



# Knowledge of Injection Safety among Primary Health Care Workers in Nsukka Local Government Area of Enugu State, Nigeria

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## Abstract

*The purpose of the study was to determine the level of knowledge of injection safety among Primary Health Care Workers (PHCWs) in Nsukka Local Government area of Enugu State. Three research objectives with corresponding research questions and two hypotheses guided the study. Descriptive survey research design was used for the study. The population comprised of 172 PHCWs from which a sample of 116 was withdrawn. The research questions were analyzed using frequencies and percentages while ANOVA was used to test the hypotheses at 0.05 level of significance. The findings of the study revealed that PHCWs possessed average knowledge of injection safety. Also, PHCWs with more years of working experience had average level of knowledge while those with less years of working experience had low level of knowledge of injection safety. The result also revealed that there was significant difference in the level of knowledge of injection safety among PHCWs according to years of experience and cadre. Hence, it was recommended among others that State Ministry of Health in collaboration with Primary Healthcare Co-coordinators to periodically organize workshops and seminars for PHCWs to update their knowledge of injection safety*

**Key words:** knowledge, injection safety, safe injections, unsafe injections, primary health care workers.

## Introduction

Injection safety has become a major concern in recent years not only in developing countries but globally. Injections are one of the essential medical procedures used globally. These injections are given through different routes such as intramuscular (into the muscles), intravenous (through the veins), subcutaneous (into the subcutaneous tissues) and intradermal (into the dermis and epidermis). The injections are given for prevention, diagnosis and treatment of various illnesses. Each year about 20 billion injections were administered worldwide (World Health, Organization-WHO, 2010). In developing countries, an estimated 16 billion people received injections for several reasons each year (Federal Government of Nigeria/United States for International Development/United Nations Children's Fund/World Health Organization, 2007). These injections given can be safe or unsafe.

A safe injection is the one given through the right route in right dose without harming the incipient and the health care provider. Safe Injection Global Network (2013) defined safe injection is the injection that does not harm the recipient, does not expose the health worker for any risk and does not result in waste that is dangerous for the community. World Health Organization (2010) defined a safe injection as an injection that does not harm the recipient, does not expose the healthcare provider to any avoidable risk and does not result in any waste that is dangerous to the community. Centre for Disease Control and Prevention (2014) indicated that safe injection practice protects patients and healthcare providers from life threatening infections. For injections to be safe, it needs to be prepared with clean/gloved hands in a clean environment using drugs drawn from sterile vial or ampoule, administered with sterile equipment by a skilled professional. Then after the administration, sharps must be discarded in a safety box for appropriate disposal. When injections are given without observing the safety rules it become unsafe and life-threatening.

Unsafe injections are those injections that cause harm to the recipients, pose hazard to the healthcare providers and people living in the community where the wastes are finally disposed. Oguamanam (2014) reported that unsafe injections constitute dangers to the patients/clients, healthcare workers, healthcare waste management personnel and the communities though indiscriminate waste disposal. Many healthcare providers sustain needle stick injuries (NSI) from unsafe injections while many injection recipients become infected with blood borne viruses through unsafe injections. WHO (2010) stated that at least 50 per cent of the 20 billion injections administered in the world each year were unsafe.

Unsafe injections can lead to transmission of blood borne diseases such as Hepatitis B (HBV), Hepatitis C (HCV) and Human Immune Deficiency Virus (HIV). Globally, unsafe injections account for more than 25

million preventable new cases of blood borne infections like Hepatitis B, Hepatitis C and HIV (United Nations Fund-UNICEF, 2011). Mehta, Pilla & Singh (2016) reported that more than 93 per cent of injections in India were unsafe and that about 60 per cent of cases of HBV contaminations were due to unsafe injections. WHO (2015) reported that annually 21 million hepatitis B, 2 million hepatitis C and 260, 000 HIV cases may have been transmitted through unsafe infections. These infections are transmitted from infected patients to uninfected ones through the careless sharing of injection equipment between patients/clients.

