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Perception of Health Workers on Reporting of Adverse Events Following Immunization in Jigawa State, Nigeria, 2022

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Abstract

An adverse event following immunization (AEFI) is any untoward medical occurrence which follows immunization, and which does not necessarily have a causal relationship with the usage of the vaccine. Reporting of AEFI is suboptimal amongst healthcare workers (HCWs). This study aimed to determine health workers' perception on AEFI reporting. A descriptive cross-sectional study was conducted among health workers in selected health facilities in Jigawa State. We used an Open data kit (ODK) based self-administered questionnaire to collect data on socio demographic characteristics, knowledge, and perception of respondents on AEFI. Data was analyzed using Statistical Package for Social Sciences (SPSS), for frequencies, associations and factors affecting HCWs perception of AEFI reporting at 5% significance (p-value<0.05) and 95% confidence interval. Perception was graded as: poor<50%, fair 50–70% and good ≥70%. Of the 400 respondents, 227(56.8%) had good perception. Building public trust in immunization (94.8%), to enable proper diagnosis and management (94.0%), elicit training needs (94.0%) and reduce consequences of AEFI on health workers (86.0%) were the main reasons for reporting AEFI. The barriers to reporting AEFI were time constraints (51.6%), poor feedback (48.8%) and fear of consequences (41.0%). AEFI knowledge (AOR 2.312, p=0.018) and receipt of feedback on reported AEFIs (AOR 0.45, p=0.026) were independent predictors of good perception of AEFI. Only 57% of health workers had a good perception of AEFI. To improve reporting of AEFI, there is need to train heath workers and strengthen feedback mechanism of AEFI surveillance system.

Keywords: *Adverse events following immunization, Health providers, Perception, Surveillance.*

Introduction

The Expanded Programme on Immunization was introduced in 1974 by the World Health Organization (WHO), and since then global efforts have been put in place to expand the reach and benefits of vaccines across all countries and population groups [1]. Immunization has been proven to be an effective public health interventions that has saved millions of lives by protecting individuals and the public from vaccine-preventable diseases (VPDs) [2, 3].

To ensure that immunization remains among the safest of modern medical interventions and each new vaccine goes through rigorous testing processes before being licensed for use and routinely monitored for side effects [4]. Advances in technology have continued to make vaccines safer and easier to administer with some providing protection from five diseases in a single injection to reduce the number of injections, improve the ease and safety of immunization and minimize the risk of multiple

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side effects [4]. Like other medicinal products, vaccines are not free from adverse reactions, and they are monitored through adverse events following immunizations (AEFI) surveillance [2]. No vaccine [5]. An Adverse event following immunization (AEFI) is defined as "any untoward medical occurrence which follows immunization, and which does not necessarily have a causal relationship with the usage of the vaccine" [2, 6, 7].

AEFIs are categorized as Vaccine product-related reactions, vaccine quality defect-related reactions, Immunization error-related reactions, Immunization anxiety-related reactions, and Coincidental events [8]. An AEFI could also be serious or non-serious. Non-serious AEFIs are those events that result in death, are life-threatening, require in-patient hospitalization or result in permanent or significant disability [8]. Adverse events following immunization reporting is a key component of a functional vaccine safety monitoring system [8].

The WHO instituted the Global Vaccine Safety Initiative [9] to address the issue of underreporting of AEFIs with a set of indicators to monitor case reporting [9, 10]. The AEFI reporting ratio is defined in the Global Vaccine Action Plan (GVAP) [11] as "the number of AEFI reports per 100,000 surviving infants" [10] The GVAP set the AEFI case reporting target of at least 10 AEFI per 100,000 surviving infants per year to monitor the performance of AEFI surveillance systems. Vaccine hesitancy attributed to vaccine safety has continued to be a public health problem affecting immunization globally despite having over 80% of children vaccinated [12].

