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A study on assessment of practices which pose risk to waste handler in various health care settings of Kashmir valley

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Abstract

Background: WHO defines a safe injection as 'one that does not harm the recipient, does not expose the healthcare worker to any avoidable risks and does not result in any waste that is dangerous to the community. Breaks in safe injection practices coupled with overuse of injections may expose the recipients, healthcare workers or the community to several harms including life-threatening infections. Unsafe injections can transmit bacterial, viral (HBV, HCV and HIV) and parasitic (malaria) infections. Bio-medical waste (BMW) is defined as any waste, which is generated during the diagnosis, treatment or immunization of human beings or animals or in research activities pertaining thereto or in the production or testing of biologicals. Approximately 75-90% of the bio-medical waste is non-hazardous and as harmless as any other municipal waste. The remaining 10-25% is hazardous and can be injurious to humans or animals and deleterious to environment. Sharps which include needles are hazardous type of waste and need proper disposal at the site of generation. The Bio Medical Waste Management Rules (2018) should be used as a reference and followed carefully for sharps management.

Material and Methods: Cross sectional observational study conducted among 152 waste handlers in various health care settings of Kashmir valley over a period of six months. A validity tested questionnaire was used to gather information. Results are summarised and presented in the form of tables and chi (χ^2) test was used for test of association with statistical significance set at p-value of less than 0.05.

Results: In this study out of 152 waste handlers, majority (71.1%) of waste handlers were male. 78.4% belonged to the age group of 31-50 years. All the waste handlers were illiterate. Only a small percentage (3.9%) was trained in waste handling. In 40.1% of the facilities protective measures for waste handlers in the form of only latex gloves was available. Only 23.7% of these waste handlers had received Hepatitis B vaccine. Out of these 58.3% had received three doses, 30.6% two doses and 11.1% one dose of the vaccine. Majority (86.2%) of the waste handlers carried waste bags by hand while only 13.8% used Lorries. In only 6.6% of waste handlers needles were seen piercing out of the waste bags. 98.7% of waste handlers were not aware about different colors of polybags and their purpose. In 48% of the cases separate polybags were used for disposal. 23.7% of the waste handlers had received a needle stick injury in last 6months while waste collection.

Conclusion: None of the waste handlers were wearing protective gear. PPE in the form of only latex gloves were available in 40.1% of the facilities. Waste handlers were not using protective gear; their knowledge about waste handling was poor and were not following BMW rules for waste management.

Keywords: waste handlers, bio-medical waste, injections

Introduction

WHO defines a safe injection as 'one that does not harm the recipient, does not expose the healthcare worker to any avoidable risks and does not result in any waste that is dangerous to community ^[1]. Breaks in safe injection practices coupled with overuse of injections may expose the recipients, healthcare workers or the community to several harms including life-threatening infections ^[2]. Unsafe injections can transmit bacterial, viral (HBV, HCV and HIV) and parasitic (malaria) infections ⁽²⁾. Every year at least 16 billion injections are administered worldwide and at least half of them are unsafe. People residing in South-East Asian region receive 1.5 to 11.3 injections per person per year ^[3]. The vast majority, around 90% of injections are given in curative care while immunization injections account for around 5%. The remaining includes indications like transfusion of blood and blood products,

intravenous administration of drugs and fluids and the administration of injectable contraceptives [4]. Bio-medical waste (BMW) is defined as any waste, which is generated during the diagnosis, treatment or immunization of human beings or animals or in research activities pertaining thereto or in the production or testing of biological [5]. Approximately 75-90% of the bio-medical waste is non-hazardous and as harmless as any other municipal waste. The remaining 10-25% is hazardous and can be injurious to humans or animals and deleterious to environment [6]. Sharps which include needles are hazardous type of waste and need proper disposal at the site of generation. The Bio Medical Waste Management Rules (2016) should be used as a reference and followed carefully for sharps management.

Methods

A cross sectional observational study conducted among 152 waste handlers in various health care settings of Kashmir valley over a period of six months. A validity tested questionnaire was used to gather information. The first part consisted of questions on general characteristics of waste handlers including gender, age, literacy, training received, protective equipment available in facilities, hepatitis B vaccination status and no. of doses of vaccine received. The second part contained questions on assessment of risk to waste handler by level, type and location of health facility.

