



### Research Article

## Injection Safety Knowledge and Practice among Nurses Working in Jimma University Medical Center; Jimma South West Ethiopia; 2018

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### Abstract

**Objective:** The main objective of this study is to assess knowledge and practice about injection safety among nurses in Jimma University Medical centre.

**Methods:** The study was conducted in Jimma University Medical Centre in Jimma Zone, Oromia Regional State from March 8-15, 2018 in Jimma Zone. Institution based cross section study by using simple random sampling technique to select 247 nurses. Data was collected through self-administered questionnaire. Descriptive statistics and chi-square test was done to describe the study variables and identify factors associated with injection safety practice.

**Results:** About twenty nine percent of the study participants 71(28.7%) had good Knowledge about injection safety practice. The level of injection safety practice was 63(25.5%). Findings of the study also showed years of experience ( $p=0.000$ ,  $df=3$ ), sex ( $p=0.048$ ,  $df=1$ ) and level of education ( $p=0.003$ ,  $df=1$ ) was statistically associated with the current knowledge and practice about injection safety among nurses working at Jimma University Medical Centre.

**Conclusion and recommendations:** This study revealed that knowledge and practice on injection safety was poor among nurses in Jimma University Medical Centre. It is therefore recommended that regular training and workshops on injection safety should be organized by Jimma University Medical Centre and other concerned

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body to improve their knowledge status and practice on injection safety. Also, the hospitals should develop facility protocol on injection safety for nurses in line with the national policy on injection safety.

**Keywords:** Injection safety; Jimma University Medical Centre

### Introduction

Injections are among the most frequently used medical procedures, with an estimated 20 billion injections administered each year world-wide. Injections can be given intravenously, intramuscularly, intra dermal, or subcutaneously. Majority of these injections are administered for curative purpose [1]. The World Health Organization (WHO) defined safe injection as one that is given using appropriate equipment and does not harm the recipient, does not expose the provider to any avoidable risks and does not result in waste that is dangerous for other people [2,3].

Unsafe injection is important cause of transmitting blood-borne diseases such as Hepatitis B (HBV), Human Immune-deficiency Virus (HIV), Hepatitis C virus (HCV). These diseases put the patient, health workers at great risk by causing reduced life expectancy, productivity and also create burden on communities and health-care systems in the form of high treatment costs. The burden of diseases from Needle Stick Injuries (NSIs) in Health Care Workers (HCWs) which showed that there were 3 million accidental needle-stick injuries leading to 37% of all new HBV, 39% of new HCV cases and around 5.5% of new HIV cases [4].

Health care providers and care consumers are exposed to hazards of needle stick injuries from inadequate supply of appropriate sharp containers, unsafe practices such as recapping of needles, manipulating used sharps (bending, braking, or cutting hypodermic needles), passing of sharps from one health care worker to another, sharps carelessly left in unexpected places [5]. The WHO estimates that 501,000 deaths have occurred because of unsafe injection practices [6]. These deaths could have been prevented by injection safety practices which include reduction of injections, ensuring safe injection practices [7].

Unsafe injections also carry socio-economic and psychological consequences on the individual and the health system. Safe injection practices reduce a great burden on health system by breaking the chain of transmitting blood-borne diseases and their consequences [8]. In the developing countries, unsafe injection practices exist substantially and are associated with the transmission of blood-borne pathogens [9].

Different studies showed different level of knowledge and practice in different areas for instance a study done in Benue State University Teaching Hospital healthcare professionals overall, the respondents had good (70.2%) knowledge, positive (87.2%) attitude and appropriate (79.8%) practice scores respectively. The commonest unsafe injection practice among the respondents was recap of needles (19.1%) [10]. Another comparative study carried out in two hospitals in Nigeria showed that participants knowledge level was high,

70.4% associated unsafe injection with blood-borne infection, 55.9% had correct information that two handed recapping is not a safe injection practice, 84.4% claimed that contaminated sharps predisposes the community to bio-hazards, and 293(76.1%) had correct information that used syringes and needles should be discarded in a sharp waste box. However, regarding to practice about half of them (50.4%) of the participants recently sustained sharp injury through intramuscular and subcutaneous injections. Only 15.6% of this number reported the injuries to their institution [11]. A study done in south-east Nigeria only 67.2% had previously any form of training on injection safety and only 54% (81/150) had heard or seen colour coded bins. The standard needle and syringe is still widely used and 45% still recap needles or syringes after use. Half (50.6%) of the respondents had a previous needle prick injury. Only 25.6% with previous needle prick injury had post-exposure prophylaxis [12].

