# **Original Research Article**

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# Rapid assessment of safe injection practice in a tertiary care hospital of Eastern India

#### Sadhu Charan Panda\*

Department of Community Medicine, VSS Medical College, Burla, Sambalpur, Odisha, India

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\*Correspondence: Dr. Sadhu Charan Panda, E-mail: scpanda@vimsar.ac.in

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#### **ABSTRACT**

**Background:** Unsafe injection practice is harmful to the patients, providers and community especially in a tertiary care hospital. On this backdrop, a rapid assessment of injection practice has been conducted with aim of identifying determinants and indicators of safe injection practice.

**Methods:** A cross sectional study was conducted among 20 providers, 20 prescribers, 100 prescriptions and 120 general population by convenient sampling as per WHO from November 2016 to April 2017 in the hospital of VSS Institute of Medical Sciences & Research, Burla using interview, observation method and analysis of prescriptions.

**Results:** Knowledge about possibility of transmission of HCV due to unsafe injection practice was 80% among providers and 40% among general population. All providers were using sterile syringe and needle though 60% of them were seen not using gloves in case IV Injection/blood transfusion and needle recapping was done by half of them 100 per cent of injection providers reported that they have access to a sharps waste disposal facility. Needle recapping was done by half of them. OT8 indicator was 26.7(%). Average number of injections per person based on the population data was 1 injection per annum.

**Conclusions:** Unsafe injection practice has to be tackled by CME among prescribers about rationale use of injections, antibiotics from essential drug list, regular supply of equipment and hub cutter and education of providers and people about injection safety will prevent avoidable communicable diseases.

Keywords: Awareness, Injection safety, Hub cutter, Recapping, OT8 indicator

#### INTRODUCTION

Every year some 16 billion injections are administered in developing and transitional countries. Use of injection is done for curative, diagnostic and preventive purposes. A safe injection is one that does not harm the recipient, does not expose the health-care worker to any avoidable risks and does not result in any waste that is dangerous for the community. However, unsafe injection practice has become a major public health problem globally. Faulty injection practices and overuse of injections may result in several harms including life-threatening blood borne viral

(BBV) infections. A burden of 9.2 million disability adjusted life years (DALYs) between 2000 and 2030 due to unsafe injection practice may occur unless this trend is prevented or reduced.<sup>2</sup> Annually, worldwide, injections cause an estimated 8-16 million cases of hepatitis B virus (HBV) infection, 2.4-4.5 million cases of hepatitis C virus (HCV) infection, and 80 000 to 160 000 cases of human immunodeficiency virus (HIV) infections.<sup>3</sup> The practices of unsafe injection not only harm the patient but also carry out the risks to health care workers also each year worldwide around 66,000 HBV, 16,000 HCV and 1,000 HIV infections were estimated to occur among HCWs – mostly in developing countries – due to their

occupational exposure to percutaneous injuries.<sup>4</sup> Again, unsafe injection practice affects socio-economic and psychological dimensions of individuals and health care delivery system of the country as well.

A study conducted in a tertiary care teaching hospital revealed that needle stick injuries (NSIs) per year was 27 (Mean $\pm$ SD = 27 $\pm$ 8.40) among health care providers.<sup>5</sup> Though expensive, injection safety will reduce harm to patients, health care provider, community and will ease the burden of the health system. When providing health services, it is important to prevent the transmission of diseases every time at all level. At tertiary care level patient load is more because of weak primary health care delivery and referral of seriously ill patients with complications which results in more use of injection for therapeutic and diagnostic reasons. Awareness and extent of safety of injection practice is of utmost importance to reduce the harm to a minimum level. Few studies so far related to safe injection practice has been conducted in these hospitals of eastern part of India and no such studies were reported from Odisha and especially VSS Institution of Medical Sciences and Research in particular. On this backdrop, a rapid assessment of injection practice has been conducted with an aim to collect semi-quantitative and qualitative information regarding injection practices.

#### **Objectives**

- 1) To identify the determinants of injection practice.
- 2) To find out the indicators of injection safety.
- 3) To find out the outcome indicators of safe injection practice.