Ethical considerations

Ethical clearance was obtained from the Institutional Ethics Committee. Besides this

1. Proper permission in writing was sought from the Director SKIMS/Director Health Services Kashmir/Principal GMC Srinagar.
2. Written informed consent was taken from the Head/In charge of each facility.
3. Confidentiality was maintained at all times during the course of the study.

Statistical Analysis

The standard statistical test like chi square (χ^2) was applied where ever required. All the results obtained have been discussed on 5% level of significance i.e. a p value of < 0.05 has been considered significant. The analysis of the data was done using SPSS version 20.00, Chicago, USA for windows.

Results

Table 1 depicts general characteristics of waste handlers. Majority (71.1%) of waste handlers were male. 78.4% belonged to the age group of 31-50 years. All the waste handlers were illiterate. Only a small percentage (3.9%) was trained in waste handling. In 40.1% of the facilities protective measures for waste handlers in the form of only

latex gloves was available. Only 23.7% of these waste handlers had received Hepatitis B vaccine. Out of these 58.3% had received three doses, 30.6% two doses and 11.1% one dose of the vaccine (fig. 1).

Table 2, 3, 4 shows that none of the waste handler was wearing puncture proof gloves nor was he/she in clothes proper for waste collection. Majority (86.2%) of the waste handlers carried waste bags by hand while only 13.8% used Lorries. The difference with regard to the same was statistically significant ($p=0.013$) by location of facility. In only 6.6% of waste handlers needles were seen piercing out of the waste bags. However the difference with regard to this practice was not statistically significant by level, type and location of the facility. 98.7% of waste handlers were not aware about different colors of polybags and their purpose. Poorer knowledge levels were seen in primary level, private and rural facilities. In 48% of the cases separate polybags were used for disposal. This favorable practice was seen to be more prevalent at the secondary/tertiary level facilities (54.7%) and in urban health care settings (63.2%) and this difference by level and location was statistically significant ($p=0.000$ & 0.000 respectively). In 20.3% instances sharps were scattered and these scattered sharps were picked up by bare hands by the waste handlers. 23.7% of the waste handlers had received a needle stick injury in last 6months while waste collection. Needle stick exposure was seen more in secondary/tertiary, government and urban health facilities. However, the difference in this regard was statistically significant by type and location only ($p=0.003$ & 0.004 respectively).

Table 1: General information of Waste Handler (N=152)

		N	%
Gender	Male	108	71.1
	Female	44	28.9
Age	<20	6	3.9
	21-30	21	13.8
	31-40	62	40.9
	41-50	57	37.5
	51-60	6	3.9
Literacy	Literate	0	0.0
	Illiterate	152	100.0
Training received	Yes	6	3.9
	No	146	96.1
Protective equipment available in facilities	Yes (Latex gloves)	61	40.1
	No	91	59.9
Vaccinated against hepatitis B	Yes	36	23.7
	No	116	76.3
No. of doses of vaccine received (n=36)	One	4	11.1
	Two	11	30.6
	Three	21	58.3

Table 2: Assessment of risk to the waste handler by level of health facility

		Total		Level of facility				P-value
		N	%	Primary		Secondary/Tertiary		
				n	%	n	%	
Was he /she wearing puncture proof gloves while collecting waste (n=152)	Yes	0	0.0	0	0.0	0	0.0	0.410
	No	152	100.0	24	100.0	128	100.0	
Was he/she in clothes proper for waste collection (n=152)	Yes	0	0.0	0	0.0	0	0.0	0.410
	No	152	100.0	24	100.0	128	100.0	
Waste bags were carried on/ in/by (n=152)	Lorry	21	13.8	0	0.0	21	16.4	0.115
	Hands	131	86.2	24	100.0	107	83.6	

Were there any needles piercing out of the waste bags (n=152)	Yes	10	6.6	2	8.3	8	6.2	0.706
	No	142	93.4	22	91.7	120	93.8	
Did he/she seem aware about the different colors of polybags and their purpose (n=152)	Yes	2	1.3	0	0.0	2	1.6	0.983
	No	150	98.7	24	100.0	126	98.4	
Whether separate polybags were used for disposal (n=152)	Yes	73	48.0	3	12.5	70	54.7	0.000
	No	79	52.0	21	87.5	58	45.3	
If any sharps were scattered, how did he/she pick it up (n=31)	With bare hands	31	100.0	4	100.0	27	100.0	0.380
	With gloved hands	0	0.0	0	0.0	0	0.0	
Had he/she accidental needle-stick or sharp injuries in the last six months (n=152)	Yes	36	23.7	2	8.3	34	26.6	0.071
	No	116	76.3	22	91.7	94	73.4	