## Methods and Materials

### Study area and period

The study was conducted in JUMC Jimma Zone, Oromia Regional State from March to April 2018. Jimma Zone is one of the 17 zones of Oromia Regional State found at 352 km from AA, the capital city of Ethiopia. In this zone there are five public hospitals, namely, JUMC, Shenen Gibe, Limu Genet, Agaro and Seka hospital. The first two are situated in Jimma town where as the later one is at Limu town which is 72 km far from Jimma town. JUMC play a major role in this zone and it is the only teaching and referral hospital in south-western part of the country, and provides specialized clinical services to about 15 million people. Currently the total numbers of the nurses in our study are 546.

### Study design

An institutional based Cross Sectional study design was employed.

### Sample size determination

Standard sample size calculation formula was used to determine the required sample size and 247 Nurses were selected by using Simple random sampling techniques.

### Data collection procedure

Data was collected through a self-administered questionnaire using structured questionnaire. The questionnaires comprised of three main parts; socio demography, knowledge and practice questions about injection safety.

### Data quality control

Pre-test was done at Shenen Gibe General Hospital among 5% of respondents. Training was given for data collectors. Then data was cross checked each day by data collection supervisor and principal investigator for consistency and accuracy.

### Data analysis procedure

Descriptive statistics and chi-square test was done to describe the study variable and identify factors associated with injection safety practice.

## Ethical consideration

Ethical clearance and approval to conduct the study was obtained from Jimma University Ethical Review Board (JUIRB) and permission letter was secured in order to get support for the study from administrative body. The purpose of study was explained to the participants and they are told as participation was voluntarily, confidential and anonymity will be ensured throughout the execution. Finally, verbal and written consent was assured from the study subjects.

## Results

### Socio-demographic characteristics

A total of 247 questionnaires was distributed and returned with full information which yields 100% response rate. From the total 247 participant 104(42.1%) were males whereas 143(57.9%) were females. Concerning age of the respondents, 115(46.6%) was between 20-29 years old. Regarding the religion, 84 of them were orthodox. Concerning the ethnic composition of the nurses more than half (57.5%) were Oromo's. In terms of the educational level, 147(59.5%) were BSC and the rest 100(40.5%) were diploma holders. 81(32.8%) were single and 146(59.1%) were married. Concerning to year of services 113(45.7%) have one up to four years working experience. Regarding working units of the study participants, OPD, Medical, Surgical, Pediatrics, Gynaecology and Obstetrics (Table 1).

### Injection safety knowledge

Most respondents had good knowledge about transmission of Hepatitis B infection which is 219(88.8%) and its prevention through vaccination 192(77.7%) and also possessed knowledge on Hepatitis C transmission 217(87.8%). The areas in which nurses showed the good knowledge were hand washing 235(95.2%), HIV infection 227(91.9%), PEP 227(91.9%) choice of correct injection devices 231(93.5%) and implementing measures to prevent sudden patient movement during injection 228(92.3%).

As shown in table 2, nurses were more likely to wash their hands after contact with clients 182(73.7%) and after removing gloves 221(89.5%) compared to between procedures 17(6.9%) or before putting on gloves 18(7.3%) to administer injections.

From the total participants 227(92%) of the respondent uses new sterile syringe from sealed pack. 213(87.9%) respondents indicated that they always avoided contamination of medication and 217(86.2%) respondents always avoid contamination of injection equipment during the injection process (Table 2). 63(25.5%) of respondents reported that they always adhered to recommended infection prevention practices during preparation of injections. Findings of the chi square test showed that clinical practice was significantly associated with respondent sex ( $p=0.027$ ,  $df=1$ ).

Out of the 247 respondent only 56(22.7%) indicated that they always conducted the five recommended steps presented under legible labelling. Legibly labelled medication name, time of reconstitution, strength of education, expiry date and person preparing the medication.

