

Research Article

Knowledge, Attitude and Practices (KAP) of Sterilization and Disinfection of Health Care Professionals in Bangladesh

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Abstract

Background: Healthcare professionals face a constant risk of acquiring infections from patients. Exposure to blood, saliva, and sharp instruments increases their susceptibility to various infectious diseases. Proper sterilization and disinfection procedures are crucial for protecting both healthcare workers and patients. *Objective:* This study aimed to assess the knowledge, attitude, and practices regarding sterilization and disinfection among healthcare professionals in Bangladesh. *Methods:* A cross-sectional study was conducted at the National Institute of Cardiovascular Diseases & Hospital in Dhaka, Bangladesh, from January to June 2023. A total of 81 healthcare professionals were randomly selected and participated in the study after providing verbal consent. Data collection involved a pre-structured questionnaire focusing on knowledge, attitude, and practices related to sterilization and disinfection. Statistical analysis was performed using SPSS software, and results were presented as frequencies and percentages. Ethical clearance was obtained before the study commenced. *Results:* The study included healthcare professionals from various backgrounds, with the majority being young adults (21-25 years old). Knowledge assessment revealed a good understanding of sterilization methods, disinfection procedures, post-sterilization instrument management, and waste disposal practices. Additionally, most participants were aware of the hospital's sterilization protocols and infection prevention policies. Regarding attitudes, a positive response was observed towards regular training for staff, proper use of personal protective equipment (PPE), and adherence to sterilization and disinfection guidelines. However, a minority expressed concerns about reusing disposable items. Practices reflected the positive knowledge and attitudes, with a high percentage of participants following hand hygiene protocols, using PPE, and opting for disposable equipment. However, a small number reported experiencing needle-stick injuries, highlighting a potential gap between knowledge and practice. *Conclusions:* the study found that a majority of healthcare professionals in this setting demonstrated good knowledge, positive attitudes, and appropriate practices regarding sterilization and disinfection. However, a small knowledge, attitude, and practice gap was identified, particularly concerning needle-stick injuries. These findings suggest a need for ongoing education and reinforcement of safe practices to ensure optimal infection prevention and control in healthcare facilities.

Keywords

Knowledge, Attitude, Practice, Sterilization and Disinfection, Health, Care Professionals, Bangladesh

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1. Introduction

Sterilization is a process by which complete destruction or killing of all microorganisms including bacterial spores is achieved. Disinfection is thermal or chemical destruction of pathogenic and other types of microorganisms. It is less lethal than sterilization because it destroys most recognized pathogenic microorganisms but not necessarily all microbial forms (e.g., bacterial spores) [1]. Asepsis refers to prevention of contact with microorganisms. Prevention of infection and control is an important part of safe patient care. Concerns about the possible spread of blood-borne diseases, and the impact of emerging, highly contagious respiratory and other illnesses, require practitioners to establish, evaluate, continually update, and monitor their infection prevention, control strategies, and protocols. Health-care professionals are at an increased risk of cross infection and its transmission while treating the patients. Surgical procedures frequently cause bleeding and exposure to infected blood, saliva, and aerosol are a known means of infectious disease transmission [2]. Surgeons have to work in a pathogen-rich, contaminated environment, often dealing with blood. They are exposed to a variety of microorganisms present in blood and saliva, coupled with possible injury from the sharp instruments. While treating the patients, physicians become susceptible to various infectious diseases. Diseases such as hepatitis B and Acquired Immune Deficiency Syndrome (AIDS) can spread through unsterile instruments [3]. Prevention of infection and control is an important part of safe patient care. Concerns about the possible spread of blood-borne diseases, and the impact of emerging, highly contagious respiratory and other illnesses, require practitioners to establish, evaluate, continually update and monitor their infection prevention and control strategies and protocols [4]. Therefore the present study was done to evaluate the knowledge, attitude and practice of nursing staff and paramedical staff regarding sterilization. There are effective infection control procedures and universal precautions for hospitals and surgical operators to prevent cross contamination, which should be practiced by doctors and health-care staff including nurses, theater assistants, lab technicians, and sanitation staff of hospitals [5]. To minimize the risk of cross infection in the hospitals, specific recommendations have been issued by professional health agencies. These recommendations include routine use of barrier techniques (gloves, masks, spectacles, etc.), heat sterilization of surgical instruments, and the universal precautions. The use of gloves, face mask, and spectacles has been reported to be important in preventing the three routes of transmission, namely doctor to patient, patient to doctor, and patient to patient in hospitals. Increased awareness about risks of transmission of infection through blood and saliva has led to increased use of protective barrier techniques and prevention of communicable diseases [6].

