

# Vaccine Hesitancy and Views About COVID-19 Among Teachers in Belize

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## Abstract

*This study examined vaccine hesitancy and the views about COVID-19 among teachers in Belize. A quantitative descriptive cross-sectional survey and correlational study was conducted using an online survey via Qualtrics with three sections - Demographics, Hesitancy, and Views. Data collected from 351 teachers indicated that vaccine hesitancy was lower among teachers prior to COVID-19, but increased during the early part of the pandemic (summer 2021). Factors that were significantly related to teachers' COVID-19 vaccine hesitancy included safety of vaccines, believing vaccines protect from serious diseases, believing there are other (better) ways to prevent diseases, as well as gender and ethnicity. The main reasons for the hesitancy were teachers' belief that they were healthy, concern about the side effects of the vaccine, and lack of trust in the vaccine's effectiveness. This study's findings emphasize the importance of vaccine campaigns to target hesitant groups, especially teachers, and to promote accurate information related to vaccines and COVID-19.*

**Keywords:** Belize, Corona vaccine, COVID-19, teachers, vaccine hesitancy

## Introduction

The Coronavirus Disease of 2019 (COVID-19) affected the world and countries had to rapidly strategize on the best way forward to treat symptoms and prevent widespread outbreaks of the disease. The cause of COVID-19 that started in Wuhan, China, in December 2019 was identified as the Severe Acute Coronavirus 2, SARS-CoV-2 (Umakanthan et al., 2021). The World Health Organization (WHO) declared the spread of the virus as a global pandemic on March 11, 2020 (Cucinotta & Vanelli, 2020). The first case of the COVID-19 pandemic in the Caribbean region was reported on March 10, 2020 in Jamaica where initial cases were largely attributed to imported cases and from cruise ships (Razai et al., 2021). Shortly thereafter, the first case of COVID-19 was identified in Belize on March 22, 2020 (Government of Belize, Press Office, 2020a).

Vaccines were developed and recommended for the prevention of severe symptoms that the SARS-CoV-2 and its variants can cause. The first vaccine authorized and used in the United States (US) was BNT162b2 (Pfizer-BioNTech) with the first doses administered on December 14, 2020 (Hatcher et al., 2022). Other vaccines were developed in the US and other countries, such as England, China, and Cuba. Hatcher et al. (2022), in their comprehensive review of published articles on clinical trials of the coronavirus vaccines, established that "COVID-19 vaccination, particularly with the mRNA vaccines, is an important tool for preventing COVID-19 morbidity and mortality among fully vaccinated persons aged 16 years and older,

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including among vulnerable populations” (p. 27). At first, the vaccines were scarce, but even when they were available for the general public, many individuals were hesitant to take the vaccines (Razai et al., 2021; Dhama et al., 2021). It was ascertained that vaccine hesitancy exists in various countries (Eberwein et al., 2021) as well as in special groups, such as medical students (Gao et al., 2021) and teachers (Estrela et al., 2022). Various studies indicated that the main reasons for the hesitancy were safety, efficacy, and knowledge of the vaccines (Lockyer et al., 2021; Gao et al., 2021). The refusal of getting vaccinated or the delay in doing so exposes the individual to contracting the disease and increases the virus transmission in the community (Freeman et al., 2020; Kricorian et al. 2021). The spread of the SARS-CoV-2 in schools was a major concern during the pandemic and many countries, including Belize, closed schools as a strict measure to contain the virus. It was believed that to return to full-scaled face-to-face learning, a high vaccination rate among teachers would be required (Estrela et al., 2022).

In an Amandala newspaper article from an interview with the Belize Minister of Education, Honorable Francis Fonseca, it was reported that teachers, among other groups, had reservations in taking the vaccines, but were encouraged to do so in order to participate in face-to-face learning (“Vaccinations Aren’t mandatory for teachers”, 2021). Information on vaccine hesitancy among teachers of Belize was not readily available. Hence, this quantitative study sought to determine the prevalence of vaccine hesitancy and views about COVID-19 among teachers in Belize. Four research questions were formulated to address this purpose:

1. How prevalent was vaccine hesitancy among teachers in Belize?
2. Which factors were significantly related to teachers’ COVID-19 vaccine hesitancy?
3. Why were teachers hesitant in taