Biomedical waste management in a large teaching hospital

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The methodical “Hospital waste Management” is of critical significance as its inappropriate management poses risks to health care workers, waste handlers, patients, community in common and mainly the environment. Keeping this in view, bio-medical waste management was studied at “J.A. Group of Hospitals, Gwalior” for a period of three months. Quantity of solid waste generated per bed per day was found to be 2.02 Kg. Inpatient area generated maximum solid waste (69.09 %) followed by supportive services (14.70%). Other areas like operation theatre, Emergency and OPD together produced lesser amounts (16.09 %). In the waste management processes, segregation and storage were not properly followed in J.A. Group of Hospitals, Gwalior. However, collection and transportation activities to final disposal are being practiced. The policy of quality control system in waste management needs to be improvised.

Key words : Biomedical waste, Waste management

The biomedical waste management and handling rules of 1998 of Govt. of India requires every occupier of an establishment generating bio-medical waste, which includes a hospital, nursing home, clinic, dispensary, veterinary institution, animal house, pathological laboratory, blood bank by whatever name called to take all steps to make sure that such waste is handled without any adverse effect to human health and environment.

The biomedical waste by its definition includes solids or fluids, their containers and any intermediate product generated during diagnosis, treatment or immunization, in research pertaining there to or in the production of of testing of biological and animal waste. Hospital waste generated from different units of hospitals can cause serious health hazards like spread of HIV infection, Hepatitis B and C etc. According to WHO, around 85 % of the hospital waste is non-hazardous, 10 % infective and remaining 5 % non-infective but hazardous.

Management of hospital waste is a main challenge to the hospitals. This waste has become a risk factor to the health of the patients, hospital staff extending beyond the restrictions of the medical establishments to the general population and to the environment, hence the management of hospital waste at this tertiary care hospital was studied.

A study has been conducted at about 1200 bedded teaching hospital (J.A. Group of hospitals) including J.A. Hospital and Kamla Raja Hospital to find out the quantity of waste generated and the methods of disposal.

Materials and Methods

Bio-medical waste management was studied at J.A. Group of hospitals and the average bio medical waste was calculated by recording bio medical waste accumulation fortnightly from each study site randomly from September 2008 to November 2008. A study of the various hospital areas was done to study the process of collection, segregation, storage, transportation, treatment and disposal of hospital waste. Through personal observations, the area-wise generation of waste from inpatients, accident and emergency, operation theatre, OPD, laboratories, kitchen, CSSD and pharmacy was recorded. The actual type and amount of waste was physically inspected to record different types of waste and their collection in different containers. These wastes were subjected to weighing by a balance and the weight was recorded. The emphasis was laid on separate collection of bio-medical waste. Separate containers were used for collection of such waste. Most of the officials

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and staff were reluctant to provide any information on
the present position of waste management. The data were
used to calculate amount of waste generated in kg/bed/
day by the following formulae:

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\text{Mean waste generated per day} = \frac{\text{Total waste produced during period of study}}{\text{No. of days of study}}
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\[
\text{Waste generated per bed per day} = \frac{\text{Mean waste generated per day}}{\text{No. of beds}}
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### RESULTS AND DISCUSSION

The different types of wastes generated at J.A Group
of hospitals included paper, soiled dressings, body tissue,
waste ampoules, disposable masks, sharps, disposable
syringes, drapes, catheters, drainage sets, colostomy bags,
surgical gloves and sweepings from hospital, contaminated
glassware, plastics, specimen container, specimen slides
and organs, cartons, crates, packing material, metal
containers, food container, solution bottles, pharmaceutical
bottles, waste from public and patient’s rooms, waste food
material, waste from x-ray department. In J.A Group of
hospitals these wastes were not segregated in different
types.

Collection of waste was done in polythene bags and
PVC containers by skilled sanitary workers. The collected
waste from wards was transported through chute to the
propositioned tuggers lying under the chute. Tuggers were
also placed at some points in the hospital premises by
sanitation department for collection of waste. The waste
from emergency, OPD, theatres and other service areas
of the hospital was collected in PVC containers, and then
carried to tuggers, which are being emptied at incineration
plant where it is incinerated.

Biomedical waste collected separately was found to
be 28.44% of total waste generated. Amount of waste
generated was 2.0 kg per bed per day. 18031.10 kg
(69.09%) of the total quantum generated from inpatient
area, 704.46 kg (2.7%) from OPD, 652.45 kg (2.5%)
from operation theatre, 1591.98 kg (6.1%) from
emergency, 730.75 kg (2.8%) from laboratories, 626.35
kg (2.4%) from pharmacy, 104.39 kg (0.4%) from CSSD.
Total waste from supportive services was found to be
3836.40 kg (14.70%).

Managing waste has two vital parts: firstly
management of hazardous waste of different types
generated from different sources, which involve careful
segregation, collection, transportation and final disposal
and secondly effective training and supervision of various
categories of personnel involved in whole waste
management system Acharya and Singh (1992) and
Sharma (1999).

For streamlining the process wastes have been
classified and are to be stored in different colour coded
containers or bags so that staff is able to distinguish the
appropriate container for each particular type of waste.
Segregation is an important pre-requisite in the entire
process of waste management as it allows unique interest
to the reasonably small quantities of infectious and
hazardous waste, only domestic waste is being collected
to separate containers, which also gets mixed with bio-
medical waste. No segregation is practised. Different
colour coded bags are not used for different types of
wastes. No labeling or marking, viz., hazardous/infectious
waste is being practised. The general waste is collected
in common container in the wards which also contains
part of bio-medical waste. It is documented that such a
practice of non segregation may increase the costs of
final disposal of waste because the infective and non
infective wastes get mixed up and hence the wastes that
could be disposed off by land-fill need incineration also
thus reducing risks and costs of waste management.

In developed countries due to the increased use of
disposals the waste produced has been up to 5.24 kgs, in
hospitals of UK, France, Norway, Spain, Netherlands,
USA and Latin America, waste produce is 3.3 kgs, 2.5
kgs, 3.9 kgs, 4.4 kgs, 4.2 kgs, 4.5 kgs and 3.8 kgs per bed
per day, respectively (W.H.O. 1995). Most hospitals in
India generate 1-2 kgs per bed per day, except the tertiary
care hospital like AIIMS which produce waste on higher
side. Waste generated in developing countries like India
contain much less disposables and plastics than those
generated in developed countries due to difference in life
style and use of more disposable items. Increasing use of
disposables in tertiary care hospitals may be the reason
of higher quantum of wastes generated.

Studies conducted at AIIMS revealed that the
quantum of waste generated was 2.2 kgs per bed per
day, Mumbai Tata Memorial hospital produces 1.13 kgs
per bed per day. In Amritsar large tertiary hospital
produces 1.05-1.3 kg per bed per day. Packing materials
must be rigid, leak resistant, impervious to moisture and
strong enough to resist tearing and bursting. Containers
holding untreated medical waste must be labeled as
“infectious waste or medical waste” or with the universal
“Bio-hazard” symbol. Packing must be marked to identify
the generator, the transporter and the date of shipment.
Conclusion:

J.A. Group of hospitals generate 2.02 kgs per bed per day. Though waste management practice in this hospital is healthier than other hospitals in the state, yet, all the waste management activities like collection, segregation, transportation, treatment and disposal need to be done on scientific basis. Segregation should start at the source of generation, containers of recommended colours should be used for different types of wastes. Proper labelling and marking of infectious should be done. Since this is the first study of its kind in Gwalior city, more research will be desirable to work out the improvised policy of waste management practices and its quality control system in hospitals of the state.

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