

Evaluation of Health Education Intervention on Safe Immunization Injection among Health Workers in Ilorin, Nigeria

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Abstract

Background: Vaccination is expected to be a safe medical intervention that will not lead to harm. Part of this expectation arises because vaccines are routinely given to healthy children. However, reports have shown that about one-third of all vaccination injections are unsafe partly due to poor knowledge and skills of health workers on injection safety.

Method: At the pre-intervention stage of this study, semi-structured questionnaires were administered to 102 consenting staff and observational checklist was completed for each of the 13 static immunization centres in the study area. In the intervention stage, the subjects were grouped into case group (50 subjects who had health education intervention given) and the control (52 subjects who were not given health education). While at the post-intervention stage, questionnaires and observational checklist similar to what was used at the pre-intervention stage were administered to both the case and the control groups.

Results: Most of the subjects 82(80.4%) had poor knowledge of safe immunization injection technique and were not aware of any policy on injection safety. Injection abscess was the main health hazard of unsafe injection reported by majority 71(69.6%) of the subjects while few of them, 10(9.8%), mentioned needle prick as a health hazard. About two-thirds of them 69(67.6%) felt that open burning is the ideal method of disposal of injection waste, while the actual methods of disposal commonly practiced in most health facilities was open burning 49(48%).

Post-intervention results showed that subjects in the case group had better knowledge of injection safety than those in the control especially on issues like what constitute safe injection; injection safety policy, handling and disposal of injection waste and these were statistically significant ($p < 0.05$). Also, there was remarkable improvement on injection safety practices in health facilities of the case group than was observed in the control, but these were not statistically significant except in the area of single use of syringe for each patient.

Conclusion: Health education in the form of training on basic concept of injection safety for health workers is an effective strategy in promoting safe immunization injection at the health facility level.

Key words: Safe immunization, health education, injection safety

Résumé

Introduction : Comme on doit s'y attendre, la vaccination doit être une intervention médicale sans danger qui ne va pas faire du mal à l'homme. C'est en partie du au fait que des vaccines sont administrées systématiquement aux enfants en bonne santé. Toutefois, des rapports avaient montrés qu' environ le tiers de tous les piqûres des vaccinations sont dangereux en partie attribuable au mauvaise connaissance et habileté des inspecteurs de la santé sur une injection sans danger.

Méthodes: Au niveau pré-intervention de cette étude, des questionnaires demi structurés ont été administrés aux 102 personnel volontaires et une liste récapitulative et observationnelle a été remplie pour chacun des 13 centres d'immunisation stactics dans la région d'étude. Dans le stade de l'intervention, les sujets ont été divisés en groupe de cas (50 sujets qui avaient subi un enseignement d'intervention de la santé) et le groupe témoin (52 sujets qui n'avaient pas eu l'enseignement de la santé). Au cours d'étape post-intervention, des questionnaires et une liste récapitulative observationnelle semblable au celle dont on avait utilisé dans le niveau pré-interventionnel ont été administrés chez les deux groupes.

Résultats : La plupart de sujets 82 soit 80,4% avaient mauvaise connaissance sur la méthode du vaccin d'immunisation sans danger et ils ne savaient pas aucune politique sur l'injection de sécurité. Abcès à

travers l'injection était le risque majeur pour la santé de l'injection sans danger rapporté par la majorité 71(69,6%) des sujets tandis que peu parmi eux 10(9,8%) ont mentionné la piqure d'aiguille comme un risque pour la santé. Environ deux tiers d'entre eux 69(67,6%) avaient l'impression que combustion ouverte est la méthode idéale de la mise au rebut des déchets/ordures de l'injection, tandis que la méthode véritable de la mise au rebut le plus ordinairement utilisée dans la majorité des centres hospitaliers était la combustion ouverte 49 (48%). Des résultats postinterventionnels avaient montré que des sujets dans le groupe témoin en particulier sur les problèmes comme ; qu'est ce qui constitue l'injection sans danger ? La politique sur la sécurité de l'injection, maniement et la mise en rebut des ordures des injections et tous sont statistiquement importants ($P < 0,05$). De plus, il y avait une amélioration remarquable sur la pratique de l'injection sans danger dans les centres hospitalier de groupe de cas plus qu' était noté dans le groupe témoin, mais ils ne sont pas statistiquement importants à l'exception de la zone où on utilise une seule seringue pour chaque patient.

