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Original Research

Assessment of knowledge and practice about covid-19 among health care workers involving in various aerosol generating procedures

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ABSTRACT:
Introduction: Post-COVID, the importance of the particle and aerosol generation has gained much significance. Hence in the present study we assessed the knowledge and practice about COVID-19 among health care workers involving in various aerosol generating procedures. **Material and methods:** We piloted a questionnaire based descriptive cross-sectional study at various aerosol generating departments of KIST Medical College and Teaching Hospital, Imadole, Nepal from June 2020 to December 2020 with IEC No: 076/077/42. All the health care workers at same departments were included. The self-administered questionnaire had two sections; knowledge and practice. The responses noted and analyzed using the 2 tailed multivariate regressions to estimate influencing factors. **Results:** We observed that the about one third of the respondents get information about COVID-19 mainly from TV and social media. In the multivariate model, source of information, type of health institution and knowledge of COVID-19 are strongly associated with preventive practice of health care workers. HCWs who had good knowledge on COVID-19 were 2 times more likely implement good preventive practice. **Conclusion:** Type of health facilities, level of education, training on COVID, work experience, type of source of information were significantly associated with knowledge, and practice of HCWs toward COVID-19. Various aerosol generating departments showed good knowledge and practice. Among all OMFS department showed good knowledge and practice as compared to other departments of Dentistry. Also knowledge and practice of Departments of Medicine, Anesthesia, Emergency, Pediatrics and ENT was good.
Key words: Practice, Knowledge, Aerosol, Covid-19, Health Care Workers

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INTRODUCTION

World is threatened by Novel Corona Virus (SARS-COV-2) to an extent that life has been jeopardized in all services however the aerosol generating services affected the most among all the other health services. World health organization declared a Global Pandemic on 11th March 2020. Aerosol generating practice is considered as high risk category for SARS-COV-2 due to contamination with virus through saliva and close contact with oral; pharyngeal; nasal and eyes.More than 90% dental procedure generates aerosol.[1-5]SARS-COV-2 is an envelope, single-stranded RNA virus which is highly transmissible and has a less than 5% fatality rate, especially in the elderly and those with medical co morbidities. The typical presentations are; fever, cough and shortness of breath, diarrhea is common early in infection, and anosmia, fatigue and agausia has also been reported later. The severe complications are pneumonia, renal failure, cardiomyopathy and encephalopathy.Route of transmission of SARS-COV-2 are aerosolized

droplets expelled during sneezing/suctioning/ intubation/CPR aerosol generating procedures, coughing & breathing; saliva; faeco-oral transmission; possible airborne transmission. The median duration of viral shedding was 20 days; the longest duration observed was 37 days. Environmental contamination by SARS-COV-2 is another cause for concern, scientists were able to detect viable SAR- COV-2 in aerosols up to 3 hours post aerosolization, although in an experimental setup lacking any ventilation, and not necessarily reflecting how the virus behaves in real-life conditions. The study also found infectious virus could survive up to 24 hours on cardboard, up to 4 hours on copper, and up to 2 to 3 days on plastic and stainless steel.[6-10]The COVID-19 is affecting most of the health professionals and their practice. The knowledge and practice is key thing to prevent the transmission of infection from the health professionals.[5]there is vast difference in knowledge and practice among various disciplines of medical sciences. Some disciplines are frontiers and some are not practicing yet. The aerosol generating procedures are also varies among various disciplines. The health care workers in aerosol generating departments are highly venerable to infection and cross contamination.[11-16]those workers should have adequate knowledge and standard practice. There is no standard set guideline to practice for aerosol generation procedure and different departments are following differently. [11-16] Health care workers should have sound knowledge and practice working with aerosol generating procedures.[17]There are differences in level of knowledge and practice among different disciplines. Hence in the present study we assessed the knowledge and practice about COVID-19 among health care workers involving in various aerosol generating procedures.