Apart from infections transmitted through unsafe injections, unsafe injections can lead to sudden collapse of the recipient and even death if adequate resuscitative measures are not given. Unsafe injection can cause permanent blindness or deafness in the recipients if the adverse side effects are not reported on time. These problems of unsafe injections spread through developed and undeveloped countries. In the developed countries, unsafe injections pose dangers to the patients, healthcare providers and the general public. Apart from hepatitis and HIV, other life-threatening bacterial infections such as septicemia, meningitis or epidural abscesses can result from unsafe injections. Unsafe injections can as well cause partial paralysis of the lower limbs and the child had to grow into adulthood with disability.

In developing countries Nigeria inclusive, unsafe injections is a case of major concern. Aziz, Esena and Dotse-Gborgbortis (2013) reported that unsafe injections accounted for one third of new hepatitis B and 2 million hepatitis C infections in the developing countries. Aziz et al went further to assert that most cases of HIV infections occur in Africa and Asia. United Nations Children's Fund (2011) stated that in Africa, 250-500 people were newly infected with HIV each day as a result of unsafe blood transfusions and unsafe injections. Unsafe injections are not only harmful to the patients but also carry risks to the healthcare provider through needle stick injuries (NSI). NSIs are wounds caused by needles that accidentally harm the skin and are risky for healthcare providers, who work in clinical setting with hypodermic syringes and other sharp equipment (Dulon, Lisiak, Wendeler & Nienhaus, 2017). Through NSI, healthcare provider can be infected with HBV, HCV or HIV. Gyawali, Rathore, Shankar and Bhavai (2013) indicated that the matter of serious concern is that in developing countries very less number of PHCWs are vaccinated against hepatitis B. WHO (2010) indicated that about 3 million NSI occur every year with about 90 per cent occurring in developing countries. These NSI expose the health care provider to dangers of suffering hepatitis or HIV infection which eventually lead to their untimely death. These hazardous effect of unsafe injections on the recipients, health care providers and the general need to be addressed. WHO (2016) introduced concept of injection safety practices which supposed to guide the health care providers in administration of injections. Applying the safety injection practices depend on the level of knowledge of injection safety possessed by the health care providers.

Knowledge is critical to man's quality of life because ability to perform anything depends on what we know or perceive. Therefore, there is need for possession of adequate knowledge by PHCWs regarding safe injections to avert hazardous effect of unsafe injections. Knowledge is the ability to recall or recognize something such as a concept, principle or custom (Kalua, 2009). Knowledge on to give safe injections has existed for years. This, notwithstanding millions of recipients, health care providers and general public are exposed to unsafe injections because the PHCWs may not possess adequate knowledge necessary for safe injections. Knowledge of injection safety will guide the healthcare provider to make injections safe for recipients and general public. Knowledge of injection safety vary in the developed and developing countries. Adejumo and Dada (2013) reported poor knowledge of injection safety among nurses in two hospitals in Ibadan, Nigeria. Anita, Priyanka and Damodar (2014) indicated that interns in a tertiary care teaching hospital, Delhi had good knowledge in certain aspects of injection safety and poor knowledge in some aspects of injection safety. Adequate knowledge of safety injections will motivate healthcare providers to apply the safety injection practices. However, there is no study that determined the level of knowledge of injection safety among PHCWs in Nsukka Local Government Area (L.G.A), of Enugu State. In view of the dangers of unsafe injections, it becomes necessary to assess the level of knowledge of injection safety among the PHCWs in Nsukka L. G. A of Enugu State. Additionally, the study examined level of knowledge according to years of experience and cadre.

### **Purpose of the study**

The study determined the level of knowledge of injection safety among PHCWs in Nsukka Local Government Area of Enugu State.

### **Research Objectives**

1. determine the level of knowledge of injection safety among PHCWs in Nsukka L. G. A.

2. determine the level of knowledge of injection safety among PHCWs in Nsukka L. G A. according to years of experience.
3. Determine the level of knowledge of injection safety among PHCWs in Nsukka L. G. A. according to cadre.

### Research Questions

1. What is the level of knowledge of injection safety among PHCWs?
2. What is the level of knowledge of injection safety among PHCWs according to years of experience?
3. What is the level of knowledge of injection safety among PHCWs according to cadre?

### Hypotheses

1. There is no significant difference in the level of knowledge of injection safety among PHCWs according to years of experience.
2. There is no significant difference in the level of knowledge of in injection safety among PHCWs according to cadre.

