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Awareness on Medical Waste Management and Occupational Health Safety among the Employees Related to Medical Services at Upazila Level in Bangladesh

Kazi Shamima Akter[1]*, Shaikh Mohammad Shamim Reza[2]

1- Military Institute of Science and Technology, Bangladesh University of Professionals, Dhaka, Bangladesh
2- University of Asia Pacific, Dhaka Bangladesh

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Abstract

The proper knowledge in waste management is a vital requirement the proper waste management. Whereas the number of Healthcare Establishments (HCEs) is increasing day by day at upazila level, it is necessary to evaluate the level of knowledge on medical waste management of the employee related to medical services. It is also necessary to find the occupational health safety practices among the employees. In this study, Singra Upazila of Natore district in Rajshahi division has been selected to achieve the objectives of the study. A total 40 numbers of HCEs was selected in the study area. To find the level of knowledge in Medical Waste Management (MWM) practices, a questionnaire survey was conducted among the employees of the selected HCEs. The questionnaire also helped to find the occupational health safety practice and the difficulties faced by the employees. After getting all the data from field observation and questionnaire survey, the results are accumulated by using SPSS software. After that, results were presented by tables and bar charts. It was found that, hands on training played an important role in both knowledge level of employees and occupational health safety practices. It was also found that all the non-government employees are non-trained. On the other hand, most of government employees are trained and only a few were non-trained. So, the comparison between government and non-government can consider as the comparison between trained and non-trained employee. The knowledge level of government HCE's employees found higher than the private HCE's employees. The government HCE's employees were also more aware about occupational health safety practices. So, they had less injuries the private HCE's employees. Workers were facing different types of difficulties as well as occupational health hazard in both types of HCEs. Finally it was recommended that, to run a proper waste management system, the employees will need hands on training on it.

Keywords: Medical Waste, Hazardous waste, Rural Health Care, Awareness, Knowledge, Occupational health safety

1 Introduction

Medical waste management is an important issue at present days. The number of HCE is increasing day by day at upazila level to give health care service for the people of remote area [1]. Although the MW generation was in a considerable amount but the waste management system was found very poor. There was a vast lacking to follow the waste management rules in this level [2]. Improper disposal of medical wastes poses to transmitting hepatitis B and C, HIV and other blood-borne diseases [3]. A study showed that, about 5.2 million people including 4 million children die each year from waste-related diseases all over the world [4]. Therefore, it is necessary to focus on the medical waste management system in rural level.

It was found from a study that the non-government hospitals managed medical wastes better than the government ones [5]. Another study showed that government HCEs are slightly better than the private HCEs in upazila level [2]. A few NGO's are working on MWM [6]. Although there is a future action plan of Ministry of Health and Family Welfare (MoHFW) of Bangladesh, but the overall present scenario of MWM in rural areas is not satisfactory [7].

The proper waste management is not possible without having the proper awareness and knowledge in waste management. It is also very important to follow the occupational health safety issues when it deals with hazardous waste. The objectives of the study were knowing the awareness, perception and knowledge about MWM of

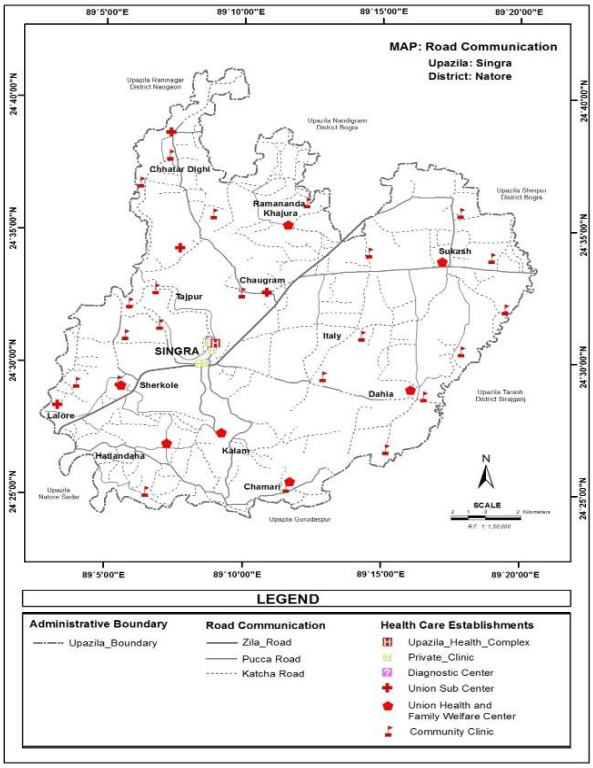
Corresponding author: Kazi Shamima Akter, University of Asia Pacific, Dhaka Bangladesh. E-mail: engr.shamim.ce@gmail.com.