#### **METHODS**

This cross sectional study was conducted applying rapid assessment method and semi quantitative approach as per the "Injection Practices: Rapid Assessment And Response Guide, WHO, 2002 with slight modification from November 2016 to April 2017 in the hospital of VSS Institute of Medical Sciences and Research, Burla.<sup>6</sup>

### Study site

One site from each department was chosen from nine departments at random. Tenth study site was immunization clinic.

#### Study population

Injection prescribers, injection providers and general population were interviewed.

#### Sample size

Convenient sampling was applied to include 2 prescribers, 5 prescriptions from each prescriber, 2 providers and 100 people around the hospital. In order to

ensure representation of all ages and gender age groups of 5-14, 15-29, 30-49, 50 and above were structured and in each age group 12 participants of either sex were included.

#### Tools and methods

Five data collection instruments (instrument 3, 4, 5 were used in this study) of rapid assessment and review guide and injection safety checklist were used for observation of injection practice after pre-test.<sup>6</sup> Interview schedules were translated into Odia language for the convenience of the general population.

# Study technique

At the outset, injection provider present over the study sites were explained about the purpose of the study and whoever among them gave consent were interviewed. Again, two injection providers who gave their consent to participate were interviewed and their injection practices were observed. Lastly general population were interviewed.

#### Data collection

Prescribers were interviewed to find out average no of injection prescribed by them per prescription, awareness about injection safety, preference towards injection and type of injection provider. Prescriptions from the prescribers were collected to calculate the proportion of prescriptions in relation to essential drug list. Similarly, standardized rapid assessment instruments were used to collect information from injection providers and from the population including observation of their injection procedure of the provider.

#### Statistical analysis

Proportion, ratio, averages and rates were used in the present study.

#### Data analysis

Outcome indicators such as OT8 indicator, key indicators of injection safety and determinants of injection practice were analyzed as per rapid assessment and review guide and injection safety checklist.<sup>6,7</sup>

# Ethical clearance

Ethical clearance was obtained from the ethical committee of the institute and due permission was taken from the superintendent of the hospital.

# **RESULTS**

Data collected from the prescribers, providers and general population were refined and presented below.

In this table determinants of injection practice were presented. Knowledge about possibility of transmission of HIV/HBV due to unsafe injection practice was found to cent per cent among doctors which was 100% among nurses and 80% and 40% respectively among general population. Regarding HCV transmission all prescribers were aware of possibility of transmission of HCV

followed by nurses (80%) and none of the general population was aware of it. Proportion of injection providers reporting sufficient supplies of injection equipment and sharps containers was 90% and 80% respectively. However 100 per cent of injection providers reported that they have access to a sharps waste disposal facility (Table 1).

**Table 1: Determinants of injection practice.** 

ators Percentage (%)					
The possibility of injection associated HBV, HCV, and HIV infection	HIV, HBV, HCV				
Prescriber	100, 100, 100				
Provider	100, 100, 80				
Population	80, 40, 00				
Preference for injections					
Prescribers reporting patients' preference	54				
Patients reporting preference (population data) 38					
The proportion of injection providers reporting sufficient supplies of					
Injection equipment	90				
Sharps containers	80				
Access to a sharps waste disposal facility (providers' data)	100				

Table 2: Safe injection practice by injection providers (N=20).

Task during injection practice	Percentage (%)
sterile syringe and needle used	100
Gloves not used in case IV injection/blood transfusion	60
Needle that is touched are used	10
Glass ampoule opened with bare hands	10
Needle recapped	50
Needle not disposed in hub cutter	10

Table 3: Community's experience about injection safety (N=33).

Community's experience	Percentage (%)				
Population who recalled receiving their last injection					
Clinic	30				
At home	9				
Injection provider other than doctor/nurse	21				
Blister pack used	45.5				
Recapping	3				

Table 4: Injection practices: outcome indicators related to injection use.

