



## A Cross-Sectional Study On Knowledge, Attitude And Practice Of Non-Teaching Staff Towards COVID 19 Vaccines Working In A Private Medical College & Hospital In Kanchipuram During The Initial Phase Of Implementation Of COVID 19 Vaccination

Sakthivel M<sup>1</sup>, Kokila Selvaraj<sup>2</sup>, Harish Narayanan<sup>3</sup>, Vaishnavi K\*, Kowsalya M<sup>4</sup>

<sup>1,4</sup>Postgraduate, <sup>2</sup>Professor & HOD, <sup>3</sup>Assistant Professor,

Department of Community Medicine,

Meenakshi Medical College Hospital & Research Institute, Kanchipuram, Tamil Nadu, India

Meenakshi Academy of Higher Education & Research, Chennai.

### \*Corresponding Author:

**Vaishnavi K**

Assistant Professor, Department of Community Medicine, Meenakshi Medical College Hospital & research Institute, Kanchipuram, Meenakshi Academy of Higher Education & Research, Chennai, Tamil Nadu, India.

Type of Publication: Original Article

Conflicts of Interest: Nil

### Abstract

**Introduction:** As of 29 June 2021, 19.8% people got vaccinated with single dose of COVID vaccine, 4.2% people have got both doses in India. This data suggest that, vaccine coverage is inadequate. Non-teaching staff of tertiary care hospitals are exposed to COVID infection as like health care providers. It becomes important to assess their knowledge, attitude and practice towards COVID vaccines.

**Objectives:** 1. To assess the Knowledge, Attitude and Practice of Non-teaching staff towards COVID 19 vaccines. 2. To assess factors favouring and hindering COVID 19 vaccine acceptance. **Methodology:** This Cross-sectional study was conducted from May to June 2021 among non-teaching staff working in a tertiary care hospital. A Structured and validated questionnaire was used. Data entered in Microsoft excel, results analysed using SPSS 25. **RESULTS:** Among 317 Participants, majority of them 273 (86%) were not vaccinated and only 44 (14%) were vaccinated. Most of them 261 (82%) had below average level of knowledge regarding COVID 19 vaccines. Many of them 190 (60%) had Negative attitude towards COVID vaccination.

**Conclusion:** This cross-sectional study is one of the first attempts in India to assess the knowledge, attitude and practice of COVID-19 vaccine among the nonteaching staff in a Tertiary care hospital and its surprising to see majority of the Non-teaching staff are not vaccinated and are having negative attitude towards COVID vaccination, despite the management's effort to vaccinate all their employees free of cost

**Keywords:** Attitude, COVID 19 vaccine, Knowledge, Practice

### Introduction

Since December 2019, the human race worldwide is facing a major threat in the form of a virus named SARS-CoV-2 (Corona / COVID 19).<sup>[1]</sup> World Health Organization (WHO) declared the outbreak of COVID-19 as a pandemic on 11<sup>th</sup> March 2020.<sup>[2]</sup> This pandemic has affected many aspects of people's life including physical, social, emotional and behavioural wellbeing.<sup>[3,4]</sup>

The government, the public health authorities and health care providers around the world are working meticulously to end this pandemic.<sup>[5]</sup>

Management of COVID 19 at present aims at prevention and control of COVID 19 infection and supportive care for the patients.<sup>[6]</sup> Preventive strategies recommended by WHO are, to follow proper hand hygiene by using alcohol-based hand washes, cough & sneeze etiquette, physical distancing, wearing of proper fitting face masks.<sup>[7]</sup> Apart from this, mass vaccination is an important and promising measure to control the disease.<sup>[5]</sup>

Many studies done worldwide has shown, herd immunity as the only ray of hope against this massive spreading infectious diseases. Herd immunity can be achieved either, through natural infection or by vaccination. Acquiring herd immunity by Natural infection is not practical and also not ethical and this can be achieved only by mass vaccination. The average threshold of COVID 19 herd immunity was found to be 67% and community participation is very much essential to achieve this percentage through mass vaccination. Studies globally represent that people are hesitant to accept this effective vaccine. [8-15] Vaccine hesitancy is reported as one of the major threats to global health by WHO and it needs to be addressed. [16]

