

Knowledge, awareness and acceptance of covid-19 vaccine among general population in urban Raigarh, Chhattisgarh: A cross-sectional study

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Abstract

Introduction: While there are considerable enthusiasm and anticipation for the COVID-19 vaccine, little is known about vaccine hesitancy specifically for COVID-19 in the general population. Identifying specific populations, their characteristics with regards to vaccine knowledge, awareness & acceptance will help as key components of a successful vaccination strategy. Hence the present study was carried out to assess the knowledge, awareness & acceptance of COVID-19 vaccination among general population of urban Raigarh, Chhattisgarh.

Methods: A community-based cross-sectional study was conducted among 400 participants of urban Raigarh regarding knowledge, awareness & acceptance of COVID-19 vaccine from April-June 2021. The methodology comprises of primary data collection through survey in a pre-designed pre-tested proforma by face to face interview.

Results: Total 400 participants among general population who had an average age of 34.3 years \pm 11.8 years with slight male preponderance (53.2%). Nearly half (58.2%) of participants were from the slum, (45.2%) came under middle socio-economic class and (49%) were self-employed. Majority (77.25%) knew about COVID-19 vaccination programme, while (46.75%) knew about common side effects of vaccine. More than half (54.25%) were aware that it boost up immunity against COVID-19 infection and (77.5%) were having good knowledge regarding COVID-19 vaccination, and (36.5%) were afraid of taking COVID-19 vaccine, while (39%) were concerned about its side effects.

Conclusion: The study identified that majority of responders were aware regarding COVID-19 vaccine, still many have doubts & concerns about its potential efficacy and safety thereby providing an important outlook for feasible interventional awareness programs to enhance vaccination rates. The study also identified that the concerns regarding the vaccine adverse effects acted as the leading barrier for vaccine acceptance.

Keywords: Knowledge, awareness, acceptance, COVID-19 vaccination, general population

Introduction

Several vaccines for COVID-19 infection started to arise and near the end of 2020 there are about 100 candidate vaccines globally^[1]. Several vaccines are in the clinical trial phases, and few have already gained emergency use authorization (EUA). There are different perceptions, directions and attitudes toward the vaccine due to the variability in COVID-19 vaccines. Those differences symbolize challenges for governments and public health experts. According to WHO vaccination hesitancy is one of the top ten obstacles for global health^[2]. Amongst others, the hunt for safe and effective vaccines continues across multiple nations while a few countries including India have successfully developed vaccines in less than a year's time frame, started their trial, approved and permitted the mass vaccination drive^[3]. As a part of control measures against COVID-19, vaccines have been launched in India from 16 January 2021, which has been subsequently scaled up in response to the surge of cases starting in April 2021^[4]. The first group of beneficiaries included healthcare and frontline workers, the second group comprising people over 60 years of age (as of January 1st, 2022) and those in the age group of (45-59) years with co-morbid conditions started receiving vaccinations from March 1st, 2021. Subsequently, starting 1 April 2021 and 1 May 2021, all individuals in India aged 45-59 years and 18-44 years have become eligible to receive vaccination, respectively^[5].

The process of registration for the vaccination is done online through the COVID-19 Vaccine Intelligence Network (CO-WIN) portal which is developed with the support of United Nations Development Programme (UNDP). Covishield® (Astra Zeneca's vaccine manufactured by Serum Institute of India) and Covaxin® (manufactured by Bharat Biotech Limited) are the two vaccines that have been granted emergency use authorization by the Central Drugs Standard Control Organization (CDSCO) in India^[6]. In the initial launching phase of the vaccination program, the beneficiaries were advised to receive two doses at a minimum time gap of 28 days. Although the second dose of Covaxin® can be taken four to six weeks after the first, however, the time gap between two doses of the Covishield vaccine has been extended from four-six weeks to four-eight weeks. The vaccine is free and participation in the vaccination drive is voluntary. One can register on the Co-WIN Portal and schedule his/her vaccination appointment or local government health workers at Corona Vaccination Centers (CVCs) can help the beneficiaries with on-the-spot registration, appointment, verification, and vaccination on the same day in case the latter fail to get themselves registered online. Despite these efforts on the governmental end, the public response, particularly, in the early days of the first phase of vaccination was no less than dismal^[6].