MATERIALS AND METHODS

We piloted a descriptive cross-sectional study by convenient sampling technique at various aerosol generating departments of KIST Medical College and Teaching Hospital, Imadole, Nepal from June 2020 to December 2020 with IRC No: 076/077/42. All the health care workers at same departments were included and those who are not giving consent were excluded. The departments that were included were Dentistry, Medicine, Pediatrics, Anesthesia, ICU, ENT, OT, Orthopedics, Ophthalmology, General Surgery, general ward. The study design was explained to the participants. Written consent was obtained from them via google form only. Online data collection via WhatsApp, Viber, Facebook Messenger, and Email was conducted. An Online questionnaire was sent to the participants. The self-administered questionnaire was made via google form. Questionnaire had two sections; First section contained demographics and second section contained knowledge and practice having 25questionnaire. Out of 26 questionnaire among which 14 questions were about knowledge and 11 questions were about practice Questionnaire was sent to 10 % of participants; their feedback was taken to validate the questionnaire before conducting the research. Test and retest was done to find out the reliability of the questionnaire. The statistical analysis was done using IBM SPSS version 23 using the 2 tailed multivariate regressions to estimate influencing factors. Knowledge and practice were calculated based on self-administered questionnaire, logistic regression analysis was done to identify the main factors, Odd ratio was used for practice and knowledge was calculated as a score. Those who scored >65 % was considered as having good knowledge and practice and below 65% was considered as poor knowledge/practice. Data was managed and stored in google form.

RESULTS

DEMOGRAPHIC CHARACTERISTICS OF PARTICIPANTS

Total of 159 HCWs participated in this study, making response rate of 100% were included. Themajority of age groups were in between 18-30 years. 99 were the male and 60 were the females. Regarding educational level of participants, 44.9% of the respondents had master level of education. About 62% were unmarried, 84.27.0% of the participants had singleinstitutional practice and 35.2% of the participants were BDS interns and 32. % were faculties. About one third of the respondents get information about COVID-19 mainly from TV and social media but also got information from websites, training, Radio, etc. Among various aerosol departments OMFS department had 80% knowledge which is more as compared to other departments of dentistry and medicine. Department of medicine, anesthesia, emergency, Pediatrics ENT also had good knowledge.**(Table 1).**

KNOWLEDGE OF PARTICIPANTS

Out of 159 participants, 65.2% of the HCWs had demonstrated good knowledge of COVID 19. In multivariate analysis, type of health institution, level of education, and training on COVID-19 were strongly associated with knowledge of HCWs about COVID-19. HCWs of comprehensive specialized hospital had good knowledge of COVID-19 4.46 times more likely than health centers (AOR = 4.46, 95% CI = 1.46–13.62). HCWS who received training on COVID-19 were 6 times had good knowledge of COVID-19 than health centers than who didn't receive the training (AOR = 6.59, 95% CI = 2.97–14.65). Level of education also significantly associated with the knowledge. Having higher education degree positively associated with of knowledge HCWs about COVID-19 **(Table 3).**

PRACTICES OF PARTICIPANTS

About 65.81% of the HCWs had implemented best preventive practice of COVID-19. In the multivariate model, source of information, type of health institution and knowledge of COVID-19 are strongly associated with preventive practice of health care workers. HCW's source of information from social media, training were 3 times more likely had good preventive practice than source of information from websites (AOR = 3.13, 95% CI = 1.28–7.66). HCWs of hospital were less likely had good practice than other hospital/clinic AOR = 0.36 95% CI = 0.21–0.620). Knowledge of COVID-19 also showed significant association with good preventive practices of HCWs. HCWs who had good knowledge on COVID-19 were 2 times more likely implement good preventive practice than who had poor knowledge AOR = 1.80, 95% CI = 1.03–3.14). Among various aerosol generating departments. Among various aerosol departments OMFS department had 80% good practice which is more as compared to other departments of dentistry and medicine. Department of medicine, anesthesia, pediatrics, emergency, ENT also had good practice. **(Table 4).**