### Methods

**Design of the Study:** The study adopted the descriptive survey design.

**Area of the Study:** The study was conducted in Nsukka L. G.A. of Enugu State, Nigeria. **Population for the Study:** Population for the study consisted of all PHCWs that work in primary health care facilities (PHCFs) in Nsukka L. G A. of Enugu State Nigeria. The population is 172 working in 28 PHCFs (Officer in charge-OIC Nsukka Health District Board). These facilities are chosen for the study because they are the first contact of patients with health care facilities where they can be treated or referred to other level of care. PHCFs are located in the communities where they provide health care services closer to the people. PHCWs are doctors who are the primary health care coordinators, nurses/midwives, community health officers (CHOs), community health extension workers (CHEWs), junior community extension workers (JCHEWs), laboratory technicians and dispensers. Those will be used for the study are nurses and midwives. CHOs, CHEWs and JCHEWs because they are directly involved in giving injections.

**Sample and Sampling Techniques:** Purposive sampling was used to select one health facility from each community, thus selecting 14 health facilities. Total number of PHCWs in the 14 health facilities were 127. PHCWs are in these categories: Nurses and midwives-3, CHOs-10, CHEWs-63 and JCHEWs-51. There was no sampling as the number was manageable.

**Instrument for Data Collection:** The instrument for data collection was 16 items questionnaire which was divided into two sections: section A comprised of 2 items of respondents' bio-data while section B comprised of 14 items questionnaire to determine the level of knowledge of injection safety among PHCWs. The instrument was validated by three experts from the Department of Human Kinetics and Health Education, University of Nigeria, Nsukka. Suggestions of the experts were incorporated to produce the final draft of the instrument.

**Data Collection:** A total of 127 questionnaires were administered by the researcher with help of 5 research assistants. However, only 116 were properly completed giving a return rate of 91.3 per cent. These were analyzed for the study.

**Data Analysis:** Data for the study was analyzed using frequencies and percentages and ANOVA statistics. In determining the level of knowledge of PHCWs, Okafor (1997) rule for determining knowledge was used. Primary healthcare workers with score between 0 – 39% were considered to possessed low level of knowledge (LK), those that scored between 40 – 69% were considered to possessed average level of knowledge (AK) while those that scored 70% and above were considered to possessed high level of knowledge (HK). ANOVA was used to test the null hypotheses at .05 level of significance.

### Results

**Table 1: Level of knowledge of injection safety among PHCWS (n=116)**

S/N	Knowledge of injection Safety	F	%	Decision
1	Definition of safe injection	70	(60)	HK
2	Diseases transmitted through unsafe injection	60	(51.7)	AK
3	People at risk of unsafe injection	54	(46.5)	AK
4	When hands should be washed	45	(38.7)	LK
5	Use of multiple vial	48	(41.3)	AK
6	Environment for giving injections	51	(43.9)	AK

7	How to dispose syringe and needle	24	(20.6)	<b>LK</b>
8	When to give injections	60	(51.7)	<b>AK</b>
9	What to do in case of drug reaction	30	(25.8)	<b>LK</b>
10	Where to give intramuscular injections	41	(35.3)	<b>LK</b>
11	Routes commonly used for injections	63	(54.3)	<b>AK</b>
12	Examination of injection vials and ampoules	50	(43.1)	<b>AK</b>
13	Attended injection safety training	20	(17.2)	<b>LK</b>
14	Where to dispose injection syringes/Needles	64	(55.1)	<b>AK</b>
<b>Overall %</b>			<b>41.8</b>	<b>AK</b>

Key: Low knowledge (LK) = 0-39%  
Average knowledge (AK) = 40-69%  
High knowledge (HK) = 70% and above

Table 1 showed that overall percentage (41.8%) indicates that PHCWs had average knowledge of injection safety. The table also showed that the respondent had high level of knowledge on definition of injection safety (60.3%), average level of knowledge on diseases transmitted through unsafe injections (51.7%), people at risk of unsafe injections (46.5%), use of multiple vials (41.3%), environment for giving safe injections (43.9%), routes commonly used for injections (54.3%) and where to disposal of injection syringes and needles (55.1%). The table further indicated that respondents had low of level of knowledge on disposal of syringes and needles (20.6%), handling of drug reactions (25.8%) and attendance of injection safety training (17.2%).