While there are considerable enthusiasm and anticipation for the COVID-19 vaccine, little is known about vaccine hesitancy specifically for COVID-19 in the general population. Identifying specific populations and their characteristics with regards to vaccine hesitancy will help serve as key components of a successful vaccination strategy. Thus, this study was aimed to assess the knowledge, awareness and acceptance regarding COVID-19 vaccines among general population of urban Raigarh, Chhattisgarh.

Material and Methods

This was a community based cross sectional study regarding knowledge, awareness & acceptance of COVID-19 vaccine among 400 general population of urban Raigarh, Chhattisgarh, India during the period of April-June 2021. The methodology comprised of primary data collection through survey among selected participants of city by formula $n = Z^2 P (1-P)/d^2$ through multistage random sampling. Sample Size was calculated at 95% confidence level and taking the expected proportion to be 50% as it gives highest sample size

and with an absolute error or precision of 5%, thus by using the formula $n = Z^2 P (1-P) / d^2$ Where n = sample size, $Z = 1.96$ value of the standard normal variant corresponding to level of significance alpha 5%, P = Expected proportion in population (50%), d = Absolute error or precision (5%). The sample size came out to be 384, which was rounded up to 400. By an imaginary line Raigarh city was divided into four zones & two wards has been selected randomly from each zone through lottery method, then fifty households were taken from each ward including both slum & non slum population through systematic random sampling to cover up the total 400 samples. Line listing of wards & household was gathered from municipal corporation Raigarh. Data was collected through pre-designed, pre-tested proforma by face to face interview. The adults from general population ≥ 18 years and who were residents for more than or equal to 1 year were enrolled the study. Those who were not willing to participate & those who did not give complete information and already vaccinated beneficiaries were excluded from study.

Study tool: Proforma included questions pertaining to socio-demographic characteristics ranging from their age, gender, education, occupation, socio-economic status, marital status & residence area. To assess knowledge, awareness and acceptance includes questions regarding COVID-19 vaccination program, types of COVID-19 vaccine, its dosage, interval, availability, accessibility, side effects, protection & questions related to acceptability of vaccine. The study was approved by the Institutional Ethics Committee (IEC) with letter Sr. No./Med./Ethics Commi./2021/110, dated 29/03/2021. Prior informed written consent has been taken from the study subjects.

A pre-designed and pre-tested questionnaire was used for assessment of knowledge among the participants. A total of eight questions were used and a correct answer was awarded 1 point and an incorrect/unknown answer as 0 point. The total knowledge score ranged from 0 to 8, a cut off score of 4 or less was graded as 'poor' and 5 or more as 'good' knowledge. Socio-economic class categorization was done by using modified BG Prasad classification 2020^[7].

Statistical analysis: Data was entered in Microsoft Excel Software checked for its completeness, correctness & analyzed by using SPSS version 21.0. Results on categorical measurements were presented in numbers and percentage. Chi-square tests were used to find the significance of study parameters on categorical scale between two or more groups. P-value of <0.05 has been considered to be statistically significant.

Results

Table 1: Socio-demographic Characteristics of the study population (n=400)

Sr. No.	Characteristics	Number (No.)	Percentage (%)
1.	Age (in years)	18- 29	37.0%
		30- 49	35.7%
		50-69	24.3%
		≥ 70	3.0%
2.	Gender	Male	53.2%
		Female	46.8%
3.	Education	$\leq 12^{\text{th}}$ Standard	42.7%
		Graduate	45.3%
		Post Graduate	9.0%
		No formal education	3.0%
		Student	5.3%
4.	Occupation	Private job	28.7%
		Government job	5.0%