To build trust and regain confidence among the populace, surveillance of AEFIs immunization safety is crucial to ensure that necessary actions are instituted to minimize the risks of AEFIs. The unprecedented surge in introductions of new vaccines into immunization programmes, in the African Region, has not revealed the expected corresponding increase in reported AEFIs in the region [13]. In Nigeria like most African countries, AEFIs are underreported both by parents and healthcare workers and range from 19.3% -57% [14]. AEFI reporting in Nigeria relies strictly on passive surveillance which consists of routine reporting by health care providers to the local government authorities (Districts) using AEFI reporting forms and active during campaigns [15]. The passive nature of AEFI surveillance has limitations like underreporting, lack of completeness of reports, non-reporting, and potential reporting bias due to poor perception on AEFI reporting [16]. Reporting of AEFI is still a major challenges and there is paucity of information on the perception of HCWs towards AEFI in the state like studies that have documented the knowledge, perception, attitudes, and practices of health care workers toward AEFI reporting in other Nigerian states [17, 18].

Understanding the perception and factors affecting HCW's perception on AEFI reporting will provide the opportunity to develop targeted strategies to strengthen the surveillance system. With the introduction of new vaccines in the system, it is pertinent that barriers to AEFI reporting among health care workers are addressed appropriately.

The study was conducted to determine the perception of AEFI reporting amongst health workers in selected health facilities in Jigawa state, Northern Nigeria and specifically to determine the facilitators and barriers of AEFI reporting among healthcare providers, HCW perception on AEFI surveillance and factors affecting perception of AEFI surveillance among HCWs.

Materials and Methods

Study Area/Population

Selected health facilities providing RI in Jigawa state, Northern Nigeria were enrolled for this study. The state has 27 LGAs with 712 health facilities providing/offering routine immunization (RI) across 287 wards of which 178 wards participated in the study. Healthcare

workers providing immunization and other health related services in public primary and secondary healthcare facilities who might likely come across AEFI cases in the course of their daily work in the selected HFs were interviewed using a self-administered questionnaire. Only health workers from public HFs who have worked for the past six consecutive months either as casual, volunteer, or fulltime staff and willing to participate were included in the study.

Study Design

We conducted a descriptive cross-sectional quantitative study amongst 400 randomly selected health workers spread across health facilities in the state.

Sampling Technique

A two-stage probability sampling methodology was adopted in which public health facilities offering RI were selected across the LGAs using simple random sampling by balloting and respondents selected from identified health facilities.

Data Collection

A self-administered structured field-tested questionnaire was deployed electronically on an open data kit (ODK to identified facilities via a web link and data collected on:

1. Socio-Demographic information.
2. Knowledge of health workers on adverse events after immunization.
3. Perception of health workers on AEFI: facilitators and barriers affecting AEFI reporting.
4. Training received.

Data Analysis

Data was collected for a period of two months, cleaned and coded and analyzed using Statistical Package for Social Sciences, IBM® SPSS version 21 (SPSS Inc., USA). Statistical significance was set at p-value ≤ 0.05 at 95% confidence interval.

Grading: The perception of respondents towards AEFI reporting had 26 questions in 2 broad categories: barriers to AEFI reporting had 15 items and facilitators of AEFI reporting had 11 items. These were rated using a Likert scale and a score of 1 to 3 assigned to "Agree", 2 to "Indifferent" and 3 to "Disagree" for barriers and reverse for the 11 facilitator items of AEFI reporting; 1 assigned to "Disagree", 2 to "Indifferent" and 3 to "Agree" Overall, we had a maximum obtainable score of 78 and the minimum obtainable score of 26. Perception was further categorized based on total score as <50% - Poor, 50–70% - Fair and ≥70% - Good. Univariate analysis was conducted for frequencies, proportions summarized using frequency tables, and charts. Bivariate analysis was conducted using the Chi-Square test and Fisher's exact test where indicated, to compare the outcomes of interest (good perception) with the sociodemographic characteristics of respondents and to determine associations. Variables found to be significant in the Chi-square test (p-value <0.05) were subjected to a binomial logistic model to determine their relationship with good perception using adjusted odds ratio (AOR) at 95% confidence interval and statistical level of significance (α) set at $p<0.05$.

Ethical Considerations

Ethical clearance was obtained from the State Ministry of Health and permission sought from the Jigawa State Primary Health Care Board for onward transmission to the selected LGA to the Heads of Departments of Health The participation of the health care workers providing RI and other services was made voluntary and only HCWs who consents to be part of the study administered the questionnaire. Information about the participants was kept confidential and their names were not indicated to ensure the anonymity of participants. Feedback on the findings will be shared with all stakeholders at the national, state, LGA and health facilities. There was no potential risk attached to the study or participating in the study as findings will be used by authorities to develop plans to improve the immunization system.