Conclusion : L'enseignement sur la santé dans la forme d'une formation sur la conception de base sur l'injection sans danger pour les inspecteurs de la santé est une stratégie efficace dans le progrès et dans l'amélioration de l'injection d'immunisation sans danger au niveau du centre hospitalier.

Mot clés : Immunisation sans danger, enseignement sur la santé, sécurité de l'injection

Introduction

Injection as a method of vaccine administration is a basic component of immunization programme. Although immunizations are necessary, public awareness of the consequences of unsafe injection practices especially that relating to unsterile practices has threatened to reduce their acceptability. Unsafe injections are associated with significant morbidity and mortality particularly from infectious complications. It is estimated that unsafe injections are responsible for millions of cases of hepatitis B and C, and accounts for about one-quarter of a million of HIV infection annually.¹⁻³

Reasons for unsafe immunization injection practices in developing countries include: lack of sufficient quantities of syringes and needles, lack of sterilization equipments or fuel to operate the equipment and lack of understanding by health workers and other stakeholders of the risk of unsafe injections or even what constitute unsafe injection.³ Several studies have confirmed that unsafe immunization injections continue to occur in settings where health workers have little or no knowledge and skill relating to new equipment, technique and concept introduced into their practice.^{2,4-6}

The aim of this study was to assess the effect of health education intervention on knowledge and standard of practice of safe immunization injection among health workers in static immunization centre.

Materials and Methods

This study was conducted among health workers in static immunization centres in Ilorin using all technical staff involved in immunization activities in all public health centres. The study was conducted in 3 stages, namely: pre-intervention, intervention and post-intervention.

In the pre-intervention stage, pre-tested semi-structured questionnaire was administered to 102 consenting staff while observational checklist was completed for each of the 13 fixed immunization

centres in the study area. The questionnaire contained questions that elicited information on socio-demographic characteristics of the respondents, their knowledge and practices on safe immunization injection. The checklist was designed using the WHO guideline on assessment of injection safety⁽⁷⁾ and this was used to gather information / data on supply and disposal of injection waste within the health facilities and the health workers' practices within the concept of injection safety. The data generated at this stage was used as inputs to design the health education intervention that was instituted at the second stage of the study.

In the intervention stage, the subjects were grouped into two; one served as the case group (50 subjects) who had health education intervention given and the other was the control (52 subjects) who was not given health education. The grouping was done on Local Government Area (LGA) basis to control exchange of information among subjects in the 2 groups. The degree of separation of the subjects into case and control might not be perfect because the LGAs share common boundaries and this may give opportunity for interactions. However, the decision on which LGA served as case or control was done randomly by simple balloting. The training content included: injection safety, disposal of injection waste and hazards associated with unsafe injection practice.

At the post-intervention stage, questionnaire and observational checklist similar to what was used at the pre-intervention stage were administered to both the case and the control groups.

The data generated from the questionnaire and the checklists were validated manually for possible errors and then entered and analyzed on a microcomputer using EPI-Info version 6 software package. The pre-intervention and post-intervention data were analyzed separately and the results compared where necessary to highlight important findings. Also, the data of the post-intervention study was analyzed to compare the responses of the case and control groups. Chi-square test was used to determine the statistical significance of differences observed in the two groups. Level of significant was set at a p-value < 0.05 .

Results

The age of the respondents ranged from 21 to 50 years with a mean of 35 ± 6 years. Their sex distribution showed that there were more females (90%) than males (10%), while majority of the respondents (60, 58.8%), had 5-10 years experience on immunization (Table 1). In the pre-intervention data, the health workers' understanding of safe immunization injection was found to be low. Only 20(19.6%) of them gave correct meanings or definitions, while the rest were either wrong in their definitions 40(39.2%) or did not respond at all 42(41.2%). Also, most of the subjects 82(80.4%) were not aware of any policy on safe injection practice while 20(19.6%) claimed to be aware of the policy.