**Table 2: Level of knowledge of injection safety based on years of Exp. (n=116)**

Knowledge of injection	<5 years		6-10 years		11 years & ab	
	N = 30		N = 40		N = 46	
	F	% D	F	% D	F	% D
1	14	(43.3) <b>AK</b>	25	(62.5) <b>AK</b>	31	(67.3) <b>AK</b>
2	11	(36.6) <b>LK</b>	21	(52.5) <b>AK</b>	28	(60.8) <b>AK</b>
3	10	(33.3) <b>LK</b>	17	(42.5) <b>AK</b>	27	(58.6) <b>AK</b>
4	7	(23.3) <b>LK</b>	14	(35) <b>LK</b>	24	(52.1) <b>AK</b>
5	8	(26.6) <b>LK</b>	15	(37.5) <b>LK</b>	25	(54.3) <b>AK</b>
6	10	(33.3) <b>LK</b>	18	(45) <b>AK</b>	23	(50) <b>AK</b>
7	9	(30) <b>LK</b>	10	(25) <b>LK</b>	8	(17.3) <b>LK</b>
8	18	(60) <b>AK</b>	20	(50) <b>AK</b>	22	(47.8) <b>AK</b>
9	4	(13.3) <b>LK</b>	11	(27.5) <b>LK</b>	15	(36.6) <b>LK</b>
10	8	(26.6) <b>LK</b>	12	(30) <b>LK</b>	21	(45.6) <b>AK</b>
11	12	(40) <b>AK</b>	23	(57.5) <b>AK</b>	28	(60.8) <b>AK</b>
12	7	(23.3) <b>LK</b>	18	(45) <b>AK</b>	25	(54.3) <b>AK</b>
13	2	(6.6) <b>LK</b>	5	(12.5) <b>LK</b>	13	(28.2) <b>LK</b>
14	11	(36.6) <b>LK</b>	19	(47.5) <b>AK</b>	34	(73.9) <b>HK</b>
<b>Overall %</b>		<b>30.9 LK</b>		<b>40.7 AK</b>		<b>50.4 AK</b>

Key: Low knowledge (LK) = 0-39%  
Average knowledge (AK) = 40-69%  
High knowledge (HK) = 70% and above

Table 2 indicated that PHCWs with less than 5 years working experience had low level of knowledge of injection safety (30.9%). The table also showed that PHCWs with 6-10 years and 11 years and above working experience had average level of knowledge of injection safety (40.7% and 50.4%) respectively. The table also showed that all the respondents had low level of knowledge of injection safety on items 7, 9 and 13 irrespective of the years of their working experiences. Also, respondents of less than 5 years working experience had low level of knowledge of injection safety on all the items except items 1, 8 and 11 where they have average level of knowledge of injection safety. The table further indicated that those who have worked for 11 years and above had high level of knowledge of injection safety only on item 14.

**Table 3: Level of knowledge of injection safety based on cadre**

S/N	Knowledge of injection safety	Nurse/midwives n = 3		CHO n = 6		CHEW n = 59		JCHEW n = 48	
		F	% D	F	% D	F	% D	F	% D
1	Definition of safe injection	3	(100) HL	4	(66.6) AK	35	(.59.3) AK	28	(58.3) AK
2	Diseases transmitted through unsafe injection	2	(66.6) AL	3	(50) AK	36	(61.0) AK	19	(39.5) LK
3	People at risk of unsafe injection	3	(100) HL	5	(83.3) HK	28	(47.4) AK	18	(37.5) AK
4	When hands should be washed	3	(100) HL	4	(66.6) AK	22	(37.2) LK	16	(33.3) LK
5	Use of multiple vial	3	(100) HL	5	(83.3) HK	25	(42.3) AK	15	(31.2) LK
6	Environment for giving injections	2	(66.6) AK	4	(66.6) AK	24	(40.6) AK	21	(43.7) AK
7	How to dispose syringe and needle	2	(66.6) AK	4	(66.6) AK	10	(16.9) LK	8	(16.6) LK
8	When to give injections	3	(100) HK	5	(80.3) HK	30	(50.8) AK	22	(45.8) AK
9	What to do in case of drug reaction	3	100 HK	4	(66.6) AK	13	(22) LK	10	(20.8) LK
10	Where to give intramuscular injections	3	(100) HK	5	(80.3) HK	21	(35.5) LK	12	(25) LK
11	Routes commonly used for injections	3	(100) HK	5	(80.3) HK	35	(59.3) AK	20	(41.6) AK
12	Examination of injection vials and ampoules	3	(100) HK	5	(80.3) HK	26	(44) AK	16	(33.3) LK
13	Attended injection safety training	2	(66.6) AK	2	(33.3) LK	9	(15.2) LK	7	(14.5) LK
14	Where to dispose injection syringes/Needles	3	(100) HK	6	(6.6) AK	35	(59.3) AK	22	(45.8) LK
<b>Overall %</b>		<b>90.4 HK</b>		<b>69.3 AK</b>		<b>42.2 AK</b>		<b>34.7 LK</b>	

