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# ORIGINAL ARTICLE

# BIOMEDICAL WASTE MANAGEMENT OF GOVERNMENT HEALTH INSTITUTIONS IN GUWAHATI CITY, ASSAM WITH SPECIAL REFERENCE TO IMMUNIZATION SESSION

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**ABSTRACT: BACKGROUND:** Biomedical waste Management has recently emerged as a matter of serious concern to national and International health and environment agencies. **OBJECTIVES:** to assess the Biomedical Waste Management of the Govt. Health facilities in Guwahati city and to observe the waste practices of health care providers related to immunization session waste. **MATERIALS AND METHODS:** Facility based cross sectional study was conducted in all 46 primary and secondary level Govt. health facility and data was collected with pre designed pretested semi structured proforma based on observation of facilities and interviews of Health care providers. **RESULTS:** Knowledge regarding the importance of Hub cutter and collection of sharps were from 95% facilities. However knowledge regarding treatment of mutilated needles and syringes were only 39%. In none of facilities needles and syringes underwent chemical treatment before disposal. Sharp pit and deep burial pit was available in only 17.4% and 6.5% facilities respectively. 9 out of 46 facilities (19.6%) providers were found to wash their hands with soap and water and dried with clean towel. None of the providers wore gloves when required. None of the providers wore gloves when required. Recapping or bending of syringe was done in 4 facilities (8.7%) and use of separate needle and syringe for each injection was done in 97.8% of facilities. **CONCLUSION:** Proper treatment, storage prior to treatment or disposal and safe disposal of biomedical waste is the need of the hour.

**KEYWORDS:** Biomedical waste, Biomedical Waste (Management and Handling) Rules, 1998, Immunization session, Hubcutter.

**INTRODUCTION:** Biomedical Waste is generated in the health facility and its scientific disposal as per the "Biomedical Waste (Management and Handling ) Rules, 1998" is to ensure that such waste is handled and managed without adverse effects to human beings and the environment by all health care institutes. However biomedical waste has recently emerged as a matter of serious concern to national and International health and environment agencies. It is the "waste generated in the diagnosis, treatment or immunization of human beings or animals, in research or in the production of testing of biological products including all categories of infected and toxic waste that is potential threat to human being and environment.[1] Biomedical Waste is forming approximately 1-2 percentage of the total municipal solid waste stream.[2] Only 15% of Biomedical waste is hazardous, not the complete. But when hazardous waste is not segregated at the source of generation and mixed with non-hazardous waste, then 100% waste becomes hazardous.[3] A survey done in Bangalore revealed that the quantity of solid waste generated in hospitals and nursing homes generally varies from ½ to 4 kg per bed per day in Govt. hospitals, ½ to 2 kg per day per bed in private hospitals and ½ to 1 kg per day per bed in nursing homes.[4] Proper management is needed at all levels whether segregation,

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collection, transportation and treatment of biomedical waste to prevent injuries from sharps leading to infections to hospital personnel, waste handlers and the general public, to stop "Disposable" being repacked and sold by unscrupulous elements without treatment and also grave risk of air, water and soil pollution.

**Fig. 1: Unscientific method of Biomedical Waste disposal**

Considering the seriousness of the issue and to assess the situation in Guwahati city in Assam, the present study has been proposed to be carried out in urban area of Guwahati City with the following.

**OBJECTIVES:**

1. To assess the process of biomedical waste management of the Govt. health facilities of Guwahati city.
2. To observe the biomedical waste management practices of the primary health care workers during immunization sessions.