Majority of the subjects 85(83.3%) preferred the use of disposable syringes and needles for vaccination, 7(6.9%) favoured use of sterilizable syringes / needles while 10 (9.8%) would use any type that is available. However, about three-quarters of the respondents 75(73.6%) reported that they used both sterilizable and disposable syringes and needles for vaccination in their centres. Only a few of them reported using only sterilizable syringes 7(6.8%) while 20(19.6%) claimed to use disposable syringes only. Less than half, 42(41.1%) of the subjects had ever heard of injection safety box and as little as 20(19.6%) had ever seen any type of injection safety box while only 8(7.8%) had ever used it in their practice. No health facility was seen using it throughout the study period.

About two-thirds of the respondents 69(67.6%) believed that the best method of disposal of injection waste was open burning, 17(16.7%) felt burying the waste was the best, while use of incineration and recycling were mentioned by 11(10.7%) and 5(4.9%) subjects respectively. However, the actual disposal methods practiced in the health centres as reported by the respondents included open burning 49(48%), dumping into open pit 21(20.6%), dumping on open ground 17(16.7%) and dumping into secure pit 15(14.7%).

Comparing data from post-intervention study with that of the pre-intervention stage, it was found that the knowledge of the respondents on injection safety was much better in the post-intervention stage than what it was in the pre-intervention stage. These were particularly significant on issues like awareness and understanding of policy on injection safety, infections and hazards that can result from unsafe injection practices including experience on injection safety box (Table 2). Similarly, safe injection practices at the immunization centres improved at the post-intervention stage better than what was observed at the pre-intervention even though most of these improvements observed were not statistically significant. Non-use of hand gloves by the vaccinators remained the same in the pre- and post-intervention studies (Table 3).

Comparison of knowledge and standard of practice among the case and the control groups showed that respondents in the case group had better understanding of safe injection than those in the control group, especially on issues of awareness and understanding of injection safety, and use of injection safety boxes. These were all statistically significant. The number of respondents with good knowledge of health hazards and infections that are associated with unsafe injections was also higher among the case than the control group, although these were not statistically significant (Table 4). There was improvement on some aspects of injection safety practices in all the health facilities used as the case group than it was in the control, even though most of the observed improvement were not statistically significant as shown on Table 5.

Most of the subjects in the case group preferred autodestruct syringes / needles for vaccination as against subjects in the control who preferred using simple disposable type. The observed difference in the choice of preferred injection equipment was statistically significant (Table 6). Use of improvised safety boxes or containers was the commonest method of collection of used syringes/needles in about 80% of the health facilities in the case group, this was better than using open plastic dustbin that was mostly used in the control centres. Also, all the health facilities in the case group burnt their injection waste in secure pits in the post-intervention study, while in the control centres open burning and open dumping on the ground were mostly practiced (Table 6).

Table 1: Basic socio-demographic data of the health workers

Age distribution	
Age (years)	No. (%)
<26	16 (15.6)
26 – 35	56 (54.9)
36 – 45	24 (23.5)
46 – 55	6 (5.9)
Total	102 (100)
Cadre of health workers	
Cadre	No. (%)
CHEW	50 (49.0)
CHO	14 (13.7)
Nurse/midwife	28 (28.5)
JCHEW	10 (9.8)
Total	102 (100)
Working experience on routine immunization	
Experience (years)	No. (%)
<5	30 (29.4)
5 – 10	60 (58.8)
>10	12 (11.8)
Total	102 (100)

CHEW: Community health extension worker; CHO: Community health officer; JCHEW: Junior community health extension worker

Table 2: Comparison of some issues on knowledge of injection safety among the subjects at the pre-intervention and post-intervention stages