Variables	Category	n	%
Age in year	20-29	115	46.6
	30-39	97	39.3
	40-49	35	14.1
Sex	Male	104	42.1
	Female	143	57.9
	Total	247	100
Religion	Orthodox	84	34
	Muslim	67	27.1
	Protestant	46	18.6
	Catholic	33	13.4
	Other	17	6.9
	Total	247	100
Ethnicity	Amhara	53	21.5
	Tigre	29	11.7
	Oromo	142	57.5
	Other	23	9.3
	Total	247	100
Marital Status	Single	81	32.8
	Married	146	59.1
	Divorced	15	6.1
	Widowed	5	2
	Total	247	100
Education status	BSC Nurse	147	59.5
	Diploma Nurse	100	40.5
	Total	247	100
Year of service	<1 year	72	29.1
	1-4 year	113	45.7
	5-9 year	50	20.3
	≥10	12	4.9
Gyn/Oby	38	15.4	23.1
	Medical	50	20.3
	Surgical	46	18.6
	Paediatrics	46	18.6
	Gyn/Oby	38	15.4

**Table 1:** Socio-demographic characteristics on the study of knowledge and practice about injection safety among nurses in Jimma University Medical centre, 2018.

\* Gyn/Oby=Gynaecology Obstetrics

## Injection safety practices

Most respondents 181(73.2%) reported that they never recapped needles after administering injections and 49(19.6%). Out of 247, 121 (49%) of respondents reported that they always disposed generated waste into recommended colour coded bins, while 50(20.2%) practiced waste segregation at point of waste generation, and 46(18.6%) segregated waste according to type.

Fifty two (21.1%) out of the 247 participant in this study reported that they practiced all three recommended waste management practices examined namely: type at point of waste generation, segregation according to type and disposal in recommended bins.

Table 3 shows that pre-drawn medications were rarely labelled 18(7.3%) with the name of the person who had reconstituted the preparation. On the other hand, 237(96%) of pre-drawn drugs were

labelled to indicate medication name, time of preparation 57(23%), strength of medication 63(25.5%) and expiry date 51(21%).

## Factors associated with Injection Safety Knowledge and Practice

Findings of the study showed years of experience ( $p=0.000$ ,  $df=3$ ), sex ( $p=0.048$ ,  $df=1$ ) and level of education ( $p=0.003$ ,  $df=1$ ) was statistically associated with the current knowledge and practice about injection safety among nurses working at Jimma University Medical Centre (Table 4).

## Discussion

Seventy one (28.7%) respondent had good knowledge on injection safety and 176(71.3%) respondent had poor knowledge. And also they had specific knowledge on infections that could result from unsafe injection practices especially HIV and HBV. This is consistent with another study in Ilorin, Nigeria in which 58.3% had knowledge of diseases transmissible by needle stick injury [10]. The high level of awareness about the mode of transmission of HIV infection and the ingrained fear of the disease in the society may be responsible for this. Similar studies in Cambodia and China also found that most prescribers and injection providers were aware that HIV, HBV, and HCV were transmitted through unsafe injection practices [11,12].

Knowledge of injection safety was significantly associated with the years of experience of the respondents. Although a better knowledge is a major contributor to the practice of injection safety, it is likely that the incurable nature of HIV/AIDS and its attendant stigma may force nurses to be more careful when handling sharps without necessarily having detail knowledge of the definition of injection safety which formed the basis for determining the knowledge of injection safety.

In this study, 227(91.9%) of the respondents knew that unsafe injections are associated with HIV transmission, 219(88.8%) knew Hepatitis B transmission is associated with unsafe injections. 217(87.8%) respondents were aware of Hepatitis C transmissions. Using data presented in a study done in China, among 118 nurse professionals had knowledge that HIV, Hepatitis C virus and Hepatitis B virus might be transmitted by the contaminated syringes and needles was 95%, 59% and 89% respectively [11]. A study conducted in maternity units in five hospitals which involved a National Referral Hospital, a specialized maternity Hospital, two district hospitals and one sub-district hospital across two provinces of Kenya indicated that only 19.4% of nurses had attended an update course on infection control in the three years prior to the study [13].

In current study sixty three (25.5%) respondent had good practice on injection safety and 184(74.5%) respondent had poor practice on injection safety. Reported practice varied for the different aspects of injection safety. There was poor practice at ward level which was reflected by the unavailability of soap in all the taps in patient care areas. Majority of nurses were wash their hands after contact with contamination but only 18(7.3%) reported that they washed their hands before putting on gloves.