the employees related to medical services and to assess the occupational health hazard and difficulties faced by the employees in current medical waste management system and their suggestions to improve the system.

2 Materials and Method

2.1 Background information and Study Area

Singra Upazila was selected for the study area. The upazila is situated at Natore district in Rajshahi division. It The total area of the upazila is 528.46 square kilometer. There are 12 unions and only one pourashava in this upazila [2].



Singra upazila has an upazila health complex (UHC), 4 Union Sub Centres (USC), 8 Union Health and Family Welfare Centres (UHFWC), 42 community clinics (CC) and 3 registered diagnostic centres [8]. But the number of private clinic and diagnostic centre were increasing. For this study, the upazila health complex, 4 Union Sub Centres, 7 Union Health and Family Welfare Centres, 22 community clinics and 6 private clinics and diagnostic centres were selected which are shown in Table 1.

2.2 Methods

This study was carried out from February 2015 to December 2016. The methodology of the study was focused on questionnaire survey. The questionnaire survey helped to understand the level of knowledge and awareness of the people related to medical services. It also gave a view of occupational health hazard.

Table 1: List of Healthcare Establishment (HCEs) selected for the study

Sl.	HCE Name	Type of HCE
1	Singra Upazila Health Complex	U.H.C.
2	Chowgram U.S.C.	Chowgram Union Sub Center
3	Dangapara U.S.C.	
4	Hulhulia U.S.C.	
5	Kaliganj U.S.C.	
6	Sukash U.H.F.W.C.	Union Health and Family Welfare Centers
7	Dahia U.H.F.W.C.	
8	Kalam U.H.F.W.C.	
9	Chamari U.H.F.W.C.	
10	Hatiandaha U.H.F.W.C.	
11	Sherkole U.H.F.W.C.	
12	Ramananda Khajura U.H.F.W.C.	
13	Boalia C.C.	Community Clinic
14	Joykuri C.C.	
15	Dahia C.C.	
16	Baragram C.C.	
17	Kheerpota C.C.	
18	Pakuria C.C.	
19	Bonkury C.C.	
20	Satpukuria C.C.	
21	Mahismari C.C.	
22	Gunaikhara C.C.	
23	Baro baroihati C.C.	
24	Chakpur C.C.	
25	Shedhakhale C.C.	
26	Puthimary C.C.	
27	Tajpur C.C.	
28	Naogaon C.C.	
29	Sthapondighi C.C.	
30	Choto Chowgram C.C.	
31	Bhulbaria C.C.	
32	Pakisha C.C.	
33	Panch pakhia C.C.	
34	Bingram C.C.	
35	Janani Diagnostic Center	Private clinic and Diagnostic Center
36	Singra Diagnostic Center	
37	Al Hera Clinic and Diagnostic Center	
38	Desh Clinic and Diagnostic Center	
39	Mahanogor Clinic	
40	Dip Medical Services	

2.3 Population and Sample

The population which has been selected for the study was the medical employees like doctors, administrator, nurse, paramedic, pathologist, chemists and workers of

both sex in the HCEs. Total number of population was 273. Inclusion criteria was, all co-operative employee who were willing to participate in the study. And exclusion criteria was, employees who were not willing to participate in the study. The sample size was 85 due to time constraint. Simple random sampling technique was followed.

