

Alternative Safety Box for Sharp Medical Waste in Health Screening of Disembarkation Pilgrims at Sukolilo Hajj Dormitory Surabaya: Case Report

Aprilia Mawar Dani* and Tias Pramesti Griana

Fakultas Kedokteran dan Ilmu Kesehatan, Universitas Islam Negeri Maulana Malik Ibrahim, Malang

* Correspondence: apriliamwrn@gmail.com

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Abstract Hajj activities are mass gathering activities that produce medical waste and require special handling. Sharp medical waste from health service activity has a high potential to cause infection and injury. The disposal of sharp medical waste in mass gathering activities needed special attention. This case report occurred during the disembarkation of pilgrims from SUB16 group from Madiun Regency, East Java on June 26, 2024 at the Sukolilo Hajj Dormitory, Surabaya. The use of mineral water bottle as an alternative safety box to accommodate sharp medical waste is reviewed based on the Regulations of the Minister of Health and FDA (Food and Drugs Administrations). The objective of this case report was to review whether mineral water bottle fulfil the criteria as alternative for safety box. Mineral water bottle cannot fulfil the criteria as alternative safety box for accommodating sharp medical waste. Alternative materials used as alternative safety box must have the characteristics of puncture-proof, having sufficient thickness, water-proof, easy to carry, and having striking colours.

Keywords Mass gathering; Hajj; Disembarkation; Sharp medical waste; Safety box



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1. Introduction

The Hajj pilgrimage is a mass gathering activity with population from various ethnicities, ages and health statuses. Research showed that mostly of pilgrims were elderly (39% of the total pilgrims aged ≥ 65 years) who often suffer from chronic diseases. The most common comorbidities among pilgrims are hypertension, diabetes mellitus, heart disease and gastritis. With the comorbidities, pilgrims often need emergency services while performing their pilgrimage. Medical services at mass gatherings primarily aim to handling injury and do triage, stabilize and transfer the patients effectively [1]. To provide comprehensive medical services and be

able to handle emergency conditions, facilities such as ambulances, medical equipment and medical waste disposal have to be adequate [2]. Medical waste is coming from medical services, such as dental care, pharmaceuticals, research, treatment, or education that uses toxic, infectious, hazardous or dangerous materials. Safe and reliable methods are needed in the management of medical waste. Improper and inadequate management of medical waste cause serious consequences for health and significant impacts for the environment [3]. For example, the mostly of pilgrims who use insulin regularly, throw the insulin needles in regular rubbish bin [4]. Special attention is needed for the disposal of sharp medical waste in mass gathering activities.

2. Methods

This case report is a report of the condition sharp medical waste disposal during the health examination of pilgrims at Surabaya disembarkation in Muzdalifah Hall, Hajj Dormitory which was conducted on June 26, 2024.

3. Case Report

Pilgrims SUB16 group from Madiun Regency was arrived on Wednesday, June 26, 2024. The plane arrived at Juanda International Airport at 15.25 WIB, then the pilgrims were delivered to disembarkation by bus. After arriving at disembarkation, the health officers were carried out on the pilgrims for health screening using a thermal scanner when entering the Muzdalifah hall, in hajj dormitory.

Four patients complained of feeling weak during the travel from Saudi Arabia to Indonesia. They were examined for vital signs and a general physical examination. According to the family of the pilgrims, the patients had no appetite since boarding from Saudi Arabia until arriving in Indonesia, so they were examined for random blood glucose. The health officers prepared emergency bags with the following equipment: stethoscope, digital tensiometer, oximeter, thermometer, penlight, Point of Care Testing (POCT), gloves, alcohol swab, infusion set, intravenous catheter, infusion fluids and several emergency medicines.



Figure 1. The health officers examined the vital signs and evaluate random blood glucose with POCT

After the examination, the health officers confused about disposing of waste from POCT examination, such as gloves, alcohol swabs, blood sugar sticks and needles that had been used because they did not get the safety box. In the Muzdalifah reception hall there was no disposal equipment for disposing of medical waste. Then, the sharp medical waste was stored in empty mineral water bottle. There was one patient who had an intravenous fluid, that produced medical waste in the form of abbocath needles, gloves and alcohol swabs. For non-sharp materials such as gloves and alcohol swabs, they are disposed of in yellow plastic bag for distinguish medical waste from other waste. Then the medical waste from this yellow plastic bag will be collected into the medical waste bin in the Hajj dormitory polyclinic.



