

# Study on the undergraduate interns of a medical college in eastern India: the knowledge, attitude and practice regarding COVID-19 pandemic preparation



Uttam Majumder<sup>1</sup>, Iti Baidya<sup>2</sup>, Avik Kumar Layek<sup>3</sup>

<sup>1</sup>Assistant Professor, <sup>3</sup>Tutor, Department of Psychiatry, North Bengal Medical College, West Bengal, India, <sup>2</sup>Medical Officer, Department of Pathology, Bishnupur Super Speciality Hospital, West Bengal, India

Submission: 23-06-2021

Revision: 09-08-2021

Publication: 01-09-2021

## ABSTRACT

**Background:** With the rapid propagation of the SARS-COV-2 or COVID-19 pandemic, the healthcare facility around the world has been stretched a large extent. To keep the green supply chain to the healthcare resources ready for the battle, sufficient knowledge, proper attitude and adequate practices are of paramount necessity. **Aims and Objectives:** The study was done to the knowledge, practice and attitudes towards COVID-19 pandemic preparedness among the undergraduate medical interns of a tertiary care teaching center in Eastern India. **Materials and Methods:** Semi-structured proforma for socio-demographic details and KAP Questionnaire for COVID-19 preparedness were circulated among the Interns. Interaction among the subsets of the KAP scale as well as their association with different socio-demographic variables were studied. **Results:** Out of the 138 subjects participated in the study the KAP parameters were not significantly different based on the socio-demographic factors barring presence of better practices among the female interns and less score on knowledge and attitude in presence of Psychiatric illness. It was seen that better practice was significantly correlated with knowledge mean score. **Conclusion:** The study implied that training on the updated knowledge along with exposure to simulated environment with scheduled supervision to reflect the behavior of the interns was of great importance so that in extreme situation, the less experienced resources could also come handy into utilization if needed.

**Key words:** Knowledge; Attitude; Practice; Medical interns; COVID-19

## INTRODUCTION

The novel coronavirus disease (COVID-19) had spread rapidly across the globe involving most of the countries including India since its onset in the city of Wuhan and surrounding areas of China in the month of December, 2019.<sup>1-3</sup> It was declared as pandemic by the World Health Organization (WHO) on 11<sup>th</sup> March, 2020.<sup>4</sup> Till present, around 178 million people has suffered from the infection of COVID-19 throughout the world with around 3.8 million casualties.<sup>5</sup> Near about 30 million cases have been registered in India as well with about 388 thousand death recorded.<sup>6</sup> It has also caused a massive downfall of

economy across the world since its inception. The health infrastructure in the World as well as in India was on the verge of collapse owing to huge disease burden, death toll and lack of optimum medical management options unavailable.<sup>7</sup>

This virus usually spreads from man to man through droplets from an infected person while talking, coughing, sneezing and through body contact with an incubation period of about 4-14 days.<sup>8</sup> The elderly persons, people with chronic co-morbidities including diabetes, cardiovascular diseases and Chronic Obstructive Pulmonary Diseases appear to be more vulnerable to severity. COVID-19 mostly manifested

### Access this article online

**Website:**

<http://nepjol.info/index.php/AJMS>

**DOI:** 10.3126/ajms.v12i9.37984

**E-ISSN:** 2091-0576

**P-ISSN:** 2467-9100

Copyright (c) 2021 Asian Journal of Medical Sciences



This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

### Address for Correspondence:

Dr. Avik Kumar Layek, Tutor, Department of Psychiatry, North Bengal Medical College, Sushrutanagar, Darjeeling, West Bengal, India. Pin: 734012. **Mobile:** +91-7980959566. **E-mail:** avik.layek@gmail.com

with the symptoms of cough, fever, respiratory discomfort, aches and pains in muscles, fatigability, loss of smell and taste perception. Most of the patients having COVID-19 infection have documented imaging evidence of pneumonia with fibrotic changes in the lungs. In severe cases persons may have many complications like shock, acute cardiac diseases, ARDS, renal failure and death may happen in many cases.<sup>9</sup> Though there is no recommended antiviral medicine to combat the infection, the main focus of treatment is principally symptomatic treatment of cases and at the same time ensuring public health measures to control and inhibit the spread of COVID-19.<sup>9</sup> On the silver side, vaccines against the virus have been in the arena for half of the year across the world including India. Though, even with the administration of vaccines, the emphasis of the public health measures including practice of hygiene, maintaining distance and following proper exposure protocol remain at its prior altar.<sup>10</sup>

