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ORIGINAL ARTICLE

COVID-19 Vaccine Hesitancy Among Parents of Children Aged Between 15 Years and 18 Years: A Cross Sectional Study

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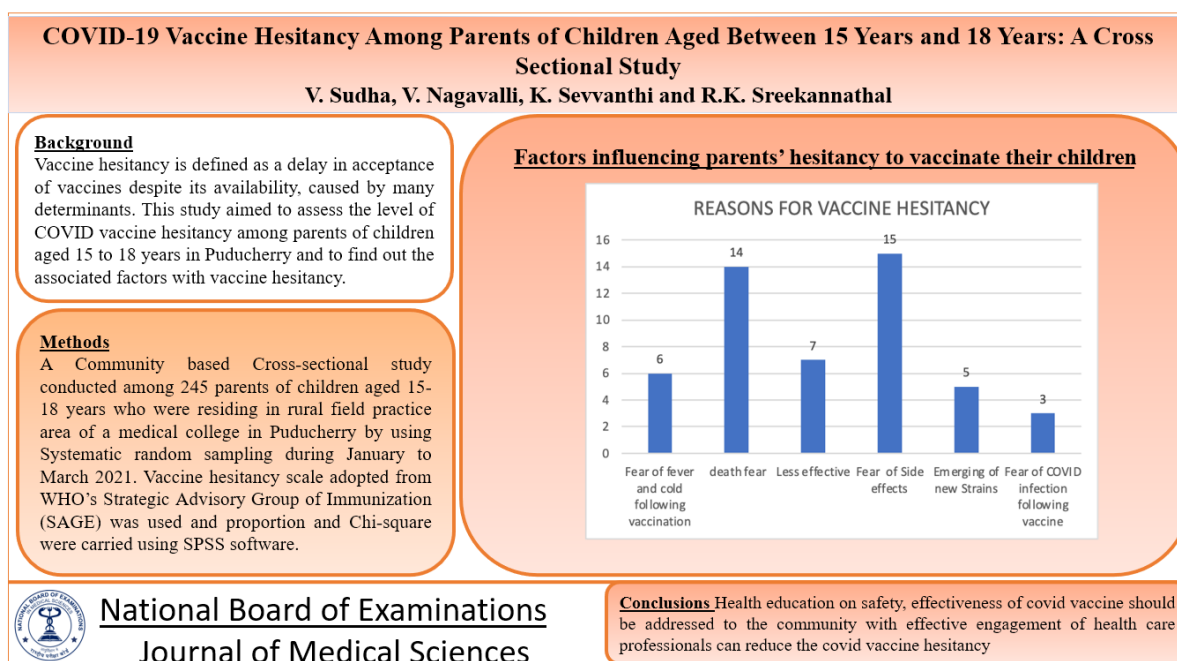
Abstract

Background and Objectives: Vaccine hesitancy is defined as a delay in acceptance of vaccines despite its availability, caused by many determinants. This study aimed to assess the level of COVID vaccine hesitancy among parents of children aged 15 to 18 years in Puducherry and to find out the associated factors with vaccine hesitancy. **Materials and Methods:** A Community based Cross-sectional study conducted among 245 parents of children aged 15- 18 years who were residing in rural field practice area of a medical college in Puducherry by using Systematic random sampling during January to March 2021. Vaccine hesitancy scale adopted from WHO's Strategic Advisory Group of Immunization (SAGE) was used and proportion and Chi-square were carried using SPSS software. **Results:** The mean age of the participants were 48 years with standard deviation of 7.3. Of the overall participants, 159 (64.6%) were females and 87 (35.4%) were males. Around 20.3% of parents had hesitation in vaccinating their children. Higher proportion of the parents mentioned the fear of death and side effects are the reasons for not vaccinating their children. **Conclusions:** Health education on safety, effectiveness of covid vaccine should be addressed to the community with effective engagement of health care professionals can reduce the covid vaccine hesitancy.

