Contact with hospital syringes containing body fluids. Implications for medical waste management regulation

Patricia Volkow, MD, (1) Bénédicte Jacquemin, MD,(1) Diana Vilar-Compte, MD, MSc,(1) José Ramón Castillo, MD,(1)

Abstract

Objective. To determine amount of syringes used in the hospital and extent of contact with blood and body fluids of these syringes. Material and Methods. Syringe use was surveyed at a tertiary care center for one week; syringes were classified into the following four categories according to use: a) contained blood; b) contained other body fluids (urine, gastric secretion, cerebrospinal fluid, wound drainage); c) used exclusively for drug dilution and application in plastic intravenous (IV) tubes, and d) for intramuscular (IM), subcutaneous (SC), or intradermic (ID) injections. Results. A total of 7 157 plastic disposable syringes was used; 1 227 (17%) contained blood during use, 346 (4.8%), other body fluids, 5 257 (73%) were used exclusively for drug dilution and application in plastic IV lines, and 327 (4.5%) were utilized for IM, SC, or ID injections. An estimated 369 140 syringes used annually, or eight syringes per patient per in-hospital day. All syringes were disposed of as regulated medical waste, in observance of the law. Conclusions. There is an urgent need to review recommendations for medical waste management by both international agencies and local governments, based on scientific data and a cost-benefit analysis, to prevent resource waste and further environmental damage. The English version of this paper is available too at: http://www.insp.mx/salud/index.html

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Address reprint requests to: Patricia Volkow. Instituto Nacional de Cancerología. Avenida San Fernando 22, colonia Tlalpan, 14000 México, D.F., México. E-mail: volkow@infosel.net.mx
Establishing special policies for handling hospital solid waste has become a burden for health budgets in many countries. International recommendations extended by World Health Organization (WHO) experts are based on colloquial data rather than on scientific evidence. Accidental injury outside the hospital setting is minimal. In several countries these recommendations have resulted in initiatives to regulate hospital waste management. However, legislation increases the costs of hospital waste handling and results in unjustified spending of health budgets in developing countries. In addition, the environmental impact of these recommendations has not been assessed.

Few studies have described the characteristics of hospital waste and practically no studies have assessed to what extent hospital solid waste is contaminated with blood or other body fluids. The objective of this study was to assess the number of syringes that contained blood or body fluids, or those used exclusively for drugs dilution (DD) and application in plastic intravenous tubes (PIVT).

**Material and Methods**

A survey was conducted during week, from July 13 to July 19, 1998, at a tertiary level of care 143-bed oncology center. A questionnaire was applied daily to every nurse, physician, or paramedic on all shifts, in all wards where syringes were used and collected at the end of each shift. Syringes were classified and counted according to capacity, i.e., 1 ml, 5 ml, 10 ml, and 20 ml. They were also classified according to use: A) taking blood samples, B) taking samples of other body fluids, C) used exclusively for DD and application in PIVL, and D) for intramuscular (IM), subcutaneous (SC), or intradermal (ID) injection.

**Results**

A total of 7 157 syringes were used during the week surveyed as follows: 1 227 (17.4%) contained blood during use; 346 (4.8%) contained other fluids (urine, gastric secretion, wound drainage); 5 257(73.4%) were used exclusively for DD and application in PIVL, and 327(4.5%) were used for IM, SC, or ID injections (Table I). The use of syringes according to capacity was 6.86% for 1 ml, 38.8% for 5 ml, 36% for 10 ml, and 18.3% for 20 ml.

An annual use of 369 140 syringes at the hospital was estimated, eight syringes per patient in-hospital day. The weight of empty syringes per year would be 3 733 kg; 2 725 kg of which would never have contact with blood or any human tissue. The latter, plus the annual consumption of 1 479 kg of 28 104 plastic lines for infusion therapy, would add up to 4 204 kg of waste with no infection potential at this hospital.

**Discussion**

From the beginning of the AIDS epidemic, the culture of disposable items has been fostered, to provide the public with the feeling of absolute safety, notwithstanding the fact that many items are currently sterilized in all surgery rooms in all countries with very high standards of safety. The culture of disposable item utilization has increased waste production, consumption of non-renewable resources, and damage to the environment. An adequate program of sterilization and knowledge of the type of waste produced at the hospital can help create a reasonable use of disposable items, and restore previous practices such as use of glass syringes for DD and application in PIVT. Preventing irreversible damage to the environment requires the development of a policy to reduce waste production, reuse material, and recycle hospital appliances.

The average cost of medical waste handling in Mexico is $1.00 US dollars (USD) per kilogram. Excessive costs of waste management in countries that over-regulate medical waste management–based more on political issues than on scientific data– is draining health budgets, which are particularly meager in developing countries. Hospital epidemiologists can contribute a great deal to saving money and protecting the environment by rationalizing medical waste management and the use of disposable items.

Furthermore, it has been proposed that the introduction of plastic disposable syringes played a major role in altering the ecological balance of routes for blood-borne pathogens in low- and middle-income
Plastic disposable syringes meant for one use are reused without proper sterilization only in high-deprivation settings such as Africa and Latin America. Use of glass syringes, which may be adequate for proper resterilization, has been proposed as a way for preventing nosocomial HIV transmission and other blood-borne pathogens in middle- and low-income countries.

There is an urgent need to revise the recommendations for medical waste management by both international agencies and local governments, based on scientific data and a cost-benefit analysis. The use of disposable syringes in hospital settings should be rationalized; using properly sterilized glass syringes would save resources and prevent further environmental damage.

References