2. Objectives

2.1. General Objective

To assess the level of knowledge, attitude and practices of sterilization and disinfection by health care professionals in Bangladesh.

2.2. Specific Objectives

- 1) To assess the knowledge of health care professionals are at an increased risk of cross infection and its transmission while treating the patients using instrument without sterilization.
- 2) To find out the knowledge of diseases such as hepatitis B and acquired immune deficiency syndrome (AIDS) can spread through unsterile instruments.
- 3) To identify socio-demographic characteristics of the respondents.

3. Methodology

This was a descriptive cross-sectional study conducted in National Institute of Cardiovascular Diseases & Hospital, Sher-E-Bangla Nagar, Dhaka, Bangladesh during January, 2023 to June, 2023. The purpose, benefits and risks of this study were disclosed to the participants in local language. Written informed consent was obtained from the study subjects and a total of 81 health professionals aged (21-40) years were enrolled in this study. A purposive random sampling technique was used and the data were collected through a pre-structured questionnaire. The collected data were cleaned, edited and entered into computer for analysis. The data were analyzed using Statistical Package for Social Sciences (SPSS) software, version 23.0. Inferential statistical analysis were performed and the results were presented as frequency and percentage in tables and charts. The ethical clearance of this study was obtained from the Ethics Committee of School of Public Health & Life Science, University of South Asia, and Dhaka, Bangladesh. The formal permission was also taken from the director and registrar of National Institute of Cardiovascular Diseases & Hospital, Sher-E-Bangla Nagar, Dhaka, Bangladesh. The inclusion and exclusion criteria of this study were as follows:

Inclusion Criteria

- 1) Age: (21-40) years.
- 2) Willing to participate in the study.
- 3) Physically, mentally sound to answer the questionnaire.

Exclusion Criteria

- 1) Age >40 years.
- 2) Refused to provide informed consent.
- 3) Physically, mentally unwell to answer the questionnaire.

4. Results

Table 1. Age distribution of the study subjects (n=81).

Age (years)	Number	Percentage
21-25	35	43.21%
26-30	25	30.86%
31-40	21	25.93%
Total	81	100%

Table 1 shows the age distribution of the study subjects. Among the respondents, 35 (43.21%) belonged to the age group (21-25) years and followed by 25 (30.86%) and 21 (25.93%) to the age group (26-30) years and (31-40) years respectively.

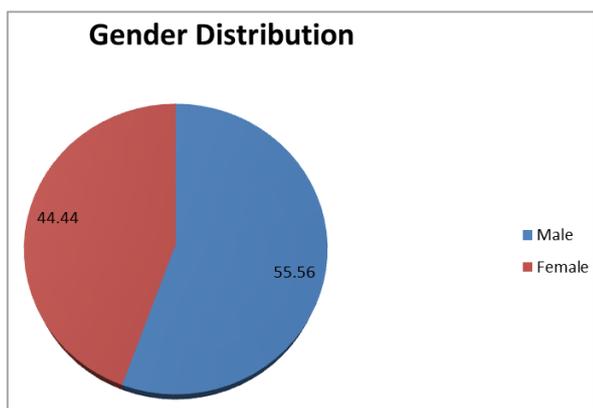


Figure 1. The gender distribution of the studied subjects (n=81).

Figure 1 shows the gender distribution of the studied subjects. Among the study subjects, 45 (55.56%) were male and 36 (44.44%) were female.