Limitations

The research was not without limitations. Though the respondents were kept anonymous, respondents had challenges around divulging sensitive information, and this led to some questions not being appropriately responded to. Health workers in private health facilities were excluded from this research and hence the findings might not be representative of the entire state. To address limitations associated with the research work such as fear of divulging sensitive information and incomplete entry, an electronic questionnaire administration was used to ensure the privacy and confidentiality of respondents and facility name was not captured.

Results

Sociodemographic Characteristics of Respondents

Overall, 400 questionnaires were administered to health workers spread across all LGAs in the state. The sociodemographic characteristics of respondents included age, sex, designation, years of experience as health workers, years of experience on immunization, role in immunization and employment status. The median age of the respondents was 37 (20–66) years, while the mean age (±SD) was 37.4 (±8.4) years old.

Table 1. Sociodemographic Characteristics of Respondents in Jigawa State, 2022

Characteristic		Frequency (N)	Percentage (%)
Age Group	20-29	77	19.3
	30-39	159	39.8
	40-49	129	32.3
	≥50	35	8.8
Sex	Male	352	88
	Female	48	12
Designation	CHEW	263	65.8
	Environmental Health	39	9.8
	CHO	35	8.8
	JCHEW	22	5.5
	Nurse	4	1.0
	Midwife	3	0.8
	Doctor	2	0.5
	Other	32	8.0
Years of experience as a health worker	<1yr	9	2.2
	1-6yrs	105	26.2
	>6yrs	286	71.5
Role in immunization	Vaccinator	188	47
	Recorder	57	14.2
	Health Educator	61	15.2
	Community Mobilizer	41	10.2
	OIC	141	35.2
	Other	104	
Employment status	Full	328	82.0
	Casual	42	10.5
	Volunteer	30	7.5
Capacity Building	Trained on RI	394	98.5

	Trained on AEFI	382	95.5
Knowledge of AEFI	Good Knowledge	280	70.0

Most respondents were males 352 (88%), had over six years of experience as health workers 286 (71.5) and over 6 years of experience in immunization 271 (67.8).

Community health extension workers (CHEW) contributed the highest proportion of respondents 263 (65.8%) and 328 (82%) were full-time personnel, 98.5% of respondents trained on RI and AEFI and 280(70%) had knowledge of AEFI (Table 1).

Health Care Workers' Perception of AEFI

A total of 26 questions were used to assess the perception of health workers on AEFI surveillance. This looked at the perceived barriers to reporting (15 questions), and facilitators: what will make the respondent report an AEFI (11questions) with a total maximum score of 78 (3*26) and a minimum score of 26 (1*26 questions).

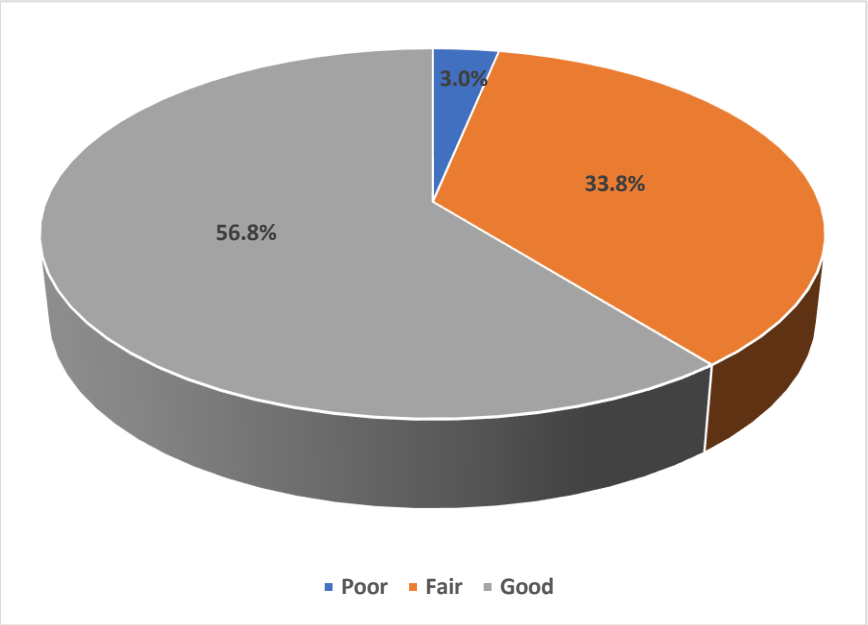

Figure 1. Health Workers' Perception of AEFI Reporting

Overall, 227(56.8%) health workers had a good perception of AEFI Reporting (Figure 1). The mean perception score (SD) was 63.07 (+ 0.43) and the median perception score (CI) was 63.00 (62.00, 64.00).

