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Original Research Article

Knowledge, attitudes and practices regarding COVID-19 appropriate behaviour and willingness for vaccination among frontline police personnel in Mumbai, India

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ABSTRACT

Background: The objective of the study was to assess the knowledge, attitudes and practices regarding COVID-19 appropriate behaviors and vaccination acceptance among police personnel in Mumbai, India, January 2021.
Methods: A total of 3232 police personnel volunteered for the survey were administered a validated questionnaire. All questionnaires were administered over a five-day period, after an informed consent. The questions were designed to elicit the following details: demographic information, underlying disease conditions with routine medications, whether they had contracted COVID-19 in the past, along with knowledge, attitudes and perspectives regarding COVID-19 along with their own practices including willingness to accept vaccination when made available.
Results: A total of 3232 police personnel participated in the study. Of these, 2602 (80.5%) were males and 630 (19.5%) were females. The participation reflected the composition of police personnel working in Mumbai. Overall, 2936 (99.6%) study participants had adequate knowledge level (≥6 out of 10 score). Knowledge levels were significantly higher among officers, males and older adults than non-officers, females and young adults respectively. The personnel involved in hot-spot duties, those with underlying medical conditions, diagnosed with COVID in the past, hospitalized for COVID along with those who subjected themselves for RT-PCR and antibody testing had higher knowledge levels.
Conclusions: The police personnel in Mumbai, India, reported very high levels of knowledge, favourable attitudes and very good compliance on recommended practices about COVID-19 during the raging pandemic, even during the decline phase after the first wave. This signifies their seriousness about the dreaded disease and commitment to help the community in controlling the pandemic and its impact.

Keywords: COVID-19 vaccination, Police personnel, Knowledge, Attitude

INTRODUCTION

India experienced the first wave of COVID-19 pandemic until early February 2021.[1] India continued to struggle with the second wave of the COVID-19 pandemic, even though the vaccination drive began in January 2021. The number of cases showed declining trends in June 2021, but a sudden increase was reported in the last few weeks

with the emergence of delta plus variants of SARS-CoV-2 at the time of writing the manuscript. In spite of increasing trends, it is surprising to see the apathy of the general populace towards COVID-19 appropriate behavior (CAB).[1-6] Following the introduction of COVID-19 vaccine among the healthcare workers on 16thJanuary 2021, the frontline workers were also offered vaccine on 2nd February 2021.[7,8] Considering this as an opportunity to understand the perspectives of police personnel, most affected response workforce, regarding COVID appropriate behavior with special emphasis on vaccination acceptance when made available, a rapid survey was planned and implemented in the last week of January 2021. This was specifically timed before the COVID-19 vaccine introduction so as to understand the acceptance of vaccine by the frontline workers involved in pandemic response.[9]

For the local authorities, and consequently, the police, this has been a logistical and administrative nightmare. In addition to their regular duties, policemen have been responsible for enforcement of curfews and lockdowns, social distancing, and compliance on mask use. They have had to help people reach hospitals, find oxygen cylinders, rescue the elderly and the infirm, and generally do everything within and above the call of duty, while battling the disease itself. The police have, therefore, been the absolute frontline workers in the COVID-19 response, and have also been responsible for the enforcement of COVID appropriate behavior. Their compliance with CAB, and also the enforcement of health regulatory mandates depends on several contextual factors, the most important of which is their knowledge, attitudes and practices regarding CAB and its implementation. Ascertaining the knowledge, attitudes and practice patterns of policemen, therefore, is critical for directing communication strategies for CAB. Given that Maharashtra, and Mumbai in particular, are particularly overwhelmed by the disease means that these policemen are particularly vulnerable. This study aimed to analyze the knowledge, attitudes and practice patterns in the policemen working in Mumbai, India's bustling metropolis.

METHODS

The questionnaire designed to assess knowledge, attitudes and practices pertaining to COVID-19 was administered along with a diabetes, lipid profile and eye screening program, to police officers in Mumbai, the capital of Maharashtra, India, which has been at the epicentre of the second wave of COVID-19 pandemic in India. Junior frontline police personnel from across the city participated in a large COVID sero-survey, diabetes and lipid profile screening initiative at one of Mumbai's largest police centres; Naigaon. Senior police officials identified those junior police personnel involved in duties at known COVID hotspots, COVID hospitals and other high-risk areas and asked them to participate in this screening activity. Participation was voluntary but recommended and there were no police personnel who refused testing. A total of 3232 police personnel who volunteered for the survey were administered a validated questionnaire in one of the three languages: English, Hindi or Marathi. All questionnaires were administered over a five-day period during 22 January 2021 and 2nd February 2021, after an informed consent. The questions were designed to elicit the following details: demographic information, underlying disease conditions with routine medications, whether they had contracted COVID-19 in the past, along with knowledge, attitudes and perspectives regarding COVID-19 along with their own practices including willingness to accept vaccination when made available. There were 10 knowledge-related questions, while five questions each were related to attitudes and practice patterns. The questions were related to CAB and attitudes towards vaccination (Supplementary Table 1). We categorized the study participants as having adequate knowledge if 6 or more out of 10 questions were answered as per the expected responses. Similarly for attitudes and practices, the study participants with favorable attitudes (≥3 out of 5) and also for recommended practices (≥3 out of 5) were considered satisfactory. The percentages of study participants having satisfactory scores were presented and studied for associations with the explaining variables. In addition, attitudes and practices were studied for their associations with knowledge levels. Considering the importance and timeliness, COVID-19 survey was implemented along with screening services and antibody survey (being reported separately) by seeking involvement of expertise required for this aspect from the researchers having experience in these areas.

Inclusion and exclusion criteria

The inclusion criteria for the study were voluntary participation for the seroprevalence study participants, and was limited to the police personnel above the age of 18 years. We excluded police personnel who were no willing to participate in the study.

Statistical analysis

Frequencies and percentages were calculated for categorical variables. Median and range was reported for continuous variables. Difference in proportion was examined by $\chi 2$ tests with Yates' correction, if required. According to needs, Fishers' exact test was also used, $p<0.05$ was considered as statistically significant. The reporting of 95% confidence intervals were also considered along with understanding associated factors. We used Open Epi web-based program of analysis.

RESULTS

Demographic characteristics

A total of 3232 police personnel participated in the study. Out of these, 2602 (80.5%) were males and 630 (19.5%)

were females. The participation reflected the composition of police personnel working in Mumbai. Among them, 1981 (61.3%) were from the age group of 18-39 years and 1237 (38.3%) belonged to 40-59 years' age group. Fourteen (0.4%) were more than 60 years' age group. A total of 304 (9.4%) of the police personnel belonged to the officers' rank and 2928 (90.6%) belonged to non-officers ranks. Educational status of the study participants indicated that 1746 (54%) were educated to less than 12th standard, 1392 (43.1%) were graduates and 94 (2.9%) were post-graduates. Over almost 10 months' period, 784 (24.3%) were admitted to hospital due to diagnosis of COVID-19 (Table 1).

Table 1: Demographic, clinical and outcome characteristics of study participants.

Variables	Demographic characteristics	Study participants	
		N	%
Rank	Officers	304	9.4
	Non-Officers	2928	90.6
Gender	Female	630	19.5
	Male	2602	80.5
Age groups	Young adults	1981	61.3
	Older adults	1237	38.3
Education	Non-graduate	1746	54.0
	Graduate	1486	46.0
Past medical condition			
Smoking	No	3017	93.3
	Yes	215	6.7
Any known medical condition	No	2696	83.4
	Yes	536	16.6
Clinical characteristics			
COVID-19 diagnosis	No	2382	73.7
	Yes	850	26.3
RT-PCR testing for SARS-CoV-2	No	1639	50.7
	Yes	669	20.7
Antibody testing for SARS-CoV-2	No	849	26.3
	Yes	366	11.3
Hospitalized for COVID	No	2448	75.7
	Yes	784	24.3
Exposure characteristics			
Family member with COVID	No	3013	93.2
	Yes	219	6.8
Colleague with COVID	No	2582	79.9
	Yes	650	20.1
Hotspot duty	No	2239	69.3
	Yes	993	30.7

Table 2: Responses to knowledge-related questions (n=3232).