Table 2. Religion distribution of the study subjects (n=81).

Religion	Number	Percentage %
Muslim	50	61.70%
Hindus	29	35.80%
Others	2	2.50%
Total	81	100%

Table 2 shows the religion distribution of the study subjects. Among the 81 health care professionals, the majority 50 (61.70%) were Muslim and followed by 29 (35.80%) Hindus and 2 (2.50%) were others religious.

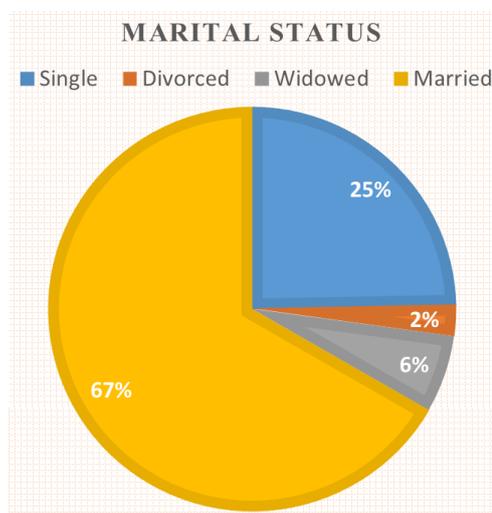


Figure 2. The marital status of the studied subjects (n=81).

Figure 2 shows the marital status of the studied subjects. Among the respondents, the majority, 54 (66.7%) were Married and followed by 20 (24.7%) were single, 2 (2.5%) were Divorced and 5 (6.2%) were Widowed.

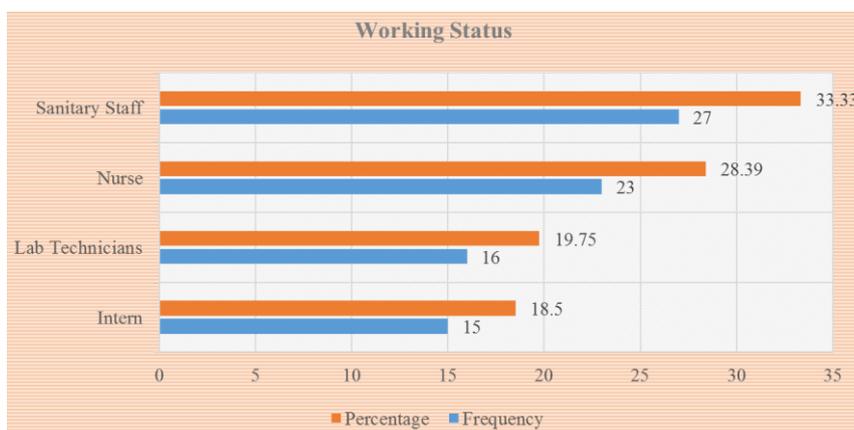


Figure 3. The distribution of working status of the studied subjects (n=81).

Figure 2 shows the working status of the studied subjects. Among the health care professionals, the majority 27 (33.33%) were Sanitary Staff and followed by 23 (28.39%) Nurse, 16 (19.75%), Lab Technicians and 15 (18.5%) were Interns.

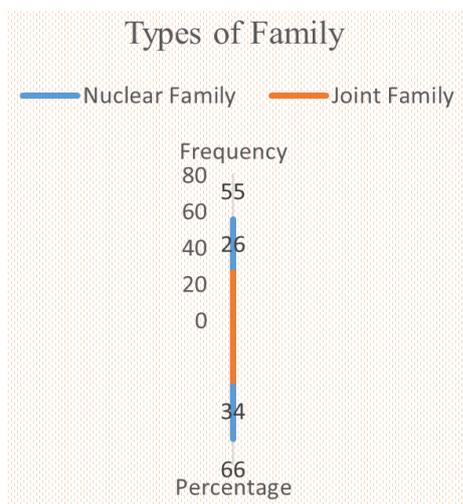


Figure 4. The distribution of family types of the studied subjects (n=81).