A test of statistical significance was conducted to determine the relationship between AEFI reporting perception rating and health workers' characteristics. Only those that had received training on RI (X2 6.58+ (p=0.013), routinely receives feedback from state/LGA on reported AEFIs (X2 4.07 (p=0.044) and knowledgeable (X2 6.03 (p=0.014) had a good perception about AEFI reporting (Table 2). The age group of respondents, gender, designation, years of experience as a health worker and on immunization and type of employment, were not significantly associated with the perception of health workers on AEFI reporting (p>0.05).

Table 2. Health Workers' Characteristics and Perception on AEFI Reporting in Jigawa State

Variables	AEFI reporting perception rating		Fisher Exact^{+} or X2 (p-value)
	Low N (%*)	High N (%*)	
N	**38 (9.5)**	**362 (90.5)**	
Age (years)			
20 – 29	8 (10.4)	69 (89.6)	0.11 (0.990)
30 – 39	15 (9.4)	144 (90.6)	
40 – 49	12 (9.3)	117 (90.7)	
50 & above	3 (8.6)	32 (91.4)	
Gender			
Male	31 (8.8)	321 (91.2)	1.46^{+} (0.195)
Female	7 (14.6)	41 (85.4)	
Designation			
CHW	30 (9.4)	290 (90.6)	0.80^{+} (0.862)
Nurse /Midwife	0 (0.0)	7 (100.0)	
Doctor	0 (0.0)	2 (100.0)	
Others	8 (11.3)	63 (88.7)	
Employment status			
Full time	27 (8.2)	301 (91.8)	4.78^{+} (0.075)
Volunteer	3 (10.0)	27 (90.0)	
Casual (part-time)	8 (19.0)	34 (81.0)	
Received RI training			
Yes	35 (8.9)	359 (91.1)	**6.58^{+} (0.013)**
No	3 (50.0)	3 (50.0)	
Received AEFI training			
Yes	35 (9.2)	347 (90.8)	0.95^{+} (0.239)
No	3 (16.7)	15 (83.3)	
Years of experience			
≤ 6 years	15 (13.2)	99 (86.8)	2.48 (0.115)
> 6 years	23 (8.0)	263 (92.0)	
Years of Immunization experience			
≤ 6 years	16 (12.4)	113 (87.6)	1.87 (0.172)
> 6 years	22 (8.1)	249 (91.9)	
Need AEFI training			
Yes	34 (9.9)	311 (90.1)	0.37 (0.544)
No	4 (7.3)	51 (92.7)	
Routinely send AEFI report			
Yes	31 (9.5)	297 (90.5)	0.01 (0.943)
No	7 (9.7)	65 (90.3)	
Routinely receive feedback from the state/LGA			
Yes	113 (86.3)	18 (13.7)	**4.07 (0.044)**
No	249 (92.6)	20 (7.4)	
Knowledge of AEFI			
High	20 (7.1)	260 (92.9)	**6.03 (0.014)**
Low	18 (15.0)	102 (85.0)	

A logistic regression was conducted to ascertain the effects of being trained on AEFI, Knowledge of AEFI and routine receipt of feedback from the state and LGA were independent factors affecting perception about AEFI. The logistic analysis was statistically significant, $\chi 2(7) = 10.77$, $p = 0.013$. The model showed 5.7% (Nagelkerke R2) of the variance in the level of AEFI reporting perception rating and correctly classified 90.5% of cases. Those with good knowledge of AEFI were 2.3 times more likely to have a high perception of AEFI reporting (AOR 2.312, p=0.018) and those who received feedback from the state and LGA on reported AEFI were less likely to have a perception on AEFI reporting (AOR 0.45, p=0.26) (Table 3).

