COVID 19 Vaccine- Public Insight, a Web Based Cross Sectional Study

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Introduction

The world stopped still in 2019, at the onset of COVID-19 pandemic. Many countries imposed complete lockdowns along with travel restriction to other countries. The current global pandemic has disrupted the people's lives. It has been more than a year since the World Health Organization (WHO) declared the virus spread as a "pandemic" on 11 March 2020; as of mid-April 2021, around 2.94 million people lost their lives and 136.6 million got infected globally. (1)

Amidst this grave situation, development of effective and safe vaccines, was considered as one of the most effective preventive strategy to curb the infection. (2) If given to sufficient numbers of people, vaccines can halt outbreaks of serious infections. (3) Currently there is gross disparity for access to vaccine, where high income countries do have excess to what is required as against low- and middle-income countries struggling for even vaccinating its frontline workers.

Along with this pandemic, a term "infodemic" was introduced by WHO Director-General which simply means 'a situation wherein overloads of information which might be true or false thus making it difficult to decide what to believe.' (4)

Since the inception of pandemic, the main problem faced globally is the inflow of misinformation and conspiracy theories about the virus's cause, origin, and prevention remedies, among other issues. Most of the countries including India are facing hesitancy for COVID vaccination in form of false beliefs and fake news related to efficacy and safety of vaccine. Vaccine hesitancy is considered a multi-factored phenomenon affected by an array of factors like cognitive, psychological, socio-

demographic, political and cultural factors that contribute to it and differ across different populations.

India began the COVID 19 vaccination campaign on 16 January 2021. (5) As of 22 August 2021, India has fully vaccinated 13.71% of total population. (6) At this rate of vaccination coverage it would be difficult to halt the pandemic. There are also substantial inequities sociodemographic inequalities like gender, education, class, and rural-urban divide in coverage of vaccines in India.(7,8) Currently the main vaccines available in India are Covishield, COVAX in and Sputnik V.(5) While availability and distribution of the vaccines remains a challenge, even in places where vaccines are made available there is vaccine hesitancy.(8) This study was planned to evaluate the knowledge, thinking and feeling for vaccination, motivation and social process related to COVID 19 vaccination as well as identify the barriers related to practical factors affecting COVID 19 vaccination and assess the Information access related to vaccination drive among general population.

Material and methods

By sending the link of Microsoft forms via WhatsApp messenger, a cross-sectional web-based, online study was conducted. After conducting a thorough literature review and consulting with peers, subject experts, and local experts, a semi-structured, self-explanatory, and pre-tested questionnaire in English was developed. The face validity of the questionnaire was validated by distributing it to subject experts. We used Cronbach's alpha to assess the questionnaire's reliability, and it was 0.807, indicating that the items have relatively high internal consistency. The questionnaire was divided into two sections- Part-A included sociodemographic information such as age, gender, place of residence, and employment status and Part B included questions about vaccination for COVID-

19 infection knowledge, attitude, and practices. Further, knowledge was graded as poor, average, or good. If a participant did not correctly answer a single question, i.e., if their score is 0%, then knowledge was considered as poor. If a knowledge score is 100 percent, it is considered good; otherwise, an average category was used. The attitude score was divided into two categories: positive attitude (for a score <50%) and negative attitude (for a score $\geq$ 50%). The practice score for COVID vaccine- a public insight was divided into two groups: poor (score <50%) and good (score $\geq$50%). This questionnaire (via link) was distributed to the general population in various parts of India among individuals aged 18 years and up, whom we could contact via WhatsApp messenger.

The data was collected over a period of three-months, from April 2021 to June 2021. The data were collected online by the principal investigator and co-authors by sending the survey link to more than 3000 participants using a convenient sampling method. Participants who completed more than 80% of the form and signed the informed consent form, which is included with the questionnaire were considered for the analysis.

