KNOWLEDGE AND PRACTICE OF REPORTING ADVERSE EVENTS FOLLOWING IMMUNIZATION AMONG PRIMARY HEALTHCARE WORKERS IN JIGAWA STATE, NORTHWEST NIGERIA

UMAR, A.A.[1]*, SUFIYAN, M.B.[2], TUKUR, D.[2], AMADU, L.[1], BASHIR, S.S.[2], IBRAHIM, M.S.[2], BALOGUN, M.S.[1] AND NGUKU, P.[1]

[1]Nigeria Field Epidemiology and Laboratory Training Program, Abuja, Nigeria
[2] Department of Community Medicine, Ahmadu Bello University, Zaria

ABSTRACT

Adverse events following immunization (AEFI) upsets people when it occurs, to the extent that they refuse further immunizations for their children. AEFI surveillance, helps to preserve public confidence in the immunization program. It is carried out regularly during both routine and supplemental immunization activities in the State. Inability to find reporting form(s), lack of awareness of reporting system, fear by the Healthcare worker of perceived consequences of reporting, and fear of litigation all negatively contribute to reporting AEFI. Aim of this study is to determine knowledge and practice of reporting adverse events following immunization among primary healthcare workers in Jigawa State. A cross-sectional study was conducted among 290 healthcare workers (HCWs) selected through multistage sampling technique. Data was collected using pre-tested self-administered structured questionnaire with open and closed ended questions. Data collected was sorted, checked for completeness and entered into computer analysis software (IBM SPSS version 20) for analysis. Results obtained were presented in tables and charts. All statistical tests were two-tailed with p value < 0.05 used as statistical significance level. Most (57.6%) of the respondents were aged between 21-30 years with mean age of 31.3±7.4 years. Up to 95.9% of the primary HCWs were aware of AEFI, and seminars/workshops were the common sources of information on AEFI. Only 43.2% of the primary HCWs could define AEFI correctly, 51.3% and 31.4% could identify serious and non-serious (minor) as types of AEFIs respectively. About 21.6% of the respondents had good knowledge on AEFI reporting while 61.5% of them had good practice of AEFI reporting. Up to 79.3% of primary HCWs that encountered AEFI reported it to the disease surveillance and notification officer (DSNO). There was high awareness of AEFI among primary health care workers, however, only few of them had good knowledge on AEFI and its reporting. Most of the HCWs had good practice of AEFI reporting and majority of them that encountered an AEFI reported it. Years of experience, knowledge on AEFI and experience in practice of AEFI reporting were factors that influence reporting of AEFI among the HCWs. The State in collaboration with Local Government Authorities should provide quality training on AEFI surveillance and ensure regular supportive supervision for all primary healthcare workers in immunization clinics or units.

Keywords: AEFI, Healthcare workers, Knowledge, Practice
***Correspondence:** abuayoub02@gmail.com, +234 803 7040 253

INTRODUCTION

The overall goal of adverse events following immunization (AEFI) surveillance is timely detection and analysis of adverse events and institution of appropriate measures to decrease the negative impacts on the health of individuals and immunization programme [1]. To find the cause of an AEFI, the events must first be detected and reported. Events are to be reported regardless of whether they occur from routine or supplemental immunization activities. AEFI can be detected and reported by either passive surveillance, ad-hoc surveillance or active surveillance [1]. The effective detection and reporting of AEFIs depend on the adequate knowledge of the healthcare workers (HCWs) on these issues. To increase immunization acceptance and improve the quality of services, the surveillance of AEFIs must become an integral part of immunization programs [1].

National Immunization Coverage Survey 2016 shows that nine percent of caregivers do not vaccinate their children because of fear of side effects [2]. During immunization campaigns, the number of reported cases increases; between 2013 and first quarter of 2018, from measles, yellow fever and meningitis campaigns, a total of 12,637 cases were reported with 72 classified as serious AEFI. These were investigated, treated and causality assessment conducted with majority found to be coincidental [2]. A study from Ilorin, Nigeria reported 19.3% AEFIs in 2005, while another report from Port Harcourt, Nigeria, revealed that about 57% of mothers reported that children had one or more of these AEFIs following pentavalent vaccine administration; fever (88%), swelling (34%), and irritability (40%) [3, 4]. Poliomyelitis vaccine was suspended in Nigeria for one year following quality and safety issues alleged by religious leaders. This led to massive rebound of polio cases [5]. Vaccine safety surveillance and follow-up by

primary healthcare workers, are therefore, central to addressing both actual and perceived AEFI-related issues in order to increase the public confidence and patronage of vaccination program.

