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# COVID-19 VACCINE HESITANCY AMONG POST-GRADUATE (P.G) MEDICAL STUDENTS AT S.M.S. MEDICAL COLLEGE, JAIPUR


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| **Dr. Shiwangi Bhardwaj*** | 3rd Year Junior Resident, Department of Community Medicine, Sawai Man Singh Medical College, Jaipur, Rajasthan, India *Corresponding Author |
| **Dr. Mahesh Chand Verma** | Professor, Department of Community Medicine, Sawai Man Singh Medical College, Jaipur, Rajasthan, India |
| **Dr. Hemnandini Pathak** | 3rd Year Junior Resident, Department of Community Medicine, Sawai Man Singh Medical College, Jaipur, Rajasthan, India |
| **Dr. Shyam Lal Meena** | Senior Resident, Department of Community Medicine, RUHS College of Medical Sciences. |



## ABSTRACT

**Background:** India had launched the world's largest COVID-19 vaccination programme with the frontline and health care workers on 16 January 2021. There was significant anxiety and apprehension about the safety, efficacy and side effects of Covid-19 vaccines among health care and frontline workers. **Objective:** To estimate the level of vaccine hesitancy to novel COVID-19 vaccine along with its association with various socio-demographic variables. **Materials and Methods:** The study conducted from April 2021 to August 2021 at SMS Medical College and attached Hospital, Jaipur, among 550 post graduate medical students, using validated semi structured questionnaire. Vaccine hesitancy scores were evaluated in relation to various socio demographic variables using appropriate statistical methods. **Results:** Out of 550 study participants, covid-19 vaccine acceptance was 89% whereas vaccine hesitance was 11%. Vaccine hesitancy scores were high (8%) low (14%) medium (78%) respectively. Main reasons for vaccine hesitancy were safety (60.8%), side effects (46%), efficacy (67%), ethical issues (97.66%) and waiting for more study results Vaccine hesitancy scores were significantly associated with age, gender, residence, service status and working departments of the working residents. **Conclusion:** Covid-19 vaccination of the post graduate medical students is most important because of their high-risk professional working environment.


**KEYWORDS :** Vaccine hesitancy, Covid-19, post graduate medical students

## INTRODUCTION

Coronavirus disease 2019 (COVID-19) is a highly contagious and infectious disease caused by the novel coronavirus, severe acute respiratory syndrome Coronavirus-2 (SARS-CoV-2)1,2. The World Health Organization (WHO) announced that COVID-19 reached pandemic status on 30 January 2020 and subsequently, declared a global pandemic in March 20203.There were approximately 44,681,650 confirmed COVID-19 cases India including 530,728 covid deaths related deaths till, 20 January 2023 with a case fatality rate of 2.2%4.

Prevention and control measures for COVID-19 in the community includes covid appropriate behaviour like hand hygiene, personal protective equipment (PPE), crowd avoidance, social distancing, isolation, school measures/closures, workplace measures/ closures, quarantine, and travel restriction, maintaining effective social distancing at the workplace, and adopting quarantine measures. Vaccination is a very effective approach to reduce morbidity and mortality among the population.5,6

On January 16, 2021, India rolled out the world's largest COVID-19 vaccination drive across 3006 vaccine centres in all its states and union territories7. COVID-19 vaccination in India has been initiated with two types of vaccines: AstraZeneca-Oxford University's Covishield and Bharat Biotech's Covaxin.8

COVID-19 vaccination was first started among HCW and some high risk category persons (above 60 years of age) since HCW are at high risk and serve as ambassadors for evidence-based medical interventions, and they are critical in promoting vaccine acceptance amongst the general population, it is essential to design targeted interventions to improve vaccine acceptance amongst this population.

Vaccine hesitancy refers to delay in acceptance or refusal of vaccination despite availability of vaccination services. It is influenced by factors such as complacency, convenience and confidence. In the 3 Cs model, confidence is defined as trust in (i) the effectiveness and safety of vaccines; (ii) the system that delivers them, including the reliability and competence of the health services and health professionals and (iii) the motivations of policy-makers who decide on the needed vaccines.9

Objective of the study is to find out the estimate of acceptance and hesitance for COVID-19 vaccine among post – graduate medical students of SMS Medical College, Jaipur along with its determinants and their association (if any) with various socio-demographic variables .

## MATERIALS AND METHODS

The prior approval from institutional ethics committee was taken for this descriptive type of observational study conducted over a period of five months from April 2021 to August 2021 at SMS medical college and attached Hospital, Jaipur Rajasthan.

Sample size was calculated at 95% confidence level and study power of 80% assuming prevalence of 24% covid-19 vaccination hesitancy among PG students (as per seed article)10. At an absolute allowable error of 4 %, the required sample size would be 438 subjects, which was further enhanced and rounded off to 550 as final sample size to allow 20% attrition.

### Inclusion Criteria

Post-Graduate medical students working under SMS Medical College and attached hospital, Jaipur and those who will give written informed consent for this study.

**Exclusion Criteria** were non-cooperative PG students or chronic illness and psychiatric disorder among PG students or

not available even after contacting three times.

### Sampling Technique

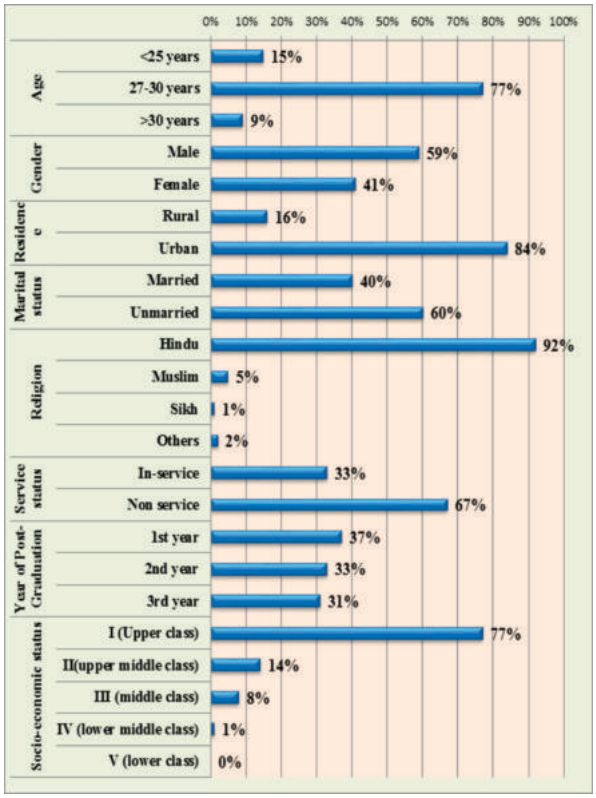
A complete list of study universe that belongs to SMS Medical College and associated hospitals was procured from academic section of SMS Medical College and office of Medical Superintendent, SMS Hospital, Jaipur. Total PG students working at S.M.S. Medical College and attached hospital were (1st year (2018) + 2nd year (2019) + 3rd year (2020)) = (449+400+376) = 1225.

Study participants were selected by Population Proportion Sampling Method to achieve the sample size of 550, then by using simple random sampling technique (simple random table), residents from each department were selected in accordance to their total strength department wise on the basis of the inclusion and exclusion criteria. All randomly selected eligible participants were asked to fill the pre-designed, pre-tested, structured questionnaire having sections for socio-demographic variables , covid vaccination status , reasons of covid 19 vaccine hesitancy.

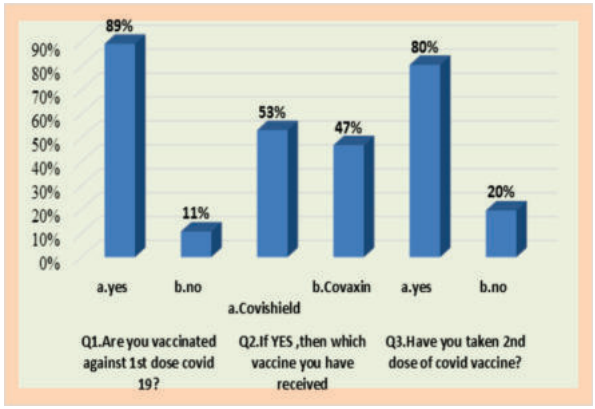
Vaccine Hesitancy Score was calculated on the basis of section of vaccine hesitancy in study proforma taking YES as 1 and NO as 0 and calculated the score as High Score(16-25), Medium Score(9-15) and Low Score(1-8) .Association if any between socio-demographic variables and hesitancy scores were assessed among 550 study participants.

### Statistical Analysis

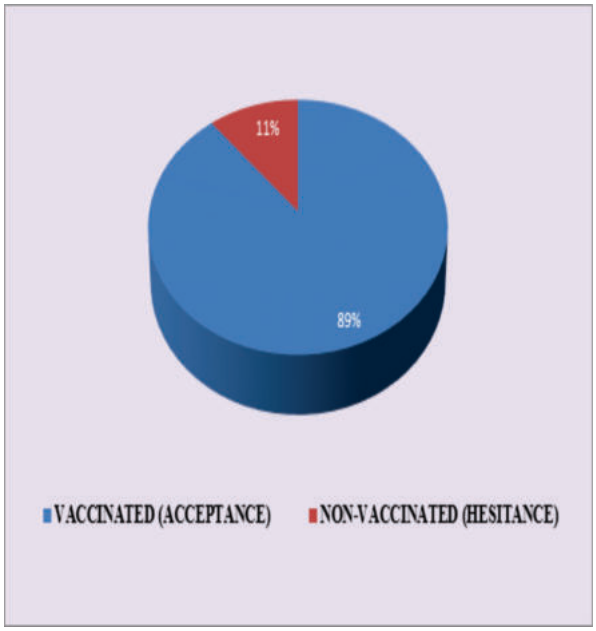
All collected data were entered in an MS excel sheet. Quantitative data were expressed as mean ± standard deviation. Qualitative data were expressed as frequency and percentage. Independent sample t test of significance was used to compare two quantitative data. Chi-square ($\chi^2$) test of significance was used to compare proportions between qualitative parameters. The confidence interval was set to 95%, and the margin of error was accepted at 5%. The $p \leq 0.05$ is considered as a significant.



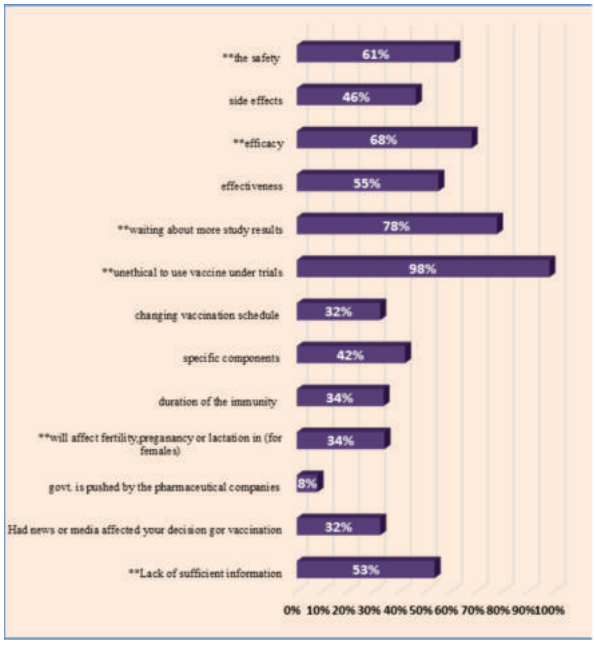

**Graph 1: Socio-demographic Variables Of The Study Participants (n=550)**




**Graph No.2a: Covid-19 Vaccination Status Of The Study Participants (n=550)**




**Graph No.2b: Covid-19 Vaccination Hesitancy Of The Study Participants (n=550)**




**Graph No. 3: Reasons For Covid - 19 Vaccine Hesitancy Among The Study Participants**

**Table No.1: Association Of Covid- 19 Vaccine Hesitancy Score With Socio-demograpic Variables**

| Variables | Categories | Low score(1-8) | | Medium score (9-15) | | High score (16-25) | | Total | | p-value |
|---|---|---|---|---|---|---|---|---|---|---|
| | | NUM. | % | NUM. | % | NUM. | % | NUM. | % | |
| Age | 23-26years | 27 | 33 | 47 | 58 | 7 | 9 | 81 | 100% | 0.001 |
| | 27-30 years | 64 | 15 | 326 | 77 | 32 | 8 | 422 | 100% | |
| | 31-34 years | 5 | 11 | 39 | 83 | 3 | 6 | 47 | 100% | |
| Gender | Male | 47 | 14 | 254 | 78 | 24 | 7% | 325 | 100% | 0.028 |
| | Female | 52 | 22 | 155 | 70 | 18 | 8% | 225 | 100% | |
| Residence | Rural | 22 | 24 | 42 | 47 | 26 | 29% | 90 | 100% | 0.001 |
| | Urban | 74 | 16 | 370 | 80 | 16 | 3% | 460 | 100% | |
| Marital status | Married | 37 | 17 | 168 | 76 | 17 | 8% | 222 | 100% | 0.922 |
| | Unmarried | 59 | 18 | 244 | 74 | 25 | 8% | 328 | 100% | |
| Religion | Hindu | 86 | 17 | 382 | 75 | 40 | 8 | 508 | 100% | 0.4 |
| | Muslim | 5 | 19 | 21 | 78 | 1 | 4 | 27 | 100% | |
| | Sikh | 2 | 22 | 6 | 67 | 1 | 11 | 9 | 100% | |
| | Others | 3 | 50 | 3 | 50 | 0 | 0 | 6 | 100% | |
| Year of post - graduation | Ist year | 38 | 19 | 147 | 73 | 16 | 8% | 201 | 100% | 0.82 |
| | 2nd year | 31 | 17 | 138 | 77 | 11 | 6% | 180 | 100% | |
| | 3rd year | 27 | 16 | 127 | 75 | 15 | 9 | 169 | 100% | |
| Service status | In-service | 42 | 23 | 128 | 71 | 11 | 6 | 181 | 100% | 0.037 |
| | Non -service | 54 | 15 | 284 | 77 | 31 | 8 | 369 | 100% | |
| Socio-economic class | I (Upper class) | 43 | 10 | 357 | 84 | 24 | 6 | 424 | 100% | 0.001 |
| | II (Upper Middle Class) | 40 | 52 | 30 | 39 | 7 | 9 | 77 | 100% | |
| | III (Middle Class) | 11 | 26 | 21 | 50 | 10 | 24 | 42 | 100% | |
| | IV (Lower Middle Class) | 2 | 29 | 4 | 57 | 1 | 14 | 7 | 100% | |
| | V (Lower Class) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100% | |

## RESULT

Socio-demographic characterstics of the participants: All 550 study participants were included in the study and had completed the questionnaire with 100% response rate. The highest proportion (77%) of the respondents were in the age group of 27 to 30 years, with 59% male participants and 84% belonging to the urban residency. 60% were unmarried and majority (92%) were of Hindu religion (as shown in Graph no.1). Nearly 2/3 rd (67%) were non service candidates with about equal proportions in 1 st , 2nd and 3rd year of post – graduation that is 37%, 33%, and 31% respectively. Majority (77%) belonged to the class I (Upper Class) according to the Modified B.G. Prasad's Socio-Economical Classification (Updated, June 2021). Working department wise distribution of the study participants showed that majority were from the department of Anaesthesia 15%, General Medicine 12% , General Surgery 6% ,Gynaecology and Obstetrics 13%, Ophthalmology 2%, Orthopaedics 7%, Paediatrics 9% respectively whereas the other departments proportion was less than 5 % each.

Covid-19 RTPCR status-68% have tested RTPCR covid positive themselves and 64% study participant's family members were RTPCR covid positive. In the current study, majority (59%) of the study participants were RTPCR covid positive before the first dose of vaccination as compared to those who were covid positive in between the two doses of covid vaccination (21%) and who were covid positive after the complete covid vaccination (20%). No such findings could be found among the other studies

Covid-19 vaccine acceptance and hesitance In the present study, vaccine acceptance among the study participants was found to be 89% whereas non-vaccinated study participants with the covid-19 vaccine were 11%. The current study showed that among non-vaccinated (11%) study participants, 8% were of the opinion that they will delay the process of vaccination followed by 2% who will get vaccinated soon with covid-19 vaccine, and 1% refused to get vaccinated with covid 19 vaccine. So, vaccine hesitancy in our study was found to be 11%. Covid 19 vaccinated participants with attitude of delay (8%) had high score of vaccine hesitancy. 80% were vaccinated with the second dose of covid-19 vaccine and 20% were not. (Graph No. 2)

Reasons for vaccine hesitancy and association of vaccine hesitancy scores with socio-demographic variables-As shown in the Graph No.3 in the present study, main reasons for covid-19 vaccine hesitancy among the study participants were safety (61%), side effects (68%), efficacy (46%), effectiveness (55%), waiting for more study (78%) results, unethical to use vaccine under trials (61%). Vaccine hesitancy scores- 8% have high vaccine hesitancy scores, followed by 14% which have low and 78% have medium vaccine hesitancy scores.

Vaccine hesitancy scores were significantly associated with age, gender, residence, service status, socio-economic class and working departments of the post graduate (as shown in Table no.1)

## DISCUSSION

The Covid-19 vaccine acceptance among the study participants was found to be 89% whereas vaccine hesitance was 11 %. The findings were similar to the study by Jain et al.11, Kausar et al.12and Yadav et al.13 where vaccine acceptance among the study participants was 64%, 83% and 67% respectively. It was reported less in the study by Saied et al.14, Kaniyke et al15 and Mose et al.16 37%, 37% and 58% respectively. This may be because of socio-cultural differences of the study areas being Egypt, Uganda and Ethopia respectively.

Vaccine hesitancy findings were in accordance to the study by Kausar et al12 and Mehta et al 17 where it was 17% and 13% respectively because these were the studies of India and similar conditions. High vaccine hesitancy is seen in the studies by Lucia et al.10 (23%) which, Saied et al. 14(46%) and Mose et al 16 (41.2%) which were conducted in U.S.A., Egypt and Ethopia respectively.

In the present study, 53% of the study participants preferred Covishield vaccine in comparison to Covaxin which was preferred by 47% (from among those who were vaccinated).This was in accordance with the study by Jain et al.11where 45.2% were vaccinated with Covishield vaccine and 19.9% with Covaxin.

The findings related to the reasons of vaccine hesitancy were in accordance to the study by Saini et al.18 where 79% were doubtful about safety, 74% effectiveness, 57% duration of

immunity, 18.7% thought that govt. is pushed by the pharma companies. Fear of side effects was seen 82.3% in study by Jain 52 et al, 71.9% by Kausar et al.12. Similarly lack of trust seen in 74% in the study by Saied et al.14. Other findings were in accordance with the study by, Kaniyke et al15, Lucia et al 10 and Mehta et al17 .

Maximum (9%) of the high vaccine hesitancy score is seen in the <25 yrs of the age group of the study participants followed by the 8% in the 27-30 years and 6% in the >30 years of the age group. Similar findings were found in the study by Kausar et al.12. and Rostkowka et al 19 et al where vaccine hesitancy is found to be decreasing with the increasing age.

Gender wise, males being less hesitant (7%) than female participants(8%).The findings were in accordance to the study by , Kaniyke et al15. (Uganda) and Saini et al.18.Similarly, study by A.A.Dror et al.20 had found positive association between male sex and acceptance of COVID-19 vaccination.

The participants with rural backgrounds were having high vaccine hesitancy (29%) in comparison to urban background study participants. Similar findings were seen in the subjects of the study by Mose et al16. 24%, 14% and 6% high covid-19 vaccine hesitancy was seen in SES (socio-economic class) class III, II and I respectively. This was in accordance with the study by Saied et al.14

High covid-19 vaccine hesitancy scores was seen in majority of the participants form the non clinical departments such as Anatomy(25%), Biochemistry(15%), Forensic medicine (13%), Physical medicine and Rehabilitation(20%) whereas Lesser proportion of covid -19 hesitance was seen among participants from the clinical departments such as Anaesthesia (1%), Gynaecology & Obstetrics(7%), Ophthalmology(5%) and Pediatrics (0%) as the majority of them are more exposed to the infection in comparison to the non-clinical departments. Findings were in accordance to the study by Edelsburg G. et al 21 (Israel) reported the similar pattern of vaccine hesitancy.

## LIMITATIONS

The study was carried out among post-graduate resident doctors at SMS Medical College and attached hospital of Jaipur which limits on generalizability of the data. The vaccine hesitancy and acceptance patterns may perhaps change in future as new information on COVID - 19 vaccines become available and added during the period of pandemic on daily basis which may influence respondent's attitude.

## CONCLUSION

Post-graduate resident doctors are the future practising doctors and their approach and attitude towards vaccination and other public health measures is highly significant to cater with a greater impact on population. Overall, the post-graduate medical students belong to high vaccine acceptors for covid-19 vaccination. Only few (11%) had vaccine hesitancy and among them 8% had the attitude of delaying and 1 % refused for vaccination .

1. This study highlights the need for education and awareness for newer vaccination in order to further decrease vaccine hesitancy among them.
2. Vaccine hesitancy (if any) is to be dealt with proper and timely intervention for their safety and proper protection.

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**Conflict of Interest:** None declared.

## REFERENCES

1. Kahn, J. S., and McIntosh, K. (2005). History and recent advances in coronavirus discovery. Pediatrics. Infect. Dis. J. 24, S223–S227. doi: 10.1097/01.inf.0000188166. 17324.60 discussion S226
2. Song, Z., Xu, Y., Bao, L., Zhang, L., Yu, P., Qu, Y., et al. (2019). From SARS to MERS, thrusting coronaviruses into the spotlight. Viruses 11:59. doi: 10.3390/v11010059
3. World Health Organization [WHO] (2023e). WHO Coronavirus Disease (COVID-19) Dashboard. Available online at: https://covid19.who.int/ (accessed December 20 jan,2023)
4. Coronavirus Outbreak in India. Available from: https:// www.covid19india.org. [Last accessed on 2021 Jul 4].
5. Güner R, Hasanoglu I, Aktas F. COVID-19: prevention and control measures in community. Turk J Med Sci. 2020;50(SI–1):571–577.
6. Rappuoli, R., Miller, H. I. &Falkow, S. The intangible value of vaccination. Science 297, 937–939 (2002). 5. Centers for Disease Control and Prevention
7. Immunization, Vaccines and Biologicals, World Health Organization [online], http://www.who.int/immunization/en/ (2011).
8. India rolls out the world's largest COVID-19 vaccination drive. https://www.who.int/india/news/feature-stories/ detail/india-rolls-out-the-world-s-largest-covid-19vaccination-drive. [Last accessed on 2021 Apr 1].
9. SAGE Working Group on Vaccine Hesitancy. Report of the SAGE working group on Vaccine hesitancy 12 November 2014*. https:// doi.org/10.4172/2155-9821.1000161
10. Lucia VC, Kelekar A, Afonso NM. COVID-19 vaccine hesitancy among medical students. J Public Health, 2020;43:445-9.
11. Jain J, Saurabh S, Kumar P, Verma MK, Goel AD, Gupta MK, et al. COVID-19 vaccine hesitancy among medical students in India. Epidemiology Infect 2021;149:e132
12. Kausar A , Shaista Parveen S , Afreen U , Hussain S et al Vaccine Perception: Acceptance, Hesitancy, Beliefs And Barriers Associated With COVID□19 Vaccination Among Medical Students. European Journal of Molecular & Clinical Medicine (EJMCM) ISSN: 2515-8260 Volume 08, Issue 04, 2021
13. Yadav A ,Kansara N ,Nimbhorkar S,Kotwal A , Ghosh , BobdeyS et al., © 2021 Medical Journal of Dr. D.Y. Patil Vidyapeeth,November 20, 2022, IP: 241.253.171.237 | Published by Wolters Kluwer – Medknow
14. Saied SM, Saied EM, Kabbash IA, Abdo SA.et al., Vaccine hesitancy: Beliefs and barriers associated with COVID-19 vaccination among Egyptian medical students, J Med Virology 2021;93:4280-91.
15. Kanyike AM, Olum R, Kajjimu J, Ojilong D, Akech GM, Nassozi DR, et al. Acceptance of the coronavirus disease-2019 vaccine among medical students in Uganda. Trop Med Health 2021;49:1-11.
16. Mose A, Haile K, Timerga A (2022) COVID-19 vaccine hesitancy among medical and health science students attending Wolkite University in Ethiopia.,17(1): e0263081PLOS ONE | https://doi.org/10.1371/journal.pone.0263081 January 25, 2022
17. Mehta K, Dhaliwal BK, Zodpey S, Loisate S, Banerjee P, Sengupta P, et al. (2022) COVID-19 vaccine acceptance among healthcare workers in India: Results from a cross-sectional survey. PLOS Glob Public Health 2(7): e0000661. https://doi.org/10.1371/journal.pgph.0000661
18. Saini, et al. Shipra Saini1 , Pooja Goyal2 , Mitasha Singh3 , Charu Kohli4 , Mithilesh Kumar Prevalence and determinants of vaccine hesitancy for coronavirus disease 2019 vaccine among healthcare workers of tertiary care center in North India Asian Journal of Medical Sciences | Mar 2022 | Vol 13 | Issue 3
19. Rostkowska OM, Peters A, Montvidas J, Magdas TM, Rensen L, Zgliczy□ski WS, et al. Attitudes and knowledge of european medical students and early graduates about vaccination and self-reported vaccination coverage – Multinational cross-sectional survey. Int J Environ Res Public Health 2021;18:3595.
20. Amiel A. Dror1,2 · Netanel Eisenbach1,2 · Shahar Taiber4 · Nicole G. Morozov4 · Matti Mizrachi1,2 · Asaf Zigron2,3 · Samer Srouji2,3 · Eyal Sela1,2 Vaccine hesitancy: the next challenge in the fght against COVID-19 2020 /Published online: 12 Springer Nature B.V. 2022
21. Edelsburg A and BadarnaKeywan H (2022) Physicians' Perspective on Vaccine-Hesitancy at the Beginning of Israel's COVID-19 Vaccination Campaign and Public's Perceptions of Physicians' Knowledge When Recommending the Vaccine to Their Patients: A Cross-Sectional Study