The frontline healthcare workers of all levels have been performing in formulating and delivering care of the patients of this intensely infective virus. They are vulnerable to major occupational health hazards by exposing them to the infected people regularly.<sup>11</sup> Terminating the nosocomial spread of the infection and ensuring the safety of the frontline healthcare personnel are of utmost importance to control the propagation of the virus and to keep the workforce at its optimum capacity. It can be only done if the concerned healthcare personnel maintains the adequate knowledge about the disease transmission and control measures, and develops proper attitude towards the same which can be converted into scientific practices to keep the infection at bay.<sup>12</sup> Actually it has been seen that correct attitude and practices can have direct implication in reducing the infection risk.<sup>13,14</sup>

Scientific literatures have showed that the poverty of knowledge and understandings of the healthcare workers lead to late diagnosis, lack of proper control of infection and disease spread.<sup>14,15</sup> After witnessing the devastating second wave and getting on the verge of a possible third wave that has been surging in many parts of the world, this has been of utmost importance. For that goal to be achieved, the level of their optimum preparedness in their knowledge, attitude and practice is extreme important. Prior Indian studies focused on the issue keeping an eye over the healthcare workers as a whole, though there is a dearth of literature where only the medical interns were assessed in India.<sup>16,17</sup> Under the circumstances, it is emphatic to assess their preparedness and to take care of any lacuna if found.

In this study, our motto was to examine the knowledge, attitudes and practices among the undergraduate interns of the concerned medical college towards the pandemic preparedness. At the same time we could address what type of supervision and training they might need.

## MATERIALS AND METHODS

This study was done in the premises of North Bengal Medical College, a tertiary care center, situated near the Siliguri corridor which links the North East India with the mainland. Ethical clearance from the Institutional Ethics Committee was obtained. It was done on the Medical Interns of this institute. Medical interns are the trainee doctors who have successfully completed medical schooling and are engaged in a year of additional training at hospitals before residency. They do not get the graduation certificate until they successfully finish this internship year. Printed questionnaires were served to individual interns except those not consented. 138 interns responded to the study. A semi-structured Performa was formed and utilized here to gather data regarding different socio-demographic variables like age, gender, religious background, whether married or not, size of the family and average monthly family income.

We used a structured KAP questionnaire structured according to the WHO guideline used in previous research work.<sup>14</sup> We used to address the knowledge, attitudes, and practices of the subjects about COVID-19 infection. It had 16 items to test the interns' KAPs focusing COVID-19. A brief part consisting eight items examined infection knowledge based on a Likert scale extending from 1 to 6 ('Not understanding' to 'Master') with total scores from 8 to 40. Attitudes were tested through four items about the level of fear, confidence, feelings of tiredness, and attitude towards disclosing the exposure. Practices were assessed by using four items related to the frequency of hand cleaning and adhering other protective measures. Unlike the knowledge subset, the parameters of good practice were awarded lower values in this Likert scale.

The data were statistically assessed by SPSS version 16 with two-tailed  $P < 0.05$  considered to indicate statistical significance.

Independent sample t test and Pearson's correlation test were done to assess the inter-relation that can affect the knowledge, attitude and behavior of the students based on their socio-demographic details and mutual interaction of the KAP scores.

## RESULT

The intern batch of 2020-21 year was comprised of 150 interns among whom 138 participated in this study. Only 2 of them were married, majority male (56.5%), the mean age was  $24.1 \pm 1.2$  years with an average family income range of Rs. 6000-1200000 [Median income = 60000] per month. Most of them were from urban background (71%). The number of family members varied from 3-19 with a median value of 4 (Table 1).

The cumulative mean scores of knowledge, attitude and practice subsets were put into comparison separately with different socio-demographic variables as shown in Table 1. It is seen that the mean practice score of the male interns was significantly greater than that of the females ( $P = 0.011$ ), which attributes the females to have shown better practice. Also presence of Psychiatric illness seems to be negatively associated with the knowledge ( $P = 0.002$ ) and attitude ( $P = 0.026$ ) scores.

