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Awareness, Attitude and Practice on Sterilization among Healthcare Staffs of a Tertiary Hospital in Bangladesh

Md. Sifat Uz Zaman^{1*}, Mushtaque Ahmed², Nabeela Mahboob², Hasina Iqbal², Sabrina Afrin², and Suma Mita Biswas³

¹Infection Prevention & Control Division, Medlife Healthcare Limited, Dhaka, Bangladesh; ²Department of Microbiology, Popular Medical College, Dhaka, Bangladesh; and ³Microbiology & Immunology Division, Evercare Hospital, Dhaka, Bangladesh.

*Correspondence: sifat.zaman9@gmail.com (Md. Sifat Uz Zaman, Assistant Manager, Infection Prevention & Control Division, Medlife Healthcare Limited, Dhaka, Bangladesh).

ABSTRACT

The background and objective of this study are to assess the awareness, attitude, and practice on sterilization among health-care staffs of a tertiary hospital in Bangladesh. This cross-sectional study was done in a renowned hospital in Dhaka city, from July 03, 2020, to August 05, 2020. A stratified random sample survey was done. The total sample size was 73 health care staff, including the OT nursing staff, OT technicians and CSSD (Central Sterile Supply Department) laboratory technicians, who were involved in sterilization and disinfection procedure. A questionnaire with both and open-ended questions was given among the respondents including socio-demographic close-ended variables, such as sex, age, working experience, job nature of the participants, and details regarding ethical approach to attitude, awareness as well as the practice of sterilization and disinfection and its proper management, methods, and the knowledge regarding management of biomedical wastes. 79.5% of healthcare staff was aware of managing biomedical waste but 20.5% were not aware of it. Only 61.6% of healthcare staff wears PPE properly but 38.4% didn't agree. Number of health care staffs (20.5%) had not taken any vaccine against the Hepatitis B virus. 86.3% of healthcare staff had a positive attitude on biomedical waste management. 91.8% of staff had a positive attitude to a vaccination before performing disinfection and sterilization procedure. 82.2% positive attitudes were detected in wearing PPE before sterilization & disinfection procedure according to this study. This type of research also should be conducted in all government hospitals, medical college hospitals as well as all private hospitals to assess the current scenario & recommend for rectification where necessary.

Keywords: Sterile supply, PPE, Ethylene oxide, Disease control, Healthcare, Infections, and Infection control.

1. INTRODUCTION:

Infection Control is a vital portion of patient safety (RCDSO, 2012). World Health Organization (WHO) showed in survey that 8.7% patients of hospital on an average had healthcare associated infections. Up to 1.4 million populations in all over the world generally

suffer from nosocomial infections in any time, acquired mainly in hospital (CDC, 2015). The common healthcare associated infections are pneumonia, infections of lower portion respiratory tract, infections of site of surgery, infections of urinary tract and infections of bloodstream (Kaushal *et al.*, 2015).

Many worldwide reports have been found about infection's risk which is related to improper practice sterilization (Saha *et al.*, 2020; Rutala and Weber, 2016).

The process of sterilization is such an important process of killing or destruction completely of all kind microorganisms such as virus, bacteria, fungus, bacterial spores. Disinfection is chemical or thermal destruction or killing pathogenic microorganisms which is less lethal compared to sterile processing because this process kills most commonly known microorganisms which are mainly pathogenic but not capable to kill all different forms of microbes such as spores of bacteria (Damani, 2003). In modern medical care, sterilizing equipment is an important element since the patients who are come mainly in connection with syringes, gauges, surgical instruments and bandages, etc in all time. For ensuring safety of the patients, the environment and the medical staffs, medical equipment must have to be used safely which includes keeping all of them clean, disinfected and sterilized. For avoiding the chance of disease transmitting from one patient to another, thorough, proper and effective reprocessing of this vital equipment is required. Germs or pathogenic microorganisms need to be destroyed properly to minimize infection spreading for both health care staffs and the patients in the hospital. A perfect example in this regard is combating against various types of (HAIs) infections. HAIs are such infections that the patients normally get due to staying in hospital. HAIs can be caused due to equipment which is contaminated, improper sterilization of instruments used for surgery or inappropriate staff hygiene. Some advantages of sterilizing and disinfecting surgical equipment are:

- It removes all biological soils such as blood, pus, foreign particles etc which could cause serious harms to the patient requiring operation where health care staffs use the instrument.
- Bio burden is decreased.
- The corrosion of expensive surgical instruments is prevented by it.
- Removal of ground which is breeding for the surviving microorganisms is ensured by this.