Health workers at peripheral facilities are expected to know how to detect AEFI, how to treat cases of AEFI, how to fill out the reporting forms and how to report cases of AEFI appropriately. They are also expected to inform clients about the possible occurrence of temporary minor reactions without causing concern or jeopardizing immunization, manage and address rumours and misinformation that may be detrimental to immunization; and encourage clients to report at the health facility if AEFI are experienced [6]. Southeast Asia region described routine training, information on AEFI and its management provided to health workers as one of the main indicators of the AEFI surveillance system [7].

Studies conducted in both developed and developing countries show varying levels of awareness and knowledge about the AEFI reporting systems among healthcare providers. A study done among HCWs in the military in the US revealed that only 53.9% were somewhat familiar with reporting system while only 6.8% were very or extremely familiar with the systems. This study included doctors, nurses, physician assistants and technologists. A higher proportion of physicians (73.4%) than other occupational groups were at least somewhat familiar with AEFI reporting system [8]. Another study in the US sought to identify practices, strengths, and weaknesses of vaccine-associated adverse event reporting by HCWs. Findings in this study were that 17% of HCWs did not know how to report AEFI and 61% could not accurately define a reportable adverse event. This study also cut across various cadres of HCWs, but one key limitation was that the response rate was 36% which could affect the validity of the results [9]. A study of AEFI reporting among obstetricians revealed that men were twice as likely to not be familiar with the vaccine adverse events reporting system (VAERS) and a higher proportion of women were familiar with the objectives of the AEFI surveillance system [10].

Appropriate action(s) must be taken to respond promptly, efficiently, and with scientific rigour to vaccine safety issues especially AEFIs. This will minimize adverse effects to the health of individuals and entire populations and in turn help to maximize the benefits of immunization programs. HCWs in PHC facilities are usually the ones with weak capacity and inadequate tools to work with. They are usually the first to come across an AEFI or received a report of an AEFI in the health facility by virtue of their position of being the closest medical staff to the people and looking at most AEFI results from human or program error. Healthcare workers have the responsibility to detect AEFIs and report AEFIs when appropriate. They also have the responsibility to treat or refer patients for treatment. All immunization staff must be able to identify and report adverse events. Detection requires effective staff training and education to ensure accurate diagnosis of AEFIs based on clear case definitions, which can be included on the AEFI reporting form and in the national AEFI guidelines. For the primary healthcare workers to be able to do this work effectively they should be aware of AEFI, have the knowledge to detect an AEFI and at the same time be conversant with the reporting process. The HCWs should also have positive attitude towards detection and reporting of an AEFI. Hence, the need for healthcare workers in our primary care facilities to have adequate knowledge, positive attitude, requisite skills in detecting and reporting AEFIs. This study determined the knowledge and reporting practices of adverse events following immunization among HCWs in primary health care centers of Jigawa State.

METHODS AND MATERIALS

Study area

Jigawa State is one of the 36 States of Nigeria, created August 27, 1991 out of Kano State. It is situated in the north-western part of the country between latitudes 11.00^0N to 13.00^0N and longitudes 8.00^0 E to 10.15^0E. It consists of 27 Local Government Areas and 288 political wards in a land area of 23,154 km square. The projected (2006 census) total population of the State is 5,739,027 while projected population of under-five and women of child bearing age are 1,147,805 and 1,262,586 respectively. The main occupation of the people is farming, petty trading and cattle rearing. The State is dominated by Hausa, Fulani, with Kanuri & Bade in the north east senatorial district. There are other settled tribes both from within and outside Nigeria inhabiting almost all the local government areas of the State with the highest concentration in the State capital [11].

