

Knowledge and Practice of Medical Technologists on COVID-19 Infection Prevention in Laboratory

Most. Rabeya Khatun¹, Sreekanto Kumar², Dr. ANM Shamsul Islam³

¹Senior Staff Nurse, Sheikh Russel National Gastro Liver Institute and Hospital, Mokhali, Dhaka.

²Senior Staff Nurse, National Institute of Cancer Research and Hospital, Mohakhali, Dhaka.

³Associate Professor & Head of the Department, Department of public health & Hospital Administration, NIPSOM, Mohakhali, Dhaka.

ABSTRACT

Background: COVID-19 is an acute respiratory condition caused by a virus and it is declared at pandemic condition. Health sector faced challenged and medical technologists are direct contact of infected patients and sample.

Objective: The study was to assess the knowledge and practice of medical technologists on COVID-19 infection prevention in laboratory in tertiary level hospital and institute Dhaka city.

Methodology: A descriptive cross-sectional study was conducted among purposive selected 221 medical technologists working in six hospital and institute (public hospital & public institute) in Bangladesh. Data were collected by self-administrated structure questionnaire.

Results: The study n-221 revealed that 100% respondents had knowledge about doing and doffing of PPE, 100% of the respondents had known that RT-PCR was confirm test for COVID-19 infection, 100% of the respondents had known about caused of COVID-19 by virus, 75.1% of the respondents were not getting training about COVID-19 sample packaging and 64.3% of the respondents were not getting training in laboratory safety against COVID-19 infection. Around 99.5% of respondents use color code bin for waste disposal, around 99.5% of the respondents were used respiratory safety cabinet and highest 96.8% of the respondents were used PPE during samples processing.

Conclusion: Through periodic training and motivation, adequate supply of resources and infection prevention materials, quarantine facility for medical technologists should be available in hospital and institute that can improve overall knowledge and practice on COVID-19 infection prevention of medical technologists.

KEYWORDS: COVID-19, Infection, Knowledge, Laboratory, Medical Technologist.

ARTICLE DETAILS

Published On:
29 May 2023

Available on:
<https://ijmscr.org/>

INTRODUCTION

The corona virus disease-2019 (COVID-19) pandemic is a continuing threat to human lives and livelihoods worldwide. Healthcare workers (HCW) are on the front lines of the pandemic's fight. During the pandemic, several health-care workers (HCWs) were infected with the severe acute respiratory syndrome corona virus 2 (SARS-CoV-2) and died.

The medical technology industry is critical to the global response to the COVID-19 pandemic. The major responsibility of medical technologists is to collect biological samples for testing. The pandemic, on the other hand, has made specimen collection more difficult for medical

technologists because it necessitates more experience, training, and quality equipment to avoid contracting the virus. The use of personal protective equipment (PPE), supply, staffing, communication and coordination, and workplace culture are some of the themes formulated with regards to the key factors of the COVID-19 outbreak [1]. Clinical laboratories provide diagnostic testing services to support the effective delivery of care in today's complex healthcare systems [2]

The work environments of biomedical laboratory specialists are extremely hazardous due to the presence of both suspected and unknown infectious pathogens. A lack of understanding, as well as bad laboratory techniques, might

Knowledge and Practice of Medical Technologists on COVID-19 Infection Prevention in Laboratory

have a double impact. Lack of communication and support from the community and government, and shortfall attention and recognition for the staff were also among the perceived barriers by the healthcare workers due to the pandemic [3]. There are also several significant implications of the pandemic on the mental conditions of healthcare workers due to the COVID-19 pandemic. Anxiety, stress, fear, suffering, depression, and turmoil were some of the psychological problems associated with the onset of the pandemic [4, 5]. Implementing infection prevention and control guidelines provides a practical, evidence-based approach to prevent both patients and health workers from being harmed by avoidable infection and possible hazards. It comprises a set of recommendations created to minimize and prevent harm to healthcare workers and patients induced by exposure to infectious agents [6]. The IPC program includes standard and transmission-based precautions that all laboratory and other healthcare workers must familiarize themselves with. These precautions involve practices of hand hygiene, the use of personal protective equipment (PPE) (gloves, gowns, masks, plastic aprons, face shields and protective eyewear), the safe use and disposal of sharps, routine environmental cleaning and waste management [7]. Social distance, wearing face masks to prevent both inhalation and transfer of infected droplets, and adequate hand hygiene by regularly washing hands or using alcohol-based hand sanitizers are all used to prevent and manage the spread of COVID-19 [8]. A lack of understanding, as well as bad laboratory techniques, might have a double impact. For starters, a misdiagnosis that leads to poor patient management can have serious effects for the patient as well as impair transmission prevention efforts; Second, a poor attitude and practices may result in safety issues (such as infection transmission) that are harmful to both the concerned employees and their immediate environment, for this aspect this study was conducted with the purpose to assess the knowledge and practices of medical technologists in Bangladesh who are involved in the diagnosis of COVID-19.

