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Surveillance of Acute Flaccid Paralysis: Influence of Healthcare Professionals' Attitudes on Case Detection in the Centre-South Region of Burkina Faso in 2022

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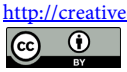

Abstract

Background: Acute flaccid paralysis (AFP) surveillance is a key component in polio eradication. In Burkina Faso, particularly in the Centre-Sud region, cases reporting deficiencies were observed in 2021, raising questions about healthcare workers' attitudes. This study aims to analyze the impact of these attitudes on the effectiveness of AFP surveillance. **Methods:** A descriptive and analytical cross-sectional study was conducted from January 2 to 24, 2022, among 268 randomly selected healthcare professionals in public health facilities in the region. Data was collected using a structured questionnaire and statistically analyzed, employing logistic regression to identify factors influencing case reporting. **Results:** The study's findings indicate that 62.3% of the 268 participants were female, and 45.1% were nurses. Only 30.7% had identified an AFP case in the past three years, and 47.8% had received training specifically in AFP surveillance. Multivariate analysis revealed that having received training (OR = 2.303, p = 0.005), demonstrating high interest in surveillance, and being male (OR = 1.897, p = 0.028) significantly increased the likelihood of case reporting. **Conclusion:** This study highlights the positive effect of targeted AFP surveillance training and strong professional engagement on the detection and notification of AFP cases, while revealing lower reporting rates among female healthcare workers. Findings underscore the need for gender-sensitive and context-specific strategies to strengthen AFP surveillance, including policy actions to enhance capacity building and motivation among frontline staff.

Keywords

Attitudes, Healthcare Professionals, Surveillance, Reporting, Detection, Acute Flaccid Paralysis, Poliomyelitis, Burkina Faso

1. Introduction

Poliomyelitis is a debilitating and potentially fatal viral disease, primarily caused by poliovirus. Thanks to the Global Polio Eradication Initiative (GPEI) launched in 1988, significant progress has been made, but surveillance remains a crucial component in detecting and containing the disease's transmission. Acute Flaccid Paralysis (AFP) surveillance is the primary strategy adopted to identify any suspected polio cases and guide response measures. Several studies and reports confirm this approach. A study in Ivory Coast highlighted that the detection of poliovirus and the monitoring of its circulation is conducted through AFP surveillance, thus contributing to polio eradication [1].

Although Burkina Faso achieved certification for the eradication of wild poliovirus in 2015, cases of circulating vaccine-derived poliovirus (cVDPV) were reported in 2020, raising concerns about the effectiveness of its surveillance system. In the Centre-Sud region, reports have revealed shortcomings in AFP case reporting, suggesting that healthcare professionals' attitudes may be a contributing factor. Early detection and prompt case notification remain essential to prevent a resurgence of the disease [2].

AFP case detection and reporting are key elements of polio epidemiological surveillance. However, several studies have shown that many countries, particularly in sub-Saharan Africa, face challenges in this area [3]. In Burkina Faso, the issue of AFP case detection and reporting may be linked to healthcare workers' attitudes. Despite the existence of standard national guidelines, little is known about how healthcare workers' engagement, perceptions, and motivation influence adherence to these protocols and ultimately influence surveillance outcomes. This gap in understanding represents a barrier to strengthening the overall surveillance system.

Research conducted in Nigeria and Ethiopia has highlighted similar gaps, showing that training and involvement of healthcare workers are key factors in the effectiveness of AFP surveillance [2] [4]. However, few studies have thoroughly examined these aspects in Burkina Faso, where limited data exist on the behavioral and institutional factors influencing AFP surveillance. Understanding healthcare workers' attitudes is crucial because these frontline actors are the primary point of contact for the detection and reporting of suspected cases. Their level of engagement directly affects the timeliness and completeness of the surveillance system.

The originality of this study lies in its analytical approach, which aims not only to describe healthcare professionals' attitudes toward AFP surveillance but also to identify key factors influencing case detection. Specifically, the study uses multivariate logistic regression to examine the relationships between sociodemographic

variables, attitude dimensions (interest, motivation, involvement, and satisfaction), and AFP case reporting. This comprehensive analytical framework allows a deeper understanding of surveillance behavior drivers.

This study aims to assess healthcare workers' awareness levels regarding AFP surveillance, evaluate their degree of involvement, and identify major challenges in implementing national surveillance guidelines.

The findings will help guide interventions and formulate recommendations to enhance AFP case detection and reporting mechanisms, ensuring an appropriate response to potential poliovirus outbreaks.

