Original Research Article

Assessment of COVID-19 related knowledge, attitude, practice and professional risk factors associated to develop infection among the police personnel of Bangladesh during the rapid rise period of the outbreak

Bahni Chakraborty[1], Pushpita Chakraborty[2], Ashekul Islam[3]*, M. Nur Hossain Bhuiyan[4], Pulak Kanti Palit[5], M. Rabiul Hasan Chowdhury[6], Abdullah Al Mamun[3], Mohammad Mosleh Uddin[3], Anannya Barua[7]

[1]Emergency Department, Chattogram Medical College Hospital, Chattogram-4203, Bangladesh
[2]Internship Doctor, Chattogram Medical College Hospital, Chattogram-4203, Bangladesh
[3]Department of Biochemistry and Molecular Biology, Mawlana Bhashani Science and Technology University, Tangail-1902, Bangladesh
[4]Department of Surgery, Chattogram Medical College, Chattogram-4203, Bangladesh
[5]Department of Medicine, Chattogram Medical College, Chattogram-4203, Bangladesh
[6]District Police Hospital, Chattogram, Bangladesh
[7]Sir Salimullah Medical College Hospital, Dhaka-1100, Bangladesh

*Correspondence:
Dr. Ashekul Islam,
E-mail: ashekbmb@mbstu.ac.bd

ABSTRACT

Background: Bangladesh police have been engaged in different COVID-19 related containment activities consequently they are being badly affected and sacrifice their lives. However, as a newly outbreak pandemic, there may have lack of proper knowledge, attitude and practices in handling to prevent rapid spreading of deadly COVID-19 virus in Bangladesh.
Methods: This cross-sectional study was conducted to assess the KAP and associated risk factors with COVID-19 among police personnel during pandemic. Total 2290 police personnel from different metropolitan cities were included and data were collected over telephone interview with an administered questionnaire following a convenient sampling technique. Bivariate associations between categorical variables were examined using Chi-square test. We also explored the independent risk factors for COVID-19 infection using binary logistic regression.
Results: Out of 2290 respondents 458 (20%) were found to be COVID-19 positive and majority (42.5%) of them were male (97.5%) and belonged to age group of 31-40 years. Our study showed that an increased risk of COVID-19 infection for those who stayed in police barrack (OR=3.45; 95% CI:1.21-6.42; p<0.021), not practicing social distancing always (OR=2.13; 95% CI:1.12-5.31; p<0.031) and not wearing mask appropriately (OR=2.15; 95% CI: 1.31-4.52; p<0.003).
Conclusions: This study provides a unique baseline of KAP and professional risk factors among the police personnel in Bangladesh on COVID-19 which indicated that, community-based health campaigns are obligatory to hold expectant attitudes and practice appropriate intervention measures. KAP study aimed at other front liners should be urgently addressed.

Keywords: COVID-19, Police, Knowledge, Attitude, Practice, Professional risk factors, Bangladesh

INTRODUCTION

Coronaviruses are a verity group of single-stranded RNA virus that causes diseases in mammals, birds and humans with severe respiratory tract infections. The world population mainly get infected with some common human coronaviruses e.g. 229E (alpha), NL63 (alpha), OC43 (beta), and HKU1 (beta). The recent outbreak of novel corona virus infection, further declared as 'pandemic' worldwide by World Health Organization (WHO) appears with the emergence of a novel coronavirus; SARS-CoV-2 that has not previously detected in human being. It was first recorded in December 2019 in Wuhan, China and unexpectedly hit the world's population, resulting in a pandemic affecting 213 countries and territories worldwide so far. The current mortality rate of the disease is estimated at 7%, with the total number of cases at 13.24 million by July 14, 2020.[1] Several previous studies reported that SARS-CoV-2 is mainly transmitted from person to person by direct contact or respiratory droplet of infected people. Subsequently COVID-19 has spread globally showing normal flu like symptoms including fever, dry cough, shortness of breath, loss of smell and taste in some extent severe lung inflammation, multiorgan failure and blood clots have also been observed.