Knowledge on safe immunization policy	Pre-intervention (n = 102)		Post-intervention (n = 102)		<i>p</i>
	Yes	No	Yes	No	
Aware of safe injection policy	20	82	54	48	<0.05
Correct understanding of safe injection	20	82	49	53	<0.05
Knowledge of health hazard of unsafe injection	71	31	82	20	<0.05
Knowledge of infections related to unsafe injection	79	23	95	7	<0.05
Ever seen injection safety box	20	82	55	47	<0.05
Satisfactory knowledge of disposal of injection equipments	37	65	72	30	<0.05
Knowledge of decontamination of injection equipments	11	91	44	58	<0.05
Need for recap of used needle before discard	89	13	57	45	<0.05

Table 3: Comparison of some injection safety practices at the immunization centres during the pre-intervention and post-intervention stages

Injection safety practices compared	Pre-intervention (n = 13)		Post-intervention (n = 13)	
	Yes	No	Yes	No
Use of recommended vaccine diluents	11	2	11	2
Use of new syringes/needles for vaccine reconstitution	9	4	11	2
Re-use of syringe for vaccine withdrawal	9	4	4	9
Use of appropriate container for collecting used needles	0	13	6	7
Recapping of used syringes / needles before discard	13	0	8	5
Use of hand gloves	0	13	0	13
Availability of policy on safe injection at the centres	3	10	7	6
Accidental needle pricks sustained by staff	3	10	0	13
Hand washing before vaccinating each child	0	13	2	11
Availability of water for hand washing	9	4	12	1

Table 4: Comparison of knowledge of injection safety among case and control groups

Knowledge on injection safety	Case group (n = 50)		Control group (n = 52)		<i>p</i>
	Yes	No	Yes	No	
Aware of safe injection policy	47	3	7	45	<0.05
Correct understanding of safe injection	38	12	11	41	<0.05
Knowledge of health hazard of unsafe injection	44	6	38	14	0.057
Knowledge of infections related to unsafe injection	48	2	47	5	0.23
Knowledge of injection safety box	48	2	7	45	<0.05
Knowledge of decontamination of injection equipments	40	10	4	48	<0.05
Knowledge of best method of disposal of injection equipments	42	8	30	22	<0.05

Table 5: Comparison of injection safety practices observed in health facilities in case and control groups

Injection practices observed	Case group (5 health centres)		Control group (8 health centres)	
	Yes	No	Yes	No
Use of recommended vaccine diluents	5	0	6	2
Use of new syringes/needles for vaccine reconstitution	5	0	6	2
Use of appropriate container for collection of use needles	4	1	2	6
Use of sterilizable syringes / needles for vaccination	1	4	4	4
Use of disposable syringe/needles for vaccination	4	1	4	4
Availability of safe injection policy in the centres	5	0	2	6
Recapping of needle before discard	0	5	8	0
Accidental needle prick	0	5	0	8
Re-use of syringes for vaccine withdrawal	0	5	4	4
Hand washing before vaccinating each child	2	3	0	8
Availability of water for hand washing	5	0	7	1

Table 6: Observed differences between case and control groups

Type of syringes/needles preferred by the subjects in case and control groups				
Type of syringe/needle	Case group (n = 50)	Control group (n = 52)	Total	
Autodestruct	38	5	43	
Sterilisable	2	4	6	
Disposable	10	43	53	
Total	50	52	102	
<i>P < 0.05</i>				
Type of material used for collection of used syringes/needles at the health facilities in case and control groups				
Container used for collection of used syringe/needle	Case group (n = 5)	Control group (n = 8)	Total	
Improvised safety box	4	1	5	
Plastic dustbin	0	5	5	
Plastic bowl	0	2	2	
Plastic bucket	1	0	1	
Total	5	8	13	
Method of disposal of used syringes/needles practiced at the health facilities in case and control groups				
Method of disposal of used syringes / needles	Case group (n = 5)	Control group (n = 8)	Total	
Open burning	0	4	4	
Burning in secure pit	5	1	6	
Dumping on ground	0	3	3	
Total	5	8	13	

Discussion

Most of the respondents in this study (90%) were females, and this clearly indicates that technical staffs in immunization clinics are predominantly women. This observation is a reflection of what is actually seen in most health facilities in Nigeria where women dominate Nursing and other nursing related professions such as Community Health Officers and