Knowledge-related questions	True N (%)	False N (%)	Don't know N (%)
A person can transmit COVID-19 to other without having symptoms himself?	2115 (65.4)	388 (12.1)	729 (22.6)
COVID-19 can be transmitted directly through contact with infected individuals?	2765 (85.6)	189 (5.8)	278 (8.6)
COVID-19 can be transmitted directly through cough / sneeze from infected persons?	2887 (89.3)	55 (1.7)	290 (9.0)
COVID -19 can be transmitted by contact with infected surfaces with bare hands?	2065 (63.9)	596 (18.4)	571 (17.7)
The COVID-19 disease is more dangerous / severe in elderly people?	2986 (92.4)	32 (1.0)	214 (6.6)
Anyone with underlying condition has higher risk of severe COVID?	2790 (86.3)	24 (0.7)	418 (13.0)
Most patients with COVID have respiratory symptoms like cough /sore throat/fever?	2343 (72.5)	380 (11.8)	509 (15.7)
Mask should cover both mouth and nose	3034 (93.9)	34 (1.1)	164 (5.1)
If someone recovers from COVID, they need to use mask	2506 (77.5)	607 (18.8)	119 (3.7)
There is a vaccine available for COVID-19 today	2831 (87.5)	76 (2.4)	325 (10.1)

Table 3: Responses to attitude-related questions (n=3232).

Attitude related questions	% agree	% disagree	% don't know
COVID-19 can be avoided by taking precautions	96.8	0.4	2.8
COVID-19 early/ mild symptoms can be managed at home	73.4	17.9	8.8
If there is a vaccine made available for the disease, I will take it	74.4	10.4	15.2
Awareness of COVID-19 is adequate in the society	93.6	1.7	4.8
In the COVID-19 pandemic, it is right to close schools and college	92.0	3.2	4.8

Assessment of knowledge

Responses to knowledge-related questions were sought from 3232 study participants. There were four questions about the knowledge of the transmission of COVID-19. Overall, 2936 (99.6%) study participants had adequate knowledge level (≥6 out of 10 score). Among them, 85.6% felt that disease can be transmitted directly through contact with infected individuals and 89.3% felt that COVID-19 can be transmitted directly through cough/sneeze from infected persons. However, only 63.9% responded that COVID-19 can be transmitted by contact with infected surfaces with bare hands. Similarly, 65.4% individuals felt that a person can transmit COVID-19 to others without having symptoms himself. Awareness about the transmission of COVID was adequate, however it reflected relative importance and contribution of different modes playing a role in transmission. In terms of severity of the disease, 92.4% felt that the disease is more dangerous/severe in elderly people. Similarly, 86.3% felt that anyone with underlying condition has higher risk of severe disease. Knowledge about the people at risk of severe disease was adequate. However, only 72.5% study participants felt that most patients with COVID have respiratory symptoms like cough/sore throat/fever. This needs to be emphasized in health education and public awareness programs. With regard to prevention measures, 93.9% felt that mask should cover both mouth and nose. However, only 77.5% individuals felt that use of mask is needed even if someone recovers from COVID. Emphasis needs to be given on the use of mask even after recovery from the disease. Knowledge on the availability of vaccine for COVID-19 in Mumbai in January 2021 was reported by 87.5% individuals (Table 2). There was a significant association of adequacy of knowledge with respect to age, gender, education on asking about transmission of infection from one person to other ($p<0.001$). The percentage of participants having the adequate knowledge of covering both mouth and face during mask wearing was 90%. Remaining 5% each replied that they need to cover their mouth or nose only. In addition, 92.4% of the participants agreed that COVID is dangerous in elderly population. Around 80% of the participants denied that if someone suffered from COVID, then they should not wear a mask (Table 2). In the current study, we found that the questions like a person can transmit COVID-19 to others without having symptoms himself had a significant association with age, gender and education. As, it was observed that there was a positive association of knowledge with the increase in age, nearly all the people had a correct knowledge about various knowledge related questions ($p<0.01$), except for a question where use of mask was not considered necessary after recovery from COVID-19.

