

Managing immunisation waste in a tertiary healthcare facility

Kumari R¹, Jurel SK², Srivastava K³, Wakhlu A⁴, Singh A⁵

¹**Dr Reema kumari**
Associate Professor
Dept. of Community Medicine &
Public Health

²**Dr Sunit kumar Jurel**
Assistant Professor
Dept. of Prosthodontics

³**Dr Kirti Srivastava**
Associate Professor
Dept. of Radiotherapy

⁴**Dr Anupam Wakhlu**
Assistant Professor
Dept. of Rheumatology

⁵**Dr Anshita Singh**
Ph.D Scholar
^{1,2,3,4,5}King George Medical University
Lucknow, Uttar Pradesh, India

Received: 21-10-2012

Revised: 21-11-2012

Accepted: 26-12-2012

Correspondence to:
DR. Reema Kumari
reema_tua05@yahoo.co.in

ABSTRACT

Immunisation protects children and adults against harmful infections before they come into contact with them in the community. Immunisation is given as an injection or, in the case of polio vaccine, taken as drops by mouth. The waste generated during the whole immunisation process must be disposed off properly. Improper waste disposal leads to serious health risks to recipients, health workers and the public. In King George's Medical University (KGMU) immunisation programmes are conducted regularly. Waste generated during the process are properly mutilated, collected, transported and disposed off. In KGMU a well established biomedical waste management system which disposed offs the waste as per the norms and legislation.

Key Words: Immunisation, biomedical waste, management

Introduction

The management of waste from healthcare facility and immunisation programmes is serious public health concern. According to the World Health Organization, 16 billion injections are given each year in developing countries. According to Assessment of Injection Practices in India (AIPI) conducted by the International Clinical Epidemiology Programme Evaluation Network (IPEN), nearly 300 crore injections are given in India annually. [1] The huge amount of injections and introducing autodisable syringes further leads to the problem of disposal of injection related waste

materials. According to WHO (World Health Organization) estimates that each year there are about 8 to 16 million new cases of Hepatitis B virus (HBV), 2.3 to 4.7 million cases of Hepatitis C virus (HCV) and 80,000 to 160,000 cases of human immune deficiency virus (HIV) due to unsafe injections and mostly due to very poor waste management systems. [2, 3] The Ministry of Environment and Forests notified the "Biomedical Waste (Management and Handling) Rules, 1998" in July 1998. [4] In accordance with these rules, it is mandatory for the producer of biomedical waste to ensure its safe disposal. The World Health Organization

reports that the number of sharp and needlestick injuries per person among healthcare staff is 4 per year in Africa, Western Mediterranean and Asia. [5]

According to IPEN study in India [6] (2012) three billion injections are estimated to be administered annually in India; of them 1.89 billion were unsafe. According to WHO – a safe injection does not harm the recipient, does not expose the provider to any avoidable risk, and does not result in any waste that is dangerous for the community. At least 50% of the worlds 16 billion injections administered each year are unsafe-posing serious health risks to recipients, health workers and the public. Most injections given for therapeutic may be unnecessary, ineffective or inappropriate. The safe disposal of used needles and syringes is a critical component of any vaccination programme if infection is to be prevented.

NEED FOR MANAGING IMMUNISATION WASTE

Sharp and needle stick injuries are important problems for healthcare workers as they increase the risk of spread of infection, [7] thus an urgent need to dispose injections related waste and to prevent infections from blood born pathogens. The different risks associated with unsafe injections are:

- **Occupational risk** - Health care personnel and waste handlers are exposed to the risk of diseases and injuries during waste collection and transportation if not handled properly, risk can occur if sharps are not collected and transported in puncture proof container, no mutilation of

sharps done, no personal protective devices used, no disinfection process.

- **Community risk** - The reuse of syringe by the general public is one of the greatest public health related to the health care waste in developing world. WHO estimates that, in 2000 worldwide, injections with contaminated syringes caused about 23 million infections of hepatitis B and C and HIV. [8]
- **Indirect Risk** via the Environment. AIR AND WATER POLLUTION CAUSED BY burning of waste and indiscriminate disposal of waste and can cause serious illness to people.

Central Pollution Control Board (CPCB) has formulated guidelines for disposal of bio-medical waste generated during Universal Immunization Programme. The categories of waste as per Schedule1 of the Biomedical Waste (Management and Handling) Rules, 1998 [4] which would be included as part of immunization waste is shown in Table 1

Due to the health and environment hazards associated with open burning and incineration, the immunisation waste management guidelines recommend only non burn technologies for treating immunisation wastes. This has been recognized globally by different government and international organisation. Sharp and needle stick injuries in healthcare staff are also important due to their frequency and because they may lead to the spread of infectious agents such as hepatitis B virus, hepatitis C virus and human immunodeficiency virus. [9,10] Present study is done in Healthcare institution with the objective to find solution to the



problem of managing waste from immunisation activities, to promote safe

injection practices according to Indian Regulations Act.