Table 1: Demographic characteristics of the study participants

Variables (n = 159)	Category	Number
Age	18-30	103
	31–50	52
	51-60	0
	>60	4
Sex	Male	99
	Female	60
Marital status	Married	60
	Unmarried	99
	Separated	0
Type of health institution	KIST only	134
	KIST and other hospital/clinic	25
Level of education	Diploma	89
	Degree	50
	Masters	20
Source of information	TV/Radio/Social media/Websites	46
	TV/Radio/Websites	3
	Social Medias	34
	TV/Radio	6
	Social media/Websites	24
	Training/courses	9
	Websites	2
	TV/Radio/social medias	19
	Social medias/websites/training/courses	3
	All	13
Profession	Faculty	51
	Medical officer	18
	Dental surgeon	7
	Nursing PCL BN Bsc.	11
	Intern MBBS	4
	Intern BDS	56
	paramedics	6
	dental hygienist	6
Training on COVID	Yes	159
	No	0
Work Experience	< = 5 Years	100
	6–10 Years	49
	> 10 Years	10
Training on COVID-19	Yes	60
	No	99

Table 2: Various aerosol generating departments and number of participants

SN	Departments	Number	Percentage
1.	Oral and maxillofacial surgery	34	21.4
2.	Oral medicine and radiology	4	2.5
3.	Conservative and endodontics	21	13.2
4.	Orthodontics	5	3.1
5.	Pedodontics	5	3.1
6.	Periodontics	5	3.1
7.	Medicine	16	10.1
8.	Surgery	8	5.0
9.	Gyene	5	3.1
10.	Peadiatrics	9	5.7
11.	Ent	2	1.3
12.	Emergency	2	1.3
13.	Operation theatre	17	10.7
14.	Other	8	5.0
15.	Oral pathology	14	8.8
16.	Communinity dentistry	4	2.5
17.	Total	159	100.0

Table 3: Knowledge about covid-19 among health care professionals

S.N.	Questions	Correct Answer	Correct Answer Given (Number/%)
1.	The virus causing COVID-19 is	SARS COV-2	136 (86.8)
2.	Incubation period of COVID-19 is	2-14 days	105 (66)
3.	Mode of transmission of COVID-19 is	Respiratory droplet, Direct (infected person) & Indirect Contact (surface, objects such as thermometer) Airborne Transmission All	125 (78.6)
4.	Main symptoms of COVID-19 is	Fever (>38 degree Celsius) Dry Cough Shortness of Breath All	156 (98.1)
5.	Diagnostic test for COVID-19 is	RT PCR	87 (54.7)
6.	The high-risk population of COVID-19 for the severe outcome is	Elderly (over 60 years) & People with underlying medical commodities such as; Diabetes, Heart disease, Asthma, Cancer etc,	85 (53.5)
7.	Which of the following is/are zone of COVID-19?	Red, orange, green all	91 (57.2)
8.	Why aerosol generating procedures are considered as high risk?	Aerosol is the only mode of transmission for COVID-19	93 (58.5)
9.	Why Dentistry is considered as high risk category for COVID-19?	It involves the highest aerosol generating procedure, Contamination with saliva is more, working area is close contact to oropharynx, nasopharynx and eyes, All	139 (87.4)
10.	Instrument/equipment that generates aerosol?	Hand piece, airroater, ultrasonic scaler, Bone drilling machine, Suction apparatus, All	93 (58.5)
11.	After completion of aerosol generating procedure; the minimum duration that the COVID-19virus remains in that environment?	30 minutes to 2 hours	66 (41.5)

12.	The management options for COVID-19 is	Supportive & Symptomatic, Rehabilitative, Palliative Care, Anti-viral Therapy	153 (96.2)
13.	Complications of COVID-19 is/are	ARDS, Organ dysfunction (AKI, acute lung injury), Shock, ALL	119 (74.8)
14.	Mortality rate of COVID-19 is	0.5 to 3%	128 (80.5%)

Table 4: Practice on covid-19 prevention among health care professionals

S.N.	Questions	Correct Answer	Correct Answer Given (Number/%)
1.	Preventive measure for COVID-19 infection is/are	Hand washing with soap & water, Social distancing and Isolation of suspected & confirmed cases, Wearing of PPE while caring infected patients, All	157 (98.7)
2.	I am following hand hygiene with 7 steps	Always	107 (67.3)
3.	I am using 60% alcohol-based hand sanitizer in the absence of soap & water	Always	114 (71.7)
4.	I am wearing PPE while caring for my patients	Always	90(56.6)
5.	For oral-nasal examination and oro-naso-pharyngeal procedure, the required level of PPE is	Level III	118 (74.2)
6.	When to remove surgical mask?	>6-8 hours of uses, Soaking and physical damages of mask, Contamination with blood and body secretions, All	136 (85.5)
7.	According to CDC guideline, How to re use N95 mask?	Can be used 5 times with gap of 72 hours	65 (40)
8.	I am carefully performing the steps of doffing of PPE in a proper place	Always	100 (62.9)
9.	We shift all of the suspected and/or infected patient to an isolation ward	Always	123 (77.4)
10.	Fumigation does required after the completion of procedure?	Always	103 (64.8)
11.	Once returned from the hospital, does changing of clothes, taking bath and maintenance of social distances with family members is required?	Always	138 (86.8)