Table 4: Responses to practice-related questions (n=3232).

Practice-related questions	% agree	% disagree
I avoid going out of my home unless very essential	95.0	5.0
I avoid hand shaking and hugging	95.8	4.2
I frequently wash my hands	99.2	0.8
I use alcohol sanitizer regularly	98.5	1.5
I use face mask outside home	94.6	5.4

Assessment of attitudes

Overall, the attitudes among police personnel were favorable (≥3 out of 5) in 3036 (93.9%) police personnel. Over 96.8% respondents agreed that COVID-19 can be avoided by taking proper precautions, and 93.6% respondents felt that the awareness in the community was adequate. The decision of closing of academic institutions was felt appropriate by 92.0% participants. The appropriateness of management of COVID-19 cases with mild symptoms at home was reported by 73.4% respondents. The willingness to vaccinate themselves when vaccination is available was reported by 74.4 % respondents. Considering the role of police personnel in pandemic response activities, they need to be educated and counseled on the need and acceptance of vaccination (Table 3).

Assessment of practices

On interviewing about the practices followed during pandemic, the adherence to practices was excellent (99.2%). The participants followed practices of avoiding going out of home unless and until there is an urgency and reported using masks outside their homes. They also avoided hand shaking and hugging. Almost all followed

frequent hand washing or used alcohol-based sanitizers regularly in case of non-availability of hand washing facility (Table 4).

Table 5: Baseline characteristics and their association with knowledge, attitude and practices.

Variables	Categories	Study participants	Knowledge		Attitudes		Practices	
		N	%	P value	%	P value	%	P value
Rank	Officers	304	93.8	0.032	96.7	0.055	99.3	0.382
	Non-Officers	2928	90.5		94.6		99.2	
Gender	Female	630	86.3	0.000	91.9	0.000	99.0	0.322
	Male	2602	91.9		95.5		99.2	
Age groups	Young adults	1981	89.4	0.000	93.4	0.000	99.1	0.210
	older adults	1237	93.0		96.9		99.4	
Education	Non-graduate	1746	90.3	0.133	95.4	0.051	99.3	0.210
	Graduate	1486	91.5		94.1		99.1	
Smoking	No	3017	90.8	0.433	94.8	0.469	99.2	0.159
	Yes	215	91.2		94.9		98.6	
Hotspot duty	No	2239	89.6	0.000	94.1	0.005	99.1	0.204
	Yes	993	93.6		96.3		99.4	
Any known medical condition	No	2696	90.4	0.035	94.4	0.028	99.2	0.358
	Yes	536	92.9		96.5		99.1	
COVID-19 diagnosis	No	2382	90.0	0.003	94.1	0.002	99.1	0.206
	Yes	850	93.2		96.7		99.4	
RT-PCR testing for SARS-CoV-2	No	1639	90.4	0.005	94.6	0.007	99.4	0.486
	Yes	669	93.7		97.0		99.4	
Antibody testing for SARS-CoV-2	No	849	92.0	0.002	95.9	0.014	99.4	0.490
	Yes	366	96.4		98.4		99.2	
Family member with COVID	No	3013	90.8	0.309	94.7	0.324	99.2	0.426
	Yes	219	91.8		95.4		99.1	
Colleague with COVID	No	2582	90.9	0.495	95.0	0.162	99.3	0.192
	Yes	650	90.8		94.0		98.9	
Hospitalized for COVID	No	2448	90.1	0.004	94.3	0.014	99.2	0.375
	Yes	784	93.2		96.3		99.1	

