Behavioural insight of resident doctors into COVID-19 pandemic: A cross sectional study

[1]Dr. Shreyasi Tendolkar,[2]Dr.Sanjibani Panigrahi,[3]Dr.Pooja Shatadal, [4]Dr.Ritambhara Mehta

[1]Final Year MD Student, Department of Psychiatry Government Medical College, Surat, Gujarat, India
[2]Assistant Professor, Department of Psychiatry, SGRR Medical College and Shri Mahant Indiresh Hospital, Dehradun, Uttarakhand, India
[3]Assistant Professor, Department of Psychiatry, Government Medical College, Surat, Gujarat, India
[4]Professor and HOD, Department of Psychiatry, Government Medical College, Surat, Gujarat, India

Corresponding Author: Dr. Sanjibani Panigrahi (sanjibanipanigrahigmail.com)

Abstract
Background: The COVID-19 outbreak has been declared as a global pandemic by WHO. It has placed an unprecedented burden on health systems and authorities.In this complex context, their knowledge and attitude towards the pandemic can influence their psychological state and information about their behavioral insights can be valuable to ascertain effective strategies to reduce overall burden and tackle the crisis better [3].
Aims: To assess knowledge, risk perceptions, preventive behaviors and psychological variables regarding COVID-19 in Resident doctors.
Methodology: A list of all resident doctors working in New Civil Hospital were informed about the study and after obtaining an informed consent, they were asked to fill the WHO tool for Behavioral insight. After collecting data, statistical analysis of the data was done using appropriate Statistical test like z test, chi-square test.
Results: A total of 110 doctors participated in the study.Depression was very low (14.7%) to extremely low (38.2%) in majority of doctors. In our study, 9% of the doctors attributed their psychological burden of worries and fears to losing someone close to them in the pandemic.
Conclusion: Since most participants use almost all sources for gathering information about covid-19, regular updates should be provided by media and relevant authorities, regular group meetings, trainings to disseminate knowledge about guidelines and recent treatment protocols should be organized by the concerned tertiary care hospitals.
Keywords: Resident doctors, Covid 19, psychological variables

Introduction
The COVID-19 outbreak has been declared as a global pandemic by WHO. It has placed an unprecedented burden on health systems and authorities. Countries have had to respond with effective and appropriate interventions, policies and messages.
The pandemic and its restrictions have affected mental and physical well-being of communities[1].This is more evident in the frontline resident doctors of government hospitals especially in the developing countries like India which were not prepared to tackle a pandemic of this proportion[2].
The responses required such as quarantining of entire communities, closing of schools, social isolation have abruptly changed daily life. As a result of increase in the cases and lack of

trained workforce with India's poor doctor-population ratio of 1:1456 against the WHO recommendation of 1:1000, doctors have had to face the major brunt in terms of extra duties in COVID 19 wards. In this complex context, their knowledge and attitude towards the pandemic can influence their psychological state and information about their behavioural insights can be valuable to ascertain effective strategies to reduce overall burden and tackle the crisis better[3].

Methods
Ethical considerations
The institutional scientific review committee and ethics committee approved this study. All participants voluntarily gave their informed consent to participate the study after being informed about the purpose of the study. The procedures of this study complied with the provisions of the Declaration of Helsinki regarding research on Human participants.

Study population and rating instruments
The target population comprised all resident doctors from various specialities working in New Civil Hospital, Surat. The respondents in the target population were sampled by convenient sampling. The study was carried out in August 2020 in the early phase of Covid-19 breakout in India.

The study instrument comprised a structured questionnaire packet that inquired demographic information, including name, contact number, age, gender, type of family. WHO Survey Tool and guidance on Behavioural Insights on Covid-19[4]was used to assess knowledge, risk perceptions, preventive behaviours, trust, source of information regarding COVID19, confidence in authorities, psychological impact, psychological burden of worries and fears among the participant doctors. Finally, 110 respondents that completed the questionnaires were included in the final analysis.

Data analysis
Data were analysed with SPSS Version 22.0. An analysis of descriptive statistics was conducted to illustrate the demographic and other selected characteristics of the respondents. Percentage was calculated for Source of information regarding COVID19, Confidence in authorities, psychological impact, psychological burden of worries and fears. Pearson correlation coefficient, r, was used to evaluate the association between probability of getting infected and preventive measures taken, between correct knowledge about symptoms and scientific source of information, between correct knowledge about symptoms and preventive measures taken, between risk perception and psychological impact, between psychological impact and preventive measures taken. A two-tailed $p<.05$ was considered statistically significant.
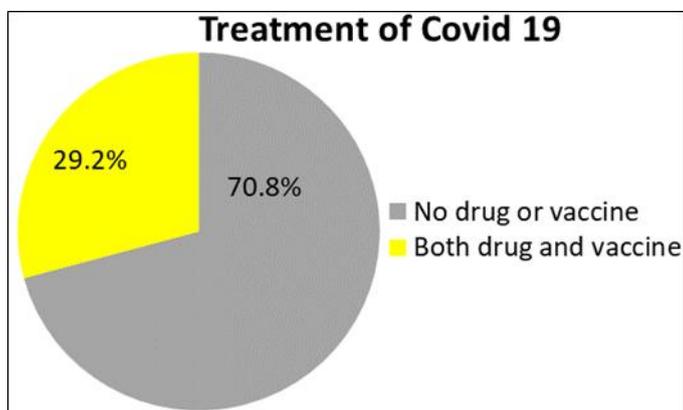
Results
A total of 110 doctors participated in the study. In our study we found, mean age was 25.37 years, 65.7% females and 34.3% were males. 85.7% belonged to nuclear families while 14.3% belonged to joint families.