Keywords: COVID 19, Vaccine hesitancy, Parents, Children, Vaccine hesitancy scale

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Graphical Abstract



Introduction

The novel Corona Virus disease 2019 (COVID-19) pandemic, caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-Co V-2) has led to increasing causes and death rates, and constrained the health care system worldwide [1]. According to World Health Organization (WHO), around 135.05 million positive cases and 2.91 million deaths were reported. To prevent further spread, precautions like maintaining 1 meter distance from others, wearing mask, cleaning hands with alcohol-based sanitizers advises has been provided by Ministry of Health and Family Welfare [2–4].

In order to control the pandemic and to help to enhance the immune system an effective and safe vaccination development is expected to save countless lives. In April 2020, the World Health Organization issued a statement: “Immunization saves millions of lives every year and it is widely

recognized as one of the World’s most successful and cost-effective health interventions”. Vaccines has reduced mortality and morbidity of several preventable diseases 2–3 million every year [5]. Despite the benefits there is still a chance of developing adverse effects like pain at the site of injection, fever, myalgia, dizziness and other life- threatening allergic reactions. In India, three vaccines were granted for emergency use of authorization by Central Drug Standard Control Organization (CDSCO), viz., Covidsheild, Covaxin is known as vaccine hesitancy, resulting the priority groups as they are at higher risk (Health care and frontline workers, Persons over 60 years of age, 45 to 59 years with comorbid conditions, Populations above 45 years, and all eligible citizens above 18 years completed their vaccine schedule and on 3rd January, 2022 it has been announced that age group between 15–18 year children are eligible for vaccination schedule [6]. In case of

young generation, parent's hesitancy towards vaccinations plays a major role. "A complex and context-specific delay in acceptance or refusal of vaccination despite availability influenced by factors such as communication, context, complacency, convenience and confidence (5C) in delay or refusal of vaccination is known as vaccine hesitancy [7–9]. From parents' perspective, hesitancy in vaccinating their children may arise from various factors such as, lack of awareness, education, religious beliefs, adverse effects, sociology-economic condition and so on. Therefore, reaching the parents of the above age group who remain hesitant to be vaccinated is important to control the outbreak.

Materials and Methods

Study design

Cross-Sectional Study

Study population

Parents of children aged between 15 years and 18 years

Sample size

The sample size of 245 was calculated using the formula $4pq/d^2$, with the expected prevalence of vaccine hesitancy as 42% which was obtained from a survey conducted in Jan 2021 [10] and with the absolute precision of 6%.

Sampling Technique

Systemic random sampling.

In a rural field practice area, 1452 households were initially listed. The sampling interval was calculated and

sample size was 245. First household was selected randomly by lottery method and every 6th household was selected. If eligible participant was not available or the door was closed, the adjacent house with eligible participant were selected.

Selection criteria

Parent of children aged between 15 years and 18 years who residing in the rural field practice area for more than 6 months.

Study tool

Vaccine hesitancy scale (VHS), adopted from WHO's Strategic Advisory Group of Immunization (SAGE)

Statistical tool

Data were analyzed using SPSS version 29. Categorical variables were summarized as frequently and percentage. Continuous variables were summarized with mean + standard deviation. Chi-square test was performed to assess the association between socio-demographic variables and hesitancy. P value less than 0.05 was considered as statistically significant throughout the study.

Results

A systematic sample of 246 parents, who residing in the rural field practice area of a tertiary care hospital were included in this study. The mean age of the participants were 48 years with standard deviation of 7.3. Of the overall participants, 159 (64.6%) were females and 87 (35.4%) were males. Most of the parents were daily labors (41.1%) and 95.5% living with their spouse (Table 1).

