



ASSESSMENT OF SAFE INJECTION PRACTICES AND DISPOSAL METHODS AMONG NURSING PERSONNEL AT TERTIARY CARE HOSPITAL IN RAJNANDGAON CITY, CHHATTISGARH, INDIA

Dr. Divya Sahu	Professor and Head, Department of Community Medicine, Bharat Ratna Late Shri Atal Bihari Vajpayee Memorial Medical College, Rajnandgaon, Chhattisgarh
Dr. Dhiraj Bhawnani*	Associate Professor, Department of Community Medicine, Bharat Ratna Late Shri Atal Bihari Vajpayee Memorial Medical College, Rajnandgaon, Chhattisgarh *Corresponding Author
Dr. Abhishek Kumar Shukla	Resident, Department of Community Medicine, Bharat Ratna Late Shri Atal Bihari Vajpayee Memorial Medical College, Rajnandgaon, Chhattisgarh
Dr. Indu Padmey	Assistant Professor, Department of Community Medicine, Bharat Ratna Late Shri Atal Bihari Vajpayee Memorial Medical College, Rajnandgaon, Chhattisgarh
Dr. Ritika Tamboli	Resident, Department of Community Medicine, Bharat Ratna Late Shri Atal Bihari Vajpayee Memorial Medical College, Rajnandgaon, Chhattisgarh
Mrs. Pallavie Gullhane	Statistician cum Demonstrator, Department of Community Medicine, Bharat Ratna Late Shri Atal Bihari Vajpayee Memorial Medical College, Rajnandgaon, Chhattisgarh

ABSTRACT

Background: Blood-borne pathogen transmission is associated with unsafe injection practices. It is estimated that each year due to inappropriate and preventable accidents, hundreds of thousands of healthcare workers are at risk of contracting diseases such as hepatitis B and hepatitis C and human immunodeficiency virus (HIV), Needlestick injury (NSI) and mucosal infection **Objectives:** To estimate knowledge and practice of injection safety among injection providers. To obtain information about the disposal of injectable devices. **Materials and Methods:** A cross-sectional survey of 34 nurses was done in their working hours and 170 observations were made in pre-designed pre-tested proforma in a tertiary care hospital in Rajnandgaon city, Chhattisgarh. Microsoft Excel and IBM SPSS 22 were used to analyse the data. **Results:** Injection provider's knowledge about risk of transmission of pathogens like HIV was 91.2%, for HBV was 100%, and for HCV was 55.9%. While knowledge about safe injection practices, nursing personnel not touching the needle was 96.47% while administering injection, clean barrier used to protect fingers when breaking glass ampoules was 80% and practices observed where providers wore gloves was 96.47%, washed hands after administering injection was 88.23%, recapping of needle was done 69.41% and Biomedical waste segregation done at source was 77.05%. **Conclusion:** Even though study findings showed good practice related to injection safety among the nursing personnel, but still improvement is required to fulfil the gap in knowledge and attitude of the health care providers to keep unsafe injection practices to the minimum level.

KEYWORDS : Injection Providers, Knowledge, Practice, Safe Injection.

INTRODUCTION

World Health Organization (WHO) define safe injection as the one which does not harm the recipient, does not expose the provider to avoidable risk, and does not result in waste that is dangerous for the other people¹.

This is achieved by utilizing sterile equipment (such as a syringe, needle, etc.), applying sterile technique under the supervision of a certified and experienced individual, and disposing of used equipment in puncture-proof containers made especially for this purpose. Any flaw in the procedure makes the injection dangerous. Sizeable studies in India have identified unsafe practices and blood borne viral infections have been attributed to unsafe injection practices. Blood-borne pathogen transmission is associated with unsafe injection practices, leading to a significant public health issue on a global scale².

It is estimated that each year due to inappropriate and preventable accidents, hundreds of thousands of healthcare workers are at risk of contracting diseases such as hepatitis B and hepatitis C and human immunodeficiency virus (HIV), Needlestick injury (NSI) and mucosal infection³.

Each year, 40% of cases of hepatitis C, 32% of cases of hepatitis B, and 5% of cases of HIV infections are caused by inappropriate medical injections worldwide⁴.