In the knowledge category of the KAP questionnaire, we kept key questions in the domains of modes and routes of COVID-19 transmission, isolation and other preventive strategies including hand hygiene and social distancing. Upon adding the values, it was found to be found to be  $31.54 \pm 6.22$  [in terms of knowledge mean score  $3.94 \pm 0.78$ ] in the sample population. It was seen in the Table No. 2 that majority showed mastery (level 4 on the likert scale) regarding the usefulness of patient isolation (40.6%), proper usage and disposal of face mask (43.5%), medical waste disposal (42%), disinfectant use (40.6%) and knowledge regarding the modes (30.4%) and routes (42%) of infection transmission. Majority students showed familiarity (level 3) regarding the role of PPE use and disposal (39.1%) (Table 2).

When we assessed the attitude regarding COVID-19 pandemic among the students, it was seen, as showed in Table 3 that the level of fear (37.7%) and fatigue (49.3%) were sometimes present. They showed mostly confidence (31.9%) and always the necessity of intimation when facing exposure to the viral source (62%).

When it came into actual practice, most response was found in the domain of proper use of hand hygiene while providing patient care (52.2%) and importance of training

(29%). They stressed on practicing quarantine maintenance (47.8%) and proper PPE use (52.2%) as shown in Table 4.

We assessed the level of knowledge as received from this questionnaire whether reflected on the attitude and practice. The results yielded to some extent mixed phenomena as showed in Table 5. Pearson's correlation was calculated using the mean scores of knowledge, attitude and practice domain. It was seen that the gathered knowledge was correlated negatively to the practice score of the interns significantly ( $P=0.021$ ), which inferred that good practice was correlated with good knowledge as the practice parameters in the scale were put in the reverse order.

## DISCUSSION

As it seems, COVID-19 pandemic is a rapidly deteriorating crisis of not only public health but also affecting economic, social life and other humanitarian domains across the globe. With subsequent waves of propagation, it exposes the vulnerability of our health system like never before. The Healthcare workers remain the frontline resources in combating the debacle. To prepare for the pandemic, adequate knowledge, attitude and practices are of paramount importance for saving the resources as well the society.<sup>12-15</sup> The Medical Interns are the vanguard of the healthcare personnel playing pivotal role in the system. Their preparedness matters a lot in the outcome.<sup>18</sup> We tried to assess the preparedness in terms of knowledge, attitude and practices in one of the esteemed Medical College of Eastern India.

It is seen in our study that the participants were mostly representative of the population in terms of gender distribution though most were from urban upper middle

**Table 1: Difference in knowledge, attitude and practice based on socio-demographic parameters**

Socio - demographic features	No	Knowledge score			Attitude score			Practice score		
		Mean $\pm$ SD	T	P	Mean $\pm$ SD	T	P	Mean $\pm$ SD	T	P
Age Group			0.460	0.625		0.733	0.465		-0.791	0.430
<25yrs	96(69.6%)	3.9 $\pm$ 0.7			1.8 $\pm$ 0.8			2.1 $\pm$ 0.7		
$\geq$ 25 yrs	42(30.4%)	3.9 $\pm$ 0.9			1.7 $\pm$ 0.9			2.2 $\pm$ 0.8		
Gender			-0.657	0.512		-0.607	0.545		2.567	0.011*
Male	78(56.5%)	3.9 $\pm$ 0.8			1.7 $\pm$ 0.9			2.3 $\pm$ 0.8		
Female	60(43.5%)	4.0 $\pm$ 0.7			1.8 $\pm$ 0.7			2.0 $\pm$ 0.6		
Marital status			1.272	0.206		1.335	0.184		1.635	0.105
Unmarried	136(98.6%)	3.9 $\pm$ 0.8			1.8 $\pm$ 0.8			2.1 $\pm$ 0.7		
Married	2(1.4%)	3.2 $\pm$ 0.0			1.0 $\pm$ 0.1			3.0 $\pm$ 0.0		
Background			-0.800	0.425		0.849	0.397		-0.630	0.529
Urban	98(71%)	3.9 $\pm$ 0.7			1.8 $\pm$ 0.8			2.1 $\pm$ 0.7		
Rural	40(29%)	4 $\pm$ 0.9			1.7 $\pm$ 0.8			2.2 $\pm$ 0.8		
Presence of psychiatric illness			-3.131	0.002*		-2.258	0.026*		0.222	0.824
Present	12(8.7%)	3.3 $\pm$ 0.9			1.2 $\pm$ 0.8			2.2 $\pm$ 0.9		
Absent	126(91.3%)	4 $\pm$ 0.7			1.8 $\pm$ 0.8			2.2 $\pm$ 0.7		
Family history of psychiatric illness			-1.475	0.142		-0.338	0.736		1.334	0.184
Present	34(24.6%)	3.8 $\pm$ 0.9			1.7 $\pm$ 0.9			2.3 $\pm$ 0.9		
Absent	104(75.4%)	4 $\pm$ 0.7			1.8 $\pm$ 0.8			2.1 $\pm$ 0.7		