The questionnaire was distributed among the HCEs 85 staffs. Then a small brief was given about the questionnaire and the project. Survey was conducted when most of the employees were less busy.

2.4 Questionnaire survey

A structured questionnaire was designed to collect information regarding personnel knowledge about MWM. The questionnaire was developed to collect data about all level of personnel working in HCEs. It aimed at gathering information about the demographic data like age, gender, professional background etc.; training and interest towards training; perception about MWM; knowledge about MWM system; occupational health hazard and safety; difficulties and problems; suggestions and opinions.

Designing or formulating the questionnaire is a very important step.

i. The first few questions were general which aimed to address the age group, gender, the professional background of the person to understand his/her interest towards waste management.
ii. There were also questions was focusing on whether he/she knows the difference between normal municipal waste and medical waste, constituents and knowledge of the hazard category of infectious waste. It also examined people‘s awareness about the risk associated with the medical waste.
iii. There were also questions regarding current waste segregation practice.
iv. Following questions examined on the awareness about the occupational health hazards.
v. The purpose of next questions was to find out participant‘s attitude towards training or to take part in a public meeting on waste management.
vi. The following question was aimed to interpret which technology does him/she considered as the best way to treat medical waste.
vii. An open question was also asked about the other obstacles they faced, coordination problems within the various departments and suggestions to improve the medical waste management at the hospital.

2.5 Data processing and analysis

The results were tabulated in SPSS and were presented through graphs, tables and charts. There will be several comparisons to be presented graphically.

3. Result and Discussion

3.1 Demographic Data of Employees

Total 85 employees of different categories were surveyed. Demographic data about the employees included their professional position, gender, age, education level, job experience, nature of job and training in health care sector are shown in table 2.

Table 2: Demographic Data of Employees

Characteristics	Category	Number of People	Percentage
Professional Position	Doctor	15	17.65%
	Administrator	10	11.76%
	Nurse/Paramedic	25	29.41%
	Pathologist/Pharmacist	15	17.65%
	Worker	20	23.53%
Gender	Male	44	51.76%
	Female	41	48.24%
Age	18-30 years	32	37.65%
	31-40 years	35	41.18%
	41-50 years	6	7.06%
	51-60 years	6	7.06%
	61+ years	6	7.06%
Education Level	Post-Graduate	5	5.88%
	Graduate	24	28.24%
	Diploma	25	29.41%
	H.S.C.	8	9.41%
	S.S.C.	5	5.88%
	Primary	12	14.12%
	Below Primary	6	7.06%
Job Experience in Health Care Sector	1-5 years	36	42.35%
	6-10 years	22	25.88%
	11-15 years	17	20.00%
	16-20 years	4	4.71%
	21+ years	6	7.06%
Nature of job	Government	47	55%
	Non-Government/Private	38	45%
Training	Trained	43	50.60%
	Not-Trained	42	49.40%

Analysing all the data from table 1 it was found that, the awareness, perception and knowledge of the employees were not much affected by their professional position, gender, age, education level and job experience. Employees’ nature of job and training on MWM mostly influenced the results.

3.2 Training on MWM

Training on MWM was a most important factor to comparison of the awareness, perception and knowledge of the employees. It was found that employees’ awareness, perception and knowledge depended on training. The percentage of trained and non-trained employee according to their job nature is given in figure 4.1.

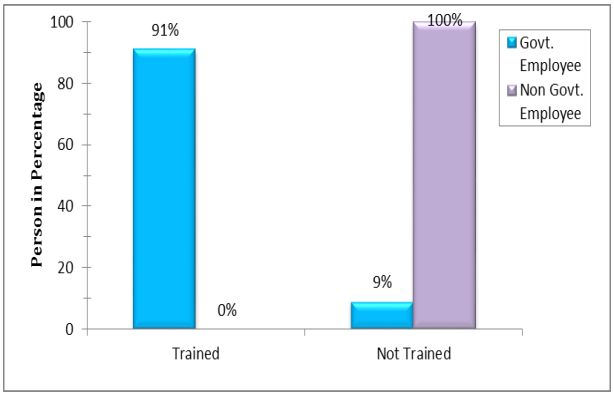


Figure 2: Training on MWM of the Employee

From figure 2, it is found that all the non-government employees are non-trained. On the other hand, 91% of government employees are trained and only 9% are non-trained. So, the comparison between government and non-government can consider as the comparison between trained and non-trained employee.