Sterilization and disinfection procedure if properly done, the perfect & safe use of non-invasive and invasive medical devices can be ensured. All hospitals must have their own specific plan for preventing HAIs from spreading. The improvement in sterilization as well as disinfection practices in medicals & hospitals is necessary for minimizing the risk of infection. Central sterile supply department (CSSD) is a vital department or service unit in a hospital that reprocesses, issues, and controls the sterile surgical instruments, medical devices and supply to all departments of the hospital. It can also be defined as, catering for the sterile supplies to all specialized units, OPDs and general wards. Increasing interest in practicing and organizing sterilization has been witnessed since the last few years in all over the world (Welch, 1961).

The purpose of CSSD is to supply all the departments of a hospital with guaranteed sterile devices, equipment or instruments which are ready and available to use immediately for surgery or patient care which is an important step towards the infection prevention (Allison, 1960). Ideally, CSSD is an independent department run by infection control committee. The overall function of CSSD is to receive, then clean, then disinfect, then pack, then sterilize, then store and finally distribute medical devices or the instruments within the protocols. Appropriate designing, standard equipment, expert operators and proper work flow are the main demands of this division (CDC, 1998). Defects or failure in sterilization and disinfection can cause serious consequences to the patients, also to the staffs of the hospital (CDC, 1998; Babcock *et al.*, 2003). The basic right of every people to get proper service or treatment in every department of the hospital. But the patients can't monitor the sterilization & disinfection practice of the hospital whether the staffs are ethically doing their duties or not. So, the health care staffs, how much they ethically perform their duties in disinfection and sterilization procedure as well as maintaining proper health care issues, those will be revealed in this study.

2. METHODOLOGY:

2.1. Study Area and Population - This research was done in a tertiary hospital in Dhaka city, from July 03, 2020 to August 05, 2020. A stratified random sample

survey was done. The total sample size was 73 health care staffs, including the OT nursing staffs, OT technicians and CSSD laboratory technicians, who are involved in sterilization and disinfection procedure.

2.2. Data Collection - A Questionnaire with both close ended and open-ended questions was administered among all respondents & questionnaire was in English. The Questionnaire was covered with information on some demographic variables like sex, age, working experience. Also included details about ethical app-

roach to attitude, awareness as well as practice of sterilization and disinfection and its proper management, methods, and the knowledge regarding the management of biomedical waste. All the OT nursing staffs, OT technicians and CSSD (Central Sterile Supply Department) laboratory technicians involved in sterilization and disinfection procedure, were invited individually to fill up the questionnaire and were assured about their anonymity and confidentiality.

2.3. Basic profile of health care study population (n=73)

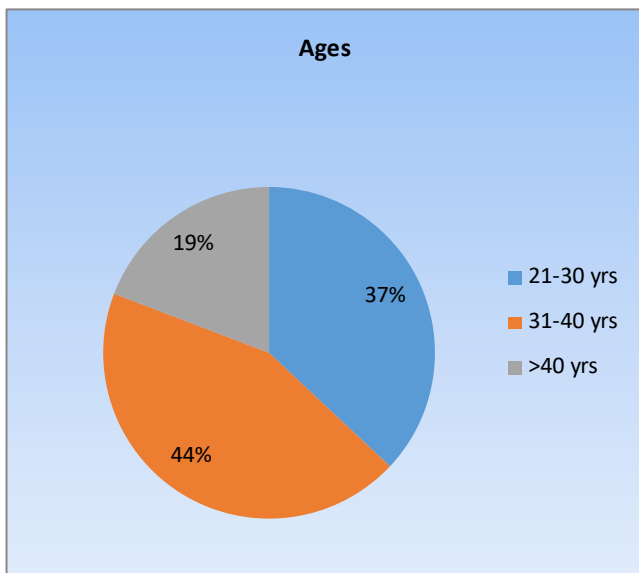


Fig 1: Distribution of age of study population.

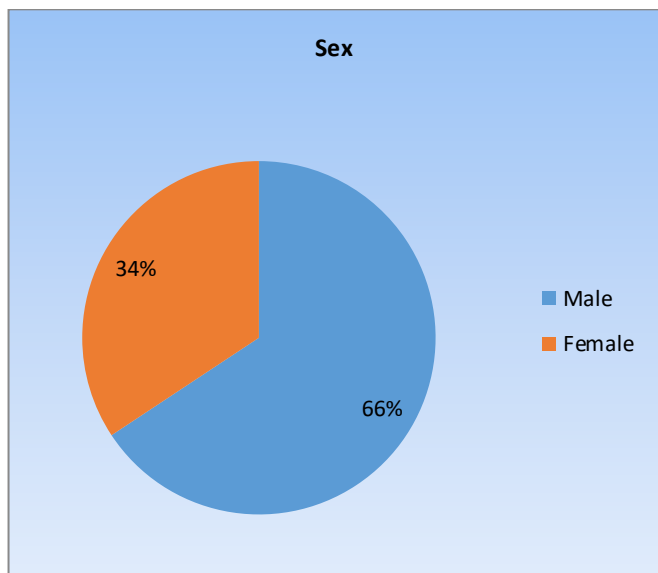


Fig 2: Distribution of gender of study population.