Unsafe injection practices are a complicated, multi-factorial issue⁵. A lot of unnecessary injections are administered because patients believe injections to be more effective and fast-acting than oral drugs, and doctors overprescribe them⁶.

Further, knowledge regarding injection safety among injection prescribers, providers and consumers is often subnormal. Thus, this study was conducted to assess the knowledge and practice about safe injection among injection providers in a tertiary care hospital.

MATERIAL AND METHODS

Study Design and Setting

An institutional based cross sectional study was conducted among the Nursing Personnel, who are mainly involved in injection practices routinely excluding doctors of Bharat Ratna Late Shri Atal Bihari Vajpayee Memorial Medical College, Rajnandgaon, Chhattisgarh. Study was conducted for a period of three month, July 2024 to September 2024.

Study Participants

From the study hospital four departments where injection procedures were frequently practiced were selected, Study participants included: nurses working in the purposively selected four departments i.e. Medicine, Surgery, Orthopaedics and Emergency.

Sample Size

The sample size for the present study was calculated by using the formula $(1.96)^2 pq / d^2$, with allowable error of 8 %. For the proposed study by considering 95% confidence level, the number of observations came out to be 132.09. Taking 10% non-response rate the final sample size set to be 170 Observations.

Inclusion Criteria

Inclusion criteria were Nurses working in the tertiary care hospital in Rajnandgaon city, Chhattisgarh; On the day of data collection who will be present at hospital and willing to participate.

Exclusion Criteria

Nursing Personnel who were not willing to participate; Absent on the day of survey were excluded from the study.

Methods of Data Collection

After obtaining written informed consent from the Nursing Personnel, they were interviewed in the form of Self-administered questionnaire (SAQ). WHO tool C was used for SAQ with modification. Primary

data was collected using SAQ technique from all the 34 Nursing Personnel. Moreover, 170 observations of injection administration were made for assessing the practices.

Method of Data Analysis

The collected primary data was analyzed using Microsoft Excel and Statistical Package for the Social Sciences (SPSS version 22).

RESULTS:

Table 1: Socio-demographic Characteristics of the Study Population

Socio-demographic characteristics	Number	Percentage
Age (in Years)		
20-25	16	47.1%
26-30	6	17.6%
31-35	9	26.5%
>35	3	8.8%
Sex		
Male	4	11.8%
Female	30	88.2%
Education		
B. Sc nursing	32	94.1%
M.Sc nursing	2	5.9%
Category		
ANM	0	0
GNM	0	0
Staff Nurse	34	100%
Department posted		
Medicine	16	47.1%
Surgery	11	32.4%
Orthopaedics	3	8.8%
Casualty	4	11.8%
Work experience		
<1 year	0	0
1-5 Years	22	64.7%
6-10 Years	8	23.5%
>10 Years	4	11.8%

Above table shows that a total of 34 nursing personnel who were involved in direct patient care were included in this study. The demographic characteristic of the study is shown in Table 1. Out of total 34 participants, majority 30(88.2%) were females, 4(11.8%) were male, 16(47.1%) were in the age of 20-25 years, 6(17.6%) were in the age of 26-30 years, 9(26.5%) were in the age of 31-35 years and 3(8.8%) were >35 years, 22(64.7%) had less than 5 years working experience.

Table 2: Knowledge Regarding Injection Safety

Sr No	Questions on Knowledge	Frequency
1	Where possible, is post-exposure Prophylactic medication for high-risk exposures provided? a) Yes	34(100%)
	b) No	0
2	What do you do if you have an accidental needlestick injury? a) Squeeze out blood and wash	2(5.9%)
	b) Wash hand with soap and water	30(88.2%)
	c) Antiseptic application	2(5.9%)
3	Any accidental needle-stick or sharps injuries have you had in the last six months? a) Yes	7(20.6%)
	b) No	27(79.4%)
4	Can you tell the names of diseases that are transmitted to health workers and patients by unsafe injections? a) Hepatitis B	34 (100%)
	b) Hepatitis C	19 (55.9%)
	c) HIV	31 (91.2%)
5	Have you yourself ever received the vaccine against Hepatitis B? a) Yes	22(64.70%)
	b) No	12(35.29%)