Knowledge regarding COVID 19

Prevention of spread of Covid 19

79.5% doctors had good knowledge regarding prevention of spread of Covid 19.
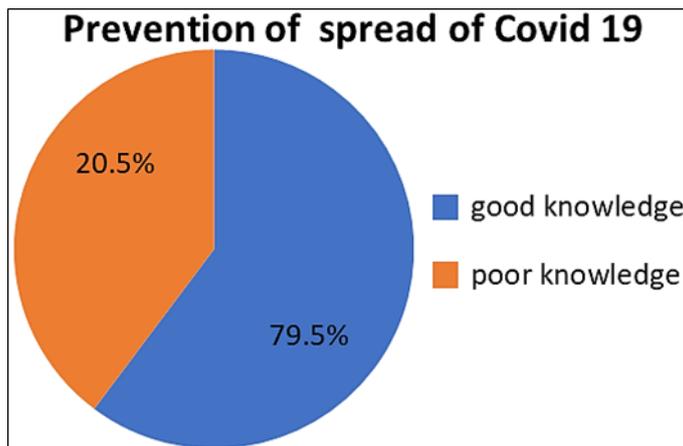

Treatment of Covid 19

70.8% doctors believed there was no specific drug or vaccine for Covid 19 while 29.2% doctors believed there was. This study was in August 2020. So majority of doctors had correct knowledge about treatment of Covid 19.
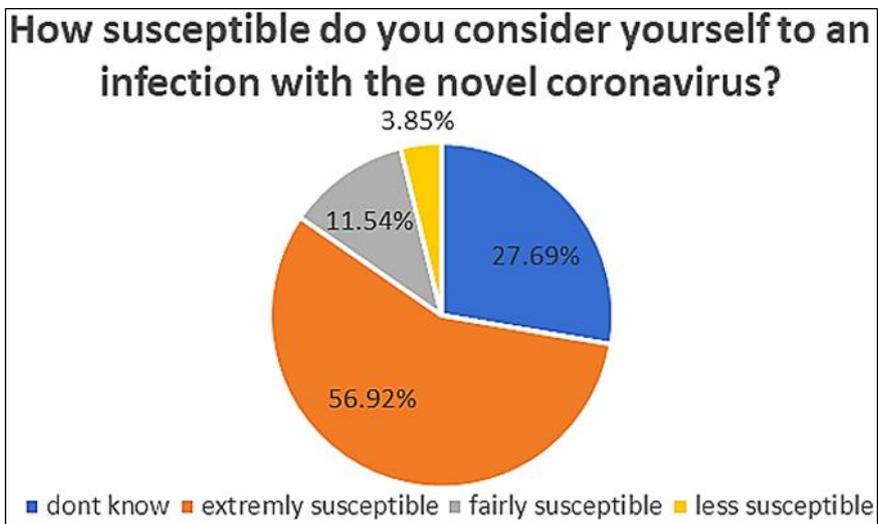

Knowledge regarding symptoms of Covid 19
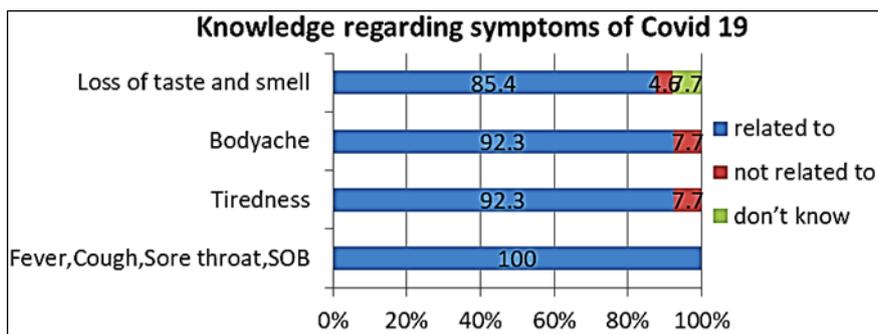
100% of the doctors identified fever, cough, sore throat, shortness of breath as likely symptoms of Covid 19, 92.3% doctors each believed tiredness and body ache to be related to Covid 19, 85.4% doctors believed loss of taste and smell to be related to Covid 19. Majority of the doctors had correct knowledge regarding symptoms of Covid 19.