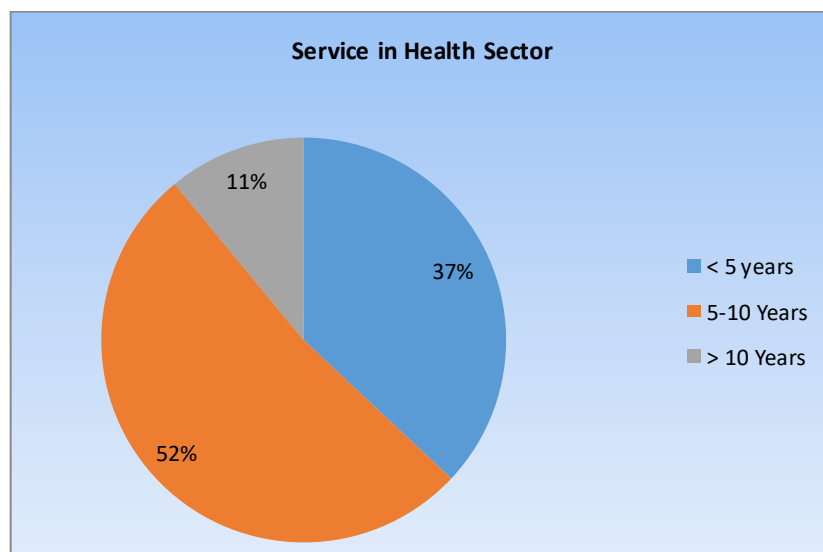


Fig 3: Experience wise distribution of study population.

3. RESULTS:

The findings of this study are discussed into 3 parts: Awareness, Practice and Attitudes. The findings are given below:

3.1. Awareness about sterilization & disinfection among health-care personnel

No.	Awareness	Yes (%)	No (%)
3.1.1	Do you have awareness about different sterilization methods & its harmful effects?	73(100)	0(0)
3.1.2	Do you have awareness about different disinfection methods & its harmful effects?	73(100)	0(0)
3.1.3	Do you have awareness about post sterilization management of surgical instruments?	62(85)	11(15)
3.1.4	Do you have awareness about the temperature for sterilization in autoclave?	65(89)	8(11)
3.1.5	Are you aware that infectious disease can be transmitted when aseptic precautions are not taken?	73(100)	0(0)
3.1.6	Do you have awareness about management method of biomedical waste?	58(79.5)	15(20.5)
3.1.7	Do you have awareness about the sterilization protocol/policy in your hospital?	73(100)	0(0)
3.1.8	Do you have awareness about the Infection prevention & control policy in your hospital?	73(100)	0(0)

3.2. Attitudes of the staffs of health care settings regarding sterilization and disinfection

No	Attitude	Yes (%)	No (%)
3.2.1	Is it necessary to regularly train health staff on sterilization and disinfection procedure?	73(100)	0(0)
3.2.2	Should health staff require vaccination before performing disinfection, sterilization procedure?	67(91.8)	6(8.2)
3.2.3	Should health staff always put on proper personal protective measures while disinfection & sterilization procedure?	60(82.2)	13(17.8)
3.2.4	Should health staff reuse disposable needles, intravenous sets?	0(0)	73(100)
3.2.5	Should health staff always wash hands with antiseptic before as well as after handling patients?	73(100)	0(0)
3.2.6	Should health staff always follow proper sterilization & disinfection guidelines or policy?	73(100)	0(0)
3.2.7	Is it necessary to regularly train health staff on methods of biomedical waste management?	63(86.3)	10(13.7)

3.3. Practice of personnel of health care settings regarding sterilization & disinfection and their management

No.	Practice	Yes (%)	No (%)
3.3.1	Do you wash hands with antiseptic before as well as after disinfection & sterilization procedure?	73(100)	0(0)
3.3.2	Do you properly use personal protective measures while disinfection & sterilization procedure?	45(61.6)	28(38.4)
3.3.3	Do you regularly use disposable needles, intravenous sets etc?	0(0)	73(100)
3.3.4	Did you ever get needle injury?	12(16.4)	61(83.6)
3.3.5	Did you report and take treatment for needle injury?	12(16.4)	61(83.6)
3.3.6	Have you done any training on sterilization & disinfection procedure for surgical instruments?	52(71.2)	21(28.8)
3.3.7	Did you take vaccine against Hepatitis B?	58(79.5)	15(20.5)