Table 3: Assessment of risk to the waste handler by type of health facility

		Total		Type of facility				P-value
		N	%	Govt.		Private		
				n	%	n	%	
Was he /she wearing puncture proof gloves while collecting waste (n=152)	Yes	0	0.0	0	0.0	0	0.0	1.000
	No	152	100.0	76	100.0	76	100.0	
Was he/she in clothes proper for waste collection (n=152)	Yes	0	0.0	0	0.0	0	0.0	1.000
	No	152	100.0	76	100.0	76	100.0	
Waste bags were carried on/ in/by (n=152)	Lorry	21	13.8	13	17.1	8	10.5	0.243
	Hands	131	86.2	63	82.9	68	89.5	
Were there any needles piercing out of the waste bags (n=152)	Yes	10	6.6	5	6.6	5	6.6	1.000
	No	142	93.4	71	93.4	71	93.4	
Did he/she seem aware about the different colors of polybags and their purpose (n=152)	Yes	2	1.3	2	2.6	0	0.0	0.293
	No	150	98.7	74	97.4	76	100.0	
Whether separate polybags were used for disposal (n=152)	Yes	73	48.0	34	44.7	39	51.3	0.417
	No	79	52.0	42	55.3	37	48.7	
If any sharps were scattered, how did he/she pick it up (n=31)	With bare hands	31	100.0	18	100.0	13	100.0	0.876
	With gloved hands	0	0.0	0	0.0	0	0.0	
Had he/she accidental needle-stick or sharp injuries in the last six months (n=152)	Yes	36	23.7	26	34.2	10	13.2	0.003
	No	116	76.3	50	65.8	66	86.8	

Table 4: Assessment of risk to the waste handler by location of health facility (rural/urban)

		Total		Location/District				P-value
		N	%	Rural		Urban		
				n	%	n	%	
Was he /she wearing puncture proof gloves while collecting waste (n=152)	Yes	0	0.0	0	0.0	0	0.0	1.000
	No	152	100.0	76	100.0	76	100.0	
Was he/she in clothes proper for waste collection (n=152)	Yes	0	0.0	0	0.0	0	0.0	1.000
	No	152	100.0	76	100.0	76	100.0	
Waste bags were carried on/ in/by (n=152)	Lorry	21	13.8	5	6.6	16	21.1	0.013
	Hands	131	86.2	71	93.4	60	78.9	
Were there any needles piercing out of the waste bags (n=152)	Yes	10	6.6	4	6.3	6	7.9	0.515
	No	142	93.4	72	93.7	70	92.1	
Did he/she seem aware about the different colors of polybags and their purpose (n=152)	Yes	2	1.3	0	0.0	2	2.6	0.293
	No	150	98.7	76	100.0	74	97.4	
Whether separate polybags were used for disposal (n=152)	Yes	73	48.0	25	32.9	48	63.2	0.000
	No	79	52.0	51	67.1	28	36.8	
If any sharps were scattered, how did he/she pick it up (n=31)	With bare hands	31	100.0	22	100.0	9	100.0	0.672
	With gloved hands	0	0.0	0	0.0	0	0.0	
Had he/she accidental needle-stick or sharp injuries in the last six months (n=152)	Yes	36	23.7	10	13.3	26	33.8	0.004
	No	116	76.3	65	86.7	51	66.2	

Discussion

General Information of Waste Handlers

In our study 71.1% of waste handlers were males and 54.7% in the age group of 20-40years which was contrary to the USAID baseline report 2011, where 65% belonged to female gender. In this report, 50% belonged to the age group of 20-40years which was in accordance with our study [7]. In our study only 3.9% of waste handlers had received training on safer ways of handling and disposing of biomedical waste. According to USAID baseline report 2011 and a study by Chowdhury AKA *et al*, 13.8% and

10.4% respectively had received training in this regard [7, 8]. In 40.1% facilities in our study protective equipment in the form of only latex gloves was available for waste handler. This was in accordance with USAID baseline report 2011, where 45% of waste handlers mentioned the availability of latex gloves as form of protective equipment [7]. Only 23.7% of waste handlers in our study had received hepatitis B vaccine. Out of these 58.3% had received three doses. However as per USAID baseline report 2011, 40% of waste handlers had received hepatitis B vaccine and among these 34.4% had received all the three doses [7]. This was in

contradiction with the study of Chowdhury AKA *et al.* from Bangladesh where only 4.2% of waste handlers had received all three doses of Hepatitis B vaccine [8].