Associations with variables

So as to understand the association of demographic and other variables with knowledge, attitudes and practices, we performed analysis of variables as presented in (Table 5). The associations of these variables with knowledge, attitudes and practices are described in following paragraphs. Knowledge levels were significantly higher among officers, males and older adults than non-officers, females and young adults respectively. The personnel involved in hot-spot duties, those with underlying medical conditions, diagnosed with COVID in the past, hospitalized for COVID along with those who subjected themselves for RT-PCR and antibody testing had higher knowledge levels. However, educational level, smoking status and COVID case in family and among colleagues at workplace were not significantly associated with knowledge levels ($p>0.05$). Associations reported for knowledge were also observed for attitudes. However, practices reported by participants were not associated with any of the variables reported for knowledge and attitudes (Table 5).

Influence of knowledge on attitudes and practices

The knowledge levels significantly influenced the attitudes and practices of police workforce ($p<0.05$). The favorable attitudes were significantly higher (98.0%, 95% CI – 97.4, 98.4%) among study participants with adequate knowledge levels as against those without adequate knowledge levels (63.2%, 95% CI 57.5-68.5%).

Similarly, the recommended practices were reported higher in those with adequate levels of knowledge (99.6%, 95% CI 99.3-99.8%).

DISCUSSION

The knowledge and attitudes towards CAB amongst police personnel is crucial in order to encourage the adoption of precautionary practices, for keeping the police officers safe, as they step into the community to enforce COVID appropriate behavior, thereby leading by example. The knowledge, attitude and practice patterns regarding COVID-19 in these frontline workers, must therefore be emphasized, so as to improve the COVID appropriate behaviours, and direct tailored communication, to prevent further spread of the dreaded disease. Murhekar et al have also considered occupations such as health-care workers and police or security personnel as high-risk occupations during seroprevalence studies for COVID-19.[10]

Not only have the police been responsible for enforcing the COVID-19 lockdown, the fulminant second wave of COVID-19 has made demands on them hitherto unprecedented. In addition to their fiduciary duties, people in uniform have been helping with oxygen and drug delivery, ferrying patients, and when all else fails, cremating the dead. It is no surprise, then, that 8,594 police personnel have contracted the virus, with about 500 active cases in the Mumbai city police force. In fact, April of 2021 has been the cruelest month yet, with 11 personnel losing their lives to COVID-19, the total death toll being 109.[9,10]

In the present study, the overall knowledge levels were very high. Over 99% of police personnel had adequate knowledge on the transmission modes, symptoms and preventive practices. However, almost one-third study participants responded that COVID-19 cannot be transmitted by contact with infected surfaces using bare hands. Also, similar proportion of individuals felt that a person cannot transmit COVID-19 to others without having symptoms himself.

Awareness about the transmission of COVID-19 was adequate and reflected relative importance and contribution of different modes playing a role in transmission. In addition, one-fifth respondents did not consider non-respiratory symptoms as features of COVID-19. Almost over one-fourth participants did not feel need of using mask after recovery from COVID-19. In spite of over 85% individuals having awareness of vaccine availability, willingness to vaccinate themselves was reported by only 75% participants. Similar proportions of participants reported that COVID-19 early or mild symptoms can be managed at home. The respondents need to be educated adequately on vaccine acceptance and home management of mild cases. Almost over 95% participants practiced COVID appropriate behaviors.