MATERIALS AND METHODS

Study design: The study was a Cross-sectional Study to explore the knowledge and practice of medical technologist on COVID-19 infection prevention in laboratory in selected hospital and institute in Dhaka city.

Study setting: The study was conducted in six (6) hospital and institutes in Dhaka, Bangladesh. Name of the hospital and institute were as follows:

1. National Institute of Laboratory Medicine and Referral Centre (NILMRC)
2. Shaheed Suhrawardy Medical College and Hospital (ShSMCH)

3. Bangabandhu Sheik Mujib Medical University (BSMMU)
4. Sheik Russel Gastro liver Institute and hospital (SRGIH)
5. Institute of Public Health (IPH)
6. Dhaka Medical College and Hospital (DMCH)

Study period: Total study period was 1(one) year from 1 January to 31 December 2021. Due to COVID-19 pandemic extend up to January 2022.

Sample size and sampling: The calculated sample size was 221. Sample was included following non-randomized convenient sampling technique and using a standard written informed consent form.

Data collection: Data were collected by face-to-face interview with the purpose of the study was explained in details to the respondents and data were collected from the sampling population through structure questionnaire. Same questionnaire was used for each respondent for data collection. It was made clear to the respondents that they were a liberty to answer or not to answer any question.

Data analysis: Data analysis was done with the help of SPSS software. After completion of data collection, to maintain consistency, relevancy the data were checked and edited manually and verified before tabulation. Data were coded, entered and analyzed in a computer according to the objectives and variables. The findings of the study were presented by frequency, percentage in tables and graphs and mean Interval were used.

Ethics: Ethical clearance was obtained from the Institutional Review Board (IRB). The aim and objective of the study along with its procedure and benefits were explained to the respondents in easily understandable local language and then informed written consent was taken.

RESULTS

This descriptive cross-sectional study was conducted in 6 tertiary level hospitals and Institute such as National Institute of Laboratory Medicine and Referral Centre (NILMRC), Shaheed Suhrawardy Medical College and Hospital (ShSMCH), Bangabandhu Sheik Mujib Medical University (BSMMU), Sheik Russel Gastro liver Institute and hospital (SRGIH), Institute of Public Health (IPH) and Dhaka Medical College and Hospital (DMCH). The aim of study was to assess the state of knowledge and practice of medical technologists on COVID-19 infection prevention in laboratory. Total 221 respondents were selected as sample. The data were collected by structured questionnaire. Collected data were processed and analyzed with the help of SPSS (Statistical Package of Social Science) version 26.

Knowledge and Practice of Medical Technologists on COVID-19 Infection Prevention in Laboratory

Table 1. Distribution of the respondents by Socio-demographic characteristics (n-221).

Age in complete years	Frequency	Percentage
21-29y	101	45.7
30-39y	82	37.1
40-49y	28	12.7
50-59y	10	4.5
Mean±SD –45.90(±0.82)	Maximum age-21,	Minimum age-59 years
Gender		
Male	139	62.9
Female	82	37.1
Education		
Diploma	93	42.1
BSc	105	47.5
MSc	23	10.4
Designation		
Medical Technologist	207	93.7
Senior Medical Technologist	14	6.3
Monthly family income		
30000-39000	117	52.9
40000-49000	55	24.9
50000-59000	22	10.0
60000-69000	9	4.1
above 70000	18	8.1
Total	221	100

Table 1 shows that among the respondents highest 45.7% were 21-29 years age group and the mean age of the respondents were 45.90 (±0.82). Around 62.9% of the respondents were male and rest of 37.1% were female. Highest 47.5% of the respondents were diploma, 42.1% were

BSc and rest of 10.4% were MSc in medical technology. Among total respondents, 93.7% were medical technologist and rest of 6.3% were senior medical technologist and highest 52.9% of the respondent's family income were 30000-39000.

