GLOBAL SCENARIO OF HOSPITAL WASTE MANAGEMENT

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Abstract

Hospitals have been existing in one form or the other since time immemorial. It is ironical that the very hospital that brings relief to the sick can create health hazard for hospital staff, patients as well as the community at large. Safe management of health care waste becomes very important when it comes to environment conservation and health of the community. Thus hospital waste generation has become a prime concern due its multidimensional ramifications as a risk factor. The generation of hospital wastes differs not only from country to country but also within a country. In middle- and low-income countries, health-care waste generation is usually lower than in high-income countries. Some characteristics of hospital waste-management situations are presented here.

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INTRODUCTION

“Nothing on earth is more international than disease”, said Paul Russel. Health and disease have no political or geographical boundaries. Hospitals have become complex institutions which were frequented by people from every walk of life in the society without any distinction between age, sex, race and religion1. With the advances in scientific knowledge, the waste from hospitals increased which was either biological or nonbiological that were discarded and not intended for further use in hospitals.

The implications of hospital wastes are manifold. Since hospital is an established social organisation the wastes from hospitals have effects on the hospital staff, the environment, and general public etc.2. Health hazards associated with poor hospital waste management include injuries from sharps to all categories of hospital personnel and waste handlers, nosocomial infections to patients, and risk of infections outside hospitals for waste handlers, scavengers and eventually the general public and may also lead to change in microbial ecology resulting in antibiotic resistance3.

Until fairly recently, medical waste management was not generally considered an issue. In 1980s and 1990s concerns about exposure to human immunodeficiency virus (HIV) and hepatitis B virus (HBV) led to questions about potential risks inherent in hospital waste. Thus hospital waste generation has become a prime concern due its multidimensional ramifications as a risk factor. And management of hospital waste is a global humanitarian issue today4.

Now hospital waste management is one of the trust areas which are drawing the attention of health authorities and the government. The last decade witnessed a significant increase of public concern regarding hospital waste disposal. The increased use of “disposables” in the hospitals has brought in its wake many ills such as inappropriate recycling, unauthorized and illegal reuse, and increased quantity of waste.

GLOBAL SITUATION

Hospital Waste was brought into focus in 1983 when WHO European office convened a working group at Bergen. Medical specialists, hospital engineers, administrators from 19 countries participated & concluded that it required a system approach involving: -
Awareness
Segregation
Source reduction of radio-active waste
WHO SEARO questionnaire survey in 1984 conducted largely due to disturbing media reports regarding plight of rag pickers- found inadequacies. Beach washings in 1998 of the Florida coast, related to syringes, lead to passing of first healthcare legislation by any country- Medical Waste Tracking Act (MWTA)

Whether in India, Tanzania, the United Kingdom, or the United States, countries around the world are coping with the proper disposal of medical waste. Developed countries face challenges with the sheer volume of waste from the use of disposable items. On the other hand, developing countries, whose supplies are limited, are dealing with challenges of sorting and disposing of all types of medical waste, in a sanitary manner.

Some characteristics of hospital waste-management situations are presented here. There is a large difference among the hospitals; however, individual hospitals may have markedly better arrangements for reduction, management, treatment, and disposal of healthcare wastes, depending on hospital management and local disposal opportunities. For developing countries, the unsanitary disposal of waste has put millions of lives at risk because dumping sites are often visited by people scavenging for goods. Developing countries face a myriad of health problems arising from the burning of the waste. Incinerators are still the main vehicle used to dispose of medical waste in much of the developing world, especially in sub-Saharan Africa.

On an international level, the United Nations’s Stockholm Convention is the main treaty for addressing the disposal of Persistent Organic Pollutants (POPs). Parties to the Stockholm Convention are required to use the best available technologies for Medical Waste Incinerators. Unfortunately the costs of such technologies are out-of-reach for most medical institutions in sub-Saharan Africa.3

MEDICAL WASTE IN THE DEVELOPED WORLD
In the United States, the medical waste problem is linked to the expanded use of disposable items, which became popular in the 1990’s with the AIDS outbreak. Operating rooms provide the most medical waste, about 20-30 percent of all hospital waste.6 Often items in surgical kits are thrown out unused because the kit was opened, thus making it unsterile. Streamlining these kits can save hospitals a lot of money and reduce the amount of waste.