The obtained data were coded and analyzed using Microsoft Excel and Statistical Package for Social Sciences (SPSS) Version 22.0 for Windows. Descriptive statistics were expressed as frequencies and percentages. Chi-square test was used to find the association and dependency of different socio-demographic variables with knowledge, attitude and practices of the participants regarding the insight of corona vaccination. A p-value less than 0.05 was taken for statistical significance.

Ethical consideration

Ethical consideration from Research Review Committee (RRC) and the Institutional Ethical committee (IEC) was

taken (BV(DU) MC&H/ Sangli/ IEC/ 460 /21). The poll was anonymous and whatever personal information taken was safe and not revealed publicly in any way. Consent was taken from each participant prior to the study. No significant risks were involved in the study.

Results

Data on participants' knowledge, attitudes, and practices regarding the COVID-19 vaccination program were collected by sending a Microsoft form link via WhatsApp messenger to more than 3000 people. Only 2394 participants submitted the form with less than 79.8% response rate.

The frequency distribution of various socio-demographic factors in our study was shown in Table 1. The majority of participants, 1223 (51.1%), were males, with 1171 females (48.9%). The majority of people, 1592 (66.5%), reported their current residence as being in an urban area, followed by rural 404 (16.9%), metro city 343 (14.3%), and NRI 55. (2.3%).

The highest level of education was found to be a Bachelor's degree/diploma 964 (40.3%), while 918 (38.3%) individuals had a higher secondary education. Post-graduates were the most numerous, i.e. 383 (16%) and 14 (0.6%) were illiterate who took part in the study. In this survey, we found 1456 (60.8 %) people were unemployed out of 2394 people in the community. The vaccination status of 1359 (56.8%) participants for Covid-19 vaccine was fully vaccinated, whereas 240 (10 %) had not received a single dose in any form.

The frequency of difficulties encountered by participants when administering the Covid-19 vaccine is shown in Table 2. The vaccine was difficult to obtain for the participants for a variety of reasons. The majority of participants, 868 (36.3%), had difficulty scheduling an appointment at the vaccination center. Other reasons included waiting time at the vaccination center being too long for 671(28%) participants, 395(16.5%) participants being unable to go on their own due to physical limitations, 234(9.8%) participants finding it inconvenient timings in the day for vaccination, and 170(7.1%) participants being unaware of the location of vaccination.

It is necessary to get vaccination against Covid-19 during this pandemic. We asked a question about vaccination motivation. Participants were expected to give various reasons in this regard. Table 3 shows the participants' motivation for being vaccinated and taking the Covid-19 vaccine. Out of 2394 participants, 1087 (45.4 percent) said they wanted to protect the health of their family/friends and 1018 (42.5 percent) said they wanted to protect their own health. The motivation to encourage others to get vaccine and protect the health of coworkers was very low, and it was found only in 46 (1.9 percent) of the participants.

Table 4 illustrates the relationship between socio-demographic factors and knowledge, attitude, and practice groups. We classified knowledge into poor, average, and good groups; attitude into positive and negative groups; and practice into poor and good groups. Gender, residence, and employment status were sociodemographic factors considered. These variables were compared to groups of knowledge, attitude, and practice. Females had poorer knowledge (88-7.5%), but this was not statistically significant. We discovered that gender had a significant impact on attitudes and practices (p<0.05). Females had significantly higher levels of positive attitude (1134-96.8 %) and good practices (928-79.2 %).

Knowledge and attitude were independent of participant's present residence, but practices were

significantly dependent on it. More participants from metro city (28-8.2%) had good knowledge and more NRI participants (53-96.4%) have positive attitude, which is not statistically significant. More number of metro city participants (276-80.5%) were practicing the covid-19 related practices very well and it is statistically significant (p<0.05)

There was a statistically significant relationship between employment status and knowledge and practices (p<0.01). It was observed that the majority of participants (967- 66.4%) had average knowledge. Non-health care workers had significantly poor knowledge (88-41.3%) and surprisingly, employed non-health care workers had higher practices (314 - 80.7%). Attitude was completely unrelated to employment status, with positive attitudes observed in employed health care workers and negative attitudes observed in non-employed health care workers.