Table 3. Binomial Logistic Regression on Factors Affecting the Perception of Health Workers on AEFI Reporting in Jigawa State

Variables in the Equation								
Variables	B	S.E.	Wald	df	Sig.	OR	95% C.I.for OR	
							Lower	Upper
Received AEFI training (Yes)	.593	.685	.751	1	.386	1.810	.473	6.930
AEFI Knowledge level (Yes)	.838	.355	5.576	1	.018	2.312	1.153	4.635
Receives AEFI feedback from the state (Yes)	-.786	.354	4.931	1	.026	.456	.228	.912
Constant	1.479	.647	5.226	1	.022	4.390		

a. Variable(s) entered on step 1: trainedaefi, knowcat_new, fdbckstate_1

When asked on what will make them report an AEFI, 373(93.3%) of respondents agreed that it was their responsibility based on the national guidelines, 379(94.8%) to build public trust around immunization programs, 379(94.0%) for proper diagnosis and prompt management, 361 (90.3%) to elicit training from health authorities, 354 (88.5%) to prevent AEFI occurrence in the future, 344 (86.0%) to decrease the consequences of AEFI on the health workers and because of the health condition of the child 341 (85.3%) (Table 4).

Table 4. Motivators of AEFI Reporting amongst Healthcare Workers in Jigawa State report an AEFI

What makes you report an AEFI	Agree	Indifferent/Not Sure	Disagree
Health condition of the child	**341 (85.3)**	8 (2.0)	51 (12.8)
If parents are concerned	309 (77.3)	13 (3.3)	78 (19.5)
If the community is concerned	298 (74.5)	19 (4.8)	83 (20.8)
All the cases we observe should be reported as a responsibility in line with national guidelines	**373 (93.3)**	6 (1.5)	21 (5.3)
When there are repeated cases of the event	305 (76.3)	20 (5.0)	75 (18.8)
When there are serious events	312 (78.0)	10 (2.5)	78 (19.5)
To decrease the consequences of AEFI	**344 (86.0)**	11 (2.8)	45 (11.3)
To prevent the occurrence of AEFI in the future	**354 (88.5)**	10 (2.5)	36 (9.0)
To build public trust in the immunization program	**379 (94.8)**	2 (0.5)	19 (4.8)
To elicit training from health authorities	**361 (90.3)**	9 (2.3)	30 (7.5)
For proper diagnosis and prompt management	**379 (94.8)**	5 (1.3)	16 (4.0)

Barriers to AEFI Reporting

On perceived barriers to reporting, respondents agreed that time constraints 206 (51.5%), client confidentiality issues 192 (48%), fear of legal issues 187 (46.8%), poor feedback mechanism 195 (48.8%), fear of negative consequences 164 (41.0%) and lack of belief in the event related to immunization were barriers identified to affect AEFI reporting. However, over 60% of respondents disagreed that difficulty in filling the AEFI form, non-utilization of the reported information lack of AEFI reporting forms and that reporting could cause unnecessary fear/alarm as barriers affecting reporting of AEFI (Table 5).

Table 5. Perceived Barriers to AEFI Reporting among Health Workers in Jigawa State

Perceived Barriers to AEFI Reporting	Agree (%)	Indifferent/Not Sure (%)	Disagree (%)
Not aware of AEFI reporting procedure	139 (34.8)	32 (8.0)	229 (57.3)
Do not think AEFI is serious to be reported	140 (35.0)	16 (4.0)	244 (61.0)
Time constraints	**206 (51.5)**	38 (9.5)	156 (39.0)
Lack of AEFI reporting forms	121 (30.3)	32 (8.0)	**247 (61.8)**
Fear of consequences	**164 (41.0)**	40 (10.0)	196 (49.0)
Lack of belief that the event was related to vaccination	**166 (41.5)**	42 (10.5)	192 (48.0)
Lack of interest	128 (32.0)	42 (10.5)	230 (57.5)
Managing the patient with AEFI was better than reporting	115 (28.8)	25 (6.3)	**260 (65.0**)
Client confidentiality issues	**192 (48.0)**	36 (9.0)	172 (43.0)
Concern about legal issues		39 (9.8)	174 (43.5)
It is difficult to fill out the form	74 (18.5)	23 (5.8)	**303 (75.8)**
No one uses the information	86 (21.5)	37 (9.3)	**277 (69.3)**
Reporting AEFI can cause unnecessary fear/alarm	114 (28.5)	18 (4.5)	**268 (67.0**)
Poor reporting structures for AEFI cases	128 (32.0)	35 (8.8)	237 (59.3)
Poor feedback mechanism	**195 (48.8)**	32 (8.0)	173 (43.3)

Discussion

Surveillance for AEFI remains dependent healthcare workers' (HCW) ability to timely detect and report cases using the correct reporting tools through an appropriate system [19]. Reporting on AEFI has remained a public concern [20, 21]. This study aimed to review the perception of health workers towards reporting of AEFI in the state to determine factors affecting perception and facilitators and barriers to AEFI reporting.