**Table 2: Response among the interns in the knowledge category of the KAP questionnaire**

Knowledge items	Responses				
	Not understanding	Understanding	General	Familiar	Master
Suspected and confirmed COVID-19 cases should be isolated in a separate ward with a minimum 1m distance between the beds.	2 (1.4%)	20 (14.5%)	10 (7.2%)	50 (36.2%)	56 (40.6%)
Wearing a mask (N95, FFP2 or equivalent) during aerosol generating procedure or entering in a room with suspected or confirmed COVID-19.	4 (2.9%)	22 (15.9%)	12(8.7%)	40 (29%)	60 (43.5%)
Proper using and disposal of the face mask.	4 (2.9%)	18 (13%)	16 (11.6%)	44 (31.9%)	56 (40.6%)
Proper disposal of medical waste products during care of COVID-19 patients.	4 (2.9%)	14 (10.1%)	18 (73%)	44 (31.9%)	58 (42%)
Proper use and disposal of PPE	2 (1.4%)	12 (8.6%)	20 (14.5%)	54(39.1%)	50 (36.2%)
Proper use of disinfectants.	0	20 (14.5%)	14(10.1%)	48 (34.8%)	56 (40.6%)
Mode of viral transmission	8 (5.8%)	22 (15.9%)	24 (17.4%)	42 (30.4%)	42 (30.4%)
Routes of COVID-19 transmission	2 (1.4%)	20 (14.5%)	12 (8.7%)	46 (33.3%)	58 (42%)

**Table 3: Response among the interns in the attitude category of the KAP questionnaire**

Attitude items	Responses				
	Always	Mostly	Sometimes	Occasional	Rare
Level of fear	18 (13%)	24 (17.4%)	52 (37.7%)	28 (20.3%)	16 (11.6%)
Frequency of fatigue	2 (1.4%)	18 (13%)	68 (49.3%)	32 (23.2%)	18 (13%)
Level of confidence	28 (20.3%)	44 (31.9%)	44 (31.9%)	18 (13%)	4 (2.9%)
Importance of intimation of exposure	86 (62.3%)	22 (15.9%)	18 (13%)	8 (5.8%)	2 (1.4%)

**Table 4: Response among the interns in the practice category of the KAP questionnaire**

Practice items	Responses				
	Always	Mostly	Sometimes	Occasional	Rare
Maintenance of quarantine during outbreak	66 (47.8%)	44 (31.9%)	8 (5.8%)	4 (2.9%)	16 (11.6%)
Participation in training of infection prevention and control	20 (14.5%)	40 (29%)	26 (18.8%)	20 (14.5%)	32 (23.2%)
Practice of proper use of PPE during duty	72 (52.2%)	46 (33.3%)	6 (4.3%)	2 (1.4%)	12 (8.7%)
Proper use of hand hygiene during provision of patient care	50 (36.2%)	72 (52.2%)	10 (7.2%)	2 (1.4%)	4 (2.9%)

and middle class socio-economic background. Interestingly, regarding effect on the preparedness towards the pandemic, differences in demographic parameters like age difference, albeit in a smaller range, family income or rural-urban background did not impose any significant effect (Table 1).

It was seen that female interns were more prone to show good practice guidelines than the male counterpart

**Table 5: Correlation between knowledge, attitude and practice among the study subjects**

Variable (mean ± SD)	Pearson's correlation	Knowledge	Attitude	Practice
Knowledge (3.94 ± 0.78)	Correlation coefficient (r)	1	0.071	-0.196
	p value	-	0.406	0.021*
Attitude (1.77 ± 0.82)	Correlation coefficient (r)	0.071	1	0.147
	p value	0.406	-	0.086
Practice (2.95 ± 0.98)	Correlation coefficient (r)	-0.196	0.147	1
	p value	0.021*	0.086	-

despite having insignificant difference in the knowledge and attitude subset (Table 1). Few epidemiological studies abroad have found that female population from different strata showed greater awareness as well.<sup>19,20</sup> It can be argued that great awareness of personal menstrual and ritualistic hygiene maintenance is a common practice in females in this subcontinent. Females are also supposed to take active participation in domestic sanity and hygiene maintenance though it can be jeopardized in poverty ridden situations.<sup>21</sup> Whether the greater disciplinary impact upon the females as a part of social construct and learning has any influence over this is a matter of need to study further.