Table1. Distribution of study participants based on Socio-demographic details

Demographic characteristics		Frequency	Percent %
Age	<40	29	11.8
	40-50	136	55.3
	50-60	72	29.3
	>60	9	3.7
Education	Illiterate	17	6.9
	Primary school	33	13.4
	Middle school	75	30.5
	High school	39	15.9
	Higher secondary school	20	8.1
	Graduate	38	15.4
	Post graduate	24	9.8
Religion	Hindu	12	5
	Muslim	5	2
	Christian	229	93
Occupation	Unemployed	4	1.6
	Housewife	95	38.6
	Daily labour	101	41.1
	Health care workers	5	2
	Professional	41	16.7
Marital Status	Living with spouse	235	95.5
	Separated	1	0.4
	Widowed	10	4.1

Parental Hesitancy on Vaccination

Table 2 shows percentages of vaccine hesitancy among parents, around 20.3% of parents had hesitation in vaccinating their children. About 90.2% of them thought vaccine can protect and only

9.8% thought vaccine cannot protect their children. About 85% of parents accepting all the recommended COVID 19 vaccines to their children. This study showed that 4.1% of the parents refused to get vaccination.

Table 2. Distribution of responses of the Vaccine hesitancy scale (VHS) by the study participants

Parental Hesitancy			
Characteristics		Frequency	Percentage %
Do you think vaccine can protect children from covid 19?	Yes	222	90.2
	No	24	9.8
Do you think that most parents like to have their children vaccinated with all the recommended vaccine for COVID 19?	Yes	209	85.0
	No	37	15.0
Have you ever been hesitant to get a vaccination for you children?	Yes	50	20.3
	No	196	79.7
Have you ever refused a vaccination for your child?	Yes	10	4.1
	No	236	95.9
Has, distance, timing of clinic, time needed to get to clinic or wait at clinic, and / or costs in getting to clinic prevented your children immunized?	Yes	7	2.8
	No	239	97.2
Are there other pressures in your life that you from getting your children immunized on time?	Yes	5	2
	No	241	98
Are there any reasons you can think of why children should not be vaccinated?	Yes	24	9.8
	No	222	90.2
Have you ever received any negative information about vaccinations?	Yes	134	54.5
	No	112	45.5
Do leaders in your community support vaccinations for infants and children?	Yes	228	92.7
	No	18	7.3

Parental Perception

Table 3 shows the details on the parents' perception on vaccination. Among the 246 parents 135 (54.9%) strongly agreed that the COVID 19 vaccination was important for their child's health and only 24 (5.8%) were disagreed. Around 126 (51.2%) of the parents were strongly agreed that COVID 19 vaccines were effective. 13.4% were strongly agreed that their child

did not need vaccine and 38.6% were concerned on the serious side effects of the vaccine.

Table 4 shows the details on the association of vaccine hesitancy and different demographic variables. Age, gender and education had statistical association with Vaccine hesitancy, since the P value less than 0.05.

Table 3. Distribution of responses based on parent's perception on COVID vaccine

Parent's perception on COVID 19 Vaccine	Strongly disagree n (%)	Disagree N (%)	Agree N (%)	Strongly agree n (%)
Important for child's health	12 (4.9)	12 (4.9)	87(35.4)	135 (54.9)
Effective	9 (3.7)	15 (6.1)	96 (39.0)	126 (51.2)
Follow doctor's recommendation in vaccination	14 (5.7)	42 (17.1)	102 (41.5)	88 (35.8)
Best way to protect from COVID 19	16 (6.5)	25 (10.2)	108 (43.9)	97 (39.4)
Received reliable information about the vaccine	9 (3.7)	6 (2.4)	76 (30.9)	155 (63.0)
Vaccinating children is important for the health of others	14 (5.7)	19 (7.7)	96 (39)	117 (47.6)
Child does not need vaccine	88 (35.8)	99 (40.2)	26 (10.6)	33 (13.4)
New vaccines have more risks	64 (26)	94 (38.2)	40 (16.3)	48 (19.5)
Concerned about side effects of vaccine	58 (23.6)	23 (9.3)	70 (28.5)	95 (38.6)