6	Do you have Training on injection safety in last two year? a) Yes	0
	b) No	34 (100%)
7	Do you have training on Biomedical waste in last 2 years? a) Yes	0
	b) No	34 (100%)

Response of nurses regarding their knowledge towards injection safety is tabulated in Table 2. All the respondents 34(100%) were aware of hepatitis B, 19(55.9%) were aware of Hepatitis C and 31(91.2%) were aware of HIV transmission through unsafe injection and After a NSI around 5.9% of the participants washed their hands after squeezing out blood from the puncture site. Number of subjects who washed their hands with soap and water were 88.2%, while 5.9% used antiseptic solution in case of accidental NSI. 12(35.29%) didn't take hepatitis B vaccination, and 7(20.6%) have needle stick injury in the last six months. None of them had attended injection safety and biomedical-waste management classes in last two years.

Table 3: Observations of Injection Practices Among the Study Participants. Observation of Injection Practices

Sr No	Injection practices observed	Total observations made	Practices observed to be followed (in numbers)	Percentage of injection practices observed to be followed (in %)
Practices observed prior to injection administration				
1	Preparation of Injections on a Clean Worktable or Tray	170	118	69.41%
2	Washed hands before administering injection	170	79	46.47%
3	Gloves used prior to beginning of injection session (gloves were not changed in between the session)	170	157	92.35%
4	Consent taken before administering injection	170	106	62.35%
5	Cleaning of patient skin before injection	170	161	94.70%
Practices observed during injection administration				
6	Touching of needle was not done.	170	164	96.47%
7	Reusing of needle was not done.	170	170	100%
8	Reusing syringe by changing the needle was not done.	170	170	100%
9	Use of clean barriers to protect fingers when breaking glass ampoules	170	136	80%
Practices observed after injection administration				
10	Recapping of needles after injection administration	170	118	69.41%
11	Rubbing after administering intramuscular injection	170	64	37.64%
12	Washed hands after administering injection	170	150	88.23%
13	Needle cutter used after giving injection	170	135	79.41%

13	Biomedical waste segregation at source	170	131	77.05%
----	--	-----	-----	--------

Practices associated with injection administration process had been divided into three categories namely practices prior to, during and after injection administration. Participants observed from the time they started preparing the injections and till the time of its biomedical segregation, these observations of injection practices are presented in Table 3.

In the first category which included practices prior to administration, around one third of the injections were not prepared on clean worktable or tray, Nursing personnel did not perform hand wash before administering injections was 46.47% and more than two third (92.35%) of the providers wore gloves.

In the second category Practices observed during injection practices, touching of needle was not done (96.47%), there is no syringe reused by changing the needle and around two third (80%) were using clean barriers to protect fingers while breaking glass ampoules.

In third category, recapping of needle was done (69.4%), in around one third (37.6%) rubbing done after administering intramuscular injection, (88.2%) hand Washed done after administering injection, Needle cutter used after giving injection was 79.415% and Biomedical waste segregation at source done was 77.05%.

DISCUSSION

The present cross-sectional study assessed the knowledge and practices related to safe injection and biomedical waste disposal among nursing personnel in a tertiary care hospital of Rajnandgaon, Chhattisgarh. The findings revealed that while most participants demonstrated adequate awareness about injection safety, several critical gaps were identified in practical implementation, particularly in hand hygiene and waste disposal practices.

In the current study, 100% of participants were aware of hepatitis B transmission through unsafe injections, and a majority recognized HIV (91.2%) and hepatitis C (55.9%) as transmissible infections. These results are consistent with studies by Datta et al. (2018)⁴ and Ganesh et al. (2015)⁷, which also reported high awareness regarding transmission of blood-borne infections among healthcare workers. However, despite this knowledge, 35.3% of participants had not received the hepatitis B vaccination, similar to the findings of Kulkarni et al. (2016)⁸, highlighting persisting gaps between knowledge and preventive practice.

With respect to safe injection practices, 46.47% of nurses washed their hands before injection, while 88.23% washed hands after administration. This pattern of suboptimal pre-procedure hygiene aligns with observations by Sahu and Gandhi (2015)² and Chaudhuri and Ray (2016)¹, where pre-injection handwashing compliance was reported to be below 50%. Although 92.35% of nurses used gloves, the fact that gloves were not changed between sessions suggests the need for improved procedural standardization.

