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Greening Health Care Waste Management:
Policies and Good Practices

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Abstract
The provision of healthcare waste management (HCWM) in many countries is often inadequate and this situation is much more severe in developing countries. It is estimated that, globally, more than 83,000 healthcare workers are infected every year through needle-stick injuries [1]. A total of 22% of the injuries take place during the collection and disposal processes [2]. While high-income countries have capacity to handle HCW sufficiently, middle-to-low income countries have been faced with additional challenges on HCWM especially due to the COVID-19 pandemic. Although middle-to-low income countries have established political strategies and legislation for sound HCWM, many of them often fail to enforce the legislation. In this context, this paper summarises the results of the webinar held in March 2022 that discusses the gaps between the regulatory measures and enforcement in developing countries, and explores potential measures to improve. For taking a closer look at the situation, cases from Kenya and Ethiopia in Africa, and from Nepal and the Philippines in Asia are presented. As a successful model, it also examines Japan's experience, whereby law enforcement measures have improved the application of national policies into practice.

Key words: Health care waste management, national health care waste management policies, law enforcement

HCWM in Ethiopia and Kenya
Looking at the current status of HCW generation in Ethiopia and Kenya, the official data at the national level are not readily available. However, the sample surveys carried out at the Health Care Facilities (HCFs) level have shown that in Ethiopia, Mizan-Tepi University Teaching Hospital in the south-west, and Menellik II Referral Hospital in Addis Ababa, generate 0.08 [3] and 0.49 [4] kg/patient/day respectively. In Kenya, the average waste generation estimated from 23 HCFs is about 0.52 kg/patient/day [5]. The data reveals a difference in waste generation rates even within countries, according to the types of HCF. Even though, global data reported that only 15% is hazardous within the overall HCW generation, this figure was 40 – 60% in Ethiopia [6], and 40 - 50 % in Kenya [5, 7], which is top ranked in the African countries [8]. Inadequate HCWM has a critically negative impact on the fragile healthcare infrastructure and the environment, and therefore both Ethiopia and Kenya have developed a series of national regulations, strategies and guidelines specifically for HCWM, in addition to the basic regulations on environment, waste management and healthcare. For example, Ethiopia formulated its National Health Care Waste Management Strategic Action Plan (2020/21 – 2024/25), Waste Handling and Disposal Guideline 1997, and the Healthcare Waste Management Manual. In comparison, Kenya has put in place a Health Care Waste Management Strategic Plan 2015 – 2020, Health Care Waste Management Implementation Plan 2016‑2020, National Policy on Injection Safety and Medical Waste Management, Injection Safety and Medical Waste Disposal Communication Strategy 2010, and National Guidelines for the Management of COVID-19 Wastes, 2020 [8].

While national policies have been formulated, the common challenges facing by both countries is effective implementation and monitoring. It is very rare to find standardised operation procedures and monitoring system at HCFs in the municipal level. There are various obstacles to enforcement and implementation at the local level, such as a lack of responsible monitoring and evaluation mechanisms at City Health Bureaus and Federal Ministries of Health [9]. Also, insufficient training and capacity building, lack of political commitments, lack of adequate resources, awareness and unfavourable attitudes of health care staff are the main challenges in improving the HCWM practices. According to a survey of five selected HCFs by the Ministry of Environment and Natural Resources, Kenya (2017), most of the waste management budget at HCF is spent on purchasing plastic bags for waste disposal and fuel for incineration. The remainder of the budget is insufficient to cover the costs for implementing adequate HCWM as this requires more human resources, as well as the installation, operation and maintenance of treatment facilities and equipment [10]. A sample survey by UNEP in 2021 shows that the average annual budget for HCWM at the selected HCFs is USD 3,203, which accounts for 14% of the HCFs' total budget. The survey also found that HCWM costs are not fully defined from an accounting perspective and tend to be separate from other operational costs This is something that most HCF managers are not fully aware of [8].

HCWM in Nepal

The volume of HCW generation in Nepal varies with type and facility. The average HCW generated by the hospitals over 25 beds are about 3 kg/patient/day, of which 1 Kg (33%) is infectious [11]. Though a similar situation was found in the south-eastern city Nepalgunji, due to poor segregation of waste at HCF, the percentage of infectious waste was 73% [12]. In Nepal, the Health Care Waste Management Guideline 2014 by the Ministry of Health and Population states that "Considering that they are waste producers, HCFs have a legal and financial responsibility for managing HCW safely, taking all necessary measures to minimize risks." According to the Guideline, Nepal has endorsed some policies and legislation to ensure proper waste management, including the Solid Waste Management Act 2011 which provides legal basis and regulation for HCWM. In recent years, the government published guidelines, more specifically on HCWM in the HCFs. For example, the National Health Care Waste Management Standards and Operating Procedures were established in 2020 based on the Health Care Waste Management Guideline 2014, the Public Health Service Act 2018, Public Health Service Regulation 2020, and National Health Policy, 2019. In response to the on-going COVID-19 pandemic, HCWM in the context of COVID-19 Emergency (Interim Guidance) was published in 2020, and Health Facility Operation Standards were approved in 2021.