Figure 4 shows the distribution of family types of the studied subjects. Among the respondents, 55 (66%) belonged to Nuclear Family and 26 (34%) belonged to Joint Family.

Table 3. Knowledge about sterilization & disinfection of the study subjects (n=81).

Knowledge	Respond	Number	Percentage
Sterilization methods & its harmful effects	Yes	65	80.20
	No	16	17.80
Disinfection methods & its harmful effects	Yes	56	69.10
	No	25	30.90
Post sterilization management of surgical instruments	Yes	69	85.20
	No	12	14.80
Temperature for sterilization in autoclave	Yes	58	71.60
	No	23	28.40
Management method of biomedical waste	Yes	61	75.30
	No	20	24.70
Sterilization protocol/policy in your hospital	Yes	72	88.90
	No	9	11.10
Infection prevention &	Yes	67	82.70

Knowledge	Respond	Number	Percentage
control policy in your hospital	No	14	17.30

Table 3 shows knowledge about sterilization & disinfection of the study subjects. Among the 81 health care professionals, 65 (80.20%) had knowledge on Sterilization methods & its harmful effects whereas 16 (17.80%) had no knowledge regarding sterilization methods and its harmful effects and followed by 56 (69.10%) had knowledge on disinfection methods & its harmful effects, 25 (30.90%) had no knowledge, 69 (85.20%) had knowledge on post sterilization management of surgical instruments and 12 (14.80%) had no knowledge, 58 (71.60%) had knowledge on temperature for sterilization in autoclave while 23 (28.40%) had no knowledge, 61 (75.30%) had knowledge on management method of biomedical waste whereas 20 (24.70%) had no knowledge, 72 (88.90%) had knowledge on Sterilization protocol/policy in their hospital whereas 9 (11.10%) had no knowledge and 67 (82.70%) had knowledge on infection prevention and control policy in their hospital and 14 (17.30%) had no knowledge on infection prevention and control policy.

Table 4. Attitudes of the health care professional regarding sterilization and disinfection (n=81).

Attitude	Respond	Number	Percentage
Regularly train health staff	Yes	63	77.80
	No	18	22.20
Staff require vaccination	Yes	48	59.20
	No	33	40.70
Put on proper personal protective measures	Yes	58	71.60
	No	23	28.40
Reuse disposable needles, intravenous sets	Yes	66	81.50
	No	15	18.50
Follow proper sterilization & disinfection guidelines	Yes	71	87.70
	No	10	12.30

Table 4 shows the attitudes of the health care professional regarding sterilization and disinfection. Among the respondents, 63 (77.80%) had positive attitude on regularly train health staff whereas only 18 (22.20%) had negative attitude regarding regularly train health staff and followed by 48 (59.20%) had positive and 33 (40.70%) had negative on staff require vaccination, 58 (71.60%) had positive and 23 (28.40%) had negative attitude on put on proper personal protective

measures, 66 (81.50%) had positive and 15 (18.50%) had negative attitude on reuse disposable needles, intravenous sets, 71 (87.70%) and 10 (12.30%) had negative attitude on follow proper sterilization & disinfection guidelines.

Table 5. Practice of health care professional settings regarding sterilization & disinfection (n=81).

Practice	Respond	Number	Percentage
Wash hands with anti-septic	Yes	73	90.1
	No	8	9.8
Use personal Protective measures	Yes	58	71.6
	No	23	28.4
Use disposable needles, intravenous sets etc	Yes	64	79.1
	No	17	20.9
Get needle injury	Yes	45	55.6
	No	36	44.4
Report and take treatment for needle injury	Yes	51	62.9
	No	30	37%
Take vaccine against Hepatitis B	Yes	79	97.5
	No	2	2.6

Table 5 shows practice of health care professional settings regarding sterilization & disinfection. Among the respondents, 73 (90.1%) washed hands with antiseptic whereas 8 (9.8%) did not wash hands with antiseptic and followed by 58 (71.6%) used personal protective measure while 23 (28.4%) did not use, 64 (79.1%) used disposable needles, intravenous sets and 17 (20.9%) did not use, 45 (55.6%) got needle injury and 36 (44.4%) did not get needle injury, 51 (62.9%) reported and took treatment for needle injury, 79 (97.5%) took vaccine against Hepatitis B Vaccine and 2 (2.6%) did not take hepatitis B Vaccine.