Jigawa has the following healthcare facilities scattered all over the State; Hospitals (tertiary, general & comprehensive) 12, PHC Centers 381, Health Posts 267, Private Health Facilities 15 and Mission Hospitals 3. All the tertiary, general, comprehensive hospitals and primary healthcare centers provides routine immunization services for clients in the State. Adverse events following immunization surveillance is carried out regularly during both routine immunization services provision and supplemental immunization activities in the State. A report from National primary healthcare development agency (NPHCDA) shows the following AEFIs cases were line listed in Jigawa State; 19 cases in 2011, 41 cases in 2015 and 39 cases in 2017. However,

there were no cases of death due to AEFI during the period [12].

Study design and study population
A descriptive cross-sectional design was used to study healthcare workers providing services in immunization units for at least 6 months in public primary healthcare centers of Jigawa State.

Sample size and sampling technique
The sample size was determined using the following formula; [13].

$$n = \frac{Z^2 pq}{d^2}$$

Where;
n = minimum sample size
z = standard normal deviate which corresponds to 95% confidence interval level
p = proportion of the target population estimated to have good knowledge on AEFI reporting = 24.3% = 0.243 [14]
q = 1 – 0.243 = 0.757
d = degree of precision = 5% = 0.05
The minimum sample size was 290.

All the 290 respondents were selected through multistage sampling technique.

Stage one: selection of LGAs
One LGA was selected using simple random sampling (SRS) by balloting from each of the three senatorial zones of the State. This made a total of three LGAs for the study.
Stage two: selection of wards
All the wards in the three selected LGAs were involved in the study
Stage three: selection of primary healthcare facilities
From all the selected wards of each selected LGA, twenty primary healthcare centers (PHCs) that offer immunization services were selected using SRS by balloting, and this made a total of sixty PHCs.
Stage four: selection of respondents
Two hundred and ninety primary HCWs were selected through proportionate allocation and using SRS by balloting from the four hundred and eighteen HCWs manning the sixty PHCs selected from the three LGAs selected from the three senatorial zones in the State.

Study instrument and data collection methods
Data was collected using self-administered structured questionnaire with open and closed ended questions. The questionnaire was pretested among HCWs working in immunization units of primary healthcare centers in the neighboring LGAs that were not participating in the study and were a bit far away (about 50km away) before it was finalized. Six research assistants trained and supervised by the researcher collected the data over two weeks.

Statistical analyses
Data collected was sorted, checked for completeness and entered into computer analysis software, IBM SPSS version 20 for analysis [15]. Univariate analysis was done to calculate frequencies and proportions of socio-demographic data, knowledge of AEFI and its reporting, attitude and perception towards reporting AEFI. The results obtained were presented using tables and charts. Mean age of respondents, mean duration in service and their standard deviations were also calculated. Bivariate analysis using chi-square test was used to examine the associations between socio-demographic characteristics, knowledge of reporting AEFI, attitude towards reporting AEFI and perception towards reporting AEFI among HCWs as well as identify the significant variables which was interpreted as statistically significant at p - values of < 0.05. Multivariate analysis was done to examine the strength of association of the various independent variables on dependent variable. All tests were two-tailed with p value < 0.05 used as the statistical significance level.

Ethical considerations
Ethical clearance for conduct of the research was obtained from Jigawa State Health & Ethics Committee, and written informed consent was obtained from every participant before data collection was carried out. Permission was also obtained from the in-charges of the health facilities involved in the research.

RESULTS

Most 167 (57.6%) of the respondents were aged between 21-30 years with mean age of 31.3±7.4 years. Majority, 168 (57.9%) of the respondents are males and 236 (81.4%) possesses diploma certificate. Majority, 179 (61.7%) of the respondents were community health extension workers (CHEWs) followed by environment health officers 57 (19.7%). Most 126 (43.5%) of the respondents had spent 1-3 years and up to 50 (17.2%) had spent more than 10 years working in immunization units. The mean duration of work experience is 5.4±4.3 years (Table 1). Up to 278 (95.9%) of the primary HCWs were aware of AEFI, and seminars/workshops or trainings were the common sources of information on AEFI, 216 (77.7%) (Table 2). Only 120 (43.2%) of the primary HCWs could define AEFI correctly, and 142 (51.3%) and 87 (31.4%) could identify serious AEFI and non-serious (minor) as a type of AEFIs respectively (Table 3). About 60 (21.6%) of the respondents had good knowledge on AEFI reporting, whereas 97 (34.9%) had poor knowledge on the AEFI reporting