Knowledge levels were significantly higher among officers, males and older adults. The personnel involved in hot-spot duties, those with underlying medical conditions, diagnosed with COVID in the past, hospitalized for COVID along with those subjected themselves for RT-PCR and antibody testing had higher knowledge levels. All above variables were also significantly associated with attitudes. However, practices reported by participants were not associated with any of the variables reported for knowledge and attitudes. Naresh et al assessed the knowledge, attitude, and practices (KAP) of police force toward COVID-19, and also the correlation of knowledge with their practices and attitude in Pune, Maharashtra, India, during the first wave of COVID-19 pandemic.[11] They conducted a cross-sectional, self-administered, anonymous survey from April 11 to 16, 2020. Of the 8706 police personnel who responded, 77.9% were male, with a median age of 35. As many as 83.7% recorded accurate (high) knowledge, and 78% reported following preventive measures. Female gender, age more than 35 years, and lower rank were associated with low knowledge and fear of contracting the disease. Women, however, were more likely to follow CAB despite low knowledge, and reported that they had faced stigmatizing behavior from society.

A recent qualitative study among police personnel in Maharashtra has highlighted the need for provision of protective measures among police personnelconsidering their nature of work and associated risks during their duties. Kokane et alused a descriptive cross-sectional survey administered online from 27th May to 1st June 2020, to evaluate the incidence of COVID-19 among police officials along with the challenges they face and their preparedness for the same.[12] Of the102 respondents included in the final analysis of primary data, 83.33% were male and 61.76% were less than 35 years old. Of the respondents, 67.7% reported that they did not have time to take care of their health during this pandemic and two out of three respondents were taking “preventive” medicine for COVID-19. While one out of three policemen were using masks, sanitizer, and gloves, only one out of two washed their clothes daily. Mental disturbance due to fear of COVID-19 were reported by half the respondent, while a third of them reported mental stress due to other reasons.

The knowledge, attitudes and practices in our study participants were higher than the earlier reported study from Pune. This could be due the differences in time periods of studies, location, phase of pandemic and differential perceptions of risks among police personnel. Associations reported in the study from Pune are also observed in our study. Alrasheed et al. conducted a cross-sectional survey between April and July 2020 in Saudi Arabia.[13] Of the 712 participants, the authors reported that over 60% respondents showed good knowledge. Poor knowledge was noted about symptoms, treatments and vaccines, transmission, and preventive measures. Similarly, over 98% of the respondents agreed on the

closure of schools and workplaces as a preventive measure; and that this would stop the spread of the disease. As for practice, over 98% of the respondents used soap and water to wash their hands often, and covered their nose and mouth on sneezing or coughing, and avoided crowded places. More than 80% respondents reported using a face mask when outside of their homes. Our study participants reported higher knowledge, better attitudes and also practiced COVID appropriate behavior.

Limitations

Police personnel were recruited for the study via a voluntary participation, which may not necessarily be representative of the entire police force. Also, since KAP is so dependent on communication particular to a demographic, results of the study may not be applicable to other police officers in other parts of the country, and indeed, the world. A more systematic, inclusive sampling method would have improved the representativeness and generalisability of the findings. Representativeness of study participants could have been considered in design; however, it could not be done due to lack of roster availability in time. In addition, as the study was conducted along with medical screening activities, it was not practical to do so. We preferred to present the findings as percentages rather than quantitatively scoring the responses. This was done to simplify the data presentation, for better understanding. There is a possibility of participants giving socially desirable responses. Since the study evaluates self-reported data, it is possible that the participating police personnel may have answered the attitude and practice questions based on what they perceive to be the correct response, and behaviour expected of them, rather than their own COVID appropriate behaviours and practices.

CONCLUSION

The police personnel in Mumbai, India, reported very high levels of knowledge, favourable attitudes and very good compliance on recommended practices about COVID-19 during the raging pandemic, even during the decline phase after the first wave. This signifies their seriousness about the dreaded disease and commitment to help the community in controlling the pandemic and its impact. Health education and communication aspects should focus on vaccine acceptance along with education about important transmission, prevention and early diagnosis related aspects along with care at homes for those with mild symptoms. Emphasis also needs to be given on proper mask usage along with compliant COVID appropriate behaviours even after vaccination and recovery from COVID-19.

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