - 2.16)	
Married	326	190	58.28	1.19	(0.85 - 1.67)	
Widowed/Divorced	4	7	57.14	1.17	(0.57 - 2.40)	

Continued

Place of residence						0.13
Rural area	121	63	52.06	1	-	
Urban area	269	162	60.22	1.15	(0.95 - 1.40)	
Profession						0.022
Housewife	59	34	57.62	1		
Artisan	72	42	58.33	1.01	(0.75 - 1.35)	
Trader/Reseller	207	110	53.14	0.92	(0.71 - 1.18)	
Official/Employee	27	24	88.88	1.54	(1.20 - 2.00)	
Pupils/Student/apprentice	18	10	55.55	0.96	(0.60 - 1.53)	
Other	7	5	71.42	1.23	(0.73 - 2.07)	
Monthly income (FCFA)						0.02
<52,000	305	165	54.09	1		
52,000 – 100,000	76	53	69.73	1.28	(1.07 - 1.54)	
≥100,000	9	7	77.77	1.43	(1.00 - 2.06)	
Level of education						0.13
None	71	34	47.88	1		
Primary	115	66	57.39	1.20	(0.90 - 1.60)	
Secondary	155	91	58.70	1.22	(0.93 - 1.61)	
Higher	49	34	69.38	1.44	(1.06 - 1.96)	
Use of prenatal and postnatal care services						0.064
No	29	12	41.37	1		
Yes	361	213	59.00	1.42	(0.91 - 2.2)	
Possession of information on epidemic-prone diseases						<0.0001
No	144	57	39.58	1		
Yes	246	168	58.29	1.72	(1.38 - 2.14)	
History of eruptive diseases in the offspring						<0.0001
No	217	107	49.30	1		
Yes	173	118	68.20	1.38	(1.16 - 1.63)	
Access to social networks						0.012
No	170	86	50.58	1		
Yes	220	139	63.18	1.24	(1.04 - 1.50)	

4. Discussion

Given the prospective nature of the study and the due diligence performed, no mother meeting the inclusion criteria and included was excluded, reducing the risk of selection bias. However, as with any interview-based study, especially in our cultural context where there is a risk of pleasing the interviewers by giving convenient answers, information biases are potential.

The bivariate analysis used in this study is susceptible to confounding bias, which could be addressed in future analyses using multivariate logistic regression. Therefore, the associated factors identified should be interpreted with caution.

4.1. Knowledge of Measles

Of the 390 mothers surveyed, 57.69% had a good level of knowledge. This proportion is relatively low. This may be explained by the relatively low educational attainment among mothers and limited health literacy. Improving maternal knowledge should involve increasing girls' school enrollment and disseminating health information through multiple channels, particularly via mobile phone networks.

The proportion of good knowledge found in our study (57.69%) is higher than the 53.6% reported by Kitombole *et al.* (2020) in Lubumbashi [10], lower than the 64% reported by Ndaki *et al.* (2024) in Tanzania [11], and comparable to rates reported by Odebiyi *et al.* [12] and Uchendu *et al.* (57.60%) in Nigeria [13]. This comparability with Uchendu *et al.* may be explained by similarities in sociodemographic, socioeconomic, and sociocultural characteristics between the study populations. Regarding awareness of the measles vaccine, 75.13% of mothers responded affirmatively. Ismayl *et al.* reported a proportion of 93.8% in the United Arab Emirates [14], indicating lower awareness in our study population. As the measles vaccine is the safest means of preventing measles, this lower level of knowledge may expose children to non-vaccination and consequent illness or death.

4.2. Factors Associated with the Level of Knowledge about Measles

In this study, age, profession, monthly income, possession of information on epidemic-prone diseases, history of eruptive diseases in offspring, and access to social networks were associated with good knowledge of measles. Not all of these factors have been reported as associated with measles knowledge in other studies. Age was the only factor common to our study and that of Uchendu *et al.* [13], who reported that age, education level, ethnicity, and marital status were statistically associated with measles knowledge. Regarding internet use and access to social networks, our results are similar to those of Ashkenazi *et al.* [15]. However, our findings differ from those of Ismayl *et al.*, who found that number of children, marital status, and education level were associated with measles knowledge. This divergence in factors associated with knowledge of measles could be explained by the variation in study settings, the lack of standardization of questions from one study to another and the variation in analyses.

Moreover, some factors may mediate the effects of others; therefore, multivariate analysis is warranted to better disentangle these relationships.

5. Conclusion

In this study, fewer than six in ten mothers of under-five children had a good level

of knowledge about measles. Age, profession, monthly income, possession of information on epidemic-prone diseases, history of eruptive diseases in offspring, and access to social networks were associated with knowledge level. The low maternal knowledge observed may contribute to recent measles outbreaks. These associated factors should be further investigated using more in-depth multivariate analyses.

Conflicts of Interest

The authors declare no conflicts of interest relevant to this study.

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