2. Materials and Methods

2.1. Study Design and Setting

This descriptive, cross-sectional, and analytical study was conducted in public health facilities (HFs) in the Central-South region of Burkina Faso. Its primary objective was to assess healthcare workers' attitudes toward AFP surveillance and identify factors influencing case reporting. Data collection took place from January 2 to 24, 2022.

2.2. Study Population and Inclusion Criteria

The study focused on healthcare personnel working in these facilities, including doctors, health officers, nurses, midwives, birth attendants, and itinerant health agents. To be included, professionals had to work in a public facility, be present at the time of the survey, and provide informed consent.

2.3. Sampling Method

Healthcare workers were selected from public health facilities using proportional stratified random sampling. First, 78 out of 155 operational HFs were selected. Each stratum corresponded to a health district, with the number of facilities drawn proportional to the size of its healthcare workforce.

A total of 278 agents were randomly selected from approximately 580 eligible personnel, giving each a 48% probability of inclusion (278/580). Each worker was assigned a unique number prior to random selection. This method ensured representativeness, minimized bias, and improved generalizability of findings.

2.4. Study Sites

The selected sites included Health and Social Promotion Centers (HSPC), where the surveys covered dispensary and maternity services, as well as Medical Centers with surgical units, specifically pediatrics and general medicine departments. These facilities were chosen due to the high likelihood of encountering AFP cases.

2.5. Data Collection

Data was collected using a structured questionnaire administered via KoBoCollect

on Android phones. The instrument had two sections:

- Socio-professional characteristics of the respondents
- Attitudes toward AFP surveillance

The second section included items rated on a five-point Likert scale (five levels: Strongly agree, Agree, Neutral, Disagree, strongly disagree), adapted from previously validated tools. It was informed by a literature review and pretested with 15 professionals to ensure clarity and coherence.

2.6. Measurement of Attitudes

The questionnaire measured four key attitude dimensions:

Interest in surveillance, measuring the level of attention, importance, and perceived relevance of AFP activities.

- Survey item statement: "I consider AFP surveillance to be an important part of my daily responsibilities."

Involvement, reflecting the perceived integration into surveillance workflows and participation in related activities.

- Survey item statement: "I regularly participate in surveillance meetings or reporting tasks."

Motivation, capturing perceptions of institutional recognition and reward systems.

- Survey item statement: "I feel encouraged to report AFP cases due to available incentives or recognition."

Satisfaction, assessing opinions about the organization and resources available for surveillance.

- Survey item statement: "Surveillance activities are well-organized in my health facility."

The reliability of the questionnaire was assessed using Cronbach's alpha, which yielded acceptable internal consistency for each subscale (α ranging from 0.71 to 0.80). Content validity was ensured through expert review by three epidemiologists familiar with AFP surveillance in Burkina Faso.

2.7. Ethical Considerations

The entire study was conducted in compliance with ethical standards, with authorization obtained from the health research ethics committee (certificate No. 2022-12-264 dated 12/23/2022).

2.8. Data Analysis

Data analysis was performed using STATA software. The descriptive analysis consisted of calculating the frequencies of respondents based on their sociodemographic and professional characteristics, as well as attitudinal dimensions. Regarding the association analysis, the dependent variable was whether the healthcare worker had reported at least one AFP case during the past three years (binary outcome: Yes/No). Independent variables included socio-professional characteristics (e.g.,

gender, education, qualification) and the four attitude dimensions.

Given the binary nature of the outcome variable (case reported vs. not reported), logistic regression was chosen as the most appropriate method for identifying associations and estimating the probability of case reporting as a function of the predictor variables.

An initial univariate logistic regression helped select candidate variables ($p < 0.20$), which were then entered into a multivariate model.

However, the variable "qualification" was forcibly included in the analytical model despite not reaching the 20% significance threshold due to its strong theoretical and contextual relevance in the surveillance of Acute Flaccid Paralysis (AFP). Indeed, qualification reflects the level of initial training of healthcare personnel, which directly influences their technical competencies, ability to identify clinical signs suggestive of AFP, to correctly apply the case definition, and to initiate the notification process within the timeframes required by surveillance standards [5].

Previous studies have established a strong link between qualification level and performance in epidemiological surveillance, particularly for diseases with epidemic potential or requiring high clinical vigilance, such as poliomyelitis [6] [7]. In the context of Burkina Faso, where human resources in health are heterogeneous in terms of training, professional qualification constitutes a key structural determinant that may condition the effectiveness of the notification system.