Injection safety knowledge items	True		False		I don't Know	
	No	%	No	%	No	%
A safe injection poses no danger to the patient	233	94.3%	10	4.1%	4	1.6%
A safe injection is not dangerous to injection provider	211	85.4%	26	10.5	10	4.1%
Safe injection practices do not pose harm	207	83.8%	25	10.1%	15	6.1%
HIV infections is a risk associated with unsafe injections	227	91.9%	13	5.4%	7	2.7%
Hepatitis B infections are associated with unsafe injections	219	88.8%	16	6.5%	12	4.6%
Hepatitis C infections are associated with unsafe injections	217	87.8%	19	7.7%	11	4.5%
Recapping the needle after injecting a patient is a safe injection practice	22	8.9%	188	76.1%	37	15%
Hepatitis B vaccine is important to injection providers	192	77.7%	18	7.3%	37	15%
Maintaining the reorder levels in stocks of injection supplies is important in injection safety	178	72%	27	10.9%	42	17.1%
I anticipate and take measures to prevent sudden patient movement	228	92.3%	14	5.7%	5	2%
Hand washing prior to administering an injection is a safe injection practice	237	95.3%	7	2.5%	3	1.2%
Hand washing after administering an injection is a safe injection practice	235	95.2%	9	3.6%	3	1.2%
Observation of proper storage conditions, such as temperature as per manufactures instructions is safe injection practice	165	66.8%	22	8.9%	60	24.3%
Post exposure Prophylaxis is recommended in the event of needle stick injuries	227	91.9%	16	6.5%	4	1.6%
I choose the correct injection device for the patient	231	93.5%	14	5.7%	2	0.8%

**Table 2:** Responses to injection safety items on the study of knowledge and practice about injection safety among nurses in Jimma University Medical centre, 2018.

Characteristics	Always		Never		don't know	
	n	%	n	%	n	%
<b>Hands washing</b>						
Immediately on arrival to work	22	8.9%	202	81.8%	23	9.3%
Before putting on to give an injection	18	7.3%	217	87.9%	12	4.6%
After removing the gloves	221	89.5%	20	8.1%	6	2.4%
After contact with any form of contamination even when gloves are worn	182	73.7%	45	18.2%	20	8.1%
Between procedures on same patient	17	6.9%	216	87.4%	14	5.7%
I use a new sterile syringe from a sealed pack for the injections	227	92%	17	6.8%	3	1.2%
I reuse disposable syringes	5	2%	239	76.7%	3	1.2%
I verify the integrity of the packet of the disposable syringe before use	53	21.5%	171	69.2%	23	9.3%
I prepare each injection in a clean designated area.	69	28.2%	137	55.5%	41	16.6%
With multi dose vials, I piece the septum with a sterile needle.	223	90.3%	17	6.9%	7	2.8%
I use a clean protective barrier (e.g. small gauze pad) to protect fingers when opening a glass ampoule.	53	21.5%	176	71.3%	18	7.2%
I discard medications with visible contamination	17	6.5%	193	78%	37	1.5%
I discard needles with visible contamination	96	39%	127	51.3%	24	9.7%
During the injection process, I avoid contamination of; Injection equipment and The medication	213	86.2%	34	13.8%	0	0
<b>Drug administration practice</b>						
Medication name	237	96%	7	2.8%	3	1.2%
Time it was done	57	23%	177	71.7%	13	5.3%
Name of the person who did it	18	7.3%	219	88.7%	10	4%
Strength of the medication	63	25.5%	157	63.6%	27	10.9%
Expiration date	51	21%	173	70%	23	9%
I choose injection site according to;						
Age of patient	47	19.1%	143	57.9%	57	23%
The dosage	205	83%	26	10.5%	16	6.5%
The type of injection	236	95.5%	7	2.8%	4	1.7%
<b>Sharp Waste Management Generation, Segregation, Transport and Disposal</b>						
I dispose injection waste into the recommended colour coded waste bins	121	49%	92	37.3%	34	13.7%
I practice waste segregation; at the point of generation	50	20.2%	167	67.6%	30	12.2%
I practice waste segregation; according to type	46	18.6%	168	68%	33	13.4%

**Table 3:** Hand washing practices on the study of knowledge and practice about injection safety among nurses in Jimma University Medical centre, 2018.