		Health worker	48	12.0%
		Others (Self, Unemployed)	196	49.0%
5	Socio-economic Status	Lower	22	5.5%
		Lower Middle	142	35.5%
		Middle	181	45.25%
		Upper Middle	39	9.75%
		Upper	16	4.0%
6	Marital Status	Married	280	70.0%
		Un married	120	30.0%
7	Area	Slum	233	58.25%
		Non Slum	167	41.75%

The socio-demographic characteristic of COVID-19 vaccinated beneficiaries was depicted in Table 1. Majority (37%) were aged 18-29 years and predominated by young population (mean age 34.3 years \pm 11.8 years) and nearly half (53.2%) were males. Around (45.3%) participants were graduates, while (3%) were found to have no formal schooling. Majority (49%) participants were self-employed followed by (28.7%) were working in private sector. Maximum (45.25%) participants came under middle socio-economic class as per modified BG Prasad classification 2020. Also (70%) participants were married. Total of (58.25%) & (41.75%) were residing in slum & non slum respectively.

Table 2: Knowledge and awareness of the participants regarding COVID-19 Vaccination (N=400)

Sr. No.	Parameters	Correct		Incorrect		Cannot reply	
		No.	%	No.	%	No.	%
1.	COVID-19 vaccination program	309	77.25%	67	16.75%	24	6.0%
2.	Types of COVID-19 vaccine	295	73.75%	78	19.50%	27	6.75%
3.	Regarding total doses & interval of the COVID-19 vaccine	194	74.50%	139	16.75%	67	16.75%
4.	It is available free in India?	338	84.50%	27	6.75%	35	8.75%
5.	It is voluntary in nature, & not mandatory	243	60.75%	86	21.50%	71	17.75%
6.	Regarding side effects	187	46.75%	114	28.50%	99	24.75%
7.	It will protect you from COVID-19 infection	217	54.25%	72	18.0%	111	27.75%
8.	It will protect community from COVID-19 infection	174	43.50%	89	22.25%	137	34.25%

Knowledge and awareness of the participants regarding COVID 19 Vaccination was shown in Table 2. Majority (77.25%) participants knew about COVID-19 vaccination programme, while interestingly (16.75%) did not know about it. Majority (73.75%) were aware about types of COVID-19 vaccine, while (74.5%) knew about dosage & interval of COVID-19 vaccine. Near all (84.5%) participants were aware of COVID-19 vaccine availability and (60.75%) were aware that it is voluntary in nature. About (46.75%) participants knew about common side effects of vaccine. More than half (54.25%) participants were aware that it boosts up immunity against COVID-19 infection, while (43.25%) knew that it also protects the community as a whole against infection.

Table 3: Association of socio-demographic characteristics with the knowledge of the participants

Sr. No.	Socio-demographic Characteristics	Knowledge				Total	p-value
		Good		Poor			
		No.	%	No.	%		
1.	Male	182	45.5%	31	7.75%	213	X ² =15.53 p=0.000081
	Female	128	32.0%	59	14.75%	187	
	Total	310	77.5%	90	22.5%	400	

2.	Age	18- 29 yrs	127	34.25%	21	2.75%	148	$X^2=33.50$ $p<0.00001$
		30- 49 yrs	120	32.5%	23	3.25%	143	
		≥ 50 yrs	63	8.25%	46	19.0%	109	
		Total	310	77.5%	90	22.5%	400	
3.	Marital status	Married	222	55.5%	58	14.5%	280	$X^2=1.706$ $p=0.1914$
		Unmarried	88	22.0%	32	8.0%	120	
		Total	310	77.5%	90	22.5%	400	
4.	Educational status	UG	164	41.0%	17	4.25%	181	$X^2=48.89$ $p<0.00001$
		PG	23	5.75%	13	3.25%	36	
		$\leq 12^{\text{th}}$	108	27.0%	75	18.75%	183	
		Total	310	77.5%	90	22.5%	400	
5.	Occupation	Student	6	1.5%	15	3.75%	21	$X^2=46.03$ $p<0.00001$
		Private job	102	25.5%	13	3.25%	115	
		Govt. Job	12	3.0%	8	2.0%	20	
		Health worker	38	9.5%	10	2.5%	48	
		Others (homemaker/unemployed)	162	40.5%	34	8.5%	196	
		Total	310	77.5%	90	22.5%	400	
6.	Residence Area	Slum	139	34.75%	64	16.0%	203	$X^2=18.22$ $P=0.00002$
		Non Slum	171	42.75%	26	6.5%	197	
		Total	310	77.5%	90	22.5%	400	