Table 4. Association Between Demographic Variables and Vaccine Hesitancy

		Vaccine hesitancy		Total (n=246)	Chi-square value	P value
		Yes (n=50)	No (n=196)			
Age	<40	11	18	29	15.11	0.001*
	40-50	16	120	136		
	50-60	20	52	72		
	>60	3	6	9		
Sex	Male	10	77	87	6.482	0.01*
	Female	40	119	159		
Religion	Hindu	43	185	228	4.819	0.09
	Muslim	3	3	6		
	Christian	4	8	12		
Education	Illiterate	7	10	17	22.115	0.001*
	Primary school	12	21	33		
	Middle school	13	62	75		
	High school	5	34	39		
	Higher secondary school	8	12	20		
	Graduate	3	35	38		
	Post graduate	2	22	24		
Occupation	Unemployed	2	2	4	2.366	0.669
	Housewife	20	75	95		
	Daily labour	19	82	101		

	Health care workers	1	4	5		
	Professional	8	33	41		
Marital status	Living with spouse	50	185	235	2.937	0.230
	Separated	0	1	1		
	Widowed	0	10	10		

The reasons mentioned for not vaccinating their children is given in

Figure 1. Higher proportion of the parents had the fear of death and side effects.

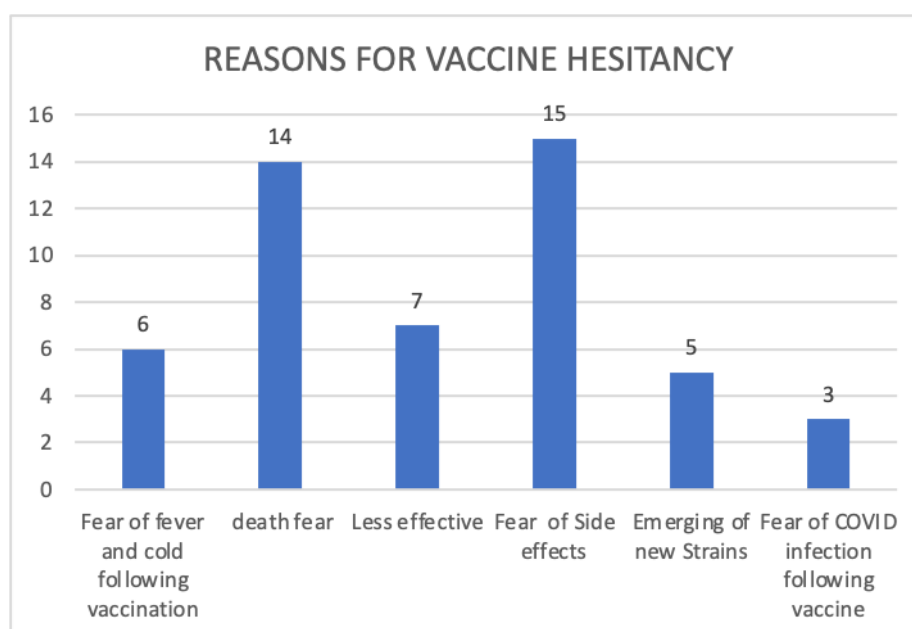


Figure 1. Factors influencing parents' hesitancy to vaccinate their children.

Discussion

The most effective way of prevention and to reduce the burden of COVID-19 pandemic is vaccination. In our cross-sectional study on COVID-19 vaccine hesitancy among parents of children aged 15–18 years, we found that one fifth of the participants were hesitant to have their children vaccinated against

COVID-19, while lesser prevalence of vaccine hesitancy was observed in the studies conducted by Bagateli et al. [11] (2.8%), Hopfer et al. [12] (11%), Kadam et al. [13] (3.3%), Bonuk et al. [14] (10%). On the other hand, the higher prevalence of vaccine hesitancy was seen in the study conducted by Ali et al (45%) [15], Xu et al.

[16] (67.4%), Al-Qerem et al. [17] (48.4%) and Ruiz et al. [18] (78.8%).