4. DISCUSSION:

In the study, it is clear that the all the healthcare personnel are aware of sterilization methods as well as disinfection methods and their harmful effects which is

satisfactory result. They all are fully aware of infectious disease which easily can be transmitted if aseptic precautions are not taken. They all are also aware of sterilization protocol/policy & IPC policy of that hospital. All those results are very much satis-

factory. But few problems in some part have been detected such as awareness of managing biomedical wastes. 79.5% health care staffs are aware of this but 20.5% are not aware which is very much alarming for the environment as well as patient's health safety issue. Another dissatisfactory result was detected in awareness of post sterilization management of the instruments. The result is not much satisfactory. 85% health care staffs are aware of this. In this issue, 100% result is required because if sterilized surgical instruments are not stored properly, there is possibility of contamination. Serious infection may be occurred if the patient's surgery is done by those contaminated surgical instruments. Another dissatisfactory thing in this result part is 89% health care staffs are conscious of the temperature for sterilization in autoclave but 11% are not aware which can harm the expensive surgical instruments, health safety of patient's as well as health care staffs. In the research, complete knowledge & awareness have been found in a medical college hospital of India (Kulkarni and Chillarge, 2015; Shah *et al.*, 2020).

All the staffs wash hands with antiseptic before as well as after disinfection and sterilization which is good. No health care staffs use disposable needles, syringe and intravenous sets which is also satisfactory. Another satisfactory thing is 16.4% staffs got needle or sharp injury previously and all the staffs report it to the IPC committee of that hospital and took proper treatment for it. But the staffs do not properly use personal protective measures properly while disinfection & sterilization procedure, for example gloves, mask, glasses, cap and apron etc. Only 61.6% healthcare staffs wear PPE properly but 38.4% doesn't wear. 38.4% is huge percentage in this issue because wearing personal protective measures properly while disinfection & sterilization procedure is a must for the staffs. This can be a serious threat to patients who are admitted in hospital as well as the staffs. Similar type of result was also revealed in the research of Sukhlecha *et al.* (2015). 71.2% health care staffs had training on sterilization and disinfection procedure for reprocessing surgical instruments but 28.85% have no training which is not satisfactory because sterilizations and disinfections are sensitive methods and the reprocessing of instruments by those methods should

not done without proper training. Another dissatisfactory issue is, number of staffs (20.5%) have not taken any vaccine against Hepatitis B which also very alarming for them. Also alarming for the patients admitted in the hospital. In the research of Sinha *et al.* (2020), similar type of result has been found in few hospitals of India.

The staffs have positive attitude to do training on sterilization and disinfection procedure which indicates they are willing to learn. 100% staffs have the positive attitude to wash their hands with antiseptic before as well as after sterilization and disinfection procedure which is good. Also 100% staffs have positive attitude to follow proper sterilization and disinfection guidelines or policy. No health care staffs think that disposable needles, syringe and intravenous sets should be reused. The staffs should have 100% positive attitude to wear personal protective equipment while disinfection and sterilization procedure but the alarming point is 82.2% positive attitude were detected according to this study. In the issue of managing biomedical waste, 86.3% health care staffs have positive attitude which is not good for environment and patient's health safety. 91.8% staffs have positive attitude to vaccination before performing disinfection and also sterilization procedure. In a research of Ahmed *et al.* (2017), which was done in Egypt, the distribution percentage of nurse's opinion on the services which is provided by mainly central sterile service department was very much satisfactory which indicates the necessity of education in sterile processing (Ahmed *et al.*, 2017).

5. CONCLUSION AND RECOMMENDATIONS:

As the treatment cost is comparatively high, patients come in that type of tertiary hospital to get 100% proper service in all aspects of their treatment. But few problems have been detected in some parts of reprocessing surgical instruments and medical devices which need to be improved. So, all the staffs and management have to approach more ethically for the better service. The other results were relatively satisfactory. Few dissatisfactory approaches were detected in their regular activities in sterilization and disinfection after conducting the study. So this research needs further work.

There are few recommendations in these aspects:

- The awareness of post sterilization management of instruments and temperature for sterilization in autoclave machine among health care staffs need to increase. Adequate training need to be conducted by IPC committee to make them understand the significance of it.
- The IPC committee has to be strict on proper management of biomedical waste system to maintain all the guidelines properly by the all health care staffs of that hospital.
- The habit of wearing personal protective measures while disinfection and sterilization process has to be increased. The IPC committee must have to monitor this closely.
- Frequent training for the staffs need to be conducted by the infection prevention and control committee for proper reprocessing of instruments, at least once per month.
- The staffs need to be immunized by vaccine before performing disinfection, sterilization or procedure. This need to be ensured by IPC committee. Vaccine center should have to be made for the staffs.
- All the staffs should show ethical attitude, honest in performing disinfection and sterilization procedure. Negligence can cause serious harm to patients and also health care staffs.
- Training facility both in house and abroad training, should have to be improved for the overall procedures and guidelines regarding sterilization.

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7. CONFLICTS OF INTEREST:

The authors announce that there is no conflict of interest with respect to the publication of this article.

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