Figure 2. Mineral water bottle used as an alternative safety box for sharp medical waste

We conducted an interview with health officers regarding the Standard Operating Procedure (SOP) for disposing of sharp medical waste in the Muzdalifah hall, and got the information that there was no specific SOP applied for disposing of sharp medical waste in the Muzdalifah hall. The use of empty mineral water bottle was only a temporary replacement for the safety box and was a spontaneous solution carried out by health officers.

4. Discussion

There are many adverse effects caused by sharp medical waste if not disposed properly. Sharps medical waste have to dispose in a special container such as a safety box, that container must be able to be closed, puncture-proof and leak-proof to prevent injured human and given a risk of disease transmission. Sharps medical waste that has been contaminated with infectious fluids must to dispose to safety box before being destroyed by incineration. The function of safety box is to reduce the risk of contamination of used needles or syringes or sharps waste to health workers and patients. It also to reduce the possibility of cross-infection from unsafe handling and disposal of waste. Safety box is usually made of duplex material which is not easily torn, has good density, and flexible, so it's not

easily damaged or penetrated by sharp objects. Also, safe to use to transfer medical waste from one place to another. If a replacement safety box is needed, it should have almost the same material characteristics and can replace its function without causing harm. A study by Choirul (2017) showed that jerrycan can be a alternative for safety boxes and meets the standards characteristics, that puncture-proof, waterproof, resilience and its surface has a minimum water absorption capacity that can prevent contaminated biohazard [5].

In this case, the temporary replacement of the safety box using mineral water bottle needs to be reviewed, whether mineral water bottles can fulfill the requirements of the safety box standards. Based on the Decree of the Minister of Health of the Republic of Indonesia Number 1204/MENKES/SK/X/2004 concerning Hospital Environmental Health Requirements, article IV concerning Waste Management and Nursamsi et al (2017), stated that sharp waste must be collected in one container regardless of whether it is contaminated or not. The container must be leak-proof, puncture-proof and not easily opened so that anyone cannot open it. It is also stated that sharp objects should be stored in a special container (such as safety box) or it substitute, safe bottle or carton [6,7]. Meanwhile, according to the Food and Drug Administrations (FDA), sharp medical waste container must fulfill the criteria, that made of heavy plastic, tightly closed, puncture-proof, impermeable to sharp objects, stable shape, leak-proof and labelled with hazardous waste. The FDA also recommends various sizes, including travel sizes, so that they are easy to use when away from health facilities [8,9].



Figure 3. Standards for Disposal of Sharp Solid Waste According to the FDA (FDA, 2021)

In this case, the mineral water bottle used as an alternative safety box, made of plastic that is waterproof and has a minimum water absorption capacity. But for resistance to penetrated by sharp objects, it is need to re-evaluate. If there is no proper container available, the FDA explains that several organizational guidelines recommend to use of plastic household equipment as an alternative. The equipment must be made of heavy plastic, leak-proof, upright and stable in shape, have a tight lid, and puncture-proof

to sharp objects. For example, is a plastic detergent bottle [9]. Compared to plastic detergent bottle, mineral water bottle has a thinner thickness than detergent bottles, and its shape is also not as sturdy as the detergent bottle.

Other studies state that an alternative that can be used is a jerrycan, From the comparison of jerrycan and mineral water bottle, mineral water bottle is less sturdy and has less thickness. Safety boxes made of duplex paper usually have a thickness of up to 2 mm, while mineral water bottles do not reach that thickness. So, it is concluded that mineral water bottles are still less suitable if used to replace the function of a safety box.



Figure 4. The example of alternative safety box according to the FDA is a detergent bottle (FDA, 2021).

Safety boxes are needed in mass gathering activities, not only in the Muzdalifah hall area. Due to the large number of pilgrims who have comorbid diabetes mellitus, they were using insulin injections. As research according to Yezli, et al (2021), mostly of pilgrims throw insulin needles into rubbish bin that dangerous for the pilgrims and also for those who process the waste. Thus, the existence of this safety box is very important in mass gathering activities, as an alternative, equipment that have the same characteristics as safety boxes can be substitute if needed.

5. Conclusion

After the review, the use of mineral water bottle as an alternative to safety box for the disposal of sharp medical waste still does not fulfil the standards. Other alternatives to safety box need to be reconsidered in mass gathering conditions, while maintaining the characteristics that puncture-proof, having sufficient thickness, water-proof, easy to carry, and having striking colours. For mass gathering conditions, additional criteria are needed, the size of the equipment should be easy to bring.

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