(Table 4). Majority, 268 (96.4%) of the primary HCWs were aware of how to report AEFI whenever it occurs. Up to 213 (76.6%) of healthcare workers knows the correct AEFI reporting flow, and only 44 (15.8%) knows that only serious AEFI are reported. About 219 (78.8%) and 54 (19.4%) primary HCWs mentioned telephone and filling forms as some of the appropriate methods of AEFI notification respectively. Up to 148 (53.2%), 72 (25.9%) and 54 (19.4%) of the HCWs said AEFI detected in the health facility should be reported to In-charge of healthcare facility (HF), Ward focal person and disease surveillance and notification officer (DSNO) respectively (Table 5). Up to 171 (61.5%) respondents had good practice of AEFI reporting (Table 6). Most of the respondents, 65 (54.2%), 59 (68.6%), 16 (66.7%), 31 (64.6%) with (1-3), (4-6), (7-9), ≥10 years of experiences respectively had good practice of AEFI reporting. However, this not statistically significant ($p = 0.170$) (Table 7).

DISCUSSION

A total of 290 healthcare workers working in immunization unit or clinic of primary healthcare facilities were involved in the study. Socio-demographic characteristics of the primary healthcare workers shows that most were aged between 21-30 years with mean age of 31.3±7.4 years. This shows that youth were more among the HCWs whom are usually full of energy to carry out stressful activities. The mean age of the respondents was lower than that of respondents in Lagos 39.5 years and Kenya 41.4 years, but similar to the study done in Zimbabwe 33.0 years [7, 14, 16]. Majority of the respondents are males and community health extension officers. In this study, males were more among the HCWs this is in contrast to findings from similar studies carried out in Lagos 88.4%, Kenya 83.3%, and Albania 94.1% where females were more among the HCWs [7, 9, 14]. Professionally, majority of the respondents are community health extension workers followed by environmental health officers. This could be due to the fact that the training of community health extension workers is centered on offering services in primary healthcare settings, where most routine immunization services are provided. Most of the respondents had spent 1-3 years and very few had spent more than 10 years providing immunization services. The mean of the work experience is 5.4±4.3 years.

Majority of the primary HCWs were aware of AEFI, and seminars/workshops or trainings were the common sources of information on AEFI. Up to ninety-six percent of the primary HCWs were aware that some unwanted events, side effects or symptoms may occur after a child is given a vaccination. This study shows that quite a great number of the primary HCWs were aware of AEFI and the commonest source of their information on AEFI was through seminars/workshops or trainings which is not surprising because of the frequent and regular training programs given to them by many different stakeholders. Less than half of the primary HCWs could define AEFI correctly, and about half and very few could identify serious AEFI and non-serious (minor) as a type of AEFIs respectively.

Only few of the respondents had good knowledge on AEFI reporting, whereas 34.9% had poor knowledge on the AEFI reporting, this is higher than 20.2% reported by Ogunyemi *et al.* in a study carried out in Lagos [14]. Majority, 96.4% of the primary HCWs were aware of how to report AEFI whenever it occurs. Most, 76.6% of the healthcare workers knows the correct AEFI reporting flow, however very few knows that only serious AEFI are reported. About 78.8% and 19.4% primary HCWs mentioned telephone and filling forms as some of the appropriate methods of AEFI notification respectively. Up to 53.2%, 25.9% and 19.4% of the HCWs said AEFI detected in the health facility should be reported to In-charge of HF, Ward focal person and DSNO respectively. The overall practice grading shows that most of the respondents had good practice of AEFI reporting. Most Community health extension workers (CHEWs) and Health assistants had good practice of AEFI reporting, and majority of them had reported AEFI. Most of the AEFIs were reported by CHEWs and Health assistants, and they did so within the first 24 hours. Most of the respondents with 1-3, 4-6, 7-9, ≥10 years of experiences respectively had good practice of AEFI reporting. However, this not statistically significant ($p = 0.170$). Almost all the primary HCWs has come across or seen an AEFI reporting forms and more than half of them stated that completed forms are sent to the LGA office. The findings of this study may be limited by the fact that data was collected based on self-reported information, the possibility of reporting errors and recall biases may not be ruled out.