3.3 Evaluation of Employee's Perception towards Training

It was very necessary to understand the employee's perception towards training. To operate and maintain a MWM system needs trained employees. The system would be introduced by training to them. So, it was needed to know their interest on training as well as their thoughts about importance of training.

Table 3: Employees perception towards training

	Government Employee	Private Employee
Trained Employees	**91%**	**0%**
Interested in Training	100%	0%
Acknowledges the Importance of Training	100%	0%
Non-trained Employees	**9%**	**100%**
Not-interested	0%	8%
Thinking no importance of Training	0%	8%

From table 3 it is found that 100% of trained and un-trained government employees were interested in further training and they also realized the importance of training. Due to having previous experience of training, they might understand the importance of training and they were also interested for further training.

Among private employees, 92% were interested in training and realized the importance of training. Though, those employees had no training but hearing these issues on MWM they realized the importance of the issue and shown interest on training. On the other hands, 28% of private employees were not interested and 25% found no importance of training. Those fewer employees had no previous training and their education level was primary to below primary level. Therefore, they did not understand the importance of training and was found not interested in training.

3.4 Evaluation of Employee's Perception about MWM

From figure 3 it was found that, all the government employees thought that proper medical waste management is an important issue. Because they were previously familiar to MWM issue and got training on it. On the other hands, 24% of non-government employees thought proper medical waste management is not an important factor as they were not familiar with the issues.

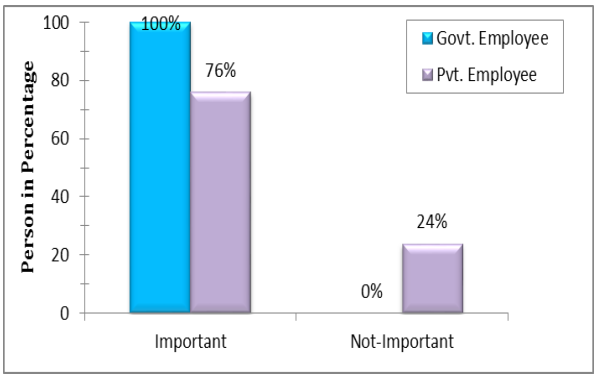


Figure 3: Perception on proper medical waste management

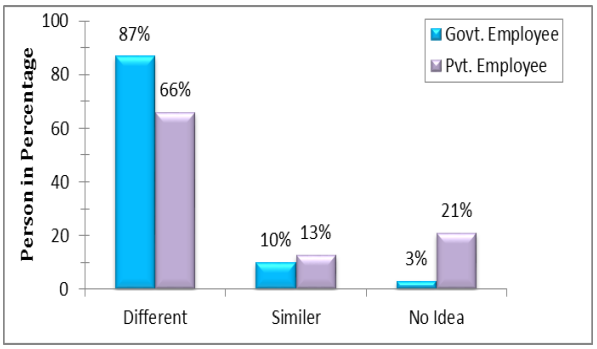


Figure 4: Perception on Municipal waste and Medical Waste

From figure 4 it was found that, government employees also performed better than the non-government employees because of their previous knowledge about MWM which was gathered by training. 87 percent of government employee said that medical waste is different than the municipal waste which was correct answer. 10 percent of them said that both wastes were similar which was wrong answer and 3 percent had no idea. On the other hand, 66 percent non-government employees gave the correct answer, 13 percent gave wrong answer and 21 percent had no idea.