**METHODS AND MATERIALS:**

**Study Design:** Facility based cross sectional study conducted from August 2011 to July 2012.
**Study Area:** Guwahati city Assam.
**Study Population:** Government Health Institutions and Health care providers (MO/ANM/LHV/GNM) and Laboratory technicians of these institutions.
**Sampling Procedure:** Considering the limited number of Government Health facilities the following were selected for the present study: all secondary health facilities which included one State hospital, two referral hospitals and one government Ayurvedic College which also provides Immunization services in West part of Guwahati. All the Primary Health Facilities which included State Dispensary, Mini Primary Health Centre (MPHC), Urban Primary Health Centre (UPHC) and Sub Centre.
**Study Tools:** Pre tested semi structured proforma and observational checklist.
**Data Collection Technique:** With the approval from the Institutional Ethics committee of Gauhati Medical College & Hospital, data was collected by periodical visits to the health facilities based on

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observations and interviews of Health care Providers in relation to Biomedical Waste during Immunizations sessions.

**Statistical Analysis:** Data was collected and analyzed using Microsoft Office Excel.

**RESULTS:** The study included 46 facilities of Guwahati City including in it all the primary and secondary government health facilities.

Table 1 show the knowledge of health care providers regarding the four steps of waste management was only seen in 76% facilities. Knowledge regarding the importance of Hub cutter and collection of sharps were from 95% facilities. However knowledge regarding treatment of mutilated needles and syringes were only 39%. Only health care providers from 82% facilities knew about color coded bins. None knew about preparation of bleaching powder solution.

| Knowledge of Health care providers | Type of facility | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Referral unit | | MPHC | | UPHC | | Sc | | Total | |
| | No. | % | No. | % | No. | % | No. | % | No. | % |
| Steps of waste management | 3 | 75 | 9 | 69.2 | 13 | 76.4 | 10 | 83.3 | 35 | 76 |
| Importance of hub cutter | 4 | 100 | 13 | 100 | 16 | 94.1 | 12 | 100 | 44 | 95.6 |
| Where sharps are collected | 4 | 100 | 13 | 100 | 17 | 100 | 10 | 83.3 | 44 | 95.6 |
| Mutilation of needles and syringes | 4 | 100 | 10 | 76.9 | 16 | 94.1 | 10 | 83.3 | 40 | 86.9 |
| Disinfection of mutilated needles and syringes | 2 | 50 | 6 | 46.1 | 6 | 35.2 | 4 | 33.3 | 18 | 39 |
| Color coded bins | 3 | 75 | 10 | 76.9 | 15 | 88.2 | 10 | 83.3 | 38 | 82 |
| Importance of hand washing | 4 | 100 | 12 | 92.3 | 16 | 94.1 | 8 | 66.6 | 40 | 86.9 |
| Preparation of bleaching powder solution | 0 | | 0 | | 0 | | 0 | | 0 | |
| **Total** | **4** | | **13** | | **17** | | **12** | | **46** | |

Table 1: Knowledge of Health care providers regarding biomedical waste management during immunization

Table 2 shows that Hub cutter was actually being used in 97.8% of the facilities. In none of facilities needles and syringes underwent chemical treatment before disposal. Sharp pit and deep burial pit was available in only 17.4% and 6.5% facilities respectively of which deep burial pit was not available in any of the MPHCs, UPHCs and SCs. However color coded bins was used in 97% of the facilities in Guwahati.

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| Practice of biomedical waste management | Type of facility | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Referral unit | | MPHC | | UPHC | | Sc | | Total | |
| | No. | % | No. | % | No. | % | No. | % | No. | % |
| Hub cutter used after vaccination | 4 | 100 | 13 | 100 | 17 | 100 | 11 | 91.7 | 45 | 97.8 |
| Needles and syringes undergo chemical treatment before disposal | 0 | | 0 | | 0 | | 0 | | 0 | |
| Color coded bins available | 4 | 100 | 13 | 100 | 17 | 100 | 11 | 91.7 | 45 | 97.8 |
| Syringes and unbroken vials segregated and stored in red bag/container | 4 | 100 | 11 | 84.6 | 15 | 88.2 | 12 | 100 | 42 | 91.3 |
| Sharp pit available | 3 | 75 | 4 | 30.8 | 1 | 5.9 | 0 | 0 | 8 | 17.4 |
| Deep burial pit available | 3 | 75 | 0 | | 0 | | 0 | | 3 | 6.5 |
| Syringes and unbroken vials go for recycling or landfill | 4 | 100 | 10 | 76.9 | 12 | 70.6 | 11 | 91.7 | 37 | 80.4 |
| **Total** | **4** | | **13** | | **17** | | **12** | | **46** | |