Risk perception regarding COVID 19
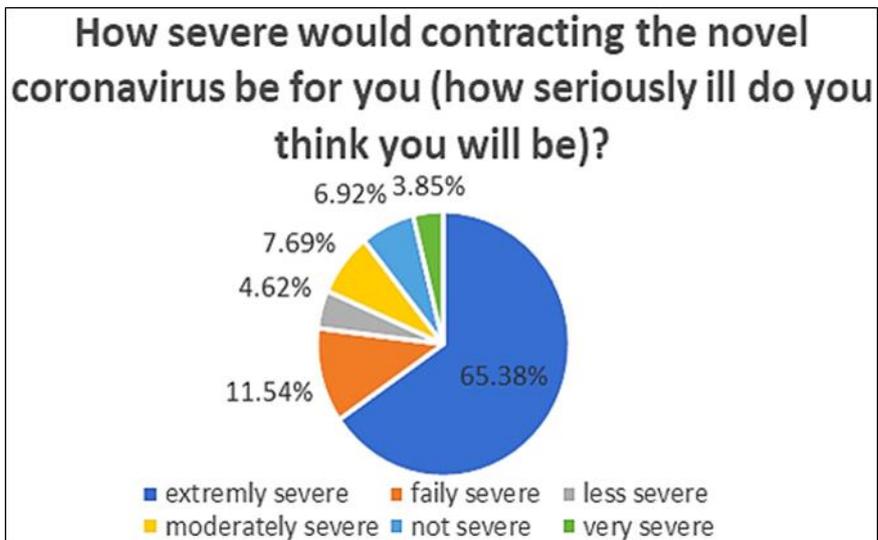
65.38% doctors believed contracting the novel corona virus would be extremely severe for them, 3.85% believed it would be very severe, 6.92% believed it would not be severe, 7.69% believed it would be moderately severe, 11.54% believed it would be fairly severe, 4.62% believed it would be less severe. Majority of the doctors felt contracting the novel corona virus would be extremely severe for them.
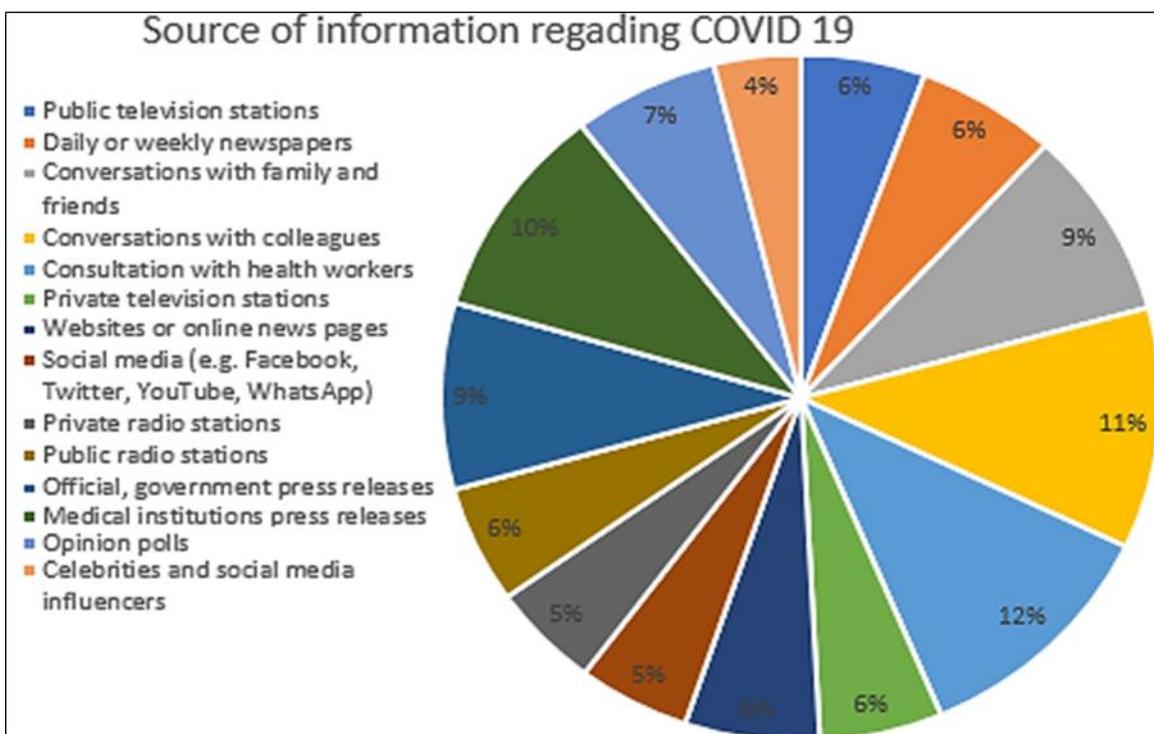

56.92% doctors believed they were extremely susceptible to an infection with the novel corona virus, 11.54% believed they were fairly susceptible, 3.85% believed they were less susceptible, while 27.69% were not sure of their susceptibility. Majority of the doctors believed they were extremely susceptible to an infection with the novel corona virus.

Preventive measures taken regarding COVID 19
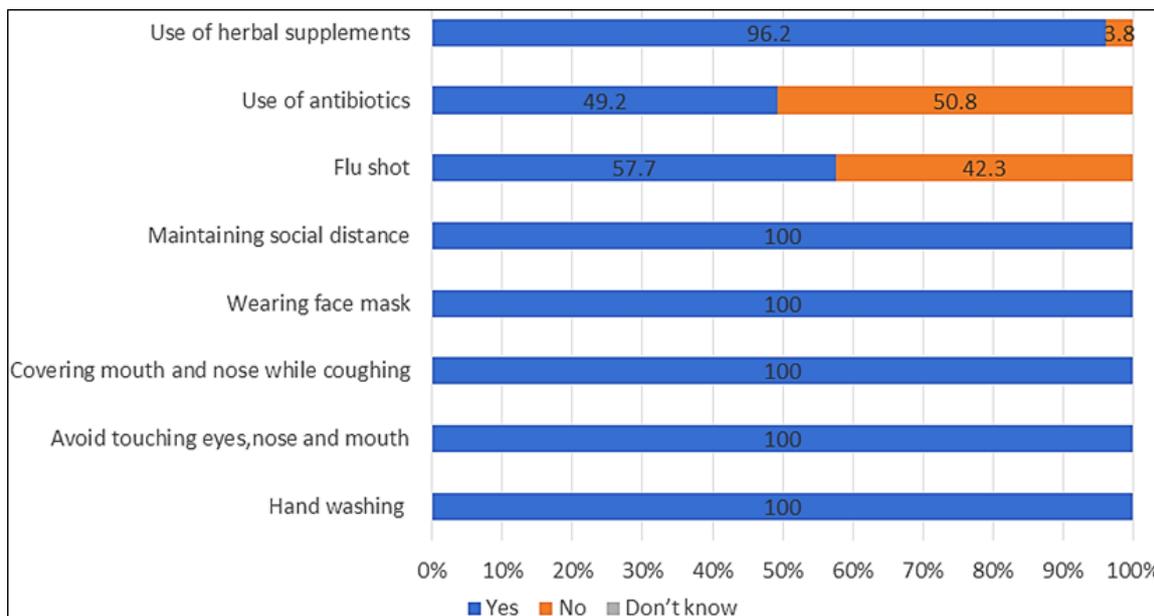
100% of the doctors followed preventive measures of hand washing, avoiding touching eyes, nose and mouth, covering mouth and nose while coughing, wearing face mask and maintaining social distance. 57.7% doctors had taken a flu shot as a preventive measure, 49.2% had used antibiotics and 96.2% had used herbal supplements to prevent infection with Covid 19. Majority of doctors followed proper preventive measures.
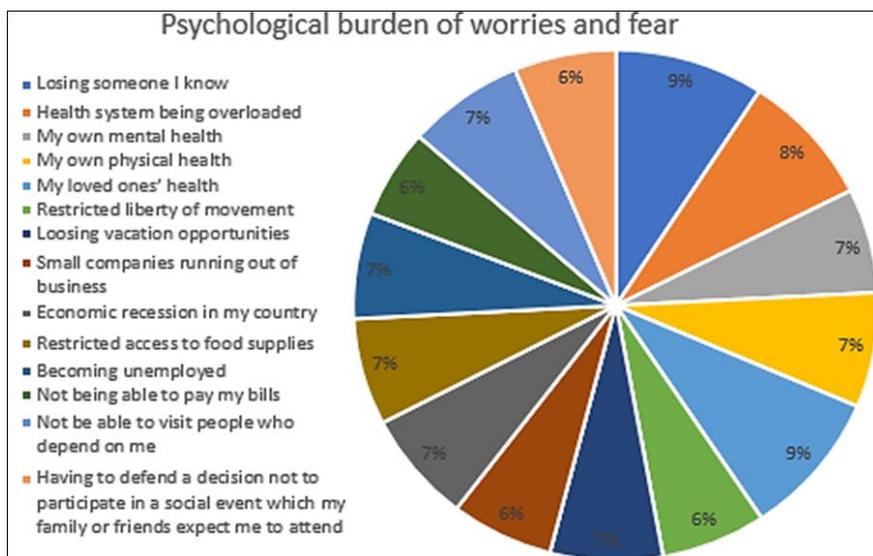
Source of information regarding COVID 19