On the perception of health workers towards AEFI reporting 80% of respondents agreed that it was their responsibility to report which showed their willingness to report AEFI like what has been observed in other climes like the Alabania study where health workers are willing to report but hindered by a couple of factors AEFI [16]. Health workers identified that they report AEFI to build trust amongst the public in the immunization programs, to elicit proper diagnosis and prompt management, to elicit more capacity-building sessions from the health authorities, prevent AEFI occurrence in the future and a few cases because of the health condition of the child [16]. With so many new vaccines being introduced into the immunization landscape health workers over time have identified training as one factor that can improve

reporting and those with less capacity have prioritized reporting as a means of drawing the attention of the government on existing gaps and the requirement for more training.

When asked about barriers affecting AEFI reporting and like other studies we identified client confidentiality issues 51.5%, fear of negative consequences 48.8%, fear of legal issues 48% and due to poor feedback mechanism from the states 46.8%. Similarly, more than 40% of health workers alluded to time constraints and lack of belief in the event being related to immunization. Similar findings have been documented in studies conducted in the country and other countries [16, 21-24]. These are critical reasons that require the attention of the health authorities to address. The fear by health workers of being victimized if AEFIs are reported, or legal issues taken against them is a perception that should be discouraged as it will further jeopardize the efforts being made to improve reporting.

Though majority of the health workers had good perception of AEFI reporting like findings from studies in other states [21], the study further identified good knowledge of AEFI and routine receipt of feedback from the higher administrative level as predictors of good perception on AEFI amongst providers. This further buttressed fact that beyond the health systems requesting these reports from the service delivery points, surveillance systems including that of AEFI is a two-way process whereby reporting should be followed by feedback on the outcome of the reports [2, 22, 25]. The global surveillance guideline indicates that irrespective of the outcome of reported AEFI cases, findings from the investigation and lessons learnt from the causality assessment of serious cases, should provide insights on the immunization programme for the technical team and immunization programme managers and there should be prompt and clear communication and with all stakeholders including feedback to the healthcare workers that reported as well as the community on the next line of action [2].

The country's immunization programme has an AEFI field guide [26] that itemizes the steps to be taken once an AEFI is reported and the need for feedback to the community. This is necessary for reassuring the health worker and the community that government is concerned and alleviates the anxiety of the reporting health worker who might have a negative perception of the reported AEFI. Systems must be put in place to ensure that these guidelines are adhered to, and feedback shared from the higher levels. This is exemplified by the surveillance system evaluation in Ghana where lack of timely feedback from higher levels affected the usefulness of the system as surveillance officers got discouraged from sending reports to higher levels, and that affected the use of data for action [22]. The good perception indicates that health workers will be willing to report encountered AEFIs based on the identified motivating factors if all their fears on the perceived negative consequences could be addressed.

Conclusion

We can conclude from this study that the majority of respondents had good perception of AEFI with a couple of factors inciting them to report AEFIs. However, barriers still exist that could act as an impediment to reporting and encountered AEFIs. Knowledge of AEFI and routine receipt of feedback from the state and LGA were independent factors affecting perception about AEFI. This calls for concerted efforts to address the gaps in the system with a focus on the following recommendations:

1. The Agency should put in place a strong feedback mechanism for AEFI reporting in line with national guidelines to ensure that there is a two-way flow of information between health workers and the authorities as well as with the communities. This will improve reporting and build trust from the community.
2. Respondents alluded to existing barriers affecting AEFI reporting and to address such, the state should institute mentorship

programs and human-centred design approaches to address the perceived barriers by health workers and promote facilitators of AEFI reporting. Qualitative studies can be conducted to better understand how best these perceptions can be addressed.

Conflict of Interest

There is no conflict of interest in the study.

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