Encouragingly, no instances of syringe or needle reuse were observed, showing adherence to one of the most crucial aspects of injection safety. Similar results were observed in studies conducted in Delhi (Siwan et al., 2015)³ and Tripura (Datta et al., 2018)⁴, indicating successful implementation of single-use injection devices in tertiary care settings. However, recapping of needles after use was still observed in 69.41% of cases, which significantly increases the risk of needlestick injuries (NSIs). This agrees with findings from Ganesh et al. (2015)⁷, where 60–70% of healthcare workers practiced recapping despite awareness of its risks.

Regarding post-injection waste disposal, 77.05% correctly segregated biomedical waste at source, and 79.41% used needle cutters, reflecting moderate compliance. Similar results were documented by Kulkarni et al. (2016)⁸ in Maharashtra, where correct segregation was found among 75% of nursing personnel. However, none of the participants had received training on injection safety or biomedical waste management in the past two years, emphasizing a major institutional gap. Continuous professional training programs have been shown to significantly improve safe practices, as noted by Reeler (2000)⁹ and WHO (2002).

Overall, the study demonstrates that while basic knowledge of injection safety is satisfactory, consistent adherence to safe practices

and regular refresher training remain crucial areas for improvement. Strengthening institutional policies, supervision, and training programs could substantially reduce occupational exposure risks among nursing personnel.

CONCLUSION

The study revealed that the participants had average level of knowledge about injection safety but there is gap on their practices, most of participant's service experience was less than 5 years, which may be the one of the cause for poor practices. Need of regular training and close supervision are the main determinants for improve the knowledge and practices of nurse.

ACKNOWLEDGEMENTS

The authors are highly thankful to the faculties and staff of Department of Community Medicine, Bharat Ratna Late Shri Atal Bihari Vajpayee Memorial Medical College, Rajnandgaon (C.G) and Nursing Medical college, Rajnandgaon (C.G.), India for their cooperation and support during the entire study period. Authors acknowledge the immense help received from the scholars whose articles are cited and included in references of this manuscript. The authors are also grateful to authors/editors/publishers of all those articles, journals and books from where the literature for this article has been reviewed and discussed.

Funding: No funding sources

Conflict of Interest: None declared

REFERENCES

1. Chaudhuri SB, Ray K. Safe injection practices in primary health care settings of Naxalbari Block, Darjeeling district, West Bengal. *Journal of Clinical and Diagnostic Research: JCDR*. 2016 Jan;10(1):LC21.
2. Sahu D, Gandhi N. Assessment of safe injection practices in a tertiary care hospital: a cross-sectional study from Chhattisgarh. *National Journal of Community Medicine*. 2015 Dec 31;6(04):500-3.
3. Siwan RM, Das JK, Gupta S. A study on safe injection practices among healthcare professionals in a tertiary care hospital in Delhi.
4. Datta A, Nag K, Karmakar N, Chakraborty T. An epidemiological study on knowledge, attitude and practice of injection safety among health care personnel in a tertiary care hospital of Tripura. *International Journal of Community Medicine and Public Health*. 2018 Sep;5(9):4128-34.
5. Reeler AV. Anthropological perspectives on injections: a review. *Bull World Health Organization* 2000;78: 135-43
6. WHO fact sheet no.231 safety of injections. 2002. Available from: <http://www.int/inffs/en/fact231.html>. last accessed on 19.10.2015
7. Ganesh SA, Raghunath N, Balaji SK. Assessment of safe injection practices and disposal methods among nursing personnel at health care centres of Hoskote-Rural Bengaluru, India. *Journal of Indian Association of Public Health Dentistry*. 2015 Oct 1;13(4):475-8.
8. Kulkarni RS, Giri PA, Gangwal PR. Injection safety: Knowledge and practices among nursing personnel in tertiary care teaching hospital of Marathwada region of Maharashtra, India. *Archives of Community Medicine & Public Health*. 2016 Jun 25;21(1):018-21.
9. Reeler AV. Anthropological perspectives on injections: a review. *Bulletin of the World Health Organization*. 2000 Jan;78(1):135-43.