Risk to the waste handler

Waste handlers are vulnerable to the risks associated with handling injection related waste. The safety of waste handlers will be reflected by the practices adopted by them while handling this infectious waste. In our study it was observed that in majority of facilities the waste handlers resorted to unsafe practices due to lack of knowledge/training.

None of the waste handlers in our study used protective gear during waste collection which was due to non-availability of appropriate protective gear in the health facility. Other unsafe practices which predominated included: waste bags being carried by bare hands (86.2%) and difference being statistically significant by location of facility ($p=0.013$), lack of awareness about color and purpose of polybags (98.7%), not practicing waste segregation (52%) difference being statistically significant by level and location of facility ($p=0.000$ and 0.000) and picking up scattered sharps with bare hands observed by all waste handlers. 23.7% reported exposure to NSI (Needle Stick Injury) which could be a reflection of unsafe practices during injection related waste handling. A striking feature of our study was that majority (96.1%) of the waste handlers had not received any training regarding handling of infectious waste. Only 23.7% of waste handlers were vaccinated against HBV thus posing these waste handlers to the risk of blood borne infections. In a USAID baseline report 2011, it was observed that only 13.8% of waste handlers had received training on waste handling and 66% of them had used any one of PPE (Personal Protective Equipment). Hepatitis B vaccine was received by 40% of waste handlers and 13.7% had suffered needle stick injury [7]. Ismail IM *et al* from Karnataka reported non-use of PPE in 70% of waste handlers, 66.67% had history of NSI and none of these waste handlers were vaccinated against HBV. Only 16.67% of waste handlers had correct knowledge regarding colour coding for waste segregation [9]. NSI as reported by Jahnvi R *et al* was 28.2% [10] while as Sharma S *et al* from Agra reported a history of NSI in 19% [11].

Conclusion

- 71.1% of waste handlers were males. All were illiterate and only 3.9% were trained in waste handling. 23.7% of them had history of needle stick injury in last 6 months. 23.7% had received hepatitis B vaccine out of which 58.3% had received three doses. 98.7% of waste handlers were not aware about different colors of polybags and their purpose.
- None of the waste handlers were wearing protective gear. PPE in the form of only latex gloves were available in 40.1% of the facilities. Majority (86.2%) of waste handlers carried waste bags by hand and 20.3% picked scattered sharps by bare hands. In 6.6% needles were seen piercing out of the waste bags.
- Waste handlers were not using protective gear, their knowledge about waste handling was poor and were not following BMW rules for waste management.

Recommendation

- There is a need to establish a proper system of reporting

and documentation of NSI at the health facilities which should be the responsibility of the Infection Control Committee (ICC). The committee will ensure availability of adequate logistics for the provision of post-exposure prophylaxis (PEP) as and when needed.

- Advocate for appropriate policy and guidelines to ensure that all health care providers who are in contact with injection equipment receive the full course of the hepatitis B vaccination followed by post vaccination hepatitis B antibody titers to be done to ensure that they are protected. This whole should be documented in a proper hepatitis B vaccination card.
- Ensure availability of personal protective equipment for injection providers as well as waste handlers and strictly enforce their use.
- A continuous uninterrupted supply of hepatitis B vaccine, hepatitis B immunoglobulin (HBIG) and antiretroviral drugs at selected health facilities to be kept available within the facility and for health care providers of lower level facilities as and when needed with a proper referral mechanism in place.
- Puncture proof sharps containers, needle destroyers, colour coded dustbins should be kept available in all areas where injections are administered. Besides this facilities for safe terminal disposal of waste should be available and utilized in a scientific way.
- IEC material on injection safety should be displayed in the working areas of healthcare providers.

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