Table 2. Distribution of the respondents by knowledge regarding COVID-19 infection (n-221).

Knowledge regarding COVID-19 infection	Frequency	percentage
Yes	215	97.3
No	6	2.7
Knowledge regarding dispose of PPE		
Yes	221	100
No	0	0
Knowledge regarding Polymerase chain reaction (PCR) test		
Yes	221	100
No	0	0
Knowledge regarding isolation of suspected people		
Yes	220	99.5
No	1	0.5
Knowledge regarding wearing mask		
Yes	20	9.1
No	1	0.5
Knowledge regarding transmitted of COVID-19 infection		
Yes	221	100
No	0	0
Knowledge regarding hand washing with water, soap & alcohol-based sanitize		
Yes	219	99.1
No	2	0.9

Knowledge and Practice of Medical Technologists on COVID-19 Infection Prevention in Laboratory

Infection prevention by keeping social distance		
Yes	220	99.5
No	1	0.5
Knowledge regarding treatment of COVID-19		
Yes	26	11.8
No	195	88.2
Knowledge regarding vital symptoms of COVID-19		
Yes	218	98.6
No	3	1.4
Knowledge regarding incubation period of COVID-19		
Yes	218	98.6
No	3	1.4
knowledge regarding high-risk people for COVID-19		
Yes	220	99.5
No	1	0.5
Total	221	100

Table 2 shows by the knowledge regarding COVID-19 infection of the respondents (n-221). Here, highest 97.3% had knowledge regarding COVID-19 infection, all of the respondents had knowledge regarding dispose of PPE (personal protective equipment) and Polymerase Chain Reaction for COVID-19 infection test. Highest 99.5% of the respondents had knowledge regarding isolation of suspected people, most of the respondents 99.5% had knowledge regarding wearing mask and 100% of the respondents had knowledge about transmitted of COVID-19 infection through

droplets and close contact. Highest 99.1% of the respondents were wash hand with soap and water & sanitize with alcohol, 99.5% of the respondents had knowledge regarding infection prevention by keeping social distance, only 11.8% had knowledge regarding treatment of COVID-19, highest 98.6% of the respondents had knowledge regarding vital symptoms of COVID-19, 98.6% of the respondents had knowledge regarding incubation period of COVID-19 and almost all of the 99.5% respondents had knowledge regarding high risk people for COVID-19.

Table 3. Distribution of the respondents by had training on Covid-19 infection prevention (n-221).

Traits	Yes	No	Total
	N (%)	N (%)	
Training for COVID-19 infection prevention	186 (84.2%)	35 (15.8%)	221(100%)
Training in laboratory safety against COVID-19	79 (35.7%)	142 (64.3%)	221(100%)
Training in packing of COVID-19 sample	55 (24.9%)	166 (75.1%)	221(100%)

Table 3 Shows the highest 84.2% of the respondents had training for COVID-19 infection prevention, 35.7% of the respondents had training on laboratory safety against

COVID-19 and 24, 9% of the respondents had training on packing of COVID-19 sample.

Table 4. Distribution of the respondents by practice regarding COVID-19 infection (n-221).

Hand washing practice		
Opinion	Frequency	Percentage
Always	214	96.8
Often	2	0.9
Sometimes	4	1.8
Rarely	1	0.5
Never	0	0
Practice hand washing in the six-step technique		
Always	46	20.8
Often	55	24.9
Sometimes	117	52.9
Rarely	3	1.4
Never	0	0
Practice of hand Sanitize		

Knowledge and Practice of Medical Technologists on COVID-19 Infection Prevention in Laboratory