The institute of epidemiology, disease control & research (IEDCR) in Bangladesh reported the first COVID-19 positive patients in the country on March 8, 2020. COVID-19 detection test was sporadic in the initial days and detection was low. Later on cases have risen in a classic exponential pattern observed elsewhere in the world with community transmission evident as early as mid-March subsequently the Government has been taken necessary steps to prevent the drastic spreading. On March 18, 2020, the ministry of education of Bangladesh has declared closures of all educational institutions. The Government declared a 10-day nationwide holiday from March 26 onwards and restricted all passenger travel via road and highway, water, rail, and domestic air routes during this period. As the corona pandemic condition getting worse by days the consecutive holidays has been extended to May 30, 2020. All religious, social and political gatherings have been strictly discouraged. Later on the government divided COVID-19. Hit areas in red, yellow and green zones depending on the severity of the infection and till now selected area based lockdown is going on to limit the spread of infection.[2] Till our study period on July 14, the total number of COVID-19 cases confirmed in the country was 189,894 with 2391 associated deaths.[1,2]

Police personnel in Bangladesh are considered as one of the front liner who are actively participating in different mitigating and preventive program to manage COVID-19 pandemic. With the nationwide lockdown imposed in March, Police personnel were deployed to ensure residents adhered to the strict quarantine and preventive measures against corona virus across the country. In addition, police personnel involves in disinfecting streets, ensuring social distancing in public places, locating people who have escaped quarantine, COVID-19 positive patient hospitalization/medical emergency or engaged in funeral of the COVID-19 positive dead bodies etc. These activities are making them extremely vulnerable to the viral infection.[3] The ministry of health and family welfare of Bangladesh and Bangladesh police have provided some protective equips and advices to be followed strictly to keep them safe from COVID-19 that includes wearing face mask, hand sanitizer (keeping the hands clean while in duty), and using face mask while taking with a person specially with a suspected individual with COVID-19, maintaining social distancing in and out of duties and consult with health authority if have any symptom related to COVID-19.[4] Numerous protective measures have been taken to ensure the police personnel free from COVID-19 infection.[3] Nevertheless; during the outbreak of COVID-19 in Bangladesh, the ratio of COVID-19 infection in the Police personnel is increasing by days. According to the Police Head quarter news portal there were already 53 deaths of the total 13,316 confirmed cases identified until July 17, 2020 among police while undertaking their duties during COVID-19 pandemic.[5]

In this present study was aimed to assess whether the knowledge, attitude and practice (KAP) and the professional activities were associated with increased risk for COVID-19 infection among the Police personnel of Bangladesh which would be invaluable for the Policy makers and also for the Police higher authorities to restrain not only theses devastating condition but also to strengthen the ongoing preventive measures.

METHODS

This cross-sectional study was conducted among police personnel working in different thanas of Dhaka, Chattogram, Sylhet, Rajshahi, Rangpur, Khulna and Barisal city in Bangladesh from June 1, 2020 to June 30, 2020. A semi-structured questionnaire was designed which was appended with a respondent's consent form. The questionnaire was developed from the guideline provided by world health organization, IEDCR of Bangladesh and center for disease control and prevention of USA.[6-9] Data were collected over telephone interview with an administered questionnaire following a convenient sampling technique. During the data collection period 2500 police personnel were approached and response rate was 91.6% (2290 out of 2500). Respondents who had reported to COVID-19 positive and admitted in the police hospitals were considered as COVID-19 infected police.

An initial idea was given to the respondents about the aims, questionnaire and estimated time (10 minutes) for completing the survey. Respondents were asked for their agreement for participating in the study and to answer the questions faithfully and no individual data would be disclosed. Data were processed and analyzed by using

computer based software SPSS-23 (statistical package for social science). Variables were expressed as frequency (percentage). Different demographic, practice of non-pharmacological intervention and social activities were compared between infected and non-infected police respondents by Chi-square test. Variables which had significant association in bivariate analysis were entered in a binary logistic regression model to determine the independent predictors for COVID-19 infection. ($p<0.05$) were considered as statistical significant. Risk was articulated as odds ratio (OR) and 95% confidence interval.

RESULTS

Demographic characteristics regarding COVID-19

The demographic features of the respondents are summarized in (Table 1).

Table 1: Demographic characteristics of the respondents by their COVID-19 status (n=2290).