Community health extension Workers. Over 70% of the subjects were trained Community health practitioners such as CHO, CHEW and JCHEW. It is encouraging to note that immunization service, which is an important strategy in disease prevention, is carried out by these cadres of health workers. It is well established in Nigeria that most community health practitioners are engaged in curative services in the state and private hospitals in towns and cities

doing other things but Primary Health Care (PHC) work.⁸

The fact that over 70% of the subjects had at least 5 years experience on routine immunization, and less than a quarter of the total subjects knew or understood what constitute safe injection or were aware of any policy on safe injection is an indication that years of experience on routine immunization may not necessarily translate to quality immunization service, if the staff are not exposed to new ideas and concepts of immunization services. At the pre-intervention stage less than 20% of the total subjects had correct idea of safe injection and about 20% were aware of any policy on injection safety. Following the intervention, the understanding of injection safety and awareness of policy on safe injection was better among the case group than the control.

It has been reported that the knowledge of health workers tends to decline or become outdated over years after their basic training because of technological changes and emergence of new diseases and concepts in disease prevention or management.⁹ Therefore the task of providing quality health care services require that health workers must have up to date knowledge and information relating to their jobs, duties and clinical practice. The result of the pre-intervention study showed a lot of gaps on the knowledge and awareness of the subjects on immunization injection safety. This gap was, however, bridged in the case group during intervention where basic training in form of health education was given. Therefore, it can be said that the health education intervention is an effective strategy of promoting safe injection. Training at different levels (through workshop and seminar or provision of educational materials for health workers working in immunization clinics) has been shown to improve injection practices of health workers in many countries.^{1, 10, 11}

In the pre-intervention stage majority of the respondents preferred to use disposable syringes and needles for vaccination, this finding is consistent with a report from another study which showed that health workers frequently express preference for disposable syringes because it is convenient and reduces time spent on cleaning and sterilization.¹² Following the health education intervention, a significant proportion of the subjects in the case group preferred Autodestruct (AD) as against majority of the control that preferred simple disposable injection equipments. The difference here too must have been due to the health education given to the case group which raised their awareness on the latest injection equipment and its relative benefit over other types of injection equipment.

The practice of repeated use of single syringe for drawing vaccines for many recipients was a common practice in most of the centres at the pre-intervention stage, but this reduced following the intervention. Use of injection safety box or device which was lacking at the pre-intervention stage, was more evident among the case group who now used locally improvised safety box at the post-intervention stage.

Decontamination of sterilizable needles was not practiced in both the case and the control groups despite the intervention given to the case group. The major reason for this non-compliance among the case group was non-availability of the required solution for decontamination coupled with lack of fund to purchase it. Studies have shown that poor funding of health system leading to shortage or lack of materials and other consumables can make health workers to move away from standard practice even when they have requisite knowledge and skills.

Majority of the subjects also thought that simple burning of waste resulting from used injection equipments was the best method of waste disposal. Also, 3 health centres were observed to dump their injection waste on open ground. Unsafe management and disposal of sharps can cause environmental contamination and accidental injury. Sharps thrown in the open environment can easily be accessed by waste pickers and other people in the community particularly children and thus become exposed to these contaminated sharps.

At the post-intervention stage, the method of waste disposal used by the case group was mainly burning in secure pit within the health facilities, while in the control group majority of the health facilities still practiced open burning or open dumping on the ground. It is obvious that the health education intervention instituted for the case group was instrumental to the remarkable improvement in the disposal of waste among the group as against what was seen among the control.

Training in form of health education on injection safety for health workers is effective in promoting safe immunization injection. Therefore, necessary training should be provided to all staff involved in immunization programmes so that they can understand the broad concept of immunization safety which includes quality of vaccines, maintenance of cold chain, reconstitution of vaccine with the right diluents at the right temperature, reporting of adverse events following immunization and proper handling and disposal of injection equipments. However, training or health education alone cannot guarantee safe immunization injection practice unless it is complemented with adequate provision of standard injection equipments and facilities for their safe disposal after use.

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