CONCLUSION

The primary healthcare workers have high awareness on AEFI, but few of them had good knowledge on AEFI and its reporting. Most respondents had good practice of AEFI reporting and majority of them knows the appropriate place to report an AEFI detected.

RECOMMENDATIONS

The Jigawa State primary healthcare development agency (JSPHCDA) in collaboration with Local government authorities should provide quality training on AEFI surveillance to the primary healthcare workers especially those that provide immunization services. The JSPHCDA should ensure regular supportive

supervision for all primary healthcare workers in immunization clinics or units in order to support the staff involved with AEFI detection and reporting.

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Conflict of interest
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Table 1: Socio-demographic characteristics of Primary healthcare workers in Jigawa State, May 2019.

Variable	Frequency	Percent
Age group (years)		
≤ 20	9	3.1
21-30	167	57.6
31-40	71	24.5
41-50	42	14.5
51-60	1	0.3
Mean age = 31.3±7.4		
Sex		
Male	168	57.9
Female	122	42.1
Highest Educational Qualification		
SSCE/GCE	13	4.5
OND	19	6.6
Diploma	236	81.4
HND	9	3.1
1st Degree	1	0.3
Others	12	4.1
Cadre		
CHO	2	0.7
CHEW	179	61.7
Nurse	11	3.8
Midwife	4	1.4
Pharmacy technician	12	4.1
Health assistant	22	7.6
Auxiliary nurse	3	1.0
Others (Environmental health officer)	57	19.7
Work experience (years)		
1-3	126	43.5
4-6	88	30.3
7-9	26	9.0
≥10	50	17.2
Mean = 5.4±4.3		

Table 2: Awareness and sources of information on AEFI among primary healthcare workers, Jigawa State May 2019.

Variable	Frequency	Percent
Aware of AEFI		
Yes	278	95.9
No	12	4.1
Primary source of information on AEFI (n= 278)		
Classroom lectures	26	9.4
Seminar/workshop/training	216	77.7
Colleagues	32	11.5
Media	4	1.4

Table 3: Primary healthcare workers knowledge on definition and types of AEFI, Jigawa State May 2019.

Variable	Frequency	Percent
Definition of AEFI		
Correct	120	43.2
Incorrect	158	56.8
Types of AEFI*		
Non-serious AEFI	87	31.4
Serious AEFI	142	51.3
Mild AEFI	229	82.7
Moderate AEFI	146	52.7
Severe AEFI	197	71.1
**multiple responses*		

Table 4: Knowledge grade on AEFI among primary healthcare workers in Jigawa State, May 2019.

Knowledge	Frequency	Percent
Poor	97	34.9
Fair	121	43.5
Good	60	21.6

Table 5: Primary healthcare workers knowledge on reporting AEFI, Jigawa State May 2019.

Variable	Frequency	Percent
Aware of how to report AEFI (n= 278)		
Yes	268	96.4
No	10	3.6
AEFI reporting flows		
Correct	213	76.6
Incorrect	75	23.4
AEFI to be reported		
Serious AEFI only	44	15.8
All AEFIs	234	84.2
Appropriate method of AEFI notification		
Telephone	219	78.8
Filing forms	54	19.4
Telling colleagues	5	1.8
Who to report AEFI detected in your HF to		
DSNO	54	19.4
ILO*	2	0.7
In-charge of HF	148	53.2
Surveillance officer	2	0.7
Ward Focal Person	72	25.9

*ILO = international labour organization

Table 6: Practice grade of AEFI reporting among primary healthcare workers in Jigawa State, May 2019.

Practice	Frequency	Percent
Poor	107	38.5
Good	171	61.5
Total	278	100.0

Table 7: Years of experience by practice of AEFI reporting among primary healthcare workers in Jigawa State, May 2019.

Years of Experience	Practice		Total
	Poor Frequency (%)	Good Frequency (%)	
1-3	55 (45.8)	65 (54.2)	120 (100.0)
4-6	27 (31.4)	59 (68.6)	86 (100.0)
7-9	8 (33.3)	16 (66.7)	24 (100.0)
≥10	17 (35.4)	31 (64.6)	48 (100.0)

$\chi^2 = 5.023$, $p = 0.170$