Presence of Psychiatric illness seemed to be negatively associated with knowledge and attitude score as seen in Table 1. Though the number of cases with such illnesses are low, persons with Psychiatric illnesses are prone to have decreased motivation and possibility of executive functioning deficit which can lead to such findings.<sup>22</sup> Whether this is applicable to the COVID-19 situation needs further evaluation on a large scale before generalization. But it can be safely asserted that the mental health of the treating doctors is of immense importance while getting the proper preparedness against the pandemic and measures for ensuring the proper mental faculty of the doctors are to be taken.

Among the subjects surveyed, the cumulative knowledge score demonstrated was to some extent at par to the prior studies conducted onto the healthcare workers. They showed a mean score of 31.54 while study done abroad utilizing the same scale yielded scores as high as 36-38 ranges.<sup>12,14</sup> Similarly KAP scores as depicted in detail in tables 2-4 were found to be almost at the same level when studies done in students of universities in different parts of the world.<sup>15</sup> The difference can be attributed to the level of exposure as well as the work experience in the concerned field as seen in other studies.<sup>14</sup> Also, lack of exposure to similar types of epidemic in India might get to its contribution unlike those in Eastern Asia as in 2008 SARS epidemic<sup>13</sup>. As we all know, to establish preventive thoughts, affirmative attitudes, and positive practices, knowledge is a definite prerequisite.<sup>12-16</sup> Personal cognition can be shaped in such way where the healthcare worker can cope up with much more insight.<sup>23</sup>

The present study complies with the fact that knowledge can induce positive attitudes.<sup>13-16</sup> A healthcare worker can impart more confidence in dealing with the virus if one has sufficient knowledge. This finding, as mentioned in table 5, is at par with prior studies on similar topic from different parts of the world<sup>9,12,14,15</sup> as well as in India.<sup>16,17</sup> It has been seen that healthcare workers while having proper attitude can disclose their risk of possible exposure thus limiting the viral load in transmission.<sup>14</sup>

However, as shown in table 5, here we found that the behavioral practices, that the interns supposed to be sufficient in combating COVID-19 pandemic, were paradoxically negatively correlated with knowledge scorings. While taking the practice values as per the KAP scale used here, the parameters in favor of the good practices were awarded lower ratings in the Likert scale. Thus we can safely conclude that actually good practice is significantly correlated positively to the mean knowledge score. This finding corroborate to prior studies done on similar topics.<sup>14-17</sup>

We have found that knowledge can impart positive correlation towards the behavioral practices in the real time scenario. Though regarding the synchronization of knowledge, attitude and practice, it is mentioned in prior studies that the behavioral practices depend on many other factors apart from knowledge and attitudes especially work experience and whether the person is a vanguard in the combat or not.<sup>23, 24</sup> A study conducted in China on the COVID-19 healthcare workers found that the group with 5-9 years of experience as the frontline worker showed much more confidence, less fatigue and better preventive practices including quarantining oneself from the family members.<sup>14</sup> Besides, as shown in another study, the type of healthcare worker and their frequency of exposure are also

useful determinant in developing protective practices.<sup>24</sup> It is important in the present situation, as the interns, as they enter into the services, are at greater risk of exposure with their duty pattern.<sup>25</sup> Therefore, besides providing adequate knowledge, provision of training, clinical exposure and real life simulation is of utmost importance in the combative preparedness against the COVID-19 pandemic.

This study has some limitations. The survey was conducted in only one Medical College of India, so the results may not be generalized. The study populations are not evenly exposed to the hands-on exposure to such types of events or epidemics. Also, due to the study design, this study catered only the young population so that the professionals with longer working experience were not included. Moreover, the estimation of KAP cannot be precise because of the less number of items. More studies are required to expand and resolve such problems.