Discussion

The COVID-19 pandemic has forced healthcare services to adopt unprecedented prevention and control measures of infection, and fast track vaccine approvals to terminate the spread of disease. The latter is a key strategy to stop further escalation of the COVID-19 pandemic, and just may be the game changer as the world battles its most serious health crisis of the century. Several COVID-19 vaccines have now been authorized or approved for human use, and many more are currently in the late stages of development and research.

Apart from availability of effective vaccine, approval, production at larger scale, affordable price and equitable distribution are the key requirements for a successful vaccination program to be effective. These four dimensions of the global vaccination challenge are closely interrelated.(6, 9)Factors like geography, time period, social factors, contextual human behavior, and

ethnicity do affect public trust and acceptance of vaccine.(10, 11) The public perception of the benefits and relative risks of vaccination is a major obstacle for vaccine acceptance as evidenced by some studies.(12) Thus knowledge, attitudes and practices (KAP) of the population towards the COVID-19 vaccine is critical not only to understand the epidemiological dynamics of disease control, but also the effectiveness, compliance and success of the vaccination program. Additionally to offering direct protection for vaccinated individuals, it also contributes indirectly to herd immunity by slowing the transmission. (13)

A cross sectional online study was conducted by sending a link of Microsoft form by WhatsApp to include participants from all regions of India. Amid COVID crisis, face to face interviews was a big hurdle in collecting data hence online survey thus was the most apt way to collect the data.

Majority of the participants were from urban areas (80.6%), while 14% of participants were employed in health care industry. More than 50% of participants had completed both doses of vaccination. Compared to other studies the prevalence of vaccination in this study is high. Globally, research has been conducted to study coronavirus vaccine hesitancy. Difficulty in getting vaccine was found to be 31.13% in Americans as in study conducted by Callaghan et al (14) while this study showed 36.3%. Similarly Ruiz and Bell found in their US survey that COVID-19 vaccine Motivation was less (14%) while this study showed almost 100 % motivation.(15) In a study conducted by Loomba et al, only 54.1% and 42.5% of participants in the USA and the UK, respectively, would "definitely" take coronavirus vaccine misinformation being the main reason.(16) In Hong Kong, vaccine motivation decreased from 44.2% to

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34.8% owing to fear of COVID-19 vaccine side effects.(17) In present study only 10% of participants had not taken any vaccination dose. Better availability of information regarding vaccine safety, free and readily available vaccine are the virtues of successful vaccination program in India.

A survey conducted across countries in June 2020 before the availability of the vaccine showed that there was wide heterogeneity in factors of vaccine acceptance. Vaccine acceptance was high amongst elderly in France and Germany, in contrast to China where the young ones showed high acceptance. High education was associated with greater acceptance in France, Germany and India, whereas in Canada, Spain and UK low education was directly proportional to vaccine acceptance in. (18) In a nationwide survey conducted among medical students in India, vaccine hesitancy was found among 10.6%of the students. (19) This is high given the fact that their level of awareness and risk perception are likely to be high. The major factors driving vaccine hesitancy are false information about the vaccine, lack of sufficient credible information, lack of trust in the health system, and religious factors that deter one from accepting the vaccine. (20)

In this study among those willing to take the vaccine reasons cited were, to protect family and friends to protect own health, to get back to work/school, and to resume social activities respectively. The most common difficulties faced by participants for taking vaccine were making an appointment and too long waiting time.

The World Health Organization (WHO) has identified vaccine hesitancy as a leading global health threat.(21) Hesitancy towards vaccination has been reported previously and the main reasons for hesitancy include the compulsory nature of vaccines, their coincidental temporal relationships to adverse health outcomes, religious reasons, unfamiliarity with vaccine-preventable diseases, and lack of trust in corporations and public health agencies.(22) The concerns regarding adverse reactions and efficacy can only be addressed with evidence-based research. Mass, credible awareness programs can help in increasing the acceptance of the vaccine

The use of Web-based survey produced higher response rates when administered to an educated population with access to electronic media. (20) It would have not been a good idea to conduct the survey physically among the participants in lieu to the current pandemic situation. The participants were recruited from all parts of the state with different professional and educational backgrounds to justify the representation of a large population.