Many hospitals are starting to look into recycling or donating leftovers that are still usable to developing countries, many of whom are in desperate need for these supplies. At least half of U.S. hospitals send some of their single-use items to reprocessors, who sterilize the items and resell them back to hospitals at a fraction of the cost. Since 2000, the FDA has required that reprocessors meet the same stringent standards as the original makers.

Europe: Wastes are properly segregated at the point of generation, although the disposal is expensive. Contaminated items are incinerated at source, although new technologies, such as microwave disinfections, etc., are gaining popularity. For effective waste management, the European Commission, in 1990, under the Environmental Protection Act, imposed strict controls and instituted statutory duties. Ignorance or defiance of these can result in severe fines and custodial sanction7.

In 1995, legislation on incinerator plants to integrate pollution control was introduced. After 1996, the European Commission turned their attention to waste minimization by reuse, recycling, segregation, and better management with minimum impact on the environment and ecosystem. They are imposing strict laws to manage and control hospital wastes. In the European countries, the majority of wastes are incinerated, with stringent control of air pollution. There is a move from local incineration toward regional medical waste incinerators with better air pollution-control characteristics, but concerns about compliance with respect to management and disposal, and differentiation from countries to countries persist.

Latin America/Caribbean: Traditionally, attention has been given to clinical wastes, but more work needs to be done to reduce exposure by waste workers. A good understanding exists of the source of pathogenic, chemically hazardous, and regular solid wastes within a health facility. Law usually requires on-site incineration, but often facilities are defective, and wastes may end up in special cells in a sanitary landfill8.

North America: The U.S. Environmental Protection Agency has regulations and guidelines, but actual regulation is done at the state level9. Most healthcare wastes are burnt in hospital incinerators, but these are also disposed of in landfills and public sewers. Other treatment methods include steam or gas sterilization, irradiation, and chemical disinfections. The privately-owned facilities compete to handle wastes. Some new technologies, such as bio-oxidation, gas-pyrolysis, plasma-treatment technology, microwave disinfecting, autoclaving, etc., are practised now9.

Health-care waste generation according to National income level8

<table>
<thead>
<tr>
<th>National income level</th>
<th>Annual waste generation (kg/head Of population)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High income countries:</td>
<td></td>
</tr>
<tr>
<td>All health-care waste</td>
<td>1.1-12.0</td>
</tr>
<tr>
<td>Hazardous health-care waste</td>
<td>0.4-5.5</td>
</tr>
<tr>
<td>Middle-income countries:</td>
<td></td>
</tr>
<tr>
<td>All health-care waste</td>
<td>0.8-6.0</td>
</tr>
<tr>
<td>Hazardous health-care waste</td>
<td>0.3-0.4</td>
</tr>
<tr>
<td>Low-income countries:</td>
<td></td>
</tr>
<tr>
<td>All health-care waste</td>
<td>0.5-3.0</td>
</tr>
</tbody>
</table>

Quantum of hospital waste - International level8

<table>
<thead>
<tr>
<th>Region</th>
<th>Daily waste generation (kg/bed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>North America</td>
<td>7-10</td>
</tr>
<tr>
<td>Western Europe</td>
<td>3-6</td>
</tr>
<tr>
<td>Latin America</td>
<td>3</td>
</tr>
<tr>
<td>Eastern Asia</td>
<td></td>
</tr>
<tr>
<td>High-income countries</td>
<td>2.5-4</td>
</tr>
<tr>
<td>Middle-income countries</td>
<td>1.8-2.2</td>
</tr>
<tr>
<td>Eastern Europe</td>
<td>1.4-2</td>
</tr>
<tr>
<td>Eastern Mediterranean</td>
<td>1.3-3</td>
</tr>
</tbody>
</table>

MEDICAL WASTE IN THE DEVELOPED WORLD
Medical waste problems in the developing world are...
associated poor funding and the lack of national regulations for the sanitary disposal of waste (and/or lack of oversight).