## CONCLUSION

Based on our study we can opine that medical interns from different socio-economic background can be incorporated with almost same efficiency in the management of the ongoing pandemic. The knowledge regarding the virus awareness is the chief determinants of their practice in the actual scenario that matters. With adequate training and working environment provided, they can be much useful for the society, for themselves and for the mankind at this situation.

## ACKNOWLEDGEMENT

1. Dr. Abhijit Mukherjee, Associate Professor, Department of PSM, North Bengal Medical College, West Bengal, India
2. Dr. Nirmal Kumar Bera, Professor, Department of Psychiatry, North Bengal Medical College, West Bengal, India.

## REFERENCES

1. World Health Organization. Novel Coronavirus (2019-nCoV) technical guidance. 2020. <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance> [last accessed June 2021].
2. Centers for Disease Control and Prevention. US: 2020. 2019 Novel coronavirus, Wuhan, China. Information for Healthcare Professionals. 2020. (Updated Aug. 25, 2020) <https://www.cdc.gov/coronavirus/2019-nCoV/hcp/index.html> [last accessed June 2021].
3. World Health Organization (WHO). October 12<sup>th</sup> 2020. Coronavirus disease 2019 (COVID-19). <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/question-and-answers-hub/q-a-detail/coronavirus-disease-covid-19> [last accessed June 2021].
4. World Health Organization. Geneva, Switzerland: WHO; 2020. WHO Director-General's opening remarks at the media briefing