Association of socio-demographic characteristics with the knowledge of the participants was depicted in Table 3. Out of total 400 participants, (77.5%) were having good knowledge regarding COVID-19 vaccination, while (22.5%) had poor knowledge. Around (45.5%) male & (32%) female had good knowledge respectively. The level of knowledge decreases with advancing age & found to be (34.25%) in 18-29 years age group, (32.5%) in 29-49 years age group & (8.25%) in ≥ 50 years age group. More than half (55.5%) had good knowledge & (14.5%) had poor knowledge among married & un-married participants respectively although its association was found to be statistically non-significant? Also (41%) of undergraduate participants were found to have good knowledge score, while (18.75%) participants who were $\leq 12^{\text{th}}$ standard were found to have poor knowledge. Interestingly (40.5%) participants who were either home maker or unemployed had good knowledge score. Out of total (42.75%) of non-slum population were having good knowledge, while (16%) of slum population were found to have poor knowledge score. The association between age, gender, education, occupation, residential area and knowledge score were found to be statistically significant ($p<0.05$).

Table 4: Acceptance of COVID-19 Vaccination among the study population (N=400)

Sr. No.	Acceptance of COVID-19 vaccine	Agree		Neutral		Disagree	
		No.	%	No.	%	No.	%
1.	Would take the COVID-19 Vaccine	173	43.25%	119	29.75%	108	27.0%
2.	COVID-19 Vaccine is safe to use	179	44.75%	150	37.5%	71	17.75%
3.	Afraid of taking COVID-19 Vaccine	146	36.5%	164	41.0%	90	22.5%
4.	Concerned about vaccine side effects	156	39.0%	98	24.5%	146	36.5%
5.	Vaccine will stop infection	246	61.5%	64	16.0%	90	22.5%

Acceptance of COVID-19 vaccination among the study population was shown in Table 4. Out of total participants (43.25%) were agreed, (29.75%) were neutral, while (27%) were disagreed to take COVID-19 vaccines. Around (44.75%) participants agreed that COVID-19 vaccine is safe & interestingly (17.75%) did not agree with the same. About (36.5%) of participants were afraid of taking COVID19 vaccine, while (39%) were concerned about its side effects. More than half (61.5%) agreed that COVID-19 vaccination will stop spread of infection, while (22.5%) did not agree with the same.

Discussion

Our study results indicate that nearly three-fourth (77.25%) participants knew about COVID-19 vaccination programme, majority (73.75%) knew about types of COVID-19 vaccine, while (74.5%) knew about dosage & interval of COVID-19 vaccine. Near all (84.5%) participants were aware of COVID-19 vaccine availability and two third (60.75%) were aware that it is voluntary in nature. Around (46.75%) participants knew about common side effects of vaccine. More than half (54.25%) participants were aware that it boosts up immunity against COVID-19 infection; however (43.25%) knew that it also protects the community as a whole against infection. Around (77.5%) were having good knowledge regarding COVID-19 vaccination, while (22.5%) had poor knowledge. Around (45.5%) male & (32%) female had good knowledge respectively. The knowledge score significantly differed among the various socio-demographic variables except the marital status. These findings were in accordance with study conducted by Arumuganainar Suresh *et al.*, where almost all the participants 97.7% knew that the 1st phase of vaccination started on 16th January, 2021. However, one third of the respondents were unaware of the Indian vaccine candidate, the attribute of voluntary/non-mandatory participation in the vaccination program and free-of-cost availability-provisions of the vaccines in India. Nearly a quarter of the participants 22.9% did not know the requirement of a second shot to complete the vaccination schedule. Nine out of ten answered correctly about the two types of vaccines, currently being administered in the country. The respondents were aware of the fact that the beneficiaries in the 1st phase of the vaccination program were the healthcare and frontline workers [8].