3.5 Evaluation of Employee's Knowledge on Identifying Medical Waste

From figure 5 it was found that, regarding the identification of kitchen waste as non-hazardous, both government and non-government employees answered very close. In case of paper, cartons and boxes they also answered very close and identified those as non-hazardous waste. It was easier to understand that, kitchen waste as well as paper, cartons and boxes were non-hazardous medical waste. Without training, it could be answered by

using common senses.

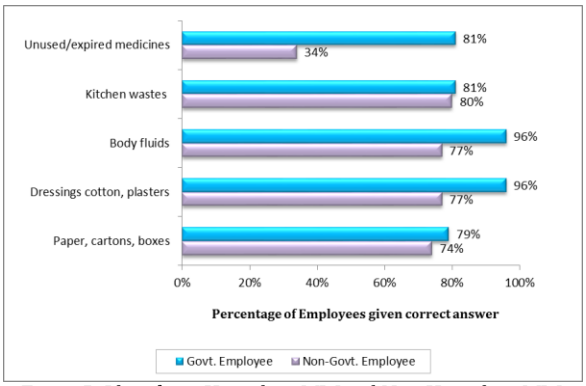


Figure 5: Identifying Hazardous MW and Non-Hazardous MW

In case of unused/expired medicine, large percentage of government employees considered it as hazardous waste. On the other hands, 66% of non-government employees considered it as non-hazardous waste. To identify body fluids, dressing cotton and plasters as hazardous waste, government employees were more correct than non-government employees. It may be due to the previous training on MWM by the government employees.

3.6 Evaluation of Employee's Knowledge on the Elements of Medical Waste Management System

From figure 6 it was found that, government employees familiar with coloured bin. It might be the result of training. But they had trouble to answer to segregation and storage related questions. It was clear from that; they had a great weakness in segregation practice as well as storage practice. For these two elements they gave more wrong answers and had no idea. Most of them did not answer properly about the storage time. It may be happened due to irregular practice of MWM system.

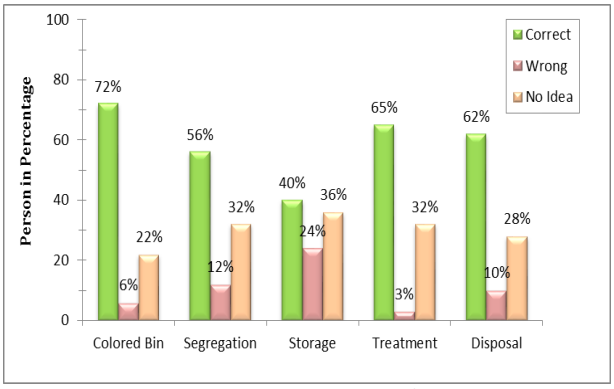


Figure 6: Knowledge about the Elements of MWM (Govt. Employee)

From figure 7 it was found that, most of the non-government employee had no idea about coloured bin, segregation and storage. Above the fifty percent of them had no idea about MW treatment.

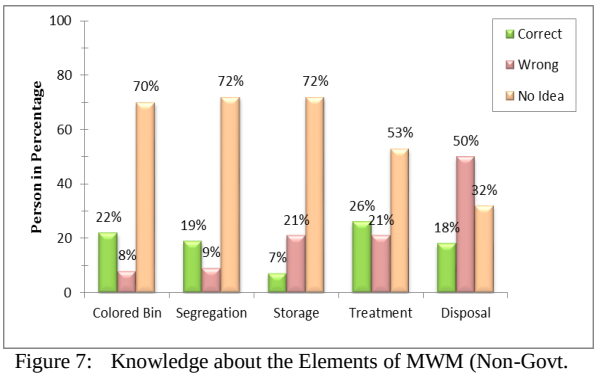


Figure 7: Knowledge about the Elements of MWM (Non-Govt. Employee)

Half of them gave wrong answer about MW disposal. Behind all of these, it might be due to the lack of training on MW management and practice. From figure 5 and 6 it was found that, government employees were performed better than non-government employees. The reason may be the training facility and practice of MWM.

3.7 Occupational Health Hazard

The history of accidental injuries during management of MW of the workers is given in figure 4.7.

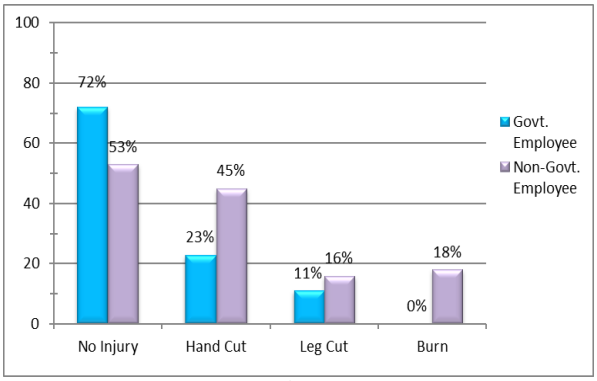


Figure 8: Injuries of workers during work

From figure 8, non-government employees were found suffering from more injuries compared to the government employees. The reason behind the less injury of government workers was that they got training and had some safety measures. Non-government workers experienced almost double injury due to hand cut compared to the government employees during handling of MW. There was no burn injury for the government workers but 18% of non-government workers got burn during handling of MW.

3.8 Workers using safety measures

Whereas workers were directly to involved with handling, storing, disposing the medical waste, so it was very important to measure safety precautions. Out of 20 workers, 12 of them were govt. employee and 8 were non govt employee. Out of 20 workers, 14 of them were using gloves, 12 workers were using safety dress, only 4 of them were using boots. Gas musk and goggles were used by 6

and 5 workers respectively. But sanitizer was used by 19 workers. The safety measures used by the employees are shown in table 4.

Table 4: Safety measures used by HCEs' workers

Safety Equipment	Govt. Workers		Private Workers	
	Frequency	Percentage	Frequency	Percentage
Gloves	10	83%	4	50%
Dress	9	75%	3	38%
Boots	3	25%	1	13%
Gas musk	4	33%	2	25%
Goggles	4	33%	1	13%
Sanitizer	12	100%	7	88%

From table 4, we can also illustrate the data in a histogram below:

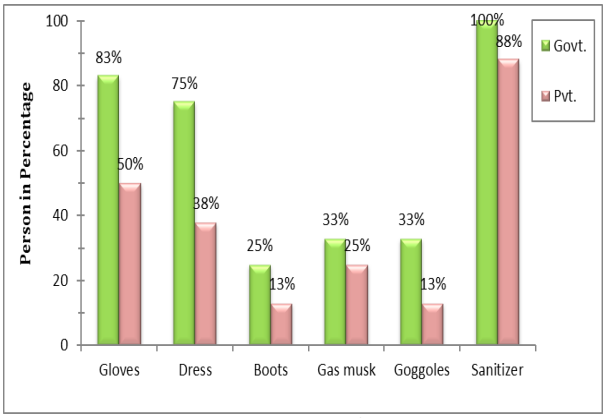


Figure 9: Workers using safety measures

From figure 9, it is very much accessible that, trained workers were more aware about occupational health safety practice then the un-trained workers.

3.9 Difficulties Faced by Employees in Current MWM System and their Suggestion to Improve the System

From figure 10 it was found that, most of the government employees were not much satisfied with their current MWM system. Whereas there were some facilities of MWM system in the government HCE, therefore a very few of them said "not satisfied".

Figure 10: Employees satisfaction on current MWM system

Only 2% of government employees and 13% of non-government employees were satisfied with their current MW management practice. A large number of non-government employees were not satisfied on their current MWM. Because they did not have proper facilities for the MW management in their HCEs.

Employees were also facing a lot of difficulties in the current MW management practice. Improper disposal and lack of treatment facility both were the major problems identified by the highest percentage of both the government and private HCEs employees. Regarding storage, collection and safety issues, non-government employees were found to face significantly more difficulties compared to government employees. It was due to the lacking of these facilities in the non-government HCEs. Employees of both types of HCEs faced MW transportation problem. These all were shown in figure 11.