Always	214	96.8
Often	1	0.5
Sometimes	5	2.2
Rarely	1	0.5
Never	0	0
Practice PPE during sample processing		
Always	214	96.8
Often	2	0.9
Sometime	5	2.3
Rarely	0	0
Never	0	0
Practice safety cabinet during sample collection		
Always	215	97.2
Often	0	0
Sometimes	3	1.4
Rarely	0	0
Never	3	1.4
Practice to dispose of PPE		
Always	221	100
Often	0	0
Sometimes	0	0
Rarely	0	0
Never	0	0
Practice color code bin for waste disposal		
Always	220	99.5
Often	1	0.5
Sometimes	0	0
Rarely	0	0
Never	0	0
Total	221	100
Practice to clean laboratory item		
Always	213	96.4
Often	4	1.8
Sometimes	4	1.8
Rarely	0	0
Never	0	0
Respondents by practice disinfectant your work surface		
Always	149	67.4
Often	49	22.2
Sometimes	23	10.4
Rarely	0	0
Never	0	0
Practice to allow visitor entre in laboratory		
Always	19	8.6
Often	2	0.9
Sometimes	54	24.4
Rarely	137	62
Never	9	4.1
Total	221	100

Table 4 shows the highest 96.8% of the respondents were always washing hand with soap and water at least 20 second, only 20.8% were always wash hand by six-step technique,

highest 96.8% of the respondents were always sanitize hand with sanitizer, most of the respondents 96.8% were use PPE during sample processing and 97.2% of the respondents were

Knowledge and Practice of Medical Technologists on COVID-19 Infection Prevention in Laboratory

always work with safety cabinet. All of the respondents 100% were always practiced to dispose of PPE, 99.5% of the respondents were always use color code bin for waste disposal, highest 96.4% of the respondents were always clean

the laboratory item, 67.4% of the respondents were always disinfected work face and 62% respondents rarely visitor allow enter in laboratory.

Table 5. Distribution of respondents by practice etiquette in cough and sneeze, dispose of used tissue immediately, avoid contact with other, and avoid crowds and public gathering to prevention of COVID-19 infection (n-221).

Opinion	Always N (%)	Sometimes N (%)	Never N (%)	Total N (%)
Variables				
Practice etiquette in cough and sneeze	35 (15.8%)	186 (84.2%)	0(0%)	221 (100%)
Dispose of using tissue immediately	193 (87.3%)	28 (12.7%)	0(0%)	221 (100%)
Avoid contact with other	13 (5.9%)	208 (94.1)	0(0%)	221 (100%)
Avoid crowds and public gathering	9 (4.1%)	212 (95.9%)	0(0%)	221 (100%)

Table 5 shows the highest 84.2% of the respondents were practice sometimes etiquette I cough and sneezing, 87.3% of the respondent were always dispose used tissue immediately, 94.1% of the respondents were sometimes avoid contact with other and 95.9% of the respondents were sometimes avoid crowds and public gathering.

DISCUSSION

COVID-19 is an emerging, rapidly changing global health challenge affecting all sectors. HCWs are not only at the forefront of the fight against this highly contagious infectious disease but are also directly or indirectly affected by it and the likelihood of acquiring this disease is higher among HCWs compared to the general population.

The present cross-sectional study had been undertaken with the objective to assess the knowledge and practice of medical technologists in hospital and institute. It is tertiary level hospital and institute in Bangladesh. Two hundred twenty one (221) medical technologists had been interviewed who were selected by purposive sampling technique. Structured questionnaire was used to assess the knowledge and practice of medical technologists on COVID-19 infection prevention.

In the study all respondents were medical technologists. The mean age of the respondents was 45.90 (± 0.82) and from their minimum and maximum age were 20 and 59. Highest of the respondent among 221(45.7%) were from 20-29 years age group. Highest of the respondents among 221 (62.9%) were male. Highest educational qualification of the respondents among 221(47.5%) were BSc in medical technology. Highest lengths of service of the respondents among 221 (50.2%) were age group from-0 to 5 years. A similar study also found that around the highest 45.7% of the medical technologists were under the age group of 20-29 years of age. Highest of the respondents were from laboratory (n-134, 64.4%) [8].

The study 100% of the respondent had knowledge about Real time Polymerase Chain Reaction. By isolation of suspected people around 99.5% of the respondents had knowledge. Wearing mask of the respondents around 99.5% were positive knowledge, and 100% of the respondents had knowledge about source of COVID-19 infection. Knowledge regarding hand washing with soap and water was best for COVID-19 infection prevention around 99.1% were had knowledge, for prevention of COVID-19 social distance were effective around 99.5% of the respondent had knowledge, 99.5% of the respondents had knowledge about source of COVID-19 infection, 99.5% of the respondents had knowledge about first source of covid-19 infection.