DISCUSSION

This study was conducted to assess knowledge, and practice towards COVID-19 and associated factors among HCWs in health facilities. The outputs of this study are essential to HCWs, health facilities, health management authorities to mitigate the spread of COVID-19. According to this study, 65.2% of HCWs had demonstrated good knowledge on COVID-19. The result is comparable with other two studies conducted in Ethiopia where 70% of HCWs had sufficient knowledge.[18] Nearly comparable finding is also reported in a study conducted in Uganda where

69% of HCWs had adequate knowledge of COVID-19.[19] However, it is lower than findings reported in China where 89% and in Pakistan 93.2%. [20,21]On the other hand, the finding is higher than studies conducted in Saudi Arabia and India where 45% and 54.7% of HCWs had good knowledge respectively.[22,23] This difference might be related to variations in study area. Battling pandemic across countries may not be the same leads to difference in knowledge. Another possible reason is that it could be due to differences in the cut-off points used to categorize knowledge. In this survey, Type of health institution, level of education, and training on COVID-19 were strongly associated with knowledge of health care workers about COVID-19.HCWs of Comprehensive specialized hospital were about 4.46 times more likely had good knowledge of COVID-19 than health centers. This may be explained by HCWs working in comprehensive specialized hospital tend to have higher level of education this may leads to deference in knowledge. HCWS who received training on COVID-19 6 times had good knowledge of COVID-19 than who didn't receive the training. Also level of education having Bachelor degree and master degree positively associated with the level of knowledge. Some studies have reported that educational level of HCWs had strongly associated with level of knowledge on COVID-19.In our study, about 65.81% of the HCWs implemented appropriate practice. This finding was nearly comparable with studies conducted in Pakistan and India where 73.4%, and 74% of HCWs had implemented good practice respectively. [22,23] Good preventive practice of the HCWs was significantly associated with source of information of COVID-19. HCW's source of information from TV/Radio/Websites/Social medias is more rather than single media however social media have given more source of information. The possible reason for the association might be due to the more availability of information on social media and easy access. HCWs of primary hospital were less likely had good practice than tertiary centers. This is congruent with previous studies. [22,23] Level of knowledge also shows significant association with good practices of HCWs. HCWs who had good knowledge on COVID-19 about 2 times more likely implement good preventive practice than who had poor knowledge. Similar findings were reported in previous studies.[22,23]Various aerosol generating departments showed good knowledge and practice. Department of Oral and maxillofacial Surgery is emergency department and worked in front line among dentistry. Various aerosol generating department should have good knowledge and practice for preventive aspect as aerosol is only route of transmission of virus. Study also showed the same as we needs good knowledge and practice about COVID-19 among various aerosol generating departments. There were few limitations in the present study. It was a Single center study. We could not assess the changes, causes and effect relationship. The present study may provide reference for further spreading of infection among HCWs during pandemics. However further studies are suggested at multi-centric levels.

CONCLUSION

Within the limitations of the study we can conclude that majority of HCWs had good level of knowledge, practice but lower proportion of HCWs practices sufficiently in compare to magnitude of good knowledge. Type of health facilities, level of education, training on COVID, work experience, type of source of information were significantly associated with knowledge, and practice of HCWs toward COVID-19. Various aerosol generating departments had good knowledge and practice. Among all OMFS departments had good knowledge and practice as compared to other department of dentistry. Department of medicine, anesthesia, emergency and ENT also showed good knowledge and practice. The training of HCWs should be implemented by the governments and the institutions for better practice of tackling with COVID-19.

CONFLICT OF INTEREST

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