Table 2: Practice of biomedical waste management with the type of facility

Table 3 shows that only in 9 out of 46 facilities (19.6%) providers were found to wash their hands with soap and water and dried with clean towel. None of the providers wore gloves when required. Unfortunately recapping or bending of syringe was done in 4 facilities (8.7%) and use of separate needle and syringe for each injection was done in 97.8% of facilities. Biomedical Waste Management guidelines were available in 39% facilities.

| Practice of Health provider during immunization session | Type of facility | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Referral unit | | MPHC | | UPHC | | Sc | | Total | |
| | No | % | No | % | No | % | No | % | No | % |
| Clean place available | 2 | 50 | 13 | 100 | 17 | 100 | 12 | 100 | 44 | 95.7 |
| Washing hands with soap and water and wiped clean | 1 | 25 | 6 | 46.2 | 2 | 11.8 | 0 | | 9 | 19.6 |
| Wear gloves when required | 0 | | 0 | | 0 | | 0 | | 0 | |
| Needles touched with swab or finger before inj | 1 | 25 | 6 | 46.2 | 1 | 5.9 | 1 | 8.3 | 9 | 19.6 |
| Recapping or bending of needles done | 0 | | 2 | 15.4 | 2 | 11.8 | 0 | | 4 | 8.7 |
| Separate needle and syringe for each injection | 4 | 100 | 12 | 92.3 | 17 | 100 | 12 | 100 | 45 | 97.8 |
| BMW guidelines being displayed in the facility | 2 | 50 | 6 | 46 | 10 | 59 | 0 | 0 | 18 | 39 |
| Total | 4 | | 13 | | 17 | | 12 | | 46 | |

Table 3: Practice of Health care providers regarding biomedical waste during immunization session

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**DISCUSSION:** The present study shows that while 95% knew about the importance of use of Hub cutter, 97.8% of the facilities actually used it. In none of facilities needles and syringes underwent chemical treatment before disposal. Sharp pit and deep burial pit was available in only 17.4% and 6.5% facilities respectively of which deep burial pit was not available in any of the MPHCs, UPHCs and SCs. Color coded bins were available in 45(97.8%) facilities which included 100% RUs, MPHCs and UPHC and 11(91.7%) SCs. Syringes and unbroken vials were segregated in 42(91.3%) facilities while it went for landfill or recycling from 37(80.4%) facilities only.

Pandit N. B et al. observed that only 26.6% of hospitals in the study area in Gujrat were trying to follow segregation method of which all were government hospitals. 11 of 15 of the government hospitals were using needle shredder while none of the private/trust/NGO run hospital had one. Moreover none of the hospitals were using disinfecting method for waste. 83% hospitals were disposing their waste by open air burning.[5]

Mathur V. et al (2011) reported in a study in Allahabad city that majority of hospitals including government and private as well as nursing homes use a common private provider for the collection, management and disposal of health care waste and at times training regarding biomedical waste management to healthcare personnel is arranged by the same common provider.[6] A private agency is also being engaged for disposal of waste in Guwahati city.

A clean place for immunization was available in available in 95% of the facilities in Guwahati City. Goel S. et al has rightly remarked that inadequate cleanliness and ventilation of immunization clinic, insufficient health education and minor flaws in immunization technique does compromise on the quality of immunization services.[7] Virendra Singh et al has rightly mentioned that the most imperative component of the waste management plans is to develop a system and culture through education, training and persistent motivation of the health care staff.[8]

**CONCLUSION:** Biomedical waste Management was deficient in all levels of Government health facilities in Guwahati. Proper treatment, storage prior to treatment or disposal and safe disposal of biomedical waste is the need of the hour. Strict adherence to Protocols and guidelines related to Biomedical Waste Management must also be followed.

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