Variable		Non-infected (n=1832), frequency (%)	Infected (n=458) frequency (%)	Total (n=2290) frequency (%)	P value
Age group (years)	18-30	212 (11.6)	44 (9.6)	256 (11.2)	
	31-40	776 (42.4)	198 (43.2)	974 (42.5)	0.692
	41-50	692 (37.8)	176 (38.4)	868 (37.9)	
	51-60	152 (8.3)	40 (8.7)	192 (8.4)	
Sex	Male	1781 (97.2)	452 (98.7)	2233 (97.5)	0.848
	Female	51 (2.8)	6 (1.3)	57 (2.5)	
Rank	Constable	1102 (60.2)	296 (64.6)	1398 (61.1)	
	ASI	383 (20.9)	89 (19.4)	472 (20.6)	
	SI	251 (13.7)	53 (11.6)	304 (13.3)	0.775
	Sergeant	81 (4.4)	17 (3.7)	98 (4.3)	
	Officer	15 (0.8)	3 (0.7)	18 (0.8)	
Dwelling place	Home	1443 (78.8)	269 (58.7)	1712 (74.8)	
	Police barrack	383 (20.9)	181 (39.5)	564 (24.6)	<0.01*
	Hotel	6 (0.3)	8 (1.8)	14 (0.6)	
Comorbidity[a]	No	1565 (85.4)	378 (82.5)	1943 (84.5)	
	Yes	267 (14.6)	80 (17.5)	347 (15.5)	0.112

[a] DM and HTN only. ASI: assistant sub-inspector; SI: sub-inspector; *significant p value.

Regarding age distribution majority of them were either in age group of 31-40 years (42.5%) or in 41-50 years (37.9%) (Figure 1).

Most of the respondents were male 2233 (97.5%) and only 57 (2.9%) were female. Among them the respondents were either constable (61.1%) or ASI (20.6%). About one fourth of the respondents reported to live in police barrack or hostel and others reported to live in their respective home. About one fifth (16%) of the respondents reported to have diabetes and/or hypertension as comorbidity. Rank wise infectivity distribution elucidated that officer ranked police personal were found to be less infected whereas constable found to be more infected which may result from less KAP practice or limited knowledge of transmission of COVID-19 (Figure 2).
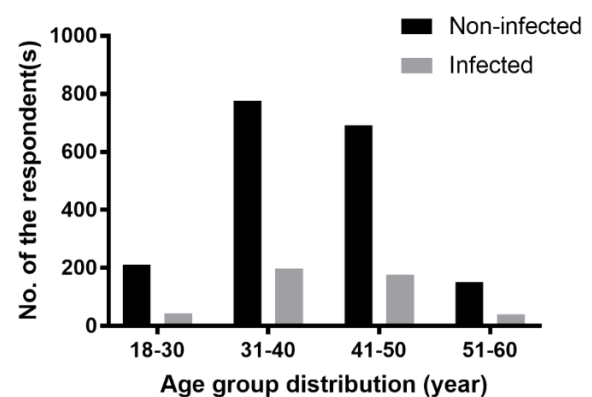
Figure 1: Age-wise distribution of the respondents with COVID-19 infection. The total study population was categorized into several age groups. Age group 31-40 years showed mostly infected with COVID-19.
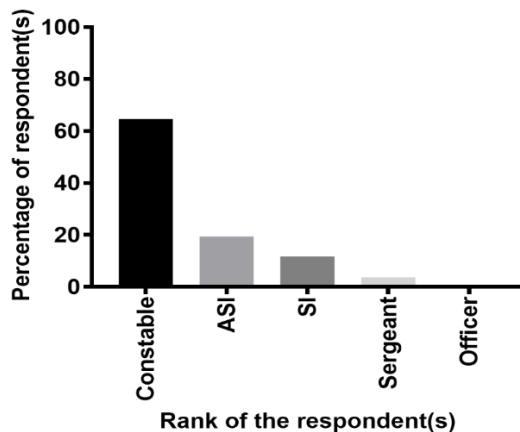
Table 2: Frequency distribution of responses on knowledge questions (n=2290).