Healthcare workers working in COVID-19 laboratories, clinics, isolation and treatment centers must be fully equipped with the necessary Personal Protective Equipment (PPE) designed to protect wearer's skin, eyes, mucous membranes, airways and clothing contact with infectious agents Gloves (Protect hands), 2), Gowns/aprons (Protect skin and/or clothing), 3) Masks (Protect mouth/nose), 4) Respirators (Protect respiratory tract from airborne infectious agents, 5) Goggles (Protect eyes), and 6) Face shields (Protect face, mouth, nose, and eyes).

Risk considers include: nature of contact (direct or indirect) and duration of contact with patient or patient's specimens. Factors Influencing PPE Selection include: Type of exposure anticipated, potential splash/spray versus touch, category of isolation precautions, durability and appropriateness for the task and lastly, fitness. The use of PPE is very critical in protecting healthcare professional against COVID-19; however, they are not substitute for proper infection prevention and control practice. Meanwhile, healthcare Workers must be familiar and proficient in wearing (donning) and removing (doffing) the PPE [9].

Knowledge and Practice of Medical Technologists on COVID-19 Infection Prevention in Laboratory

Around 84.2% of the respondent were getting training about COVID-19 infection prevention, highest 35.7% of the respondents were getting training in laboratory safety against COVID-19, and 24.9% of the respondents were getting training in sample packaging of COVID-19 infection.

CONCLUSION

There should be need to minimize the knowledge and practice gaps of infection prevention among medical technologists by training. Through periodic training and motivation, adequate supply of resources and infection prevention materials, quarantine facility for medical technologists should be available in hospital and institute that can improve overall knowledge and practice on COVID-19 infection prevention of medical technologists.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

REFERENCES

- I. Yau B, Vijn R, Prairie J, McKee G, Schwandt M. (2021) Lived experiences of frontline workers and leaders during COVID-19 outbreaks in long-term care: A qualitative study. *American Journal of Infection Control*. Published. doi: 10.1016/j.ajic.2021.03.006
- II. Care, V. Value Of Clinical Laboratory Services In Health Care. [online] *Ascls.org*. 2005. Available at: <https://ascls.org/position-papers/177-value-of-clinical-laboratory-services/153-value-of-clinical-laboratory-services> [Accessed 30 March 2020].
- III. Mersha A, Shibiru S, Girma M, et al. (2021) Perceived barriers to the practice of preventive measures for COVID-19 pandemic among health professionals in public health facilities of the Gamo zone, southern Ethiopia: a phenomenological study. *BMC Public Health*, 21(1). doi: 10.1186/s12889-021-10256-3.
- IV. McGlinchey E, Hitch C, Butter S, McCaughey L, Berry E, Armour C. (2021) Understanding the lived experiences of healthcare professionals during the COVID-19 pandemic: an interpretative phenomenological analysis. *European Journal of Psychotraumatology* 12 (1) : 1 9 0 4 7 0 0 . d o i : 10.1080/20008198.2021.1904700.
- V. Fofana NK, Latif F, Sarfraz S, Bilal, Bashir MF, Komal B. (2020) Fear and agony of the pandemic leading to stress and mental illness: An emerging crisis in the novel coronavirus (COVID-19) outbreak. *Psychiatry Research*, 291, 113230. doi: 10.1016/j.psychres.2020.113230.
- VI. World Health Organization. Infection Prevention And Control. 2020. Available at: <https://www.who.int/infection-prevention/about/ipc/en/> [Accessed 16 March 2020].
- VII. Cdc.gov. Transmission-Based Precautions | Basics | Infection Control | CDC". 2016. Available at: <https://www.cdc.gov/infectioncontrol/basics/transmission-based-precautions.html> [Accessed 8 March 2020]
- VIII. Chawe, A., et al. (2021). Knowledge and attitude and practices of COVID-19 among medical laboratory professionals in Zambia. *African journal of laboratory medicine*. Vol, 10(1).
- IX. Itodo, G., Enitan, S., Oyekunle, A., Agunsoye, C., Asukwo, U., Enitan, C. (2020). COVID-19 among Healthcare Workers: Risk of Exposure, Impacts and Biosafety Measures. *International Journal of Health, Safety and Environment (IJHSE)*. Vol. 6 (04), Pp. 534 – 548.