Indicators	Percentage (%)
Prescriber data	
OT8 indicator (the number of prescriptions with at least one injection, out of the total of prescription surveyed".)	26.7
Prescriber data: the ratio of therapeutic/immunization injections	4:1
Population data	
The ratio of therapeutic/immunization injections	3.3:1
The proportion of the population who received an injection in the last three months	37.5
Population data: average number of injections per person and per year	1

**Table 5: Prescription indicators.** 

Type of drug	As per essential drug list				
Antibiotics	Yes		No		
	Number	Percentage (%)	Number	Percentage (%)	
Yes (174)	78	44.8	96	55.2	
No (214)	133	62.1	81	37.9	
Total (388)	211	54.4	177	45.6	

On observation of the injection practice of the providers it was found that all of them were using sterile syringe and needle though 60% of them were seen not using gloves in case IV injection/blood transfusion and needle recapping was done by half of them. Ten per cent of them used the needle after being touched; opened glass ampoule with bare hands and needle left undisputed in hub cutter after use (Table 2).

On analysis of community's experience about injection safety (Table 3) 30% and 9% of population recalled receiving their last injection at clinic and home respectively. An injection provider other than doctor and nurse as reported by the people was 21%. Around forty six per cent of people recalled that blister packs were used when injections were given to them and only one of them (3%) of them reported about needle recapping.

OT8 indicator was 26.7% and ratio of therapeutic/immunization injections were 4:1 and 3.3:1 as per the prescribers and population respectively. The proportion of the population who received an injection in the last three months was 37.5% (33) and average number of injections per person based on the population data was 1 injection per annum.

A total of 388 medicines were found in 100 prescriptions out of which 174 were antibiotics and 214 were non antibiotics. Average number of medicines prescribed per patient was 3.9 More than half (54.4%) of the drugs were found in essential drug list. Less percentage of antibiotics prescribed (44.8%) were as per essential drug list compared to the non-antibiotics (62.1%) (Table 5).

# DISCUSSION

Rapid appraisal of injection practice was conducted at VSS Institute of Medical Sciences and Research, Burla focusing on safe injection practice, prescription analysis, awareness of nurses and community about injection practice.

On assessment of determinants of injection practice which has a bearing on injection safety our study revealed that awareness among prescribers about the possibility of transmission of blood borne pathogens like HIV, HBV and HCV due to use of dirty syringe was 100 per cent whereas it was 95.7%, 96.2% and 96.2% respectively doctors of Karachi, Pakistan according to Ameet.<sup>8</sup> In this regard, providers (nurses)'s awareness

was 100%, 100% and 80% respectively which was higher than that of the counterparts of Chhattisgarh (77.4%, 33.8%, 1.6%), Surat (90%, 80% and 30%) and Karachi, Pakistan (82.1%, 78.6% and 78.2%) respectively. In Surat 10% of nurses were totally unaware of this transmission. <sup>10</sup>

Among general population 80%, 40% were of the opinion that HIV and HBV could be transmitted by dirty syringe. In Cambodia, higher percentage (95%) people compared to ours had Knowledge of HIV transmission through "dirty" syringes which might be because of higher prevalence of HIV in that country and in adjacent Vietnam than India.<sup>11</sup>

We found that 54% of prescribers reported patient's preference for injection whereas it was 38% among general population. proportion of injection providers reporting sufficient supplies of injection equipment and sharp container in the present study was 90% and 80% respectively though 100% of providers had access to a sharps waste disposal facility. In spite of inadequate supply of sharp container the providers reported they had access to sharp containers. However, it was observed that in each unit duty room of providers were situated in the middle and sharp waste disposal equipments were placed there. Hence, a provider has to cover around 50 meters from one rear end of the unit to dispose the sharp which might harm the provider.

We observed that sterile syringe and needle were used by all. Sixty per cent of the providers were not using gloves in case IV injection/blood transfusion which was higher than the findings of other studies i.e. 43.1% and35% respectively. Fifty per cent of our providers found recapping needles during injection practice which was consistent with the findings of Nayak whereas in Chhatisgarh it was only 33.1% and in Rajkot, Gujarat it was still less (9.35%). However, in Cambodia and Nigeria, recapping of needle and syringe was higher than ours i.e. 58% and 12 (70.5%). Ten per cent of them used the needle after being touched; opened glass ampoule with bare hands and needle left undisputed in hub cutter after use.