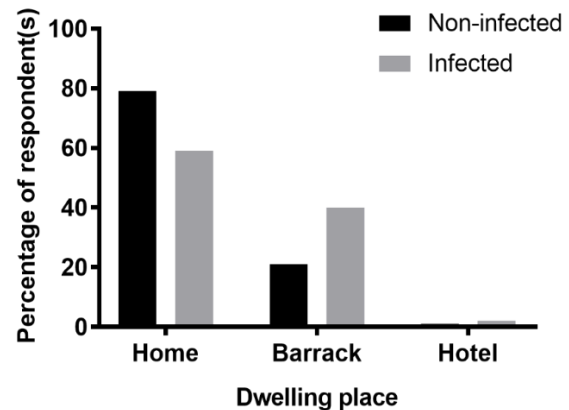| Statements	Right answer N (%)	Wrong answer N (%)
The main clinical symptoms of COVID-19 are fever, fatigue, dry cough, and breathing distresses	2290 (100)	0 (0)
The COVID-19 spreads via respirational droplets (from coughing, sneezing) of infected people	2290 (100)	0 (0)
COVID-19 virus can live on and spread through objects like mobile, utensils, cloths etc.	1606 (70.1)	684 (29.6)
Persons with COVID-19 having no fever cannot infect to others.	1568 (68.5)	722 (31.5)
Elderly people and people having chronic illnesses and other health complications are more likely to be seriously affected by COVID-19	1864 (81.4)	426 (18.6)

Table 3: Frequency distribution of responses on attitude questions (n=2290).

Attitude	Yes N (%)	No N (%)	May be N (%)
Do you think that social distancing (e.g. stay 1-2 m apart, avoid gatherings, etc.) can prevent COVID-19 spread?	2102 (91.8)	55 (2.4)	133 (5.8)
Do you think that extended lock down can prevent COVID-19 spread.	1374 (60.0)	334 (14.6)	582 (25.4)

However, there was no significant difference between infected and non-infected police persons in terms of age, sex, rank and comorbidity status was found. On the other hand, proportion of police person residing in the barrack showed significantly higher infection compared to non-infected group (p<0.01) (Table 1 and Figure 3). This outcome may result from the less hygiene facilities, not properly maintaining social distances (living more than two or more police personnel in a single room) after finishing their duties or hard to maintain preventive measure all time.

Figure 3: COVID-19 infectivity and residential status among the respondents. Infected police personnel were sorted out with their dwelling places, police personnel living in the barrack showed mostly infected with COVID-19.

Knowledge about COVID-19

Though all of the respondents were found to be familiar with the main symptoms and mode of transmission of COVID-19 infection a concealable number of them had knowledge gap in other aspect of this disease. Like about one third of the respondents reported that, only patients with fever can spread infection and virus cannot be transmitted through objects like mobile, utensils etc. Table 2 shows that about 18.6% of the respondents did not consider the elderly people and people with comorbidities are at special risk of severe COVID-19.

Figure 2: Rank-wise COVID-19 infection among the infected respondents. Among the study population, COVID-19 positive cases were classified with their rank. Constable ranked police personnel showed the most infection with COVID-19.

Attitude towards COVID-19

The frequency distribution of respondents' attitudes concerns to COVID-19 is shown in (Table 3). The attitude towards lock down showed mixed outcomes as about one fourth of the respondents was uncertain about its efficacy. On the other hand, majority (91.8%) of the respondents positively agreed that, social distancing is an effective measure to contain COVID-19.

Practices regarding COVID-19

Regarding different non-pharmacological intervention to prevent COVID-19 the entire study group reported to wear mask always during their duty. But about 40% of the respondents reported to practice social distancing always and 61% reported to practice hand cleaning/washing frequently. Though all the respondents reported to use mask, about 9% of them reported to remove mask while talking (sometimes) and about 23% of them reported to touch the outer surface of mask (Table 4). The bivariate analyses between individual non pharmacological interventions and COVID-19 infection showed that there was significant association between COVID-19 infection different practices. Practices of different interventions like maintaining safe distance, cleaning hands and using mask appropriately were reported significantly lower proportion of infected police compared to non-infected police (Table 5).

Table 4: Frequency distribution of responses on practices questions.

Practice	Always N (%)	Never N (%)	Sometime N (%)
Do you always maintain safe distance with people (3 feet) while working outside?	919 (40.1)	1034 (45.5)	337 (14.7)
Do you always wear mask while working outside?	2290 (100)	0 (0)	0 (0)
Do you frequently clean/wash your hands appropriately?	1394 (60.9)	418 (18.3)	478 (20.9)
Do you remove mask while talking?	0 (0)	2094 (91.4)	196 (8.6)
Do you cover both of your mouth and nose with mask?	2240 (97.8)	20 (0.9)	30 (1.3)
After wearing a mask do you touch the outer surface of it?	104 (4.5)	1769 (77.2)	417 (18.2)

Table 5: Practice of different non pharmacological interventions for COVID-19 between non-infected and infected police.

