



## Managing hospital wastes in Nigeria

A.O. Coker, A.Y. Sangodoyin and O.O. Ogunlowo, Nigeria

PATRONAGE OF HOSPITAL and other health care facilities in Nigeria is on the increase. The rapidly increasing population coupled with the deteriorating environment are some of the factors responsible for this trend. The situation cuts across rural and urban settlements. Hospital records have confirmed high incidence of typhoid, cholera, dysentery, infectious hepatitis and guinea worm in both rural areas and peripheral - urban settlements of Nigeria (Sangodoyin, 1995). The relatively inadequate medical facilities are currently being over stretched. These medical facilities continue to make a sizeable contribution to the waste stream as a whole. Managing the resulting vast quantities of hospital wastes is indeed an herculean task. Worse still, hospital waste may not only be hazardous, the composition is highly varied. Apart from refuse and sewage, the composition of hospital wastes may also typically include radioactive wastes and pharmaceuticals, cytotoxic agents, mercury and other heavy materials, waste chemicals, infectious waste such as human blood and blood products; anatomical wastes; pathological wastes and contaminated sharps. Sharps are objects with the potential of penetrating the skin and they include hypodermic needles, syringes, pasteur pipettes, broken glass and scalpel blades (Cheremisinoff and Shah, 1990).

The hospital waste generation rate in the US was estimated (Hershkowitz, 1990) as close to 3 million tons a year and is growing at an alarming trend. Neither the composition of hospital wastes by percentage nor its generation rate is available for Nigeria. There has been an acute dearth of literature on the subject matter in the country. Oluwande (1975) exclusively reported that the Biochemical Oxygen Demand (BOD) rate constant,  $k$  of a Nigerian hospital sewage was  $0.39d^{-1}$  while the corresponding value for the ultimate (BOD) was 234ppm. Both values are within the range which has been quoted for all types of waste waters by Fair et al (1968). Ours is an on-going study (started since 1995) aimed at coming up with the engineering of hygienically managing hospital waste as a basis for directing a sound hospital waste disposal policy in Nigeria. This paper presents some of our salient findings up to date.

### Research procedure

Five selected groups of hospitals and clinics responsible to different authorities were visited and studied. Typical example in each group includes:

- The Nigerian Federal Government - financed University College Hospital (UCH), Orita-mefa, Ibadan.

- The Oyo State Government - financed Adeoyo Maternity Hospital, Yemetu, Ibadan.
- The Ibadan South East Local Government - financed Mapo Health Centre, Mapo, Ibadan.
- Oyin Specialist Hospital and Hellenic Home, Iwo Road, Ibadan (a big, privately - owned Clinic).
- Yinka Clinic and Maternity Centre, Old-Ife Road, Ibadan - (a small, privately - owned Clinic).

The various hospitals and clinics in Ibadan, Nigeria numbering 694 were first contacted to solicit their cooperation and voluntary participation in the investigation of waste generation, composition, handling, treatment and disposal. Structured questionnaires, personal observations and oral interviews with relevant staff were used to obtain information on the current state of hospital waste management in Ibadan's hospitals and clinics.

### Results and discussion

Quite some revealing findings have been obtained in the course of investigating hospitals and clinics in Ibadan, on such aspects as types of medical waste generated, the waste generation rate, waste collection and storage methods, preliminary treatment of waste, waste transportation and disposal. Our investigations show that small, privately-owned clinics constitute close to 60 per cent of hospitals and clinics in Ibadan. Large, privately - owned hospitals were about 30 per cent while the remaining 10 per cent of the hospitals were owned by the Federal, State and Local Government in the ratio of 2:3:5 respectively. These may have serious implications: significant majority of the medical facilities are owned by private individuals who appears to be more keen on maximising profits than giving considerable attention to effective management of generated medical wastes in their establishments.

The medical wastes found in the various hospitals and clinics range from domestic wastes (from the kitchens, offices, wards etc.), swabs, absorbants, plastics, PVC, syringes, faecal matters, urine, glass, disinfectants, beddings, shavings, paper, gauze, pads, sharps, needles to infectious wastes ( such as specimens from medical and pathology laboratories, wastes from production of biologicals, discarded live and attenuated vaccines, wasted blood, serum, plasma etc.). Generally, needles, syringes, cotton wool and swabs appears to be the most generated medical wastes in most of the hospitals visited in Ibadan.

Out of all the medical institutions visited, very few gave the account of their wastes generations rate since no

measurement of generated waste is being carried out. Most hospitals collect their medical wastes and immediately empty same into the waste storage bins, drums or refuse containers. From personal observations, the least quantity of waste generated was 2 sacks per week (i.e. an average of 10kilogrammes per week). Most hospitals utilise the simple dust bins (metallic or plastic, perforated or non-perforated) to collect their wastes. Many a times, these dust bins are left open thus constituting a health hazard. The situation is slightly better in the Federally funded University College Hospital. Several waste tins located within reach in the hospital mounted on tyres are used to collect used needles, syringes, cotton wool, swabs etc.

17 per cent of the hospitals and clinics visited utilise black polythene sacks hung on metal reams in different locations. A few hospitals use carts to collect and transport the wastes. Unfortunately such wastes are carried uncovered in the carts. Moreover, in exceptional circumstances, the hospitals carts are used to transport food and yet-to-be used hospital items!. It is however interesting to note that in some specialist hospitals, the pathogenic wastes (such as aborted babies, placenta etc.) are properly collected and preserved in special tubes for research purposes.