Key: Low knowledge (LK) = 0 -39%  
Average knowledge (AK) = 40 - 69%  
High knowledge (HK) = 70% and above

Table 3 showed that nurses/midwives had high level of knowledge of injection safety (90.4%). The table also indicated that community health officers (CHOs) and community health extension workers (CHEWs) had average level of knowledge of injection safety (69.3%) and (42.2%) respectively. The table further showed that junior community health extension workers (JCHEWs) had low level of knowledge of injection safety (34.7%).

**Table 4**  
**One- way Analysis of Variance (ANOVA) Testing the Null Hypothesis of NO Significant Difference in Level of Knowledge of Injection Safety among PHCWs according to Years of Working Experience**

Years of Experience	Sum between	square within	df	Mean between groups	Squares within groups	F value	P-Value
<5years	6990.389	177667.443	3	2536.6702	395.850	3.822	.001
6-10years	5209.806	183977.6112	3	1528.877	448.611	2.659	.037
Above 11 yrs	8156.211	215018.101	3	3 116.461	701.727	4.104	.002

**P < 0.05 = Significant**

Table 4 shows the F-values and their corresponding P-values for PHCWs of < 5years working experience (F=3.822, P=.001< 0.05), 6-10 years (F= 2: 659, P = .037< 0.05), and 11 years and above (F = 4.104, P =.002<0.05). Since the p-values were less than .05 level of significant at 3 degrees of freedom, the null hypothesis was therefore rejected. This implies that PHCWs differed in their level of knowledge of injection safety according to their years of working experience.

**Table 5**  
**One-way Analysis of variance (ANOVA) Testing the Null Hypothesis of No Significant Difference in Level of Knowledge of Injection Safety among PHCWs according to Cadre.**

Dimensions Cadre.	sum between	square within	df	mean between groups	squares within group	F-value	P-value
Nurse/Midwife	26685.472	156243.141	3	7395.174	341.341	22.524	.000
CHO	31548.237	144568.189	337	11789.109	546.308	21.764	.000
CHEW	2630.667	178545.544	341	8771.832	484.757	15.023	.000
JEHEW	518573.432	24151.301	346	98573.432	34778.108	16.105	.000

**P < 0.05 = Significant**



Table 5 showed that the F-values and their corresponding p-values for Nurse/midwife ( $F= 22524, P = .000 < 0.05$ ), CHOs ( $F = 21.764, P = .000 < 0.05$ ), CHEWs ( $F=15.023, p = .000 < 0.05$ ) and JCHEWs ( $F = 16.105, P = .000 < 0.05$ ) which were less than 0 .05 level of significant at 3 and 346 degrees, of freedom. The null hypothesis was therefore rejected. This implies that level of knowledge of injection safety among PHCWs differed according to cadre.

## Discussion

Result in Table 1 indicated that PHCWs in Nsukka local government possessed average level of knowledge of injection safety (41.8%). The finding was expected and therefore not a surprise. This is because PHCWs might have been taught of injection safety during their various professional training programmes. More so, the respondents may also have acquired more knowledge on injection safety during their course of practice in different primary healthcare facilities. The finding is in consonance with that of Anita et al (2014) who reported that their respondents possessed good knowledge of injection safety. The similarity in the findings might be attributed to the fact that respondents in both studies attended professional courses where they were effectively taught injection safety.