Our study revealed that 30% and 9% of population recalled receiving their last injection at clinic and home respectively unlike the study of Vong et al where it was found that majority (>85%) of injections were received in the private sector. We found that an injection provider other than doctor and nurse as reported by the people was

21 per cent. Around forty six per cent of people recalled that blister packs were used when injections were given to them. In Cambodia all participants i.e. 500 general populations who recalled their last injection reported that the injection was administered with a newly opened disposable syringe and needle and this difference might be due to their larger sample size compared to ours. However, higher percentage (58%) of them reported recapping of the needle after use compared to ours (1.3%).

OT8 indicator in our study was 26.6% and ratio of therapeutic/immunization injections were 4:1 and 3.3:1 as per the providers and population respectively was much higher i.e. OT8 indicator of 31% according to Yvan and therapeutic/immunization injections as per provider was 10.4:1 and 6.5:1 in a study conducted by Yvan and Rajasekharan. <sup>13,14</sup> We observed that the proportion of the population who received an injection in the last three months was 37.5%. Average number of injections per person based on the population data was 1 injection per annum which was less than findings of other studies which ranged from 2.1 to 2.4 per year) and it was 5.9 injections per person per year among the people of Cambodia. <sup>11,13,14</sup>

On analysis of prescriptions we found that average number of medicines prescribed per patient was 3.9 which was higher than that of Ofori-Asenso et al. <sup>15</sup> Out of 388 injections prescribed 54.4% were found in the essential drug list (EDL) unlike that of a teaching hospital of central Nepal where it was 474 (49.63%) and findings of the systemic review of African region was higher i.e. 88%. <sup>16</sup>

A total of 388 medicines were found in 100 prescriptions out of which 174 were antibiotics and 214 were non antibiotics. More than half (54.4%) of the drugs were found in essential drug list. Less percentage of antibiotics prescribed (44.8%) were as per essential drug list compared to the non-antibiotics. (62.1%) and percentage of medicines prescribed by generic name=68.0% (IQR 55.4–80.3), percentage of encounters with antibiotic prescribed=46.8% (IQR 33.7–62.8), percentage of encounters with injection prescribed=25.0% (IQR 18.7–39.5) and the percentage of medicines prescribed from essential medicines list=88.0% (IQR 76.3–94.1).

#### **CONCLUSION**

Sufficient supply of disposable needles and syringes, sharp containers and proper waste disposal mechanism has to be implemented which will enable the providers to adhere to good injection practices. Equipments for sharp disposal should be available in more numbers so that it becomes within the reach of the injection provider after each injection procedure is over.

There was a great disparity between knowledge and practice of health care workers regarding injection

practices such as recapping of needle, not using gloves etc. Prescribers' prescriptions should be rational in terms of injections.

In spite of staying in the vicinity of tertiary care hospital and district head quarter hospital awareness of people about injection safety and blood borne disease transmission is less.

There is an immediate need to reinforce the importance of safe practices periodically through training and motivation on safe injection practices and its disposal and a monitoring system has to be initiated to ensure injection safety in the hospital.

#### Recommendation

In depth study to ascertain the determinants of unsafe injection practice, needle stick injury should be conducted.

An immediate training and awareness programme on injection safety to all the nurses has to be conducted.

Early preventive intervention and reporting of NSI to hospital administration and supportive supervision within the Institution should also be essential part of injection safety.

Educational interventions emphasizing rational prescribing along with a multidirectional effort to create an updated local formulary and a strict antibiotic prescribing policy

To increase patient safety steps should be taken by engaging undergraduate and PG students to increase awareness of people about their role and importance in ensuring injection safety.

#### Limitations

Estimation of the frequency of injections may be underestimated by surveys conducted using this methodology because of a recall bias. Thus, estimates provided by population surveys could be compared to estimated obtained from other data sources if.

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