Conclusion

The COVID-19 pandemic continues to wreak havoc on entire humanity, and the COVID-19 vaccine represents a possible ray of hope for the future. The present study revealed inadequate knowledge but more positive attitudes towards COVID-19 vaccinations. The findings suggest immediate health education intervention and information that is more accurate should be distributed and advertised by respective health authorities. Policy makers should take appropriate steps to ensure adequate knowledge, positive attitudes and perceptions towards COVID-19 vaccinations in order to reduce the vaccine hesitancy facilitated and encouraged by misinformation in the media.

References

1. COVID Live - Coronavirus Statistics - World meter [Internet]. [cited 2022 Apr 9]. Available from: https://www.worldometers.info/coronavirus/

2. Haque A, Pant AB. Efforts at COVID-19 Vaccine Development: Challenges and Successes. Vaccines (Basel) [Internet]. 2020 Dec 1 [cited 2022 Apr 9];8(4):1–16. Available, from: https:// pub med. ncbi. nlm. nih. Gov /33291245/

3. Abeysinghe S. 'Because we all know that vaccines are an extremely effective public health tool': path dependency, H1N1 and the World Health Organisation. http://dx.doi.org/101080/014428722012719725 [Internet]. 2012 Sep [cited 2022 Apr 9];33 (5): 381–97. Available, from: https:// www. Tandf online.com/ Doi /abs/ 10.1080/ 014428 72.2012.719725

4. The coronavirus is the first true social-media "infodemic" | MIT Technology Review [Internet]. [cited 2022 Apr 9]. Available from: https:/ /www. Technology review.com/2020/02/12/844851/the-coronavirus-is-the-first-true-social-media-infodemic/

5. Kumar VM, Pandi-Perumal SR, Trakht I, Thyagarajan SP. Strategy for COVID-19 vaccination in India: the country with the second highest population and number of cases. NPJ Vaccines [Internet]. 2021 Dec 1 [cited 2022 Apr 9];6(1). Available from: https:/ /PubMed. ncbi.nlm.nih.gov/33883557/

6. Grace K, Danabal M, Magesh SS, Saravanan S, Gopichand ran V. Attitude towards COVID 19 vaccines and vaccine hesitancy in urban and rural communities in Tamil Nadu, India-a community-based survey. [cited 2022 Apr 9]; Available from: https:// Doi. org/ 10.1186/s12913-021-07037-4

7. India's Covid gender gap: women left behind in vaccination drive | Global development | The Guardian [Internet]. [cited 2022 Apr 9]. Available from: https://www.theguardian.com/global,development/2021/jun/28/india-covid-gender-gap-women-left-behind-in-vaccination-drive

8. India's vax drive reflects rural-urban disparities - DIU News [Internet]. [cited 2022 Apr 9]. Available from: https://www.indiatoday.in/diu/story/indias-vax-drive-reflects-rural-urban-disparities-1818160-2021-06-23

9. Wouters OJ, Shadlen KC, Salcher-Konrad M, Pollard AJ, Larson HJ, Teera Wattana on Y, et al. Challenges in ensuring global access to COVID-19 vaccines: production, affordability, allocation, and deployment. The Lancet [Internet]. 2021 Mar 13 [cited 2022 Apr 9];397(10278):1023–34. Available from: http://www.thelancet.com/article/S0140673621003068/fulltext

10. Anil A, Sharafudeen S, Krishna A, Rajendran R, James J, Kuruvilla S, et al. Acceptance and concerns regarding COVID-19 vaccine in Kerala, India. Public Health Toxicology. 2021 Sep 15;1(1):1–6.