Therefore, regardless of its statistical significance, this variable was retained in the model as a potential confounder and adjustment variable, to allow for a better interpretation of the relationships between other factors studied and the notification of AFP cases.

2.9. Modelling Approach

A multivariate logistic regression analysis was conducted using a "stepwise backward" elimination approach to identify factors associated with AFP case reporting.

3. Results

Out of a sample of 278 personnel to be surveyed, 268 participated, representing a response rate of 96%. The results of this study are divided into two sections. The first, descriptive in nature, presents the characteristics (**Table 1**) and attitudes (**Table 2**) of the participants. The second section is dedicated to analyzing the factors associated with the reporting of AFP cases (**Table 3** and **Table 4**).

3.1. Descriptive Study

Socio-professional status of the respondents

Table 1 shows that the sample was predominantly composed of women (62.3%) and nurses (45.1%). More than half of the participants had a secondary education level (59.3%). Regarding job roles, 35.8% did not have a specific responsibility. Finally, 47.8% of respondents had received training on AFP surveillance at the time of the survey.

Table 1. Distribution of Respondents by Socio-Demographic and Professional Characteristics (n = 268).

Variables	Number	Percentage (%)
Sex		
Female	167	62.3
Male	101	37.7
Qualification		
Auxiliary midwife	30	11.2
Itinerant health worker	62	23.1
Health officer	3	1.1
Nurse	121	45.1
Doctor	10	3.7
Midwife	42	15.7
Level of Education		
College	26	9.7
Secondary	159	59.3
University	83	31.0
Position		
Head nurse	61	22.8
Dispensary manager	12	4.5
Nutritional Surveillance Manager	43	16.0
EPI Manager	49	18.3
Care Unit Manager	7	2.6
No Specific Position	96	35.8
Training Received in AFP Surveillance		
None	140	52.2
Yes	128	47.8

Attitudes of Healthcare Professionals on AFP Surveillance

The results of Table 2 show that the majority of healthcare professionals are highly supportive of AFP surveillance. More than 60% of respondents strongly agree with the assessed dimensions, and approximately 25% - 30% agree. Very few people express neutral or negative opinions, indicating an overall positive attitude.

Table 2. Distribution of healthcare personnel attitudes according to the Likert scale (n = 268).

Likert scale	Interest	Motivation	involvement	Satisfaction
Strongly agree	74%	67%	69%	61%
Agree	25%	29%	28%	26%

Continued

Neutral	2%	2%	2%	7%
Disagree	0%	2%	1%	4%
Strongly disagree	0%	0%	0%	1%

3.2. Analytical Study

Initial selection of variables for cross-tabulation

In Table 3, the variables significantly associated with AFP case notification at the 20% threshold were as follows: among the control variables—Gender of Respondents, level of education, position, and training on AFP surveillance; and among the attitudinal variables—interest, motivation, involvement, and satisfaction. The variables workplace, health district, and professional qualification did not show a significant association at this threshold. Only variables with a significant association at the 20% level were retained for inclusion in the multivariate analysis. However, as stated in the methodology, the variable professional qualification was included in the adjusted model due to its potential influence on case reporting.

Table 3. Univariate logistic regression analysis.

Case reporting	Crude OR (IC95%)	P-value
Gender of Respondents	2.59 (1.50; 4.44)	0.001*
Level of Education	1.45 (0.93; 2.27)	0.099*
Position	0.88 (0.775; 1.01)	0.084*
Workplace	0.92 (0.67; 1.25)	0.598
Health district	0.91 (0.72; 1.16)	0.469
Training in AFP surveillance	3 (1.72; 5.21)	0.000*
Interest	0.35 (0.18; 0.70)	0.003*
Motivation	0.63 (0.39; 1.03)	0.071*
Involvement	0.42 (0.23; 0.75)	0.004*
Satisfaction	0.63 (0.43; 0.93)	0.020*
Professional qualification	0.93 (0.79; 1.09)	0.377

Note: variables marked with an asterisk (*) are considered statistically significant at the 20% threshold ($P < 0.20$).

Final model

In Table 4, the multivariate analysis revealed statistically significant associations between AFP case notification and selected variables. Health workers who had received training on AFP surveillance were more likely to report AFP cases (aOR = 2.303; 95% CI: 1.288 - 4.115; p = 0.005). Male respondents were also more likely to report cases compared to females (aOR = 1.897; 95% CI: 1.072 - 3.358; p = 0.028). Regarding interest in AFP surveillance, those who agreed (rather than

strongly agreed) showed a lower likelihood of notification (aOR = 0.398; 95% CI: 0.181 - 0.876; p = 0.022). No other variable showed a statistically significant association with AFP case notification after adjustment.

