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COVID-19 vaccine hesitancy among school children aged 12-14 years: A cross-sectional study from Bhubaneswar, Odisha, India

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Abstract

Introduction: Universal coverage of COVID-19 vaccines is of paramount importance for the prevention and control of the pandemic. World Health Organization (WHO) in 2019 declared vaccine hesitancy as one of the top ten global health threats. The study aims to find out the COVID-19 vaccine hesitancy among school children along with their parent's perspectives.

Methodology: A cross-sectional study was conducted among school children (aged 12-14 years) at two schools in Bhubaneswar, Odisha. Data were collected via web-based links using a semi-structured questionnaire among students and their parents.

Results: Of 343 children, 79% (271) showed a strong willingness to get vaccinated. Around 91.8% (315) of parents agreed to get their children vaccinated. Fear of side effects (65.2%) was the most common reason for unwillingness.

Conclusions: With only 1/5 of the children not willing to get vaccinated, policymakers should create a multi-centric effort for the universal coverage of the COVID-19 vaccination.

Key words: COVID-19; vaccine hesitancy; school; students; children.

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Introduction

The global pandemic of coronavirus disease 2019 (COVID-19) has been responsible for over 622,389,418 confirmed cases and 6,548,492 deaths worldwide till mid-October 2022 [1]. During this time when the world is trying to cope with the catastrophic effects of the COVID-19 pandemic, COVID-19 vaccination is a critical tool for the control and prevention of vaccination [2]. However, an individual's knowledge and attitude about the disease and available vaccines determine the efficiency of the vaccination programme, specifically vaccine uptake, and coverage. India is more challenged than developed nations in reducing COVID-19 cases and lowering death rates due to its huge population and unprepared healthcare system. India started its vaccination drive on 16 January 2021 and has vaccinated more than 90% of eligible persons with at least one dose of vaccination. Vaccination for youth between 15 and 18 years began on 3rd January 2022 and the development of vaccines for children below 15 years is in full swing but less is known about vaccine hesitancy among them. However, an individual's knowledge and attitude about the disease and available vaccines determine the efficiency of the vaccination programme, specifically vaccine uptake, and coverage [3].

In the global fight against COVID-19, vaccination hesitancy and acceptance have surfaced as major challenges [4]. The Strategic Advisory Group of Experts (SAGE), a working group of the World Health Organization (WHO), has defined vaccine hesitancy as "the delay in acceptance or refusal of vaccines despite availability of vaccine service" [5]. Even before the COVID-19 pandemic, the WHO had named vaccine hesitancy as one of the top ten global health concerns [6]. This study aims at understanding the COVID-19 vaccine hesitancy among school children aged 12-14 years of age and their parent's perspectives.

Methodology

Study design and setting

A cross-sectional study was conducted among school children aged 12-14 years between 23 February 2022 and 10 March 2022. Two schools (one private and one government-run) were selected randomly from Bhubaneswar, Odisha. Inclusion criteria: students from

the respective schools who were in the age range from 12 to 14 years. Exclusion criteria: students who were unwilling or their parents were unwilling to take part in the study. Taking social distancing into consideration, data was collected from children as well as their parents using a semi-structured questionnaire via web-based links. Assent and consent were taken from the children as well as their parents respectively prior to data collection. The questionnaire was explained to the respective class teachers, and they were given the responsibility of ensuring all children and their parents filled up all the parameters by themselves without any confusion. The sample size was calculated to be 320 using the proportion of willingness for vaccination from a previous study in India [7] as 70.44% and considering a 95% confidence interval and a 5% alpha error.

Study tool

A semi-structured questionnaire was used to collect data regarding socio-demographic profile, COVID-19 profile, knowledge and attitude of children and parents towards vaccination. The socio-demographic profile contained data regarding age, gender, parents' occupation and income. COVID-19 profile contained the history of COVID-19 infection of children and their parents and vaccine uptake of parents.

Statistical Analysis

All sets of data were downloaded via google forms and stored using MS-excel. Statistical analysis was done using SPSS version 23.

Table 1. Sociodemographic characteristics, history of COVID-19 infection history and willingness of children and their parents toward COVID-19 vaccination.

Variables		Total N = 343 (%)	Government School N = 178 (%)	Private School N = 165 (%)	*p* value
Age Groups	12	37 (10.8)	14 (7.9)	23 (13.9)	
	13	152 (44.3)	76 (42.7)	76 (46.1)	0.089
	14	154 (44.9)	88 (49.4)	66 (40)	
Gender	Male	189 (55.1)	94 (52.8)	95 (57.6)	0.370
	Female	154 (44.9)	84 (47.2)	70 (42.4)	
Religion	Hindu	321 (93.6)	168 (94.4)	153 (92.7)	0.532
	Muslim	22 (6.4)	10 (5.6)	12 (7.3)	
Family type	Nuclear	216 (62.9)	111 (62.4)	105 (63.6)	0.820
	Joint	127 (37.1)	67 (37.6)	60 (36.4)	
Father's Occupation	Professional	208 (60.6)	121 (68)	87 (52.7)	
	Semi-professional	108 (31.5)	41 (23)	67 (40.6)	0.002
	Skilled	27 (7.9)	16 (9)	11 (6.7)	
Mother's Occupation	Professional	53 (15.5)	31 (17.4)	22 (13.3)	
	Semi-professional	13 (3.8)	9 (5.1)	4 (2.4)	0.218
	Skilled	37 (10.8)	15 (8.4)	22 (13.3)	
	Homemaker	240 (70.0)	123 (69.1.)	117 (70.9)	
Annual Family Income (in INR)	≤ 300,000	86 (25.1)	72 (40.4)	14 (8.5)	0.000
	> 300,000	257 (74.9)	106 (59.6)	151 (91.5)	
Previously infected with COVID-19 (Children)	Yes	73 (21.3)	38 (21.3)	35 (21.2)	0.970
	No	270 (78.7)	140 (78.7)	130 (78.8)	
Previously infected with COVID-19 (Parents)	Father	47 (13.7)	23 (12.9)	24 (14.5)	
	Mother	16 (4.7)	5 (2.8)	11 (6.7)	0.010
	Both	53 (15.5)	19 (10.7)	34 (20.6)	
	None	227 (66.2)	131 (73.6)	96 (58.2)	
Parents Fully Vaccinated	Father	11 (3.2)	6 (3.4)	5 (3)	
	Mother	8 (2.3)	3 (1.7)	5 (3)	0.590
	Both	315 (91.8)	166 (93.3)	149 (90.3)	
	None	9 (2.6)	3 (1.7)	6 (3.6)	
Vaccine Taken	Covaxin	252 (73.5)	126 (70.8)	126 (76.4)	
	Covishield	76 (22.2)	47 (26.4)	29 (17.6)	0.142
	Sputnik V	6 (1.7)	2 (1.1)	4 (2.4)	
	None	9 (2.6)	3 (1.7)	6 (3.6)	
Children Knowledge about COVID-19 Vaccines	Yes	322 (93.9)	169 (94.9)	153 (92.7)	0.390
	No	21 (6.1)	9 (5.1)	12 (7.3)	
Children's Willingness to get vaccinated	Yes	271 (79.1)	140 (78.7)	131 (79.4)	0.860
	No	72 (20.9)	38 (21.3)	34 (20.6)	
Willingness of parents to get their child vaccinated	Yes	315 (91.8)	167 (93.8)	148 (89.7)	0.160
	No	28 (8.2)	11 (6.2)	17 (10.3)	

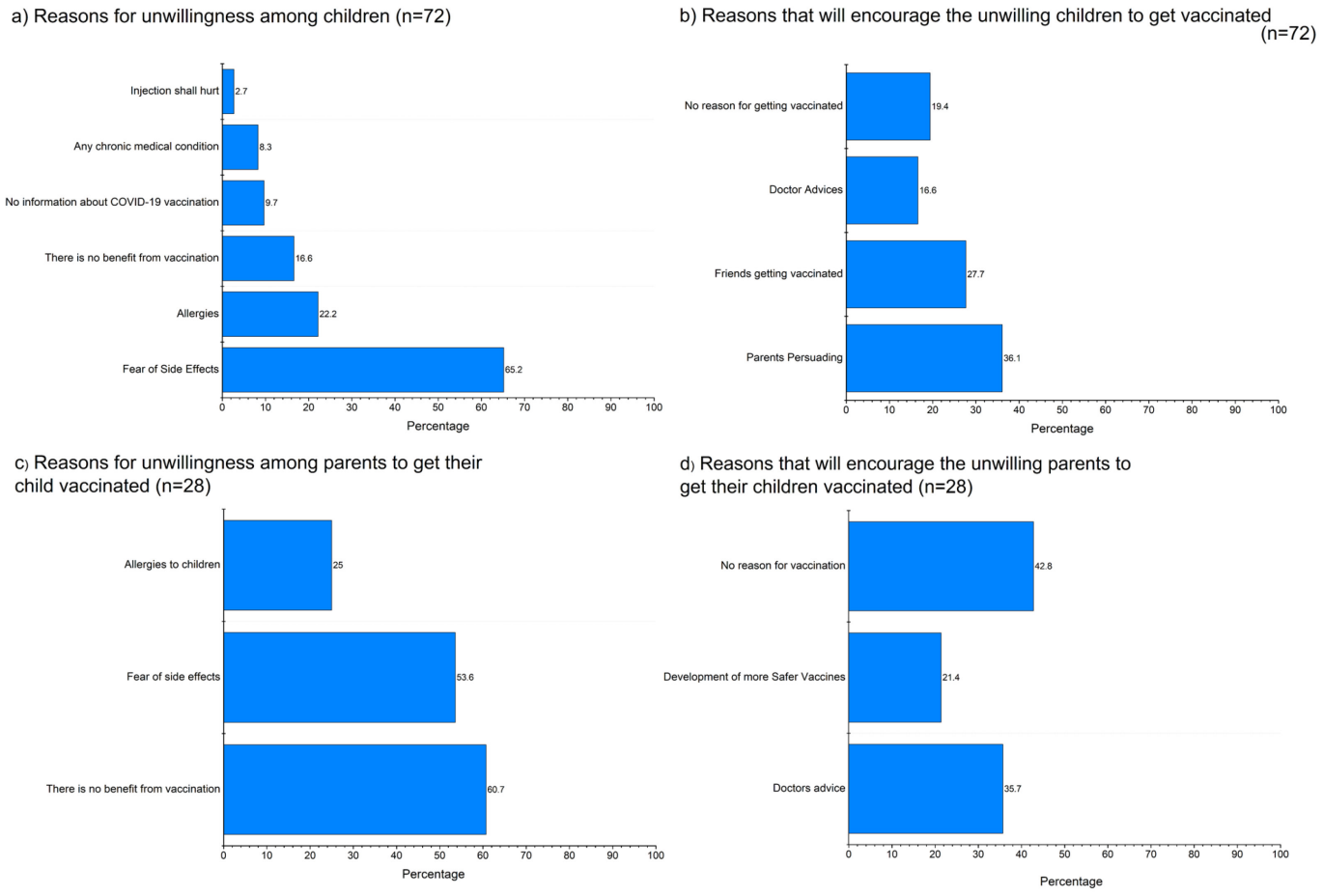
Results

A total of 343 responses were collected and analysed both from children and their parents. Around 51.9% (n = 178) of the children were from government school and the rest were from a private school (48.1%). The mean age of the children was 13.34 ± 0.66 years. Of the total participants, 55.1% were males and 44.9% were females. The mean age of the fathers and mothers were 43.21 ± 4.27 years and 39.05 ± 4.34 years respectively. Predominantly the children were from Hindu (93.6%) families. Overall, a greater number of children belonged to the nuclear family (n = 216) than the joint family (n = 127), which was also seen in both government and private schools. The occupation of fathers was divided into professional (60.6%), semi-professional (31.5%), and skilled workers (7.9%). The most common occupation of the mothers was in the category of homemaker (70%). The annual family income of 257 (74.9%) families was more than INR 300,000 (Table 1).

A total of 73 (21.3%) children were previously infected with COVID-19. About 33.8% of the families had at least one parent with COVID-19 infection. Complete vaccination among both parents was found to be 91.8% with a marginally higher proportion in the government school than in the private school. BBV-152 (Covaxin) (73.5%) was the most commonly received vaccination followed by AZD1222 (Covishield) (22.2%). A total of 9 families were found to be having none of their parents vaccinated and 19 families were only one among the parents who were vaccinated.

Among the children, 93.9% (n = 322) were having knowledge about vaccination against COVID-19 i.e., if they had ever heard about COVID-19 vaccines and if they know why it was given. The overall willingness among children toward COVID-19 vaccination was 79.1%. There was no significant difference between the willingness of children in the government and private schools. Parents' willingness (91.8%) to get their children vaccinated was higher than overall children's willingness. The willingness was slightly higher in a

Figure 1. Reasons for unwillingness and encouragement for COVID-19 among children 12-14 years and their parents. **a**) Reasons for unwillingness among children, **b**) Reasons that will encourage the unwilling children to get vaccinated, **c**) Reasons for unwillingness among parents to get their children vaccinated, and **d**) Reasons that will encourage the unwilling parents to get their children vaccinated.



government school (93.8%) than in a private school (89.7%) but was statistically insignificant. The most common reason for the 72 children who were unwilling to receive COVID-19 vaccines was fear of the side effects of vaccination (65.2%) (Figure 1). Parents persuading their children (36.1%) was found to be one of the best encouraging factors for children followed by friends getting vaccinated (27.7%) and doctors' advice (16.6%). About 60% of the parents who were unwilling to get their children perceived that there was no benefit from vaccination.

Discussion

As with other respiratory viruses, children play an important role in the transmission of COVID-19 [8]. Even if the pandemic deaccelerates, without appropriate immunity, it is likely to regenerate and spread. The spread of COVID-19 could be prevented if herd immunity is achieved which requires pediatric immunization. Vaccination of children will prevent both the children from COVID-19 infection as well as protect others from infection by halting the spread of the virus. Therefore, COVID-19 vaccination uptake among children must be known and improved if epidemic control is to be achieved. The present study focused on both the children as well the parent's willingness toward COVID-19 vaccination where it was found more than 90% of the parents accepted to get their children vaccinated. This positive data provides confidence for the government to implement vaccination strategies among children in the near future to achieve universal vaccination. In contrast to our study, another study in India found only 33.5% of willingness among parents [9]. Our study involved schools only from urban areas whereas the above study involved both urban and rural areas. A survey in England showed 12.9% unwillingness among children toward vaccination [10]. Another study in Saudi Arabia found 47.6% willingness among parents [11]. A systematic review on parents' willingness to be 61.40%, ranging from 21.6% to 91.4% across countries and regions [12]. No study from India was included in the study.

Fear of side effects was found to be the most common reason for unwillingness among children. A detailed study to assess the knowledge of children about the side effects of vaccination would be the next step. Another study in India showed that 78.2% of the unwillingness was caused due to the same reason above [9]. The study also mentions other reasons like lack of information and safety concerns which are also in line with our study. Another study in Gujarat, India found a few other reasons such as religious influence, willingness to pay, and misinformation which could play a role in vaccine hesitancy [13]. The study also found similar results as the fear of side effects being a common reason among children. Few of the parents asked for newer and safer vaccines in our study. In a study in Brazil, 34% were concerned about the safety of vaccines [14]. To investigate the facilitators and barriers to childhood vaccination uptake, as well as the drivers of vaccine hesitation, refusal, and delay, a complex, multidisciplinary approach including science, engineering, and social sciences should be used [15]. The demographic groups that have been the most severely affected by the pandemic have the highest percentages of apprehension against a future COVID-19 vaccination [16].

The strength of our study was that it was conducted in a government as well as in a private school. But it has a few limitations. As the study was conducted online so only those children and their parents with access to the internet took part in the study and convenience sampling only from urban areas was done.

Conclusions

Our study performed in the urban region of Bhubaneswar showed optimistic results with high vaccine acceptance among children in the age group of 12-14 years and their parents. It's extremely important to educate people especially children about side effects to lessen the fear of these, especially in light of the way misinformation can spread across groups of co-workers, friends, and families as well as between healthcare workers and patients. A multi-disciplinary, multi-centric effort may be recommended to encourage equitable uptake of potential COVID-19 vaccines. Populations may require tailored outreach initiatives with access to credible sources of information.

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Authors' Contributions

SP, DB, NA and GCD designed the study. DP, HRC, ARM and MP coordinated and collected the samples. AK, NA and GCD did the statistical analysis. NA, GCD, SK, and DB wrote the manuscript. All authors have read and approved the final manuscript.

References

1. World Health Organisation (2022) Coronavirus disease (COVID-19). Available: https://covid19.who.int/. Accessed: 18 October 2022.
2. Mangla S, Zohra Makkia FT, Pathak AK, Robinson R, Sultana N, Koonisetty KS, Karamehic- Muratovic A, Nguyen US, Rodriguez-Morales AJ, Sanchez-Duque JA, Zamba PT (2021) COVID-19 vaccine hesitancy and emerging variants: Evidence from six countries. Behav Sci (Basel) 11:148.
3. Samanta S, Banerjee J, Kar SS, Ali KM, Giri B, Pal A, Dash SK (2022) Awareness, knowledge and acceptance of COVID-19 vaccine among the people of West Bengal, India: a web-based survey. Vacunas: S46-S55.
4. Wang Q, Yang L, Jin H, Lin L (2021) Vaccination against COVID-19: A systematic review and meta- analysis of acceptability and its predictors. Prev Med 1: 106694.
5. Dubé E, Bettinger JA, Fisher WA, Naus M, Mahmud SM, Hilderman T (2016) Vaccine acceptance, hesitancy and refusal in Canada: Challenges and potential approaches. Can Commun Dis Rep 42: 246.
6. Feemster KA (2020) Building vaccine acceptance through communication and advocacy. Hum Vaccin Immunother 16: 1004-6.
7. Kishore J, Venkatesh U, Ghai G (2021) Perception and attitude towards COVID-19 vaccination: A preliminary online survey from India. J Family Med Prim Care 10: 3116.
8. Yılmaz M, Sahin MK (2021) Parents' willingness and attitudes concerning the COVID-19 vaccine: A cross-sectional study. Int J Clin Pract 75: e14364.
9. Padhi BK, Satapathy P, Rajagopal V, Rustagi N, Vij J, Jain L, Chakrapani V, Patro BK, Kar SS, Singh R, Pala S, Sankhe L, Modi B, Bali S, Kiran T, Goel K, Aggarwal AK and Gupta M (2022) Parents' perceptions and intention to vaccinate their children against COVID-19: Results from a cross-sectional national survey in India. Front. Med 9: 806702.
10. Fazel M, Puntis S, White SR, Townsend A, Mansfield KL, Viner R, Herring J, Pollard AJ, Freeman D (2021) Willingness of children and adolescents to have a COVID-19 vaccination: Results of a large whole schools survey in England. EClinicalMedicine 40: 101144.
11. Temsah MH, Alhuzaimi AN, Aljamaan F, Bahkali F, Al-Eyadhy A, Alrabiaah A, Alhboob A, Bashiri FA, Alshaer A, Temsah O, Bassrawi R (2021) Parental attitudes and hesitancy about COVID-19 versus routine childhood vaccinations: a national survey. Front Public Health 13: 1513.
12. Chen F, He Y, Shi Y (2022) Parents' and guardians' willingness to vaccinate their children against COVID-19: A systematic review and meta-analysis. Vaccines 10: 179.
13. Tolia V, Renin Singh R, Deshpande S, Dave A, Rathod RM (2022) Understanding factors to COVID-19 vaccine adoption in Gujarat, India. Int J Environ Res Public Health 19: 2707.
14. Bagateli LE, Saeki EY, Fadda M, Agostoni C, Marchisio P, Milani GP (2021) COVID-19 vaccine hesitancy among parents of children and adolescents living in Brazil. Vaccines 9: 1115.
15. Olusanya OA, Bednarczyk RA, Davis RL, Shaban-Nejad A (2021) Addressing parental vaccine hesitancy and other barriers to childhood/adolescent vaccination uptake during the coronavirus (COVID-19) pandemic. Front Immunol 12: 855.
16. Alfieri NL, Kusma JD, Heard-Garris N, Davis MM, Golbeck E, Barrera L, Macy ML (2021) Parental COVID-19 vaccine hesitancy for children: vulnerability in an urban hotspot. BMC Public Health 21: 1-9.

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