5. Discussion

This cross section descriptive study was conducted at National Institute of Cardiovascular Diseases & Hospital, Sher-E-Bangla Nagar, Dhaka-1207, Bangladesh. The study population was health care professional. A total of 81 study subjects were enrolled in this study to find out their knowledge, attitude and practices of sterilization and disinfection... Out of 81 respondents, the majority were male 45 (55.6%) and 36 (44.4%) were female. This findings of our study was persistent with another study where male participants were observed 37 (23.7%) [7]. In our study, among the health care professionals, the majority 27 (33.33%) were Sanitary Staff, 23 (28.39%) Nurse, 16 (19.75%), Lab

Technicians and 15 (18.5% were Interns. Similar observation was observed in some other studies [8-10]. In our study, it was observed among the 81 health care professionals, 65 (80.20%) had knowledge on Sterilization methods & its harmful effects whereas 16 (17.80%) had no knowledge regarding sterilization methods and its harmful effects and followed by 56 (69.10%) had knowledge on disinfection methods & its harmful effects, 25 (30.90%) had no knowledge, 69 (85.20%) had knowledge on post sterilization management of surgical instruments and 12 (14.80%) had no knowledge, 58 (71.60%) had knowledge on temperature for sterilization in autoclave while 23 (28.40%) had no knowledge, 61 (75.30%) had knowledge on management method of biomedical waste whereas 20 (24.70%) had no knowledge, 72 (88.90%) had knowledge on Sterilization protocol/policy in their hospital whereas 9 (11.10%) had no knowledge and 67 (82.70%) had knowledge on infection prevention and control policy in their hospital and 14 (17.30%) had no knowledge on infection prevention and control policy. From this findings of our study, it is vivid that the majority of the health care professionals had sound knowledge on sterilization & disinfection, but a few minority, had no knowledge regarding sterilization & disinfection which may cause a serious harm to them [11]. This current study prevailed, among the respondents, 63 (77.80%) had positive attitude on regularly train health staff whereas only 18 (22.20%) had negative attitude regarding regularly train health staff and followed by 48 (59.20%) had positive and 33 (40.70%) had negative on staff require vaccination, 58 (71.60%) had positive and 23 (28.40%) had negative attitude on put on proper personal protective measures, 66 (81.50%) had positive and 15 (18.50%) had negative attitude on reuse disposable needles, intravenous sets, 71 (87.70%) and 10 (12.30%) had negative attitude on follow proper sterilization & disinfection guidelines. These findings of our study claim, the majority of the health care professional had very positive attitude to sterilization and disinfection, but a minimal negative attitude is also observed in this study. The similar results were also observed in another study [12]. In our study revealed, among the respondents, 73 (90.1%) washed hands with antiseptic whereas 8 (9.8%) did not wash hands with antiseptic and followed by 58 (71.6%) used personal protective measure while 23 (28.4%) did not use, 64 (79.1%) used disposable needles, intravenous sets and 17 (20.9%) did not use, 45 (55.6%) got needle injury and 36 (44.4%) did not get needle injury, 51 (62.9%) reported and took treatment for needle injury, 79 (97.5%) took vaccine against Hepatitis B Vaccine and 2 (2.6%) did not take hepatitis B Vaccine. These findings of our study claim, there is a satisfactory level of practice appeared in health care settings of Bangladesh, but a minimal dissatisfaction also noted. Similar results were also noted the health care settings of some other countries [13-17].

6. Conclusion

This study prevailed the majority of the health care professionals had sound knowledge, pleasant positive attitude and good practice habit about sterilization and disinfection in obeying their professional duties in the hospital. At the same time, they had also a minimal knowledge, attitude and practice gap regarding sterilization and disinfection.