In our study female participants were more (65%) than the male participants (35%) similar results were seen in Temsah et al. [19] (65%). On contrary, Male participants were more in study conducted by Abedin et al. [20] in Bangladesh. The higher rate of female participants was seen in Hopfer et al. [12] (98%) and Bagateli et al. [11] (85%), studies conducted in Brazil and Saudi Arabia respectively.

In this study, nearly 75% of the study participants were higher secondary below as their educational status which was similar to Danabal et al. [21] (79.7%) study. The education level of our participants hesitancy rate of parents in higher secondary education and below showed 74.4%. A study conducted by Xu et al. [22] in China showed hesitancy rate of 57.8% in parents with education status of higher secondary and below. A study Wang et al. [23] study in China showed hesitancy rate of 30.5% in parents with education status of higher secondary and below Danabal et al. [21] study in Tamil Nadu observed hesitancy rate of 79.7% in parents with education status of higher secondary and below. On the contrary, Delgado et al. [24] conducted a study among Mexican population showed hesitancy rate of 11.3% in parents with education status of higher secondary and below.

The study done by Ali et al. [15], McElfish et al. [25], Bagateli et al. [11] in relation with age of the parents and hesitancy towards COVID vaccination showed significance whereas, the study done by Ebrahimi et al. [26] was not significant which was similar to our study.

The study done by Danabal et al. [21], Ebrahim et al. [26], in relationship with sex of the parents and hesitancy

towards COVID vaccination were found to be significant while the study conducted by McElfish et al. [25], Ali Met Al. [15], Bagateli et al. [11] found no significance which was similar to our study results. The study done by Danabal et al. [21] in relation with occupation of the parent and vaccine hesitancy found to be significant where in contrast to our study. The study conducted by Temsah et al. [19], Ali et al. [15], Bagateli et al. [11] found no significance which was similar to our study which also carried no significancy.

When we assessed the reasons for hesitancy, regarding fear of death USAID found only 5% whereas our study it was 28%. In comparison with the reason regarding less effective against COVID-19 vaccination study conducted by Fisher et al. [27],²⁷ in United States shows 20%, sage journals conducted national wide says 9.2%, Bonuck et al. [14], reported 48% and UNICEF observed 21% whereas our study showed 14%. In comparison with the reason regarding an unknown illness after years USAID showed 19% whereas our study shows 6%. We found that 10% of our educated parents said strains keep changing and there won't be use of the old vaccine. In comparison with the reason regarding concern about the side effects/safety, Celia Fisher et al. [27], in United States reported 33%, Hyunju Lee et al. [28], in Korea reported 90.4% Bonuck et al. [14] at statewide DD networks reported 88.7%, Sage journals national wide reported 56.5%, Kitro et al. [29] conducted study in Thailand reported 75.9% whereas in our study it was 24%. In comparison with the reason regarding the fear of getting infected from COVID-19 vaccine Bonuck et al. [14] conducted statewide DD Networks reported 18.8% whereas in our study it was only 6%.

Conclusion

Nearly one fifth of the study participants were hesitant to vaccinate their children. Various sociodemographic factors had direct and indirect effects towards vaccination among study participants. Health education on safety, effectiveness of covid vaccine should be addressed to the community with effective engagement of health care professionals can reduce the covid vaccine hesitancy.

Statements and Declarations

Conflicts of interest

The authors declare that they do not have conflict of interest.

Funding

No funding was received for conducting this study.

Authors' Contributions

Conceptualization: VS;
Methodology: VN; Formal Analysis: KS;
Data Collection: SK Writing—Original Draft Preparation: VS and SK; Writing—Review and Editing: VS. All authors have read and approved the final version of the manuscript and agree to its publication.

Informed Consent

Written informed consent was obtained before starting the data collection from the participants privacy were maintained and respected.

Ethical Approval

Approval for conducting this study was obtained from the Institutional Ethical committee (IHEC No: AV/IEC/2022/058), this project was considered to have less than minimal risk.

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