In contrast, only a few HCFs in Nepal have a well-established HCWM system in place [13]. HCW is commonly treated by burying it in hospital backyards, open burning and incineration without proper air pollution controls, although National Health Care Waste Management Standards and Operating Procedures recommends non-incineration technologies. The Joint Monitoring Programme by the WHO and UNICEF in 2019 revealed that only 1% of HCFs in the country meet the above basic standards and procedures, which include segregation into at least three categories, as well as proper treatment and disposal of infectious waste.

HCWM in the Philippines

In the Philippines, the Ecological Solid Waste Management Act (RA 9003) as the national basis for waste management and the Clean Air Act (RA 8749) came into force in 2001 and 1999 respectively [14]. Since the Clean Air Act bans incineration, non-incineration solutions were sought as preferable methods such as autoclave and pyrolizer. However, the interpretation and implementation of the Acts have been making some stagnant in waste management in the country. Considering the rapidly increasing volume of waste, filling up the existing landfill sites, the Department of Environment and National Resources (DENR) announced in 2019 that the direction has been shifted to seek for

opportunities to employ Waste-to-Energy technologies as solution to reduce the increasing volume of waste and to produce energy. While environmental NGOS and alliances in the country oppose the government direction, according to the DENR, the supreme court resolution in 2002 for the case of Metropolitan Manila Development Authority vs. Jancom Environmental Corporation et al, stated that the Clean Air Act does not prohibit all incineration, rather, only those emitting hazardous fumes. [15]

A review of law enforcement in Japan

During 1990s and early 2000s, large scale illegal dumping and improper treatment of HCW was one of the most serious social issues in Japan, and was often covered by the media [16]. However, Japan has introduced a number of law enforcement and other political measures to reduce improper waste treatment and illegal dumping as summarised below. Because of these law enforcement systems, the amount of illegal waste dumped and the number of illegal dumping cases has drastically reduced from 450,000 in 1995 to 80,000 in 2019 and 400,000 in 1995 to 85,000 in 2019 in respectively.

First of all, tough penalties and robust inspection have made it more difficult for waste generators and waste management operators to commit illegal acts. In Japan, the Waste Management and Public Cleansing Law (hereafter, the Law) is the basic legislation on waste management in general [17]. Whenever large-scale incidents occurred, the Law has been repeatedly amended to tightened control on illegal dumping by strengthening inspections and requirements for licenses, including fines and extending the period of imprisonment for violations. In particular, fines have been increased and reached as high as JPY 300 million, which is around USD 3 million, per case of illegal dumping. Such heavy penalties and sanctions play a key role in preventing HCFs and waste management operators from carrying out illegal dumping and improper operations [18].

The second key measure is a manifest system. In order to further prevent illegal cases, a manifest system was introduced in 1990. This system ensures transparency and traceability of waste handling by tracking the flow of waste from generation point to disposal point. In this system, the Law obliges waste generators to record the required information in manifests when outsourcing waste management services to licensed operators. The penalties for violation of the manifest system have been also tightened over the years. Under the Law, public authorities are entitled to request disclosure of the necessary manifest information and statistics [19].

Third, the roles and responsibility of different actors involved in HCWM such as public authorities and HCFs has been also reinforced. The Law stipulates that waste management businesses cannot be operated without obtaining a license from the public authorities. Prefectural governments assess the facilities and business operations to ensure that they meet all legal requirements. In accordance with the Law, the public authorities must supervise waste generators and waste management operators through reporting, on-site inspection and monitoring. The prefectural governments are entitled to issue administrative orders to waste generators and hold them be liable for the cost of restoring environments to their original state if damage has occurred after illegal dumping or treatment. HCFs which generate HCW are required to establish an internal waste management system, and to follow the rules for storage, packaging and labelling [20]. The Law stipulates that the treatment of HCW is the responsibility of the waste generator. If waste generators need to outsource the waste treatment and disposal, they are obliged to use government-licenced operators and they must carry out monitoring to ensure all waste management processes are properly carried out. HCFs are also recommended to conduct periodical on-site inspections of the treatment and final disposal facilities [18, 20].

Conclusion

Comparing the four countries above, Japan is notable for strengthening regulatory measures including the penalty for illegal treatment and dumping to the level where HCFs even may not be

able to continue operating due to the heavy fines. In addition, clear demarcation of roles and responsibilities among key stakeholders and public authorities have been given more authority to monitor and inspect how HCFs deal with waste management. These are the key factors to disincentivise HCFs and waste management operators from committing illegal activities. In developing countries such as Ethiopia, Kenya and Nepal where law enforcement is often lacking, it is recommended to impose heavier legal responsibility on HCFs and waste management operators for legislative compliance, and at the same time, to establish a system to monitor their compliance and performance by the public authorities. However, many developing counties are faced with major challenges in areas such as finance, human resources and technology, meaning that it would not always be feasible for public authorities to monitor the performance of HCFs. In such cases, citizen-science approach involving the media and citizens to monitor illegal operations and activities can be an effective option. In Japan, the media has played a key role to boost public awareness on illegal waste management. The media often disclose the name of HCFs and waste management operators who committed illegal cases to the public, resulting in businesses having to close down. Furthermore, the Ministry of the Environment has set up a hotline for citizens to monitor and report illegal activities. Thus, heavier responsibility and strengthened monitoring can function as efficient law enforcement tools.

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