Characteristic	Good practice	Poor practice	X2	Df	p- value
<b>Experience in year</b>					
Less than 1 year	16(22.2%)	56(77.8%)	51.5	3	0.000
1-4 years	22(19.5%)	91(80.5%)			
5- 9 years	11(22%)	39(78%)			
10 and above 10 years	3(25%)	9(75%)			
<b>Age of provider</b>					
20-29	29(25.2%)	86(74.8%)	4.62	2	0.099
30-39	13(13.4%)	84(86.6%)			
40-49	7(20%)	28(80%)			
<b>Sex</b>					
Male	29(28%)	75(72%)	7.31	1	0.007
Female	20(14%)	123(86%)			
<b>Department</b>					
OPD	11(19.3%)	46(80.7%)	3.58	4	0.466
Medical	14(28%)	36(72%)			
Surgery	6(13%)	40(87%)			
Paediatrics	9(19.6%)	37(80.4%)			
OBY/GYN	9(23.7%)	29(76.3%)			
<b>Level of education</b>					
BSC nurse	22(14.1%)	134(85.9%)	8.76	1	0.003
Diploma nurse	27(29.7%)	64(70.3%)			
<b>Attending injection safety seminar</b>					
Yes	21(18%)	96(82%)	0.499	1	0.48
No	28(21.5%)	102(%)			

**Table 4:** Analysis on the study of knowledge and practice about injection safety among nurses in Jimma University Medical centre, 2018.

A similar study done in West Africa indicated that only 12.3% of injection providers washed their hands before and after administering injections [14]. While this is an improvement in hand washing practice and depicts better performance from 12.3% in 2009 to the current 33%, it is still relatively low and presents an opportunity for spread of avoidable infections. All the taps in the patient care areas had running water but none had soap or alcohol hand rubs available.

In our study sixty nine (28.2%) of the respondents reported that they prepared each injection in a clean designated area and 5(2%) respondents reported that they reused disposable syringes. Only 53(21.5%) of the respondents verify the integrity of the packet of the disposable syringe before use. In JUMC, 182(73.7%) of the respondents never perform hand washing due to increased work load. This practice appears to account for the existing estimates that each year, about 6% of the world population receives injections contaminated with hepatitis B virus and between 417,000 and 1.3 million deaths are caused by unsafe injection practices in medical practices [15].

In this study, 23(9.3%) of the respondents had suffered a needle stick injury during the past 12 month period and almost a similar situation was found in a study done in Dominican. These cases of needle stick injuries could be associated with recapping of needles which exposes the injection provider to a higher risk of needle stick injury since almost the same number of respondents reported that they recapped used needles. Injection safety survey done in Kiambu and Bond districts established that injection overuse was still rampant and prescribers admitted they were pressed by patients to prescribe or

administer injections and they often complied [6]. This was also similar to a National Cross Sectional Survey in Kenya on injection safety practices indicated that there is over prescription of injections [16].

While infectious waste and sharps constitute hazardous waste and their disposal system is considered appropriate if the collected and disposed of in the right manner [13], In current study, Only 52(21.1%) out of the 247 respondents reported that they followed all three recommended waste management steps examined namely: waste segregation by type at point of waste generation, segregation according to type and disposal in recommended bins. Some of the wards practiced immediate waste segregation at the point of generation. The recommended colour coded bins were available. All the wards studied had puncture proof sharp disposal boxes were available. Almost similar report was obtained in a study conducted in Nyanza and Western province revealed that 69% practiced waste segregation and 3% of injection providers and 5% of those involved in waste handling were fully protected from Hepatitis B [6].

Some of the staffs working in paediatrics department reported that they did practice recapping about 9(19.6%) while 9(23.7%) of respondents working in the maternity department recapped needles. In our study site, sharp waste remained within the patient care environment and was not kept away in safe holding rooms. This practice was in contrast to a countrywide survey done in Kenya which showed that 47% of the hospitals had waste holding rooms as it awaited transportation [17]. Lack of injection safety guidelines within the hospital and the fact that most nurses were not trained on safe injection practices could have contributed to that state of affairs.

## Conclusion and Recommendations

There was poor level of knowledge and practice on injection safety among nurses in JUMC. Knowledge and practice on injection safety was significantly associated with working experience, sex and level of education. The practice on injection safety also was poor in some of the areas like re-use of disposable syringes, recapping of needles and overfilling of safety boxes.

There was poor handling of waste, improper waste segregation, transportation and final disposal among the study participant. Head nurse should provide training about injection safety for junior staffs assigned to their working unit. Due emphasis should be given for nurses by the health institution and Zonal Health Bureaus on proper collection and disposal of needles, syringes and sharps.

## Author's Contribution

Admasu Belay contributed to the study conception and design, supervised the study, conducted data analysis and wrote the manuscript. Eldana Amare and Yeshitila Belay planned the study, involved in data collection, prepared the first draft proposal and paper. Dagmawit Birhanu contributed on data analysis, supervised the study and critically revised the manuscript.

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