Storage of medical wastes in the hospitals premise before final disposal is being carried out of by only 64 per cent (nearly two-thirds) of the hospitals visited in the metropolitan city of Ibadan. Storing the waste affords an opportunity to pre-treat the waste before finally disposing it. Disinfection and sterilisation are a few of the pre-treatment methods in use in some of the hospitals. It was found out that some of the clinics do not necessarily pre-treat the stored waste. Their storing the waste in the premise sometimes for 3-5 days was forced on then by the irregularity and unreliability of the disposal agency saddled with disposal responsibilities. This could be the State or Local Government Waste Disposal Board or a paid private waste disposal firm or contractor.

Transportation of the wastes to disposal sites is, carried out by special vehicles owned by the Government Waste Disposal Boards or private waste contractors. However, the latter is being more frequently employed by quite a significant number of hospitals due to gross inefficiency of the former arising mainly from the fact that most of their disposal vehicles have broken down.

Disposal of medical wastes produced by hospitals and clinics in Ibadan is effected by various methods such as landfilling, open burning, incineration and open dumping in that order of decreasing applications. Slightly over 49 per cent (nearly half) of the hospitals resort to the use of sanitary landfills. This is carried out indirectly for them by the Government Waste Disposal Board or the private waste contractors who transport the wastes to landfilling sites. Availability of land in vast quantities appears to be the major principal reason for the popular use of this disposal method in Ibadan. Really it has been reported that landfilling has a striking advantage of low immediate cost and if the site is well-managed, after closure the long term cost can

also be kept reasonable (IRPTC, 1985). However, Sangodoyin (1991) has reported that the technical and hygienic considerations expected in a sanitary landfill are absent in many of the landfills in the City of Ibadan. Our visits to some of the landfill sites in Ibadan, Nigeria show nothing more than haphazard dumping of wastes. Moreover slightly alkaline water and undesirable taste has been observed in wells close to such waste disposal systems in Ibadan, Nigeria (Sangodoyin, 1993).

Open burning method of disposal is being used by about 30 per cent of the hospitals visited in Ibadan. Such burning is usually carried out within the hospitals' premises. The danger inherent in this method is that humans are susceptible to the hazards of the vapours of chemicals constituting these wastes as they get released into the atmosphere. It was found out that majority of those using this mode of disposal are the small, privately -owned hospitals who perhaps do not see any need for employing any elaborate disposal method given their low financial capabilities and relatively small waste generation rate.

Only a few hospitals visited in Ibadan, Nigeria incinerate their medical wastes. Quite unlike in the United States where approximately 67 per cent of hospitals incinerate their infectious wastes (Hall, 1989). Apparently the capital-intensive nature of hospital waste incineration has not endeared this disposal method to the hearts of many hospital proprietors in Ibadan. As at the time of our investigation, many of the hospitals incinerators were obsolete and at best producing incomplete combustion of wastes - a situation inimical to human's health. Although Schmidt and Schmidt (1994) have noted that hospital waste incineration is questionable, from the stand point of the resulting toxic emissions and ash residues, Sangodoyin and Agbawhe (1992) had suggested that the sanitary landfill could easily and properly take care of these.

A small percentage (about 5 per cent) of the hospitals visited in Ibadan adopt open dumping method to dispose the medical wastes generated in their premises. Many Local Government - owned clinics are in this category. This disposal method is not only haphazard but makes the hospital staff, patients and nearby residents to be readily susceptible to health hazards. In some cases, such exposed wastes are later burnt after sufficiently dried. In a few hospitals, the wastes are dumped openly on the ground awaiting collection by the waste disposal board or contractor. Another problem identified with this disposal method was that scavengers were seen picking the used needles, syringes, bottles and other disposables possibly for resale.

### **Conclusions and recommendations**

First and foremost, more attention need to be given to the subject of hospital waste management in Ibadan, Nigeria. The necessary waste data for the hospital sector need be particularly gathered and documented as a basis for an environmentally and hygienically sound waste disposal policy possibly for the entire country - Nigeria.

Waste Management Unit which is currently absent in majority of the hospitals and clinics in Ibadan need be created as a matter of urgency. The issue of medical waste is too serious to be left to trial and error. Such unit well staffed and equipped will prevent haphazard collection, storage, treatment and disposal of medical wastes. Pre-treatment of the wastes by such processes as compaction, grinding, adsorption (which not only reduces the volume of waste but also makes it a lot easier to dispose off) can also be part of the functions to be carried out by the Waste Management Unit.

Generally speaking, governmental control had been lacking in the hospital sector in Nigeria. A special monitoring team need be created by the government to enforce safe and efficient management of hospital waste in the country. Due to the specialised nature of medical wastes, it is also recommended that a separate medical waste management board be created specifically charged with hospital waste management. If governmental control is to be meaningful, it is just fair and moral that the Nigerian government come in to assist the hospital sector by setting up well managed and equipped incinerators where medical wastes could be disposed at subsidised cost so as to encourage hospitals to maximise the gains of this disposal method (incineration) - particularly suited for infectious wastes.

Given that sanitary landfills have found popular application for disposal of wastes containing high proportions of putrescible matter or hazardous substances, there is still tremendous scope for improvement in the management of the existing landfills in Ibadan, Nigeria. They should be fenced against intruding scavengers and considerations given to possible effects of leachates on nearby water sources and of pollution on houses that are in close proximity to the landfill sites.

Finally, recycling of re-usable items which hitherto is not being practised need to given serious emphasis. Instead of leaving the materials for the crude and intruding scavengers to pick and resell to simple-minded consumers, the hospital's "waste management unit" can recycle such re-usables as soil linens, patient care items, food service items, prescription bottles while the disposables are safely disposed.

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ENGR AKINWALE O. COKER, Faculty of Technology, University of Ibadan.  
DR ABIMBOLA Y. SANGODOYIN, Faculty of Technology, University of Ibadan.  
ENGR OLUFEMI O. OGUNLOWO, WEDC.

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