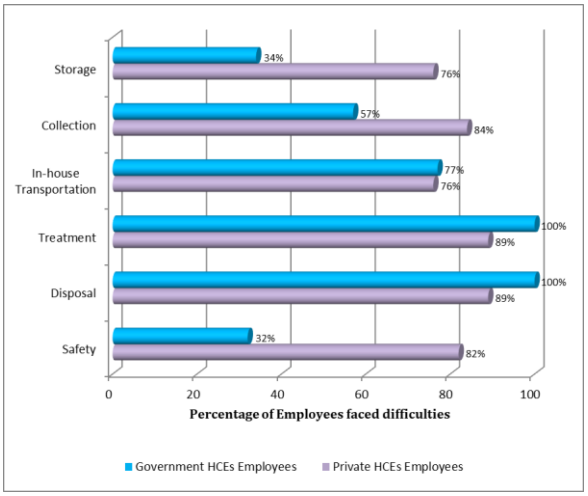


Figure 11: Difficulties faced by employees

4 Conclusions and Recommendations

4.1 Conclusions

This study showed a scenario of different types HCEs in upazila level. The knowledge level of government HCE's employees found higher than the private HCE's employees. The government HCE's employees were also more aware about occupational health safety practices. So, they had less injuries the private HCE's employess. Workers were facing different types of difficulties as well as occupational health hazard in both types of HCEs.

To run a proper waste management system, the employees will need hand on training on it. Most of the employees both government and private HCEs were interested for training because they were realized the importance of the issue. Many of them were trained before but they were also interested for further training as well.

4.2 Recommendations

The following recommendations for the future development of MWM

- Need to increase perception and knowledge level of employee through hands on training.

- Important to give emphasis on occupational health safety of workers and staffs.
- Government needs to focus on private HCEs also.

Acknowledgment

Authors are very grateful to all the employees of the Upazila Health Complex, Singra and all other health care establishments for helping to the survey. Authors are also thankful to the authorities of the HCEs for giving the permission to undertake the interviews, without which, it would be very difficult to fulfil the study.

Ethical issue

Authors are aware of, and comply with, best practice in publication ethics specifically with regard to authorship (avoidance of guest authorship), dual submission, manipulation of figures, competing interests and compliance with policies on research ethics. Authors adhere to publication requirements that submitted work is original and has not been published elsewhere in any language.

Competing interests

The authors declare that there is no conflict of interest that would prejudice the impartiality of this scientific work.

Authors' contribution

All authors of this study have a complete contribution for data collection, data analyses and manuscript writing.

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Authors Profile

Major Dr. Kazi Shamima Akter received her PhD. in Urban Engineering from The University of Tokyo, Japan in 2013. Also received M.Sc. and B.Sc. in Civil Engineering, from Bangladesh University of Engineering and Technology (BUET), Dhaka, Bangladesh in 2010 and 2007 respectively. Currenly she is working as Assistant Professor at Department of Environmental, Water Resources and Coastal Engineering (EWCE), Military Institute of Science and Technology (MIST), Dhaka. Her research interests are in Air polutuion, Carbon emmision footprint, climate change, waste water treatment, water pollution, water policies, water securities, hazardous/medical waste management, municipal waste management etc.

Shaikh Mohammad Shamim Reza received MBA from Army Isntitute of Business Administration, Savar under Bangladesh University of Professionals, Dhaka; in 2019. He received M.Engg. in Civil Engineering from University of Asia Pacific, Dhaka; in 2018 and B.Sc. in Civil Engineering from Stamford University Bangladesh , Dhaka; in 2012. Currenly he is working as a Network Modeller at Dhaka Water Supply and Sewerage Authority. He has more then 7 years working experience on Water Supply, Sanitation and Waste Management sectors. His research interests are in hazardous/medical waste management, municipal waste management, recycling of waste for sustainable development etc.