6% doctors received their source of information about the Covid pandemic from television, 6% from newspapers, 9% from conversations with family and friends, 11% from colleagues,

12% from consultation with other health workers, 6% from private television stations, 6% from websites or online newspapers, 5% from Social media platforms like Facebook and Twitter, 5% from private radio stations, 6% from public radio stations, 9% from official government press releases, 10% from medical institution press releases,7 % from opinion polls and the lowest was 4% from celebrities and social media influencers.

Conversation with colleagues and friends and consultation with other health workers was relatively more often used source of information regarding COVID.

Psychological burden of worries and fear

9% of the doctors attributed their psychological burden of worries and fears to losing someone close to them in the pandemic, 8% to the health system being overwhelmed due to the pandemic, 7% to their own mental health, another 7% to their loved one's health, 9% were worried about their restricted liberty of movement, 6% to losing vacation opportunities, 6 % to small companies running out of business, 7% to the economic recession that would prevail, 7% to restricted or shortage of food supplies, 7% feared potential unemployment, 6% worried about not being able to pay their bills on time, 7% worried about not being able to visit people who depended upon them and 6% were worried that they would have to defend a decision not to attend social events where their family and friends expected them to meet.

All issues (worries and fear) put almost equal burden on mental health of doctors.

Confidence in authority
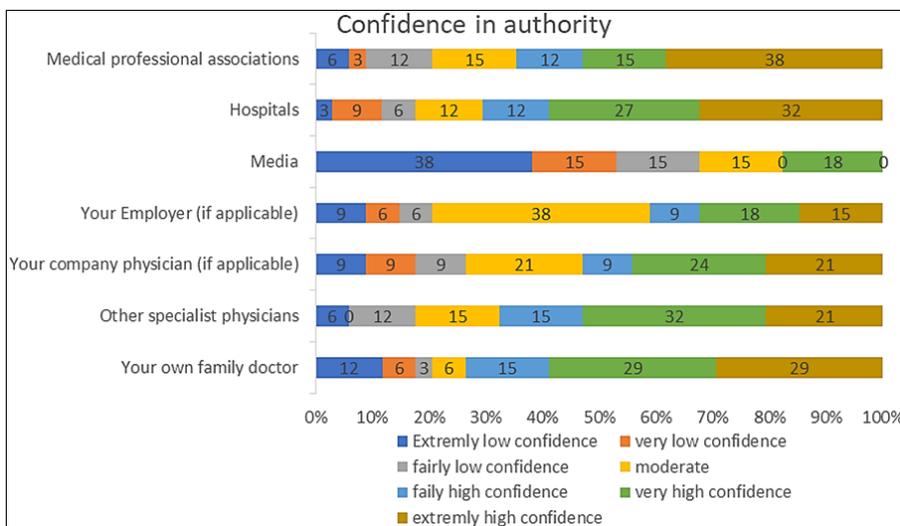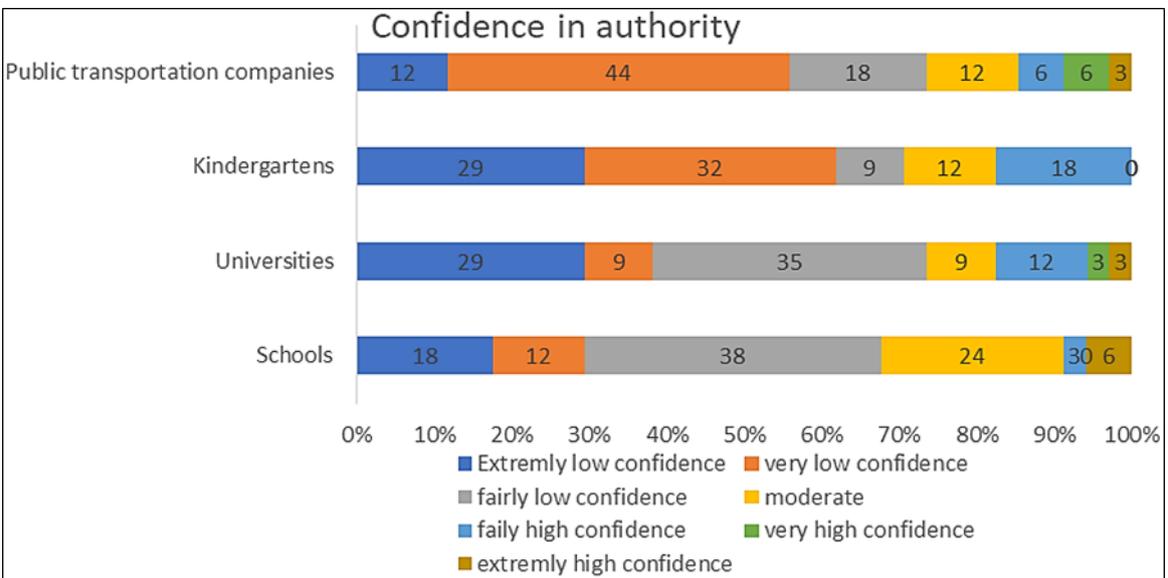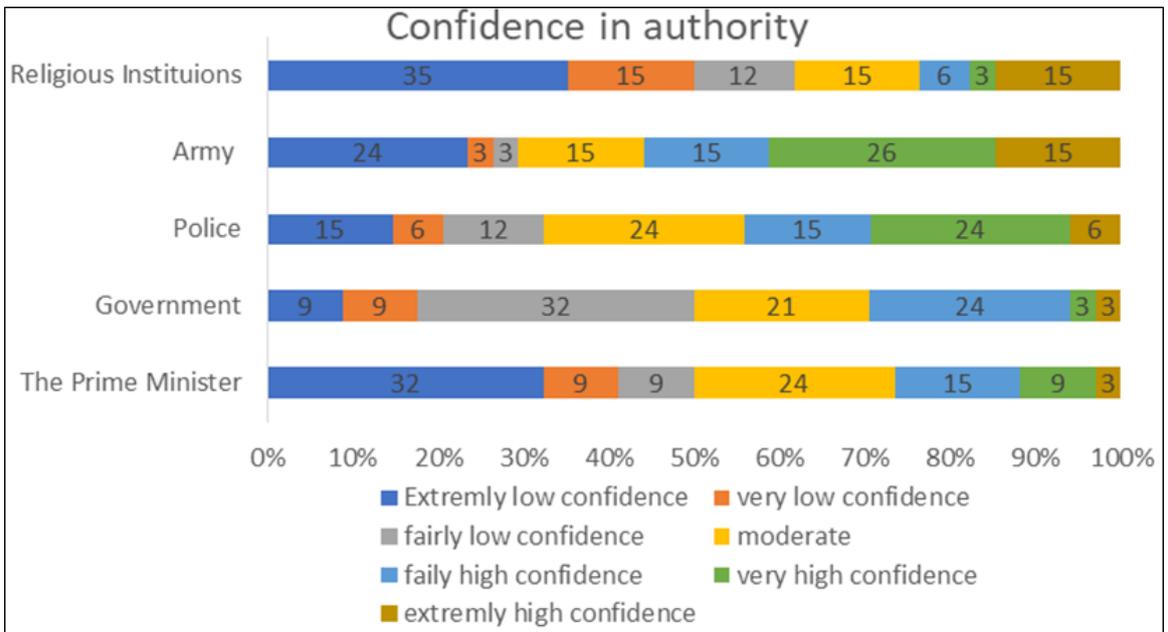
Doctors had very high to extremely high confidence in medical professional associations, hospitals, other specialist physicians, their own family doctors, Ministry of Health, Local public health authority.
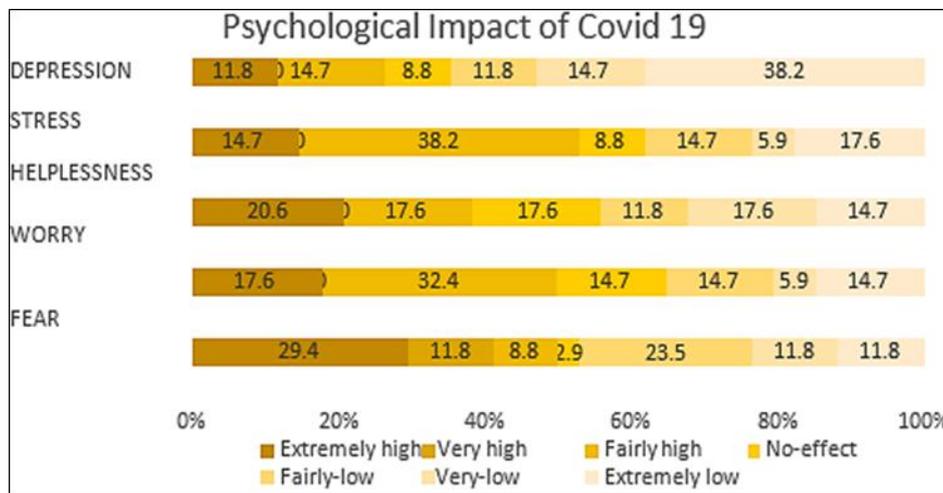
Psychological impact of Covid-19

Depression was very low (14.7%) to extremely low (38.2%) in majority of doctors. 11.8% had extremely high depression, while 14.7 % had fairly high depression. Majority doctors had fairly high (38.2%) to extremely high (14.7%) stress, 20.6% felt extremely high helplessness, 17.6% fairly high, while there was no effect on another 17.6%. 17.6% had extremely high worry, while 32.4% had fairly high worry. Majority of doctors had fears regarding Covid 19, 29.4% had extremely high fear, 11.8% had very high fear, 8.8% had fairly high fears.

Correlations		Probability of getting Infected	Psychological impact
Probability of getting Infected	Pearson Correlation	1	-.077
	Sig. (2-tailed)		.383
	N	130	130
Psychological impact	Pearson Correlation	-.077	1
	Sig. (2-tailed)	.383	
	N	130	130

Correlations			
Psychological impact has weak correlation with risk perception. Pearson (r) value is 0.077			
		Psychological impact	Preventive Measures taken
Psychological impact	Pearson Correlation	1	-.005
	Sig. (2-tailed)		.959
	N	130	130
Preventive Measures taken	Pearson Correlation	-.005	1
	Sig. (2-tailed)	.959	
	N	130	130

Psychological impact has very weak correlation with preventive measures. Pearson (r) value is 0.005.