Table 4. Final model of logistic regression according to stepwise backward selection approach.

AFP case detecting	Adjusted OR (IC 95%)	P-value
Training Received on AFP Surveillance		
No	1	-
yes	2.303 (1.28 - 4.11)	0.005
Interest in AFP Surveillance		
Strongly agree	1	-
Agree	0.39 (0.18 - 0.87)	0.022
Neutral	0.74 (0.07 - 7.03)	0.795
Gender of Respondents		
Female	1	-
Male	1.89 (1.07 - 3.35)	0.028

4. Discussion

4.1. Descriptive Analysis

The results of this study show that the majority of participants are women (62.3%) and nurses (45.1%), with a predominance of professionals with a secondary education level (59.3%) and training in PFA surveillance for approximately 47.8% of respondents. This demographic profile reflects a reality often observed in many similar studies, where women dominate in the healthcare sector, particularly in nursing positions, which are often considered less prestigious than medical roles [8].

The absence of specific responsibilities in 35.8% of participants could suggest a lack of structure in health teams, which may affect the effectiveness of surveillance and case reporting. This observation aligns with a study that highlights organizational challenges in fragile health systems, where poorly defined or poorly assigned roles can hinder effective epidemiological data management [9]. However, these results contrast with another study where better structuring of health teams and clearly defined responsibilities were associated with improved reporting of vaccine-preventable diseases [10].

Healthcare professionals' attitudes toward PFA surveillance are generally very positive, with more than 60% of respondents expressing strong support. This result aligns with the conclusions of other studies on the importance of healthcare professionals' engagement in disease surveillance strategies [11]. However, this enthusiasm contrasts with the relatively low level of actual case reporting, suggesting that positive attitudes alone are insufficient to ensure effective surveillance. This highlights a disconnect between attitudes and practice, pointing to possible insti-

tutional, motivational, or contextual constraints.

4.2. Association Analysis

The analysis of factors associated with PFA case reporting identified several significant predictors: training received, interest in surveillance, and gender.

The significant impact of training (aOR = 2.303, p = 0.005) confirms findings from other contexts [10] [12], and supports the hypothesis that regular, targeted training improves detection and notification practices. This reinforces the argument that ongoing capacity-building is essential to sustain the quality of surveillance, particularly in resource-constrained health systems where staff turnover is frequent.

The study also shows that healthcare workers who "agree" (rather than "strongly agree") on the importance of AFP surveillance were significantly less likely to report cases (aOR = 0.398, p = 0.022). This gradient effect suggests that only a high level of conviction and prioritization of surveillance activities translates into concrete action. Moderate interest may reflect competing priorities, lack of institutional incentives, or limited resources. These findings align with studies showing that frontline staff are more reactive when surveillance tasks are clearly supported and rewarded by their institutions [13] [14].

Regarding gender, male healthcare workers were nearly twice as likely to report AFP cases as females (aOR = 1.897, p = 0.028). This gender gap could be linked to multiple factors: men may be more often assigned to leadership or technical roles that involve surveillance tasks; they may have more access to training opportunities; or cultural norms might influence confidence and authority in clinical decision-making. In contrast, female staff may be overrepresented in subordinate or overburdened roles, which limits their ability to engage in reporting. This finding echoes research from Ghana and other low-income settings showing structural and sociocultural gender disparities in the health workforce [15].

However, even after forcing the variable "qualification" into the multivariate logistic regression model, it did not reach statistical significance. This suggests that, in this context, the formal qualification of healthcare workers may not be the primary determinant of AFP case reporting. One possible explanation is that AFP case detecting may be more strongly influenced by individual attitudes, local management dynamics, or practical training experiences rather than by academic credentials alone. This finding is consistent with results from other studies. For instance, similar patterns were reported in Kenya [16], Mozambique [17], and across multiple settings in sub-Saharan Africa [6], where formal qualification was not significantly associated with performance in surveillance activities. Instead, factors such as experience in the field, motivation, regular supervision, and continued training were found to have greater influence.

Crucially, these results address the gap identified in the introduction regarding the limited evidence on how healthcare workers' attitudes influence AFP case reporting in Burkina Faso. They provide empirical support for the idea that beyond

knowledge, engagement, motivation, and professional empowerment are critical levers for improving surveillance performance.

4.3. Implications for AFP Surveillance in Burkina Faso

The findings have important implications for strengthening AFP surveillance in Burkina Faso:

- Training programs should not only disseminate technical knowledge but also build confidence and motivation, especially among female health workers and those with lower involvement.
- Supervision and task allocation practices must ensure equitable distribution of surveillance responsibilities, supported by tailored mentoring and recognition systems.
- Facility-level leadership must foster a culture of vigilance where surveillance is embedded into daily routines and valued by institutional actors.

Ultimately, enhancing the responsiveness of AFP surveillance systems requires a multidimensional approach: technical capacity-building, behavioral reinforcement, and structural reform. These strategies must be grounded in the realities of frontline workers to be effective and sustainable.

4.4. Limitation of the Study

Like any human endeavor, this study has its limits, which may be related to the small sample size. A larger sample would have contributed to making the significance of the probabilities more expressive. 35.8% of respondents who did not have a specific role could have likely influenced our results. Additionally, the measurement of attitudes using a Likert scale might be subject to social desirability biases. Respondents may have overreported positive attitudes toward surveillance due to perceived expectations from supervisors or researchers, which could artificially inflate the level of reported engagement. While anonymity was assured, the presence of data collectors affiliated with the health system might have reinforced this effect.

Cross-sectional design also limits the ability to infer causality. While associations were observed between attitudes, training, and case reporting, the direction of these relationships cannot be firmly established. It is possible that individuals who reported cases were more likely to retrospectively express stronger attitudes, rather than the reverse.

Furthermore, certain contextual or institutional variables were not captured in the survey, such as workload, staffing levels, management support, or community pressures, which might moderate the relationship between attitudes and surveillance behavior. Their omission could have resulted in residual confounding.

Finally, the study was limited to public healthcare facilities in one region of Burkina Faso, which may restrict the generalizability of the findings. Private sector actors and community-based workers, who also play a role in surveillance, were not included. Nevertheless, the relatively high response rate (96%) and diversity of pro-

fessional profiles enhance the internal validity and representativeness of the results within the studied region.

5. Conclusion

The results of this study emphasize the positive impact of continuous training and strong engagement from healthcare professionals on the detection and reporting of AFP cases, while also highlighting gender disparities that warrant further exploration. Comparing these findings with other studies, it becomes clear that improving surveillance practices requires enhanced training and greater mobilization of healthcare professionals. These observations suggest the need to rethink continuous training and incentive strategies to strengthen the responsiveness of health systems, while taking into account the contextual specificities that may influence these behaviors.

Several areas for improvement in surveillance systems emerge from the results of this study:

- **Strengthening Training**: Continuous training is a key to improving case notification. It is recommended that regular training sessions be organized and tailored to the realities of the field to better equip professionals to detect and report cases. National surveillance programs should prioritize refresher courses, especially for new staff or those in peripheral areas.
- **Mobilizing Professional Engagement**: Promoting a culture of vigilance and individual responsibility is essential. Targeted awareness campaigns and incentive strategies could help transform moderate interest into full engagement from healthcare professionals in disease surveillance. Institutional recognition systems, such as non-financial awards or professional development opportunities, may help sustain motivation.
- **Studying Gender Disparities**: The observed differences between men and women in case notification deserve special attention. Further research is needed to identify the specific barriers faced by female healthcare professionals and develop tailored solutions to address these challenges. Policymakers should integrate gender-sensitive approaches into training and task allocation to ensure equity in surveillance responsibilities.

In conclusion, this study underscores the need for evidence-based reforms in AFP surveillance policy and practice. Targeted investments in training, professional engagement, and equity promotion are essential to enhance case detection and prevent future outbreaks. Strengthening these human-centered components of the system will be critical to the long-term success of polio eradication efforts in Burkina Faso and similar contexts.

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Authors' Contributions

E. S. was the principal investigator. He led the overall coordination of the study, contributed to data analysis, and interpretation, and was responsible for the initial drafting and final revision of the manuscript. **H. K.** Served as the research supervisor and was the main contributor to the study design, methodological approach, data analysis, and critical revision of the manuscript. **W. F. I.** participated in data collection, contributed to the interpretation of results, and assisted with manuscript drafting. **B. D.** Contributed to the validation of data collection tools and supported the statistical analysis and interpretation of results.

All authors reviewed and approved the final version of the manuscript.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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