- on COVID-19.[updated2020 Mar 11; cited 2021 Jan 10]; [about 3 screens]. Available from: <https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020> [last accessed June 2021].
5. World Health Organization (WHO). June 22<sup>nd</sup> 2021. Coronavirus disease2019 (COVID-19). <https://www.who.int/emergencies/diseases/novel-coronavirus-2019> [last accessed June 2021].
  6. Ministry of Health and Family Welfare Directorate General of Health Services [Emergency Medical Relief]. Novel Coronavirus Disease 2019 (COVID-19). India: 2021. [updated 2021 June 22, cited 2021 June 22]; [1 screen]. Available from: <https://www.mohfw.gov.in/>[last accessed June 2021].
  7. Ministry of Health and Family Welfare Directorate General of Health Services [Emergency Medical Relief]. Novel Coronavirus Disease 2019 (COVID-19): Guidelines on rational use of Personal Protective Equipment. <https://www.mohfw.gov.in/pdf/GuidelinesonrationaluseofPersonalProtectiveEquipment.pdf> [last accessed June 2021].
  8. Lei S, Jiang F, Su W, Chen C, Chen J, Mei W, et al. Clinical characteristics and outcomes of patients undergoing surgeries during the incubation period of COVID-19 infection. *E Clinical Medicine*. 2020; 000:100331. <https://doi.org/10.1016/j.eclinm.2020.100331>
  9. Bhagavathula AS, Aldhaleei WA, Rahmani J, Mahabadi MA and Bandari DK. Novel Coronavirus (COVID-19) Knowledge and Perceptions: A Survey on Healthcare workers. *Med Rxiv*. 2020:2020.03.09.20033381. <https://doi.org/10.1101/2020.03.09.20033381>
  10. Centers for Disease Control and Prevention. US: 2021. Guidance for fully vaccinated people. [updated 2021 June 17, cited 2021 June 22]; [1 screen]. Available from: <https://www.cdc.gov/coronavirus/2019-ncov/vaccines/fully-vaccinated.html> [last accessed June 2021].
  11. Gan WH, Lim JW and Koh D. Preventing intra-hospital infection and transmission of COVID-19 in healthcare workers. *Saf Health Work*. 2020.
  12. Nemati M, Ebrahimi B and Nemati F. Assessment of Iranian Nurses' Knowledge and Anxiety toward COVID-19 During the Current Outbreak in Iran. *Arch Clin Infect Dis* 2020;In Press. <https://doi.org/10.5812/archcid.102848>
  13. Omrani AS and Shalhoub S. Middle East respiratory syndrome coronavirus (MERS-CoV): what lessons can we learn? *J Hosp Infect*. 2015; 91:188-196. <https://doi.org/10.1016/j.jhin.2015.08.002>
  14. Zhang M, Zhou M, Tang F, Nie H, Zhang L and You G. Knowledge, attitude, and practice regarding COVID-19 among healthcare workers in Henan, China. *J Hosp Infect*. 2020; 105(2): 183-187. <https://doi.org/10.1016/j.jhin.2020.04.012>
  15. Alzoubi HM, Alnawaiseh N, Al-Mnayyis AM, Abu-Lubad M, Aqel A and Al-Shagahin HM. COVID-19 - Knowledge, Attitude and Practice among Medical and Non-Medical University Students in Jordan. *Journal of Pure and Applied Microbiology*. 2020; 14(1): 17-24. <https://doi.org/10.22207/JPAM.14.1.04>
  16. Verma S, Kumar S, Khanum R, Chandan N and Narayanmurthy M. Knowledge, attitude and practices towards COVID-19 among healthcare workers of Karnataka, India: a cross-sectional survey. *International Journal of Community Medicine and Public Health*. 2020; 7: 4889. <https://doi.org/10.18203/2394-6040.ijcmph20205158>
  17. Venkata N, Rama N, Naga K and Knowledge, attitude and practice among health care professionals regarding COVID-19 and barriers faced by health care professionals in South India. *International Journal of Community Medicine and Public Health*. 2020; 7: 3450. <https://doi.org/10.18203/2394-6040.ijcmph20203906>
  18. Carrascosa MMC, Campos T, Sampaio JE, Souza RRF, Ribeiro VL, Maia MLN, et al. Medical Interns and COVID-19: results of national research. *Rev Assoc Med Bras (1992)*. 2020;66(6):812-817. Epub 2020 Jul 20. <https://doi.org/10.1590/1806-9282.66.6.812>
  19. Suen LKP, So ZYY, Yeung SKW, Lo KYK and Lam SC. Epidemiological investigation on hand hygiene knowledge and behavior: a cross-sectional study on gender disparity. *BMC Public Health*. 2019; 19(1):401. <https://doi.org/10.1186/s12889-019-6705-5>
  20. Guzek D, Skolmowska D and Głabaska D. Analysis of Gender-Dependent Personal Protective Behaviors in a National Sample: Polish Adolescents' COVID-19 Experience (PLACE-19) Study. *Int J Environ Res Public Health*. 2020; 17(16):5770. <https://doi.org/10.3390/ijerph17165770>
  21. Sujith K. Sanitation Interventions in India: Gender Myopia and Implications for Gender Equality. *Indian Journal of Gender Studies*. 2019; 26: 097152151881211. <https://doi.org/10.1177/0971521518812114>
  22. Rabinovici GD, Stephens ML and Possin KL. Executive dysfunction. *Continuum (Minneapolis)*. 2015;21(3 Behavioral Neurology and Neuropsychiatry):646-659 <https://doi.org/10.1212/01.CON.0000466658.05156.54>
  23. McEachan R, Taylor N, Harrison R, Lawton R, Gardner P and Conner M. Meta-analysis of the reasoned action approach (RAA) to understanding health behaviors. *Ann Behav Med*. 2016; 50: 592-612. <https://doi.org/10.1007/s12160-016-9798-4>
  24. Wang D, Hu B, Hu C, Zhu F, Liu X, Zhang J, et al. Clinical Characteristics of 138 Hospitalized Patients With 2019 Novel Coronavirus-Infected Pneumonia in Wuhan, China. *JAMA*. 2020; 323(11):1061-1069. <https://doi.org/10.1001/jama.2020.1585>
  25. Jiang L, Ng IHL, Hou Y, Li D, Tan LWL, Ho HJA, et al. Infectious disease transmission: survey of contacts between hospital-based healthcare workers and working adults from the general population. *J Hosp Infect*. 2018; 98:404-411. <https://doi.org/10.1016/j.jhin.2017.10.020>

**Authors' contribution:**

**UM**-Concept and design of the study, drafting the first part of the manuscript, Data interpretation; **IB**- Co-ordination, Literature review, Revision of the manuscript; **AKL**- Review of literature, Data collection, Statistical analysis and interpretation.

**Work attributed to:**

North Bengal Medical College, Sushrutanagar, Darjeeling, West Bengal, India.

**ORCID ID:**

Dr. Uttam Majumder- <https://orcid.org/0000-0003-2416-6307>  
 Dr. Iti Baidya- <https://orcid.org/0000-0003-2000-7253>  
 Dr. Avik Kumar Layek- <https://orcid.org/0000-0002-5400-8230>

**Source of Funding:** None, **Conflict of Interest:** None