Correlations			
		Preventive Measures taken	Probability of getting Infected
Preventive Measures taken	Pearson Correlation	1	-.042
	Sig. (2-tailed)		.635
	N	130	130
Probability of	Pearson Correlation	-.042	1

| getting Infected | Sig. (2-tailed) | .635 | |
| | N | 130 | 130 |

Pearson correlation (r) is -0.42. This means doctors who take more precautionary measures perceive that they are less likely to get infection.

Correlations		Correct knowledge about symptoms	Scientific source of information
Correct knowledge about symptoms	Pearson Correlation	1	-.422[**]
	Sig. (2-tailed)		.000
	N	130	130
Scientific source of information	Pearson Correlation	-.422[**]	1
	Sig. (2-tailed)	.000	
	N	130	130

**. Correlation is significant at the 0.01 level (2-tailed).

Pearson correlation (r) is -0.42. This means people who have scientific source of information have poor knowledge about symptoms.

Correlations		Correct knowledge about symptoms	All Media
Correct knowledge about symptoms	Pearson Correlation	1	.213[*]
	Sig. (2-tailed)		.015
	N	130	130
All Media	Pearson Correlation	.213[*]	1
	Sig. (2-tailed)	.015	
	N	130	130

*. Correlation is significant at the 0.05 level (2-tailed).

Pearson correlation (r) is .213. This means people who gather more information from various media source have better knowledge about symptoms.

Correlations		Preventive measures taken	Correct knowledge about symptoms
Preventive measures taken	Pearson Correlation	1	.100
	Sig. (2-tailed)		.256
	N	130	130
Correct knowledge about symptoms	Pearson Correlation	.100	1
	Sig. (2-tailed)	.256	
	N	130	130

Pearson correlation (r) is .100. Doctors who had more knowledge about symptoms took more preventive measures.

Discussion

Our study revealed that Depression was very low (14.7%) to extremely low (38.2%) in majority of doctors. 11.8% had extremely high depression, while 14.7% had fairly high depression. Majority doctors had fairly high (38.2%) to extremely high (14.7%) stress. 20.6% felt extremely high helplessness, 17.6% fairly high, while there was no effect on another 17.6%. 17.6% had extremely high worry, while 32.4% had fairly high worry. Majority of doctors had fears regarding Covid 19, 29.4% had extremely high fear, 11.8% had very high fear, 8.8% had fairly high fears.

Another study in India had revealed a 35% prevalence of depressive symptoms among doctors during the COVID 19 pandemic. The stress and anxiety symptoms were found to be present in 39.5% and33% of doctors, respectively [5].

In April, 2020, a study on 500 health care workers from Singapore found prevalence of anxiety, depression, and stress to be 14.5%, 8.9% and 6.6% respectively and 7.7% were positive for clinical concern of post-traumatic stress disorder[6]. In another study in China, a

considerable proportion of participant health care workers had symptoms of depression (50.4%), anxiety (44.6%), insomnia (34.0%), and distress (71.5%)[7]. In a multinational multi centric study on health care workers, 5.3% screened positive for moderate to very-severe depression, 8.7% for moderate to extremely-severe anxiety, 2.2% for moderate to extremely-severe stressand 3.8% for moderate to severe levels of psychological distress[8].

Another study in Saudi Arabia during the MERS-CoV outbreak in 2014 among medical students had found that 77% reported minimal anxiety, 18.4%reported mild anxiety, 4.6% reported moderate anxiety and none of them reported severe anxiety[9].

Another reason for high stress could be long working works wearing a PPE. Previous studies have shown that the longer the working hours, the more the number of residents who developed depressive symptoms[10].

India with its high burden on doctors and poor doctor patient ratio is expected to have more psychiatric co morbidity which is reflected in our study.

In our study, 9% of the doctors attributed their psychological burden of worries and fears to losing someone close to them in the pandemic, 8% to the health system being overwhelmed due to the pandemic, 7% to their own mental health, another 7% to their loved one's health, 9% were worried about their restricted liberty of movement, 6% to losing vacation opportunities, 6% to small companies running out of business, 7% to the economic recession that would prevail, 7% to restricted or shortage of food supplies, 7% feared potential unemployment, 6% worried about not being able to pay their bills on time, 7% worried about not being able to visit people who depended upon them and 6% were worried that they would have to defend a decision not to attend social events where their family and friends expected them to meet.

All issues (worries and fear) put almost equal burden on mental health of doctors.

Our study revealed 65.38% doctors believed contracting the novel corona virus would be extremely severe for them, 3.85% believed it would be very severe, 6.92% believed it would not be severe, 7.69% believed it would be moderately severe, 11.54% believed it would be fairly severe, 4.62% believed it would be less severe. Majority of the doctors felt contracting the novel corona virus would be extremely severe for them. A study among Jordanian dentistsFound 17.7% of the 368 dentists perceived COVID-19 as very dangerous, 71.7% perceived it as moderately dangerous, and 9.5% perceived it as not dangerous[11].

Anxiety for immediate family and worry about health expenditure if doctors' family members getCovid-19 have been reported in other studies[12].A study in south India also found that 50% of the health care workers were worried about the situation of pandemic and that they can get the infection too[13].

In our study, 6% doctors received their source of information about the Covid pandemic from television, 6% from newspapers, 9% from conversations with family and friends, 11% from colleagues, 12% from consultation with other health workers, 6% from private television stations, 6% from websites or online newspapers, 5% from Social media platforms like Facebook and Twitter, 5% from private radio stations, 6% from public radio stations, 9% from official government press releases, 10% from medical institution press releases, 7% from opinion polls and the lowest was 4% from celebrities and social media influencers. Conversation with colleagues and friends and consultation with other health workers was relatively more often used source of information regarding COVID. Obtaining information from authentic sources is pivotal for disseminating unbiased and reliable data about the emerging COVID-19 infection and is essential for Health Care Workers 'preparedness and response[14].