The COVID-19 vaccination program was launched in India on 16th January 2021, initially for healthcare and frontline workers followed by the general population more than 18 years of age. [17]

In India as of June 29<sup>th</sup> 2021, 19.8% of people have been vaccinated with a single dose of COVID vaccine, whereas 4.2% of people have got both doses. [18] This data suggests that the COVID vaccine coverage was not adequate as expected during the initial period of implementation. The vaccine acceptance is influenced by multiple factors such as their knowledge and perception about the spread of COVID-19 disease, perceived safety, efficacy of the vaccine, etc. [19-22]

Non-teaching staff of the tertiary care hospitals are equally exposed to COVID infection in hospital premises as any other health care providers and frontline workers. It's essential to understand the common barriers and facilitating factors for vaccine acceptance among them, to improve their vaccination status. There are very few studies on this topic, concentrating on this vulnerable population at present in India. Hence this study was done to assess their Knowledge Attitude and Practice towards COVID 19 vaccines and to assess the factors favouring and hindering their COVID 19 vaccine acceptance.

### Methodology:

This is an Institution-based Cross-Sectional study conducted from May 2021 to June 2021 in a Private Medical College & Hospital located in the Kanchipuram District of Tamil Nadu. Institutional Ethical Committee clearance was obtained before the

start of the study. (Reference number: 81/Community Medicine/IEC/2020)

The target population for the study are the Non-teaching staff working in the institution. Non-teaching staff are the persons employed by educational institutions who have no instructional responsibilities. [23] Attenders, Sanitary workers, Securities, Catering staff, Medical Records Department (MRD) staff, Housekeeping staff & Drivers were included in the study whereas Nurses, Doctors, Postgraduates, Undergraduates, Interns of the institution were excluded. Informed consent was obtained from each participant before administering the Questionnaire.

Sample size calculation was done using the formula  $Z\alpha^2PQ/d^2$  where  $Z\alpha$  is the normal variant, P denotes prevalence, Q denotes 100-Prevalence and d denotes precision. Since it's a novel topic and there was very little literature available, Prevalence was taken as 50 assuming that 50% of the participants had a good level of knowledge in this topic. With absolute precision of 7 and a non-response rate of 10%, the minimum sample required for this study was calculated as 224. Since it's a single institutional study all the staff who consented to participate were included, so a total of 317 Non-teaching staff participated in this study. The sampling technique deployed was Universal sampling.

Data was collected by Interview method, using a structured and validated questionnaire (in open access) with a Cronbach's alpha coefficient value of 0.86, developed by Archana Kumari et al from All India Institute of Medical Science, New Delhi, India was used. [24]

The questionnaire had 39 items in total. To assess the knowledge of the participants regarding COVID vaccines, they were asked to answer 10 pre-framed questions regarding the eligibility of a certain group of people (e.g.: Infants < 1year of age, adults  $\geq$  18 years, people with Diabetes and Hypertension etc ). Scoring was given for those 10 questions, participants scoring  $\leq$  4 are categorised to have below-average level and people scoring 5 to 7 and  $\geq$  8 are categorised to have average and a good level of knowledge regarding COVID vaccines respectively.

Participants who have got at least one dose of the COVID 19 vaccine was considered vaccinated.

Participants who have already been vaccinated with COVID 19 vaccine and who are willing to get vaccinated in future are considered to have a positive attitude towards COVID 19 vaccination.

The final Data was entered in Microsoft Excel and analysed using Statistical Package for Social Sciences software version 25.

The socio-demographic details of the participants were presented as frequencies and percentages. The association between socio-demographic details and the attributes of the study were assessed using a chi-square test with a 95% confidence interval. A p-value of < 0.05 was considered significant in the analysis.

### Results:

Out of 317 Non-teaching staff, the majority 190 (60%) were males. More than half of the study participants 199 (63%) were in the age group of 35 to 60 years. The many of the study participants 271 (85%) were from rural areas. In this study Housekeeping staff 112 (35%) and Securities 80 (25%) were the maximum number of participants. In our study, nearly half of the participants 142 (45%) were uneducated and just 13 (4%) have finished Diploma courses. The complete sociodemographic profile of our study participants is given in Table 1.