Type of activities	Non-infected (N=1832) frequency (%)	Infected (N=458) frequency (%)	Total (N=2290) frequency (%)	P value
Maintain safe distance always	843 (46.0)	76 (16.6)	919 (40.1)	<0.001
Clean/wash hands	1335 (72.9)	59 (12.9)	1394 (60.9)	<0.001
Never remove mask while taking	1725 (94.2)	369 (80.6)	2094 (91.4)	<0.001
Cover both nose and face with mask always	1823 (99.5)	417 (91.0)	2240 (97.8)	<0.001
Never touch outer surface of mask	1612 (88.0)	157 (34.3)	1769 (77.2)	<0.001

Table 6: Association between COVID-19 related activities and COVID-19 status among the respondents.

Type of activities	Non-infected (N=1832) frequency (%)	Infected (N=458) frequency (%)	Total (N=2290) frequency (%)	P value
Working at densely populated areas	528 (28.8)	203 (44.3)	731 (31.9)	<0.001
Participating in humanitarian aids	314 (17.1)	97 (21.2)	411 (17.9)	0.0439
Working at hospitals	61 (3.3)	18 (3.9)	79 (3.4)	0.557
Disposing COVID-19 positive dead bodies	45 (2.5)	19 (4.1)	64 (2.8)	0.874
Transporting COVID-19 infected patients to hospital	32 (1.7)	8 (1.7)	40 (1.7)	1.0
Transporting COVID-19 infected patients to isolation center	18 (0.9)	5 (1.1)	23 (1.0)	0.794

***Professional risk factors associated to develop COVID-19 infection***

Significantly higher number of police personnel infected with COVID-19 reported to work in densely populated areas especially in the public places e.g. garments industrial areas, market place, bus stop or railway station and participate in humanitarian aids (relief distribution) compared to police without COVID-19 infection (Table 6) and (Figure 4). On the other hand, other participating in other activities like working in hospital, disposing COVID-19 positive dead bodies, transporting COVID-19 infected patients to hospital and transporting COVID-19 infected patients to isolation centre or involved in ensure quarantine were reported less frequently by the respondents (Table 6 and Figure 4).

In binary logistic regression among different variables which were found to be associated with COVID-19 infection in bivariate analysis only three factors were found to have independent association with COVID-19 infectivity (Table 7). These were not maintaining social distancing, not putting the mask appropriately and residing in police barrack. Not maintaining social distancing always was associated with significantly higher risk of COVID-19 infection among those who practiced proper hand washing.

Table 7: Independent predictor of COVID-19 infection among police.

Variables	OR	95% CI for OR		P value
		Lower	Upper	
Not always maintain social distance	2.13	1.12	5.31	0.031*
Do not clean/wash hands frequently	1.91	1.01	3.56	0.171
Not put on mask always while talking	3.08	0.3	7.3	0.112
Do not covering both face and nose	2.15	1.31	4.52	0.033
Touch outer surface of mask	1.01	0.21	4.21	0.542
Dwelling in police barrack	3.45	1.21	6.42	0.021
Working at densely populated areas	1.31	0.43	2.31	0.642
Participate in humanitarian aids	1.01	0.87	1.99	0.721

OR: odds ratio; CI: confidence interval; *significant value(s).
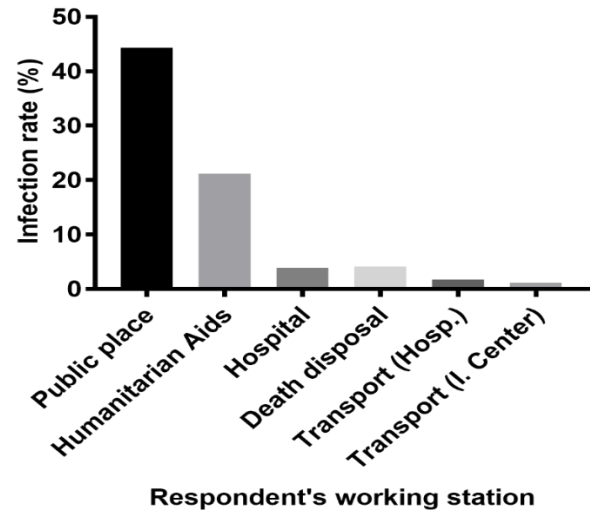
Figure 4: Association between COVID-19 related activities and infectivity. Severity of COVID-19 infection was demonstrated with the police personnel's work places, most crowd work stations showed the most feasible to COVID-19 infection.