7. Limitations of the Study

This was a single center study with a purposive sampling technique and short duration. So, the findings of this study may not reflect the whole country.

8. Recommendations

To justify the results of this study, a multi-centered study with a calculated standard sample is highly recommended and accordingly, the policies should be adopted for the health care professionals in the health care settings of Bangladesh which will ensure health security of the health care professionals so that they can play a significant role in the health care settings of Bangladesh.

Ethical Approval

The Ethical Clearance of this study was obtained from the Ethics Committee of School of Public Health and Life Science, University of South Asia, Dhaka, Bangladesh.

Conflicts of Interest

The authors declare no conflicts of interest.

References

- [1] Drummond DC, Skidmore AG. Sterilization and disinfection in the physician's office. *Can Med Assoc J* 1991; 145: 937-943.
- [2] Beltrami EM, Williams IT, Shapiro CN, Chamberland ME. Risk and management of blood-borne infections in health care workers. *Clin Microbiol Rev.* 2000 Jul; 13 (3): 385-407. <https://doi.org/10.1128/CMR.13.3.385> PMID: 10885983; PMCID: PMC88939.
- [3] Azodo CC, Ehizele AO, Umoh A, Ogbebor G. Preventing HIV transmission in Nigeria: role of dentists. *Malays J Med Sci* 2010; 17: 10-17.
- [4] Prevention of transmission of blood-borne pathogens in the health-care setting, Department of Health and Children, February 1999.
- [5] Guidelines on the Control of Cross Infection in Dentistry; the Dental Council 1993 (Amended May 1996).
- [6] Guidelines on minimising the risk of transmission of spongiform encephalopathies in health-care settings in Ireland. National Disease Surveillance Centre, 2004.
- [7] Sukhlecha AG, Vaya S, Parmar GG, Chavda KD. Knowledge, attitude, and practice regarding sterilization among health-care staff in a tertiary hospital of western India. *Int J Med Sci Public Health* 2015; 4: 1377-1382.
- [8] Report of the Advisory Group on the Transmission of Infectious Diseases in the Health-Care Setting, Department of Health, January 1997.
- [9] Louise M, Low DE, Feinman V et al. Prevalence of blood-borne infective agents among people admitted to a Canadian hospital. *Can Med Assoc J.* 1992; 146: 1331-4.
- [10] Sethi AK, Samal R, Lahiri B, Das A, Kumar G, Behera S. Awareness, attitude and practice regarding disinfection and handling of extracted teeth among the students in a dental college in India. *J Int Soc Prevent Communit Dent* 2018; 8: 488-94.
- [11] Morris E, Hassan FS, Al Nafisi A, Sugathan TN. Infection control knowledge and practices in Kuwait: a survey on oral health care workers. *Saudi Dent J* 1996; 8: 19-26.
- [12] Siddiqui HK, Ikram K, Aftab NH, Uzair F. Knowledge and practice of sterilization among different health care workers. *Pak Oral Dental J* 2014; 34: 507-9.
- [13] Uttley AH, Simpson RA. Audit of bronchoscope disinfection: a survey of procedures in England and Wales and incidents of mycobacterial contamination. *J. Hosp. Infect.* 1994; 26: 301-8.
- [14] Zaidi M, Angulo M, Sifuentes-Osornio J. Disinfection and sterilization practices in Mexico. *J. Hosp. Infect.* 1995; 31: 25-32.
- [15] McCarthy GM, Koval JJ, John MA, MacDonald JK. Infection control practices across Canada: do dentists follow the recommendations? *J. Can. Dent. Assoc.* 1999; 65: 506-11.
- [16] Spach DH, Silverstein FE, Stamm WE. Transmission of infection by gastrointestinal endoscopy and bronchoscopy. *Ann. Intern. Med.* 1993; 118: 117-28.
- [17] Weber DJ, Rutala WA. Lessons from outbreaks associated with bronchoscopy. *Infect. Control Hosp. Epidemiol.* 2001; 22: 403-8.