### Knowledge Aspect:

A maximum number of non-teaching staff 261 (82%) had a **below-average** level of knowledge. Whereas 15 (5%) of them had an **average** and 41 (13%) of them had a **good level** of knowledge regarding COVID vaccines. This study shows participants residing in Urban areas 15 (33%), participants with Diploma degree 6 (46%) and Attenders working in the college 25 (58%) had better knowledge when compared to their counterparts and this difference was statistically significant (P-value 0.000). Association between Sociodemographic profile and knowledge of the Participants is show in Table 2.

### Practice Aspect:

COVID vaccination coverage in our study participants was found to be very low 44(14%). The vaccination status of the participants are depicted in Figure 1. Majority of the participants from urban area 15 (32%) are vaccinated when compared to the participants residing in Rural areas 29 (11%). Diploma Holders 6 (45%) and attenders in the

college 18 (42%) had better vaccination rate when compared to others. [P value: 0.000] Association between Sociodemographic profile and Vaccination status of the Participants is show in Table 3.

### Attitude Aspect:

Out of 317 total participants, 83 (26%) were willing to take the vaccine, 46 (15%) of them were willing to pay for vaccines and 117 (37%) were willing to recommend COVID vaccines to their friends and families. In this study, 127(40%) of the participants had positive attitude towards COVID 19 vaccination and rest had negative attitude 190 (60%). The factors which favoured and hindered their vaccine acceptance is given in the Table 4. Majority of the participants in the age group of 35 to 60 years 81 (41%)[P value: 0.010], Males 58 (41%) [P value: 0.032], participants from urban area 22 (47%) [P value: 0.002] agreed to recommend COVID vaccines to others when compared to their counterparts. When compared to non-vaccinated males 36 (20%), non-vaccinated females 47 (37%) were willing to take the COVID vaccine [P value: 0.000]. In this study, it is surprising to see that most of the unvaccinated people in the uneducated category 50 (36%) are willing to get vaccinated compared to others [P value: 0.000].

In this study, compared to Males 32(17%), Females 33 (26%) felt that they don't need to follow COVID appropriate behaviours like wearing a mask, sanitising hands and following social distancing after vaccination. [P value: 0.003]. Likewise, many of the catering staff 8 (44%) and participants who have studied up to secondary / higher secondary school 13 (28%) felt that after getting vaccinated they don't need to follow COVID appropriate behaviours when compared to their counterparts [P value: 0.000].

### Sources of information:

Among various sources of information which can influence the participants' opinion regarding COVID vaccination, discussion with friends and family influenced majority of participants 303(96%) whereas social media was least influential 11(4%).

### Discussions:

While many studies have been conducted with interest to this topic prior to the implementation of COVID 19 vaccination program in India, studies after its implementation are scarce. Any national

program which failed to reach its expected amount of target audience will be a massive failure. As the only ray of hope in the prevention of COVID 19 infection, on 2<sup>nd</sup> of January 2021 Central Drug Standard Control Organisation (CDCSCO) granted approval for restricted emergency use of COVID vaccines in India.<sup>[25]</sup> The knowledge and attitude of the participants play a major role in their vaccine acceptance in such emergency situation. Hence this study was done with the objective to assess the knowledge, attitude and practice of Non-teaching staff of a medical college, since they are more prone to get COVID infection.<sup>[26]</sup>

Woefully, majority of our study participants had below average level of knowledge about the COVID 19 vaccines in contrary to the results of study conducted by Md. Saiful Islam et al, in Bangladesh which showed, more than half of the participants 57% had good level of knowledge in this regards. Interestingly, majority of study participants answered correctly for the questions pertaining to eligibility for COVID vaccines in regards to age like infants less than 1 year 301 (95%), children and adolescents less than 18 years 298 (94%), adults more than or equal to 18 years 245 (77%). But, majority of them answered incorrectly for the questions pertaining to eligibility for COVID vaccines with respect to conditions like Diabetes & Hypertension 268 (84%), Pregnancy 271 (85%), Active COVID infection 262 (83%) etc. Since diabetes is a risk factor for severe COVID 19 disease and prognosis and outcome are very bad in diabetics having COVID infection, it is particularly very important for these vulnerable population to get vaccinated. But this lack of knowledge may lead to some catastrophic events in the future.<sup>[27]</sup>

This study shows that only few participants 83(26%) were willing to take COVID vaccines, whereas 44(14%) had already vaccinated and remaining 190(60%) are not willing to get vaccinated. This result is contradictory to the results of the Studies done before the implementation of COVID 19 vaccination program. Which showed majority of participants from India 79.5% to 86.3%, China 72%, Saudi Arabia 67% were willing to take COVID vaccines whenever available. 13,21,22,23 And the results of the studies done in India (52%) and Geneva (72%) after implementation of COVID 19 vaccination.<sup>[28-32]</sup>

Regarding COVID 19 vaccination, discussion with friends and family has influenced majority of our participants 303(96%) and just 11(4%) of the participants were influenced by social media. Study results of Farooq Ahmad Chaudhary et al showed that majority of their participants were influenced by print and news media (52%) followed by social media (24%).<sup>[20]</sup> This disparity in results may be due to the fact that majority of our study participants are from economically weaker section and their access to smartphones and social media are remote.

The facts like Recommendation of COVID vaccination by Physicians and getting vaccinated is a social responsibility to stop COVID 19 transmission are the major favouring factor for vaccination among those who got vaccinated. This is similar to the study findings of Abu-Hena Mostofa Kamal et al.<sup>[33]</sup>

In our study, concerns about the effectiveness of the vaccines and side effects after getting vaccinated are the major factors for hesitance among unvaccinated people. Similar results was seen with other national and international studies.<sup>[34,35]</sup>

Consideration of single institution and sample size are some of the limitations of this study.

### Conclusion:

This study shows a very low coverage of COVID 19 vaccination among the Non-teaching staff. Majority of them had below average level of knowledge and negative attitude about COVID 19 vaccines. Participants from Urban area, participants with Diploma degree and Attenders working in the college had significantly better knowledge than their counterparts. Majority of the participants from the urban area are vaccinated and are willing to recommend COVID 19 vaccines to their friends and families. Compared to females, males are more likely to follow COVID appropriate behaviours even after getting vaccinated. The major source which influenced the participants decision on vaccination was discussion with friends and families. The vaccine is harmless was the fact which favoured majority of the vaccinated participants whereas Unforeseen future effects was the hindering factor for majority of the non-vaccinated participants.

**Table 1: Sociodemographic profile of the participants (n=317)**

S.NO	Sociodemographic profile	Frequency (n = 317)	%
1	Age		
	a) 18 to 34 years	97	31
	b) 35 to 60 years	199	63
	c) > 60 years	21	6
2	Gender		
	a) Males	190	60
	b) Females	127	40
3	Residence		
	a) Rural	271	85
	b) Urban	46	15
4	Education status		
	a) Uneducated	142	45
	b) Primary school	25	8
	c) Middle school	91	27
	d) Secondary / Higher secondary	46	16
	e) Diploma holder	13	4
5	Job / Position they hold in the institution		
	a) Attenders in the college	43	14
	b) Sanitary workers	40	13
	c) Securities	80	25
	d) Catering staff	18	6

e) Medical Records Department staff	12	4
f) Housekeeping staff	112	34
g) Drivers	12	4

**Table 2: Association between Sociodemographic profile and knowledge of the Participants (n=317)**

S.NO	Socio demographic profile	n	Below average level of knowledge	Average level of knowledge	Above average level of knowledge	$\chi^2$	P value
1	Age						
a)	18 to 34 years	97	75 (77%)	3 (3%)	19 (20%)		
b)	35 to 60 years	199	170 (85%)	10 (5%)	19 (10%)	7.34	1.119
c)	> 60 years	21	16 (76%)	2 (9%)	3 (15%)		
2	Gender						
a)	Males	190	161 (85%)	7 (4%)	22 (11%)		
b)	Females	127	100 (79%)	8 (6%)	19 (15%)	2.10	0.349
3	Residence						
a)	Rural	271	231 (85%)	14 (5%)	26 (10%)	18.76	0.000*
b)	Urban	46	30 (65%)	1 (2%)	15 (33%)		
4	Education status						
a)	Uneducated	142	138 (97%)	3 (2%)	1 (1%)		
b)	Primary school	25	18 (72%)	1 (4%)	6 (24%)		
c)	Middle school	91	63 (69%)	9 (9%)	19 (21%)	51.24	0.000*
d)	Secondary / Higher secondary	46	35 (76%)	2 (4%)	9 (20%)		
e)	Diploma holder	13	7 (54%)	0	6 (46%)		

5	Job						
a)	Attenders in the college	43	18 (42%)	0	25 (58%)		
b)	Sanitary workers	40	34 (85%)	4 (10%)	2 (5%)		
c)	Securities	80	63 (79%)	7 (9%)	10 (12%)	107.9	0.000*
d)	Catering staff	18	14 (78%)	1 (6%)	3 (16%)		
e)	MRD staff	12	11 (92%)	0 (%)	1 (8%)		
f)	Housekeeping staff	112	109 (97%)	3 (3%)	0		
g)	Drivers	12	12 (100%)	0	0		

MRD – Medical Records Department

\*Denotes statistically significant value (P < 0.05)

Horizontal summing of each cells will give 100%

**Table 3: Association between Sociodemographic profile and Vaccination status of the Participants (n=317)**

S.NO	Socio demographic profile	n	Not vaccinated	Vaccinated with Single Dose	Vaccinated with Double Dose	x <sup>2</sup>	P value
1	Age						
a)	18 to 34 years	97	78 (80%)	9 (9%)	10 (11%)		
b)	35 to 60 years	199	177 (89%)	10 (5%)	12 (6%)	4.19	0.380
c)	> 60 years	21	18 (86%)	1 (5%)	2 (9%)		
2	Gender						
a)	Males	190	168 (88%)	11 (6%)	11(6%)		
b)	Females	127	105 (83%)	9 (7%)	13 (10%)	2.48	0.289
3	Residence						
a)	Rural	271	242 (89%)	12 (4%)	17 (7%)	16.82	0.000*

b)	Urban	46	31 (67%)	8 (17%)	7 (16%)		
4	Education status						
a)	Uneducated	142	137 (97%)	3 (2%)	2 (1%)		
b)	Primary school	25	23 (92%)	2 (8%)	0		
c)	Middle school	91	71 (78%)	10 (11%)	10 (11%)	39.12	0.000*
d)	Secondary / Higher secondary	46	35 (76%)	3 (7%)	8 (17%)		
e)	Diploma holder	13	7 (55%)	2 (15%)	4 (30%)		
5	Job						
a)	Attendees in the college	43	25 (58%)	10 (23%)	8 (19%)		
b)	Sanitary workers	40	37 (92%)	3 (8%)	0		
c)	Securities	80	68 (85%)	4 (5%)	8 (10%)	66.56	0.000*
d)	Catering staff	18	13 (72%)	0	5 (28%)		
e)	MRD staff	12	11 (92%)	1 (8%)	0		
f)	Housekeeping staff	112	111 (99%)	0	1 (1%)		
g)	Drivers	12	8 (68%)	2 (16%)	2 (16%)		

MRD – Medical Records Department

\*Denotes statistically significant value (P < 0.05)

Horizontal summing of each cells will give 100%

**Table 4: Factors which Favoured and Hindered the participants' vaccine acceptance**

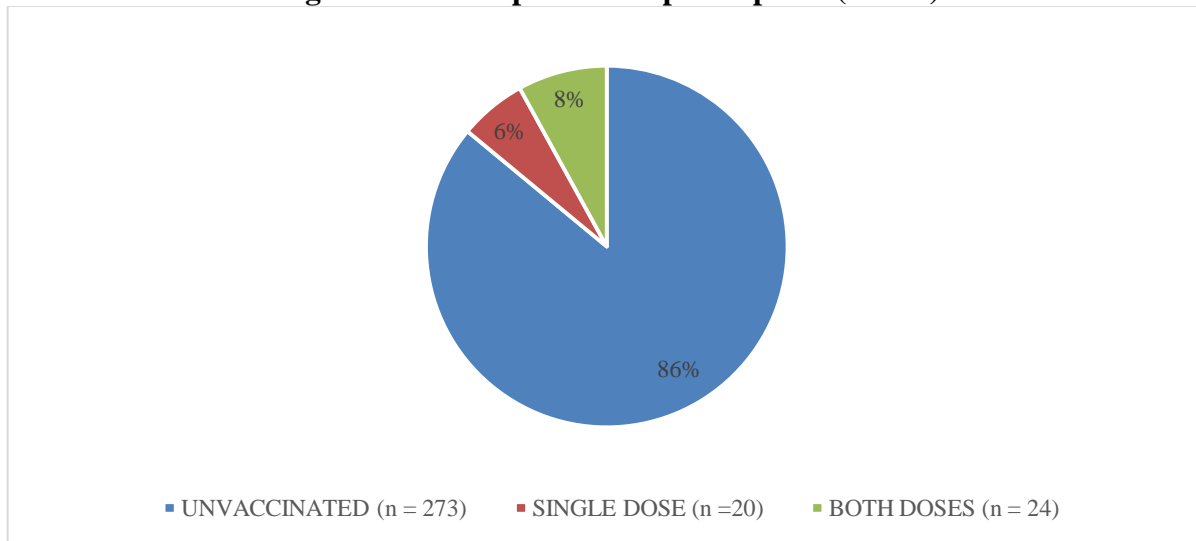
S.NO	Factors favouring COVID 19 vaccine acceptance  n = 127	n (%)	Factors hindering COVID 19 vaccine acceptance  n = 190	n (%)
1	Protects from COVID infection	41(32%)	Immediate side effects of the vaccine	58 (31%)



2	Benefits of COVID vaccine outweighs its risks	34 (27%)	Unforeseen future effects of the vaccine	86 (45%)
3	Many people are taking it	47 (37%)	COVID 19 vaccines are Rapidly developed and approved	78 (41%)
4	Health care workers' Recommendations	43 (34%)	COVID 19 vaccines are faulty and fake	60 (32%)
5	Social responsibility	49 (39%)	COVID 19 Vaccine may not be easily available	67 (35%)
6	The vaccine is Harmless	62 (49%)	COVID 19 vaccines are promoted for commercial gain	75 (39%)

Participants are allowed to choose multiple options, summing of the percentages will not add up to 100%

**Fig 1: Practice aspect of the participants (n=317)**



**References:**

1. Pal M, Berhanu G, Desalegn C, Kandi V. Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2): An Update. *Cureus*. 2020;2. doi:10.7759/cureus.7423.
2. Cucinotta D, Vanelli M. WHO declares COVID-19 a pandemic. *Acta bio-medica Atenei Parm.* 2020;91: 157–160. doi:10.23750/abm.v91i1.9397.
3. Chopra S, Ranjan P, Singh V, Kumar S, Arora M, Hasan MS, et al. Impact of COVID-19 on lifestyle-related behaviours- a cross-

- sectional audit of responses from nine hundred and ninety-five participants from India. *Diabetes Metab Syndr* 2020;14(6):2021e30.
4. Kumari A, Ranjan P, Sharma KA, Sahu A, Bharti J, Zangmo R, et al. Impact of COVID-19 on psychosocial functioning of peripartum women: a qualitative study comprising focus group discussions and in-depth interviews. *Int J Gynaecol Obstet* 2021;152(3):321e7.
5. Koirala A, Joo YJ, Khatami A, Chiu C, Britton PN. Vaccines for COVID-19: the

- current state of play. *Paediatr Respir Rev* 2020;35:43e9.
6. <https://www.cdc.gov/coronavirus/2019-ncov/hcp/therapeutic-options.html> (Last accessed on 11/1/2022)
  7. <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public> (Last accessed on 11/1/2022)
  8. Vignesh R, Shankar EM, Velu V, Thyagarajan SP. Is Herd Immunity Against SARS-CoV-2 a Silver Lining? *Front Immunol.* 2020 Sep 30;11:586781. doi: 10.3389/fimmu.2020.586781. PMID: 33101320; PMCID: PMC7554232.
  9. Frederiksen LSF, Zhang Y, Foged C, Thakur A. The Long Road Toward COVID-19 Herd Immunity: Vaccine Platform Technologies and Mass Immunization Strategies. *Front Immunol.* 2020 Jul 21;11:1817. doi: 10.3389/fimmu.2020.01817. PMID: 32793245; PMCID: PMC7385234.
  10. Anderson RM, Vegvari C, Truscott J, Collyer BS. Challenges in creating herd immunity to SARS-CoV-2 infection by mass vaccination. *Lancet.* 2020 Nov 21;396(10263):1614-1616. doi: 10.1016/S0140-6736(20)32318-7. Epub 2020 Nov 4. PMID: 33159850; PMCID: PMC7836302.
  11. Liu H, Zhang J, Cai J, Deng X, Peng C, Chen X, Yang J, Wu Q, Chen Z, Zheng W, Viboud C, Zhang W, Ajelli M, Yu H. Herd immunity induced by COVID-19 vaccination programs to suppress epidemics caused by SARS-CoV-2 wild type and variants in China. *medRxiv [Preprint].* 2021 Jul 23:2021.07.23.21261013. doi: 10.1101/2021.07.23.21261013. PMID: 34341803; PMCID: PMC8328074.
  12. Correspondent EC CNN Senior Medical Fauci says Covid-19 vaccine may not get US to herd immunity if too many people refuse to get it. CNN; Available at: <https://www.cnn.com/2020/06/28/health/fauci-coronavirus-vaccine-contact-tracing-aspen/index.html>(Last accessed on 11/1/2022)
  13. McBryde ES, Meehan MT, Caldwell JM, Adekunle AI, Ogunlade ST, Kuddus MA, Ragonnet R, Jayasundara P, Trauer JM, Cope RC. Modelling direct and herd protection effects of vaccination against the SARS-CoV-2 Delta variant in Australia. *Med J Aust.* 2021 Nov 1;215(9):427-432. doi: 10.5694/mja2.51263. Epub 2021 Oct 11. PMID: 34477236; PMCID: PMC8662033.
  14. Randolph HE, Barreiro LB. Herd immunity: understanding covid-19. *Immunity.* 2020 May 19;52(5):737-41.
  15. <https://ourworldindata.org/covid-vaccinations> (Last accessed on 1/07/2021)
  16. Harrison EA, Wu JW. Vaccine confidence in the time of COVID-19. *Eur J Epidemiol* 2020;35(4):325e30.
  17. Ministry of Health and Family Welfare. Frequently asked questions. Available from: [https://www.mohfw.gov.in/covid\\_vaccination/vaccination/index.html](https://www.mohfw.gov.in/covid_vaccination/vaccination/index.html); 2021. Last accessed on 1/07/2021)
  18. <https://www.mygov.in/covid-19/> last accessed on 04/06/2021.
  19. Lazarus, J.V., Ratzan, S.C., Palayew, A. et al. A global survey of potential acceptance of a COVID-19 vaccine. *Nat Med* 27, 225–228 (2021). <https://doi.org/10.1038/s41591-020-1124-9>
  20. Chaudhary FA, Ahmad B, Khalid MD, Fazal A, Javaid MM, Butt DQ. Factors influencing COVID-19 vaccine hesitancy and acceptance among the Pakistani population. *Hum Vaccin Immunother.* 2021 Oct 3;17(10):3365-3370. doi: 10.1080/21645515.2021.1944743. Epub 2021 Jul 8. PMID: 34236952; PMCID: PMC8437474.
  21. Kourlaba G, Kourkouni E, Maistreli S, Tsopele CG, Molocha NM, Triantafyllou C, et al. Willingness of Greek general population to get a COVID-19 vaccine. *Glob Health Res Policy* 2021;6(1). 1-0.
  22. Faturhoman T, Kengsiswoyo GAN, Harapan H et al. Factors influencing COVID-19 vaccine acceptance in Indonesia: an adoption of Technology Acceptance Model [version 2; peer review: 2 approved]. *F1000Research* 2021, 10:476

- (<https://doi.org/10.12688/f1000research.53506.2>)
23. <http://uis.unesco.org/en/glossary-term/non-teaching-staff>
  24. Kumari A, Ranjan P, Chopra S, Kaur D, Upadhyay AD, Kaur T, et al. Development and validation of a questionnaire to assess knowledge, attitude, practices, and concerns regarding COVID-19 vaccination among the general population. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews*. 2021;15(3):919–25.
  25. <https://www.icmr.gov.in/COVIDTimeline/cindex.html>
  26. Dev N, Meena RC, Gupta DK, Gupta N, Sankar J. Risk factors and frequency of COVID-19 among healthcare workers at a tertiary care centre in India: a case-control study. *Trans R Soc Trop Med Hyg*. 2021 May 8;115(5):551-556. doi: 10.1093/trstmh/trab047. PMID: 33763687; PMCID: PMC8083760.
  27. <https://www.niddk.nih.gov/health-information/professionals/diabetes-discoveries-practice/talking-covid-vaccine-patients-diabetes>
  28. Islam F, Agarwalla R, Panda M, Alvi Y, Singh V, Debroy A, et al. Assessment of the knowledge, preferences and concern regarding the prospective COVID-19 vaccine among adults residing in New Delhi, India-A cross sectional study. medRxiv [Internet]. 2021; Available from: <https://www.medrxiv.org/content/early/2021/01/26/2021.01.23.21250164> (Last accessed on 11/01/2022)
  29. Khan, Sharun & Rahman, C.K Faslu & C V, Haritha & Jose, Bosco & Tiwari, Ruchi & Dhama, Kuldeep. (2020). COVID-19 Vaccine Acceptance: Beliefs and Barriers Associated with Vaccination Among the General Population in India. *Journal of Experimental Biology and Agricultural Sciences*. 8. S210-S218. doi: 10.18006/2020.8(Spl-1-SARS-CoV-2).S210.S218.
  30. Narapureddy BR, Muzammil K, Alshahrani MY, et al. COVID-19 Vaccine Acceptance: Beliefs and Barriers Associated with Vaccination Among the Residents of KSA. *J Multidiscip Healthc*. 2021;14:3243-3252. Published 2021 Nov 24. doi:10.2147/JMDH.S340431
  31. Wisniak A, Baysson H, Pullen N, Nehme M, Pennacchio F, Zaballa ME, Guessous I, Stringhini S; Specchio-COVID19 study group. COVID-19 vaccination acceptance in the canton of Geneva: a cross-sectional population-based study. *Swiss Med Wkly*. 2021 Dec 14;151:w30080. doi: 10.4414/smw.2021.w30080. PMID: 34908389.
  32. Mathew B. Knowledge, Attitude and Acceptance of Covid-19 Vaccine among General Population in South India. *Indian Journal of Pharmacy Practice*. 2022;15(1):xx–xx.
  33. Kamal A-HM, Sarkar T, Khan MM, et al. Factors Affecting Willingness to Receive COVID-19 Vaccine Among Adults: A Cross-sectional Study in Bangladesh. *Journal of Health Management*. October 2021. doi:10.1177/09735984211050691
  34. Singhanian N et al., Acceptance of coronavirus disease 2019 vaccine among health-care personnel in India: a cross-sectional survey during the initial phase of vaccination, *Clinical Microbiology and Infection*, <https://doi.org/10.1016/j.cmi.2021.03.008>. (Last accessed on 11/01/2022)
  35. Bono SA, Faria de Moura Villela E, Siau CS, Chen WS, Pengpid S, Hasan MT, Sessou P, Ditekemena JD, Amodan BO, Hosseinipour MC, Dolo H, Siewe Fodjo JN, Low WY, Colebunders R. Factors Affecting COVID-19 Vaccine Acceptance: An International Survey among Low- and Middle-Income Countries. *Vaccines (Basel)*. 2021 May 17;9(5):515. doi: 10.3390/vaccines9050515. PMID: 34067682; PMCID: PMC8157062.