In our study, nearly half (43.25%) agreed, (29.75%) opted neither to agree nor disagree, (27%) were disagreed to take COVID-19 vaccine. Around (44.75%) participants agreed that COVID-19 vaccine is safe & interestingly (17.75%) did not agree with the same. Besides, (36.5%) asserted that they were afraid of taking the COVID-19 vaccine, while a neutral-attitude was noted for (22.5%). Responding to the query regarding hesitancy (39%) participants mentioned that their point of apprehension was the possible side effects. More than half (61.5%) agreed that COVID-19 vaccination will stop spread of infection, while around (22.5%) did not agree with the same. While in a study of Arumuganainar Suresh *et al.* seven out of ten responded that they will take the COVID-19 vaccine, while one out of ten disagreed, and two out of ten chose neither. One fourth of the respondents chose neither to agree nor disagree about the safety of the vaccines. However, 65% seconded that the vaccines were safe to use while 8% voiced the other way. Though 70% respondents agreed to get vaccinated, 20% opted neither to agree nor disagree about taking the vaccine. Besides, 30% asserted that they were afraid of taking the COVID-19 vaccine while a neutral-attitude was noted for 22%. Around 44% participants mentioned that their point of apprehension was the possible side effect while three out of ten quoted the insufficiency of clinical trial data. The acceptance score significantly differed among the gender and state category, while the difference was insignificant across other variables [8].

In a similar study of Khan Sharun *et al.*, 55% participants believed that the COVID-19 vaccination will be safe, while only 46.2% believed that it will be effective. In addition to that, participants also expressed uncertainty regarding the safety (38.5%) and effectiveness (45%) of COVID-19 vaccination. However, the majority agreed (68.1%) to the fact that vaccination is the best way to avoid the complications of COVID-19. Almost half of the participants showed positive beliefs towards COVID-19 vaccination and 86.3% were planning to get COVID-19 vaccination, while the remaining participants (13.7%) were not intending to get vaccinated. However, only 65.8% of the participants responded that they will receive vaccination as soon as possible [9].

In another study of Samar Fares *et al.*, majority of the responses regarding COVID-19 vaccination decision reported undecided (51%), while (28%) and (21%) decided no and yes, respectively. Surprisingly, age, governorates, job, educational degree, working in a COVID-19 isolation hospital, and being diagnosed as COVID-19 suspected or confirmed patients were not significant factors for COVID-19 vaccination decision nearly 92% accepted that COVID-19 is a dangerous disease & being vaccinated would help build immunity, and it is a community responsibility to get vaccinated were significantly associated with the vaccination decision^[10].

As the drive started, hesitation and uncertainty upon vaccine inoculation have been seen in the general population. Such dilemmas may exist due to inadequate knowledge and prevalent rumors regarding the side effects of the new vaccines as there are no long-term efficacy results available for both the vaccines. The vaccine has now reached almost all the countries in South Asian countries. Thus, vaccine literacy in the present scenario becomes imperative.

Conclusion

In the context of COVID-19 pandemic, vaccine uncertainty represents a considerable hurdle to execute COVID-19 vaccination programs. The study identified that majority of responders were aware regarding COVID-19 vaccine, still many have doubts & concerns about its potential efficacy and safety thereby providing an important outlook for feasible interventional awareness programs to enhance vaccination rates. The study also identified that the concerns regarding the vaccine adverse effects acted as the leading barrier for vaccine acceptance. The foremost factor that could expand vaccine acceptance is to get abundant and precise health education & facts about the available vaccines. Differences in vaccine awareness were noted along demographic lines in participants with lower knowledge in particular group. Addressing such factors will be crucial to avoid exacerbating health injustice. However, more studies are required preferably in a larger population to get an intuition on the awareness, acceptance & perceptions on the upcoming COVID-19 vaccines. This will assist the decision makers to formulate methodical policy that can aid to execute the programme efficiently.

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