**India**

In India, the government passed the Biomedical Waste Management and Handling Rules, 1998, which outlines how hospitals should collect and transport waste, as well as appropriate disposal methods. Despite this legislation, most of the medical waste in India is dumped in the open and collected with the general waste.\(^\text{10}\) Unfortunately, the Indian press often reports cases in which hospitals are shut down or are not following regulations for waste disposal. India highlights typical problems with medical waste management:

- **staff are exposed to potential infections from poor quality equipment used for handling the medical waste (such as repeated use of single-use gloves)**
- **laboratories do not segregate waste according to the required color-coded system, but put all types of waste in one bag (including sharp items)**
- **Waste storage areas are not secure (flies, rodents and dogs could access the area).**

**Africa**

The United Nations Development Program’s (UNDP) Global Healthcare Waste Project is researching ways to help Sub-Saharan Africa better dispose of medical waste. Most of the countries surveyed lacked legal policy for medical waste management and lacked proper sanitary landfills. For example, Eritrea, Lesotho, and Ghana have no legislation for health care waste management, while Kenya, Nigeria, and Gambia are signatories to the Stockholm Convention and have some relevant laws on the books.\(^\text{11}\)

The lack of sanitary landfills has lead to the increased use of incinerators. Gambia, Ghana, Lesotho, Nigeria, Senegal, Tanzania have no sanitary landfills; while Kenya and Zambia only have crude dumpsites. It is estimated that there are more than 1000 incinerators in Africa; many of which have been reported to be inoperative or operating below standards.\(^\text{11}\)

One of the biggest risks for African healthcare facilities is the disposal of sharps (needles, scalpel blades, blood vials, glassware, etc) that are in contact with infectious germs. The high cost of safety boxes for proper disposal of sharps limits the use of these boxes. Asian countries have started to produce these boxes locally, bringing down the cost, but African countries are still buying them from outside vendors. Nonetheless, all the countries surveyed by the UNDP did not allow sharp waste to be disposed of at the dump sites and some hospitals had separate sharp pits. While additional funding would certainly help developing countries better dispose of medical waste, relevant legislation is also needed to insure that waste is disposed of properly.

**South-East Asia:** In 1995, the Regional Office for South-East Asia of the World Health Organization (WHO) made a survey of healthcare waste management in 9 countries in the region with substantial responses from Indonesia, Myanmar, Srilanka, Thailand, and Bangladesh\(^\text{12}\). Results of the survey show that most healthcare establishments do not have any waste-management plan or procedure. In several countries, there is no legislation at all\(^\text{13}\). There is also a lack of waste-management guidelines. The responses on the types and segregation of wastes seem to indicate only a limited safe management of wastes with plenty of opportunity for mix-ups and disposal into the municipal dustbins. In Indonesia and Thailand, where legislation is in place, did better on most accounts. In November 1996, WHO arranged a regional consultation at Chiang Mai, Thailand, for outlining an action plan and for enacting legislation on waste management\(^\text{14}\).

**CONCLUSION**

Though WHO and the health organizations of all countries have issued clear guidelines for the disposal of hospital and other medical wastes these guidelines are rarely followed. Usually medical waste is mixed with the municipal waste in the waste bins at the roadside and is disposed off in a similar fashion. However, most of the countries have the equipment to dispose medical waste as per the WHO norms, but the attitude of the municipal staff and training of these personnel is the concern area. Solution lies in the proper training of the hospital staff to segregate the waste and by training the municipal staff regarding the disposal of such waste. For this, the municipal corporations need to make stringent laws and ensure its compliance by both the hospital management and its staff.

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