11. Larson HJ, Clarke RM, Jarrett C, Eckersberger E, Levine Z, Schulz WS, et al. Human Vaccines &Immunotherapeutics Measuring trust in vaccination: A systematic review Measuring trust in vaccination: A systematic review. 2018 [cited 2022 Apr 9]; Available from: https://doi.org/10.1080/21645515.2018.1459252

12. Sharun K, Faslu Rahman CK, Haritha C v., Jose B, Tiwari R, Dhama K. Covid-19 vaccine acceptance: Beliefs and barriers associated with vaccination among the general population in India. Journal of Experimental Biology and Agricultural Sciences. 2020;8(Special Issue 1): S210-S.

13. Dubé E, Laberge C, Guay M, Bramadat P, Roy R, Bettinger J. Vaccine hesitancy: an overview. Hum VaccinImmunother [Internet]. 2013 Aug [cited 2022 Apr 9];9(8):1763–73. Available from: https:/ /pub med. ncbi. nlm. nih. gov/23584253/

14. Callaghan T, Moghtaderi A, Lueck JA, Hotez P, Strych U, Dor A, et al. Correlates and disparities of

intention to vaccinate against COVID-19. Social Science and Medicine. 2021 Mar 1;272.

15. Ruiz JB, Bell RA. Predictors of intention to vaccinate against COVID-19: Results of a nationwide survey. Vaccine. 2021 Feb 12;39(7):1080–6.

16. Loomba S, de Figueiredo A, Piatek SJ, de Graaf K, Larson HJ. Measuring the impact of COVID-19 vaccine misinformation on vaccination intent in the UK and USA. Nature Human Behaviour 2021 5:3 [Internet]. 2021 Feb 5 [cited 2022 Apr 11];5(3):337–48. Available from: https://www.nature.com/articles/s41562-021-01056-1

17. Wang K, Lai-Yi Wong E, Ho K-F, Wai-Ling Cheung A, Sen-Yung Yau P, Dong D, et al. Change of Willingness to Accept COVID-19 Vaccine and Reasons of Vaccine Hesitancy of Working People at Different Waves of Local Epidemic in Hong Kong, China: Repeated Cross-Sectional Surveys. 2021; Available from: https: // Doi. org/ 10.3390/ vaccines 90 100 62

18. Lazarus JV, Wyka K, Rauh L, Rabin K, Ratzan S, Gostin LO, et al. Hesitant or Not? The Association of Age, Gender, and Education with Potential Acceptance of a COVID-19 Vaccine: A Country-level Analysis. J Health Common. 2020;25 (10): 799– 807

19. Jain J, Saurabh S, Goel AD, Gupta K, Bhardwaj P, Raghav PR. Title: COVID-19 vaccine hesitancy among undergraduate medical students: results 2 from a nationwide survey in India. Available from: https://doi.org/10.1101/2021.03.12.21253444

20. Green law C, Brown-Welty S. A comparison of web-based and paper-based survey methods: Testing assumptions of survey mode and response cost. Evaluation Review. 2009 Oct;33(5):464–80.

21. Four reasons for COVID-19 vaccine hesitancy among health care workers, and ways to counter them [Internet]. [cited 2022 Apr 11]. Available from: https://www.aafp.org/journals/fpm/blogs/inpractice/entry/countering_vaccine_hesitancy.html

22. Salmon DA, Dudley MZ, Glanz JM, Omer SB. Vaccine Hesitancy: Causes, Consequences, and a Call to Action. American Journal of Preventive Medicine. 2015 Nov 1;49(6): S391–8.

Legend Tables

Table 1. Frequency distribution table of different socio-demographic factors.