DISCUSSION

In Bangladesh among the law enforcement members, Bangladesh police playing the most substantial role in societal efforts to reduce the community transmission of COVID-19.[3] It is expected that they should be well informed about the COVID-19 and its mode of transmission, possible risk factors and suggested interventions to prevent this disease as well as to have a positive attitude towards the ongoing national containment programs. As it has been reported that besides general population a considerable number of police personnel are affected by COVID-19.[5] This cross sectional and survey based study was aimed to elucidate the KAP of Bangladesh police and possible risk factors associated with COVID-19 infectivity.

Several KAP studies has been conducted, which are mostly online survey and addressing the general population as a whole or a specific group like internet users.[6-12] However, till date no study has been conducted on police personnel of Bangladesh to assess the COVID-19 related KAP, as well as professional risk factors which render them vulnerable to be infected. The current study is the first to address this issue among the police personnel of Bangladesh who are doing different humanitarian activities besides their regular activities of law and enforcement.

This study reveals a significant point which coincide the higher infection rate with the types of residences of the police personnel. To help understand this, police personnel residing in the barrack have remarkably higher infection rate compared to non-infected group (p<0.01) (Table 1 and Figure 3). Whereas maintaining social

distance is one of the established keys to preclude from being infected by COVID-19, so number of members living in a room in the barrack is an important issue to take into account.

Moreover, the current study is able to identify some important gaps in the knowledge regarding COVID-19 which have a great importance in implementing the appropriate health education programs to limit the transmission of COVID-19. One of such findings was that about one third of the respondents reported that a person having no fever cannot transmit COVID-19. One of the greatest concern of the current time is the COVID-19 transmission by the asymptomatic individuals.[13] In addition, a considerable portion of the respondents have wrong idea about the risk group and transmission of disease through inanimate objects. Though some previous studies reported similar knowledge gaps in different aspects, considering the study population-specific front liners it is of great concern.[10-12] Regarding attitude, the current study revealed that, though majority of the respondents have positive attitude towards maintaining social distancing, nonetheless a considerable proportion have doubt about the lock down as an effective way to mitigate COVID-19. As a member of the law enforcement every police personnel should have positive attitude towards the ruining national activities to contain COVID-19, otherwise the program objectives will not be fulfilled.

Social distancing, hand washing or using hand sanitizer and wearing mask properly are the three important non pharmacological interventions suggested to limit the COVID-19 transmission.[7-9] The current study has shown that, though majority of the police personnel were reported to practice these three activities; there were some pit falls among their practices, like failure to do so always during their duty time. And the percentage of infected police personnel maintaining these above mentioned practices are notably low (Table 5). One this is to be noted that, about half of the respondents admit that they were never maintain social distances during their duty and about one fifth of them did not wash or clean hands appropriately during duty. Regarding using mask though 100% of them reported to use it, all of them were not able to prevent themselves from touching the outer surface of the mask or keeping it continuously in place. These findings were probably responsible for the higher infectivity of COVID-19 among Bangladesh police personnel.

Though enforcing law, additionally they have to do different humanitarian duties especially during COVID-19 pandemic situation. A case in point is that a considerable number of police personnel have participated in relief distribution whole over the country. In return, these group of police showed a higher infection rate (p=0.0439). In addition, a number of police have transported COVID-19 infected patients to the hospitals, have disposed COVID-19 infected dead bodies and so on.

But among them infection in not remarkable in comparison to non-infected. Furthermore, a good number of police personnel have worked in the densely populated areas such as garments industrial areas, markets places, and bus stations to ensure the social distances among the people which is an incredibly hard work in Bangladesh which is one of the most densely populated countries in the world. To make matters worse these group of police personnel worked at the densely populated areas became more infected (p<0.001) than others. To put it more simply, police personnel who could not maintain the social distances infected more.

CONCLUSION

Current study offers a comprehensive baseline evaluation of the KAP of police personnel of Bangladesh and risk managements towards COVID-19 during the period of rapid rise when different programs were enforced by the government. The findings suggest that though the police officials who participated in this study have adequate knowledge, good attitude and favourable practice there are some issues which could be and should be improved. Finally, our study has given a unique opportunity to better understanding of the COVID-19 preventive measures and may further correlate with KAP and professional risk factors of the other front liners like health workers.

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