A study on health care workers globally revealed that more than 33% of HCWs used official government websites as a primary source of information about COVID-19, approximately 30% of the participants reported that they used news media (TV/video, magazines, newspapers, and radio) and social media (Facebook, Twitter, WhatsApp, YouTube, Instagram, Snapchat) to obtain information aboutCOVID-19. Moreover, nearly 40% of the participants sometimes discussed COVID-19-relatedtopics with family and friends[14].

A study in the GCC region among health care workers showed government websites (47.1%) and social media websites (39.8%) as the most used source of Covid 19 related information[15].

A study in Saudi Arabia during the MERS-CoV outbreak in 2014 among medical students had found that college and hospital announcements were the most common source of information (25.4%), followed by official statements or press releases from MOH (22.8%) and the third most common were social networks, mainly Facebook and WhatsApp (19.1%). Other resources for information were: other web resources(13.4%), WHO website (11%)and MOH website (8.3%)[9].A study among undergraduate dental students in India showed that for 76.1% of the students, media was their first source of information regarding Covid 19 whereas 64.6%followed the Government website for the disease updates[16].

In our study, 79.5% doctors had good knowledge regarding prevention of spread of Covid 19. Our study revealed 100% of the doctors identified fever, cough, sore throat, shortness of breath as likely symptoms of Covid 19, 92.3% doctors each believed tiredness and body ache to be related to Covid 19, 85.4% doctors believed loss of taste and smell to be related to Covid 19. Majority of the doctors had correct knowledge regarding symptoms of Covid 19. Surprisingly, our study revealed negative correlation between correct knowledge about symptoms and scientific source of information. Doctors who gathered more information from various sources had better knowledge about symptoms.This might be because resident doctors already had correct knowledge about Covid 19 even from conversations with colleagues and teachers. A previous study in GCC region has also shown medical doctors and medical students to be better able to identify COVID-19 symptoms and exhibiting higher median knowledge[14].A survey on Iranian medical students has also showed 79.6% of participants had high, 13.8% had moderate and 6.7% had low level of Covid 19 related knowledge[17].A questionnaire based survey in Mumbai metropolitan area also found more than 90% PG doctors gave correct answers on the awareness, knowledge, and infection control practices related to COVID-19 infection[18].A study on health care workers globally revealed that a high majority of the HCWs (85.6%) agreed that maintaining hand hygiene, covering the nose and mouth while coughing, and avoiding sick patients could help to prevent COVID-19 transmission[14].The same study found that a majority of the doctors (84%) agreed that COVID-19could lead to pneumonia, respiratory failureand death and that supportive care is the only treatment option that is currently available (83.2%)[14].Similarly, in our study 70.8% doctors believed there was no specific drug or vaccine for Covid 19 while 29.2% doctors believed there was. Our study was in August 2020. So, majority of doctors had correct knowledge about treatment of Covid 19.

Bhagavathula et al. [14]have argued that the superior knowledge and perception of medical doctors might be attributed to the more rigorous education on infectious diseases and pharmacotherapy for continued professional development when compared with that of other healthcare professionals.

In our study, 100% of the doctors followed preventive measures of hand washing, avoiding touching eyes, nose and mouth, covering mouth and nose while coughing, wearing face mask and maintaining social distance. A study on health care workers globally revealed87% felt that washing hands with soap and water could help to prevent COVID-19 transmission[14].

In our study, doctors who take more preventive measures perceived that they are less likely to get infection and doctors who had more knowledge about symptoms took more preventive measures, psychological impact had weak positive correlation with both risk perception and preventive measures. A survey on Iranian medical students has also showed that majority (94.2%) of participants had high performance in preventive behaviors[17].

In our study 56.92% doctors believed they were extremely susceptible to an infection with the novel corona virus, 11.54% believed they were fairly susceptible and only 3.85% believed they were less susceptible but surprisingly there was no significant correlation between risk perception and psychological impact. In the survey on Iranian medical students, 30.8% of participants had high, 32.9% had moderate and 36.3% had low level of risk perception[17].

Our study revealed doctors had very high to extremely high confidence in medical professional associations, hospitals, other specialist physicians, their own family doctors, Ministry of Health, Local public health authority. A study in south India also found that 50% of the health care workers strongly agreed that theCOVID-19 is a serious public health issue and educating
the general public on COVID-19 can prevent the spread of infection. They also agreed to the fact that the Government of India (GOI) is providing full support to curtail the spread and they should be up-to-date with all the recent guidelines from the GOI[13].

Limitations
The data presented in this study are self-reported and partly dependent on the participants' honesty and recall ability; thus, they may be subject to recall bias.
The study is a cross sectional study, serial studies need to be carried out in order to analyse the changes in variables with time and a larger doctor population can be enrolled in a follow up study.

Conclusions
- Overall doctors are well informed about the symptoms, treatment options and measures to be taken to prevent spread of corona virus infection.
- More than half of the resident doctors consider themselves to be highly susceptible to corona virus infection.
- All the doctors practise basic preventive measures like hand washing, wearing a face mask and maintaining social distance.
- Conversation with colleagues and friends and consultation with other health workers was relatively more often used source of information regarding COVID.
- Majority of the doctors had high fear and stress regarding Covid -19
- Doctors had very high to extremely high confidence in medical professional associations, hospitals, other specialist physicians, their own family doctors, Ministry of Health, Local public health authority.
- Our study revealed negative correlation between correct knowledge about symptoms and scientific source of information. Doctors who gathered more information from various sources had better knowledge about symptoms.
- In our study, doctors who take more preventive measures perceived that they are less likely to get infection and doctors who had more knowledge about symptoms took more preventive measures, psychological impact had weak positive correlation with both risk perception and preventive measures.