Result in Table 2 showed that level of knowledge of PHCWs with less than 5 years working experience possessed low level of knowledge of injection safety (30.9%), while those with 5-10 years and 11 years and above working experience exhibited average level of knowledge of injection safety (40.7% and 50.4%) respectively. This is expected and therefore not surprising. This is because respondents with more years of working experience gather more knowledge in the course of practice than those with less years of working experience. This is consistent with the study of Audu et al (2012) who reported that their respondents with more years of working experience possessed more knowledge of injection safety than those with less year of working experience. In Audu et al study, subjects with 6-10 years and above 10year had (34.8% and 36.2%) level of knowledge respectively while those respondent with <1years and 1-5 years working experience had 8.7% and 20.3%level of knowledge respectively. The similarity may be that the respondents in both studies gather more knowledge of injection safety as they practice along.

Result in Table 3 revealed that nurse/midwife possessed high level of knowledge of injection safety (90.4%), CHOs and CHEWs had average level of knowledge of injection safety (69.3% and 42.2%), while JCHEWs possessed low level of knowledge of injection safety (34.7%). The finding was expected and therefore not a surprise. This was because the training of nurse/ midwife may be different and more thorough than the training of other cadres. The findings can also be a surprise as CHOs, CHEWs and JCHEWs are the core primary health care workers who supposed to possess high level of knowledge of injection safety to enable function effectively in the primary healthcare facilities. Also, JCHEW is the first training for community healthcare workers, and they progress from JCHEW to CHEW and then CHO. so as they progress, they gather more knowledge in different professional training. This is consistent with the study of Oladimeji et al (2014) who reported that Nurses/midwives and CHO had good knowledge of injection safety than other cadre of primary healthcare workers. The similarity may be attributed to the fact that respondents in both studies have undergone series of professional training unlike the JCHEW that have just undergone the first professional training.

Result in Table 4 indicated that there was significant difference in the level of knowledge of injection safety among PHCWs according to year of experience. This implies that PHCWs with different years of working experience also differed in their level of knowledge of injection safety. This finding was not surprising and therefore expected. This is because there is a tendency that the more you practice, the more knowledge are acquired. This finding agrees with the study of Azizi et al (2013) who reported that PHCWs with more years of working experience had good level of knowledge of injection safety than those with less years of working experience.

Result in Table 5 showed that there was significant difference in the level of knowledge of injection safety among PHWs according to cadre. The finding was expected and therefore not a surprise. This is because one expects PHWs that have undergone step by step professional training to possess high level of knowledge of injection safety than those starting the professional training. This finding is in conformity with the study of Oladimeji et al (2012) that reported that cadre of PHCWs are correlated with level of knowledge of injection safety.

## Conclusions

Based on the findings and discussion of the study, the following conclusions were reached.

Overall, primary healthcare workers possessed average level of knowledge of injection safety (41.8%).



Primary healthcare workers with less than 5 years working experience had low level of knowledge of injection safety (30.9%), while PHCWs with 6-10 years and 11 years and above working experience possessed average level of knowledge of injection safety (40.7% and 50.4%) among the PHCWs.

Nurses/midwives possessed high level of knowledge of injection safety (90.4%), CHOs and CHEWs had average level of knowledge of injection safety (69.3% and 42.2%), while JCHEW possessed low level of injection safety (34.7%) among the PHCWs.

Primary healthcare workers' years of working experience and cadres had significant difference in the level of knowledge of injection safety ( $p < 0.05$ ) among PHCWs.

### Recommendations

On the bases of the findings and conclusions, the following recommendations were made:

State Ministry of Health in conjunction with the Primary Health Care Coordinators should endeavor to organize seminars and workshops for PHCWs to update their knowledge of injection safety.

State Ministry of Health in collaboration with Primary Health Care Coordinators should organize injection safety assessment in all the PHC facilities to ensure that adequate logistics are provided for effective practice.

There is need for further research on injection safely practices among the primary healthcare workers in different primary healthcare facilities.

Primary healthcare workers should be allowed in-service training to enable them progress accordingly in the profession.

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