Waste Category	Description	Treatment Option (as per Rules/guidelines)	Disposal (as per Rules/guidelines)
4	Sharp waste	Chemical disinfection/ Autoclave/ Microwave/ Hydroclave and Mutilation	Recycling/Municipal landfill/ Deep burial
7	Plastic waste	Chemical disinfection/ Autoclave/ Microwave/ Hydroclave and Mutilation	Recycling/Municipal landfill
6	Bandages/ Swabs	Chemical disinfection/ Autoclave/ Microwave/ Hydroclave and Mutilation	Municipal landfill

Table 1: Waste Categories Generated due to Immunisation Waste

Methodology

King George Medical University, Lucknow, U.P, India is a premier 100 years old, 3000 bedded tertiary care Institution. Immunisation activities are conducted by the department of Community Medicine and Public Health of the University. Vaccines are stored at Ice-lined Refrigerator at Community Medicine department. There is a room allotted for performing immunisation session at Obstetric and Gynecology Department. Daily required vaccines are taken from the department by Lab technician and assistant in Vaccine carrier for the session. Vaccines are given continuously according to National Immunisation Schedule to the children up to five years age. Children



receive doses of BCG, DPT, Polio, Hepatitis B, Measles and Vitamin A.



Results

In the KGMU, the continuous immunisation programme is conducted according to National Immunisation Schedule. After the session most important part is the proper disposal of different type of waste generated during the immunisation process are: sharp waste, plastic, cotton swab and general waste, out of these sharp waste is the most critical part of waste should handle very carefully. During immunisation approximately 11,000 syringes used over a period of 6 month and large quantity of immunisation waste generated. (Table 2)

Month (Jan-june 2012)	Through Injection			Through Oral route	
	BCG, Hepatitis B,	DPT, Measles(n)	Polio,	Polio doses (n)	Vitamin A doses (n)
Total vaccine given	11,781			1,226	975

Table 2: Total Vaccine given from Jan to June, 2012

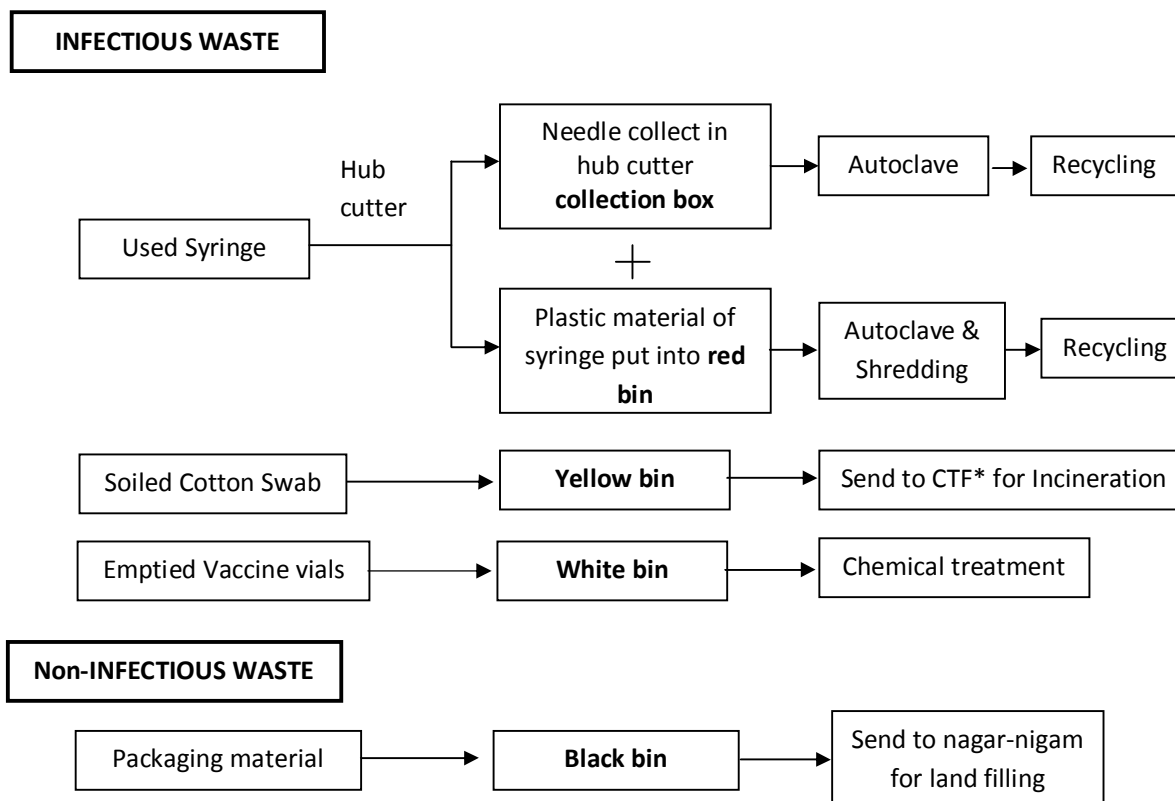


Fig. 1 Immunisation waste disposal process at KGMU

*Central Treatment Facility

Discussion

Steps for immunisation waste disposal:

- 1. Waste management at the Point of Generation:**

The appropriate immunisation process includes proper waste disposal. In KGMU, after injection immediate used syringe's needle cut with hub cutter. At the immunisation site four colour coded bins are placed for segregation at source along

with different posters that indicate which type waste goes in which colour of bin. The needle with hub automatically collects in the hub cutter collection box, remaining plastic part & covering wrapper of syringe goes into red & black bin respectively. Soiled cotton swab goes into yellow bin.

2. Collection of waste & transportation to Central Collection & Treatment Site (CCTS):

Infectious & non infectious waste is collected in separate trolleys. Hub cutter collection box is replaced with new one & filled collection box collected, kept separate in infectious waste transportation trolley. With the help of rickshaw trolley waste is transported in the storage site i.e. Central Collection & Treatment Site (CCTS). At CCTS all hub cutter collection box emptied in to large metal collection box and infectious, non infectious waste store in separate rooms before disposal. Two autoclave and two plastic shredders are installed at CCTS for disposal process.

3. Treatment & final disposal:

Facilities available for waste treatment at CCTS are Autoclave, Shredder and chemical treatment. Incinerable waste send to Synergy Pvt Ltd. (Central Treatment Facility) for final disposal which is located out skirt of Lucknow city.

- **Sharp waste:** Autoclave and send for recycling
- **Infectious plastic waste:** Autoclave, then shred into small pieces with shredder and send for recycling
- **Infectious non plastic waste:** Send to Synergy Private Ltd. for incineration

- **Glass waste:** Treat with 10% hypochlorite solution for ½ an hour and send for recycling.
- **General waste:** Send to Nagar-nigam for landfilling

Waste disposal during the immunisation process is the crucial issue which is avoided by the majority of the hospitals. In the present study we revealed that the immunisation waste is properly disposed off from the hospital and about 11,000 syringes are used in six month, a great amount are disposing off according to the BMWM rules, 1998. This proper management of waste minimises various health hazards to the health workers and to the public.

Acknowledgement:

We would like to thank clinician, lab technician and those entire people involved in the whole process that help us to encourage for the formulation of this paper.

References

1. Training Manual, Model Injection Centres (MICs): A program to Improve Injection practices in the country. Clinical Epidemiology Unit, AIIMS.
2. World Health Organisation. Unsafe injection practices and transmission of blood borne pathogens. Bull World Health Org 1999; 77:787-819.
3. Townend WK, Cheeseman CR. Guidelines for the evaluation and assessment of the sustainable use of resources and of wastes management at healthcare facilities. Waste Manage Res 2005; 23: 398- 408.

4. Bio-Medical Wastes (Management and Handling) Rules: Gazette by Govt. of India (1998/2000).
5. Mantel C. From assessment to planning: injection safety assessments coordinated by the WHO Department of Vaccines and Biologicals in the Eastern Mediterranean region, Safe Injection Global Network. Annual Meeting Report 2002. p. 16.
6. IPEN Study Group. Injection practices in India. WHO South-East Asia Journal of Public Health 2012; 1(2):189-200.
7. Pruss-Ustun A, Rapiti E, Hutin Y. Sharp injuries: global burden of disease from sharps injuries to Health-care Workers. WHO, Geneva 2003.p.1-40.
8. Awa Aidara-Kane, Roberts RR, Hota B. et al in Bulletin of the World Health Organization 2011; 89:390-392.
9. Riddell L.A. & Sherrard J. Blood-borne virus infection: the occupational risks. International Journal of STD & AIDS 2000; 11(10): 632-639.
10. Wilburn S.Q. & Eijkemans G. Preventing Needle Stick Injuries and Occupational Exposure to Blood borne Pathogens. The Global Occupational Health Network, Gohnet Newsletter 2005; Winter8:7-8.

Cite this article as: Kumari R, Jurel SK, Srivastava K, Wakhlu A, Singh A. Managing Immunisation Waste in a Tertiary Healthcare Facility. Int J Med and Dent Sci 2013; 2(1):39-44.

Source of Support: Nil
Conflict of Interest: No