Socio-demographic Factors		Frequency	%
Gender	Female	1171	48.9
	Male	1223	51.1
Present Residence	Metro city	343	14.3
	NRI	55	2.3
	Rural	404	16.9
	Urban	1592	66.5
Education	Higher secondary	918	38.3
	Bachelor's degree/Diploma	964	40.3

	Illiterate	14	0.6
	Post-graduation	383	16
	Primary school	28	1.2
	Secondary school	87	3.6
Employment status	Self-employed non-Healthcare worker	213	8.9
	Employed health care worker	183	7.6
	Employed non-healthcare worker	389	16.2
	Self-employed health care professional	153	6.4
	Unemployed	1456	60.8
Vaccinated	No	240	10
	Yes 1 dose completed	795	33.2
	Yes 2 doses completed	1359	56.8
Total		2394	100

Table 2: Frequency table showing the distribution of patients getting difficulties in getting covid-19 vaccine

Difficulties in getting vaccine	frequency	%
I couldn't go on my own (I have a physical limitation)	395	16.5
I didn't know where to go to get vaccinated	170	7.1
It was difficult to find or make an appointment	868	36.3
The waiting time was too long	671	28.0
It's too far away	206	8.6
The hours of operation are inconvenient	234	9.8

Table 3: Motivation for getting vaccination.

What would motivate you to get vaccinated?	Frequency	%
Because others encouraged me to get vaccinated	46	1.9
Protect health of co-workers	46	1.9
Protect health of family/friends	1087	45.4
Protect my health	1018	42.5
To get back to work/school	99	4.1
To resume social activities	98	4.1
Total	2394	100

Table: 4 Association of socio-demographic factors with knowledge, attitude and practices.

Variables		Knowledge groups			Attitude groups		Practices groups		Total
		Poor	Average	Good	Negative	Positive	Poor	Good	
Gender	Female	289	794	88	37	1134	243	928	1171
		24.70%	67.80%	7.50%	3.20%	96.80%	20.80%	79.20%	100.00%
	Male	351	772	100	60	1163	298	925	1223
		28.70%	63.10%	8.20%	4.90%	95.10%	24.40%	75.60%	100.00%
		Chi-Square = 5.955, p = 0.051			Chi-Square = 4.692, p = 0.03		Chi-Square = 4.469, p = 0.035		
PRESENT Residence	Metro city	98	217	28	13	330	67	276	343
		28.60%	63.30%	8.20%	3.80%	96.20%	19.50%	80.50%	100.00%
	NRI	14	39	2	2	53	13	42	55
		25.50%	70.90%	3.60%	3.60%	96.40%	23.60%	76.40%	100.00%
	Rural	128	252	24	18	386	113	291	404
		31.70%	62.40%	5.90%	4.50%	95.50%	28.00%	72.00%	100.00%
	Urban	400	1058	134	64	1528	348	1244	1592
		25.10%	66.50%	8.40%	4.00%	96.00%	21.90%	78.10%	100.00%
		Chi-Square = 10.854, p = 0.093			Chi-Square = 0.258, p = 0.968		Chi-Square = 9.038, p = 0.029		
Employment status	Self-employed non-Healthcare worker	88	115	10	10	203	65	148	213
		41.30%	54.00%	4.70%	4.70%	95.30%	30.50%	69.50%	100.00%
	Employed health care worker	43	127	13	3	180	61	122	183
		23.50%	69.40%	7.10%	1.60%	98.40%	33.30%	66.70%	100.00%
	Employed non-healthcare worker	112	252	25	19	370	75	314	389
		28.80%	64.80%	6.40%	4.90%	95.10%	19.30%	80.70%	100.00%
	Self-employed health care	34	105	14	7	146	50	103	153
		22.20%	68.60%	9.20%	4.60%	95.40%	32.70%	67.30%	100.00%

	professional								
	Unemployed	363	967	126	58	1398	290	1166	1456
		24.90%	66.40%	8.70%	4.00%	96.00%	19.90%	80.10%	100.00%
		Chi-Square = 31.749, p = 0.000			Chi-Square = 3.785, p = 0.436		Chi-Square = 37.012, p = 0.000		
Total		640	1566	188	97	2297	541	1853	2394
		26.70%	65.40%	7.90%	4.10%	95.90%	22.60%	77.40%	100.00%