Future implications
Since most participants use almost all sources for gathering information about covid-19, regular updates should be provided by media and relevant authorities, regular group meetings, trainings to disseminate knowledge about guidelines and recent treatment protocols should be organized by the concerned tertiary care hospitals.
Readily available counselling and psychological help should be provided to those experiencing psychological distress due to COVID-19 Pandemic.
Another study can be done involving other health care staff such a nurses, ward personnel etc. who play a big role in managing the patient in order to assess their knowledge and risk perceptions.

References
1. HabersaatKB, Betsch C, Danchin M, *et al*. Ten considerations for effectively managing the COVID-19 transition. Nat Hum Behav, 2020.https://doi.org/10.1038/s41562-020-0906-x
2. Shanafelt T, Ripp J, Trockel M. Understanding and Addressing Sources of Anxiety

among

Health Care Professionals during the COVID-19 Pandemic. Jama-7th,2020April.

3. Betsch C. How behavioural science data helps mitigate the COVID-19 crisis. Nat Hum Behav, 2020.

4. World Health Organization. Regional Office for Europe. Survey tool and guidance: rapid, simple, flexible behavioural insights on COVID-19, 2020.https://apps.who.int/iris/handle/10665/33354

5. Chatterjee SS, Bhattacharyya R, Bhattacharyya S, Gupta S, Das S, Banerjee BB. Attitude, practice, behavior and mental health impact of COVID-19 on doctors. Indian J Psychiatry. 2020;62:257-65.

6. Tan BY, Chew NW, Lee GK, Jing M, Goh Y, Yeo LL, *et al*. PsychologicalImpact of the COVID-19 Pandemic on Health Care Workers in Singapore.Ann Int. Med., 2020.

7. Lai J, Ma S, Wang Y, Cai Z, Hu J, Wei N, *et al*. Factors associated with mental health outcomes among health care workers exposed to Coronavirus disease 2019. JAMA Network Open. 2020;3:e203-976.

8. Chew NW, Lee GK, Tan BY, *et al*. A multinational, multicentre study on the psychological outcomes and associated physical symptoms amongst healthcare workers during COVID-19 outbreak. Brain Behav Immun. 2020;88:559-565. Doi: 10.1016/j.bbi.2020.04.049.

9. Al-Rabiaah A, Temsah MH, Al-Eyadhy AA, et al. Middle EastRespiratory Syndrome-Corona Virus (MERS-CoV) associated stressamong medical students at a university teaching hospital in SaudiArabia. J Infect Public Health. 2020;13(5):687-91.

10. Tan BY, Chew NW, Lee GK, Jing M, Goh Y, Yeo LL, *et al*. Psychological Impact of the COVID-19 Pandemic on Health Care Workers in Singapore. Ann Int. Med., 2020.

11. Khader Y, Al Nsour M, Al-Batayneh OB, *et al*. Dentists' awareness, perception, and attitude regarding COVID-19 and infection control: cross-sectional study among Jordanian dentists. JMIR Public Health Surveill. 2020;6:e18-798.

12. Misra A. Doctors and healthcare workers at frontline of COVID 19 epidemic: Admiration, a pat on the back and need for extreme caution. Diabetes Metab Syndr. 2020;14:255-6.

13. Unnikrishnan Bhaskaran, Rathi Priya *et al*.Knowledge, Awareness and Perception of COVID-19 Pandemic Among HealthCare Workers in a Tertiary Care Teaching Hospital in Coastal South India. The Open Public Health Journal. 2021;14:135-39.

14. Bhagavathula AS, Aldhaleei WA, Rahmani J, Mahabadi MA, Bandari DK. Knowledge and perceptions of COVID-19 among health care workers: cross-sectional study. JMIR Public Health Surveill. 2020;6:e19-160.

15. Abdulwahab M, Kamal M, *et al*.Knowledge and Perceptions of COVID-19 among Health Care Professionals, Medical Students, and Dental Students in the GCC Region: A Cross-Sectional Correlational Study. Journal of Multidisciplinary Healthcare. 2021;14:1223-32.

16. Kashid RV, Shidhore AA, Kazi MM, Patil S. Awareness of COVID-19 amongst undergraduate dental students in India-A questionnaire based cross-sectional study.

17. Taghrir MH, Borazjani R, Shiraly R. COVID-19 and Iranian medical students; a survey on their related-knowledge, preventive behaviors and risk perception. Arch Iran Med. 2020;23:249-254. doi:10.34172/ aim.2020.06

18. Sehgal.P, Kumar.B, Sharma.M, Salameh A.A, Kumar.S, Asha.P (2022), Role of IoT In Transformation Of Marketing: A Quantitative Study Of Opportunities and Challenges, Webology, Vol. 18, no.3, pp 1-11

19. Kumar, S. (2020). *Relevance of Buddhist Philosophy in Modern Management Theory*. *Psychology and Education*, Vol. 58, no.2, pp. 2104–2111.

20. Roy, V., Shukla, P. K., Gupta, A. K., Goel, V., Shukla, P. K., & Shukla, S. (2021). Taxonomy on EEG Artifacts Removal Methods, Issues, and Healthcare Applications. Journal of Organizational

and End User Computing (JOEUC), 33(1), 19-46. http://doi.org/10.4018/JOEUC.2021010102

21. Shukla Prashant Kumar, Sandhu Jasminder Kaur, Ahirwar Anamika, Ghai Deepika, Maheshwary Priti, Shukla Piyush Kumar (2021). Multiobjective Genetic Algorithm and Convolutional Neural Network Based COVID-19 Identification in Chest X-Ray Images, Mathematical Problems in Engineering, vol. 2021, Article ID 7804540, 9 pages. https://doi.org/10.1155/2021/7804540

22. Modi PD, Nair G, Uppe A *et al*. COVID-19 awareness among healthcare students and professionals in Mumbai metropolitan region: a questionnaire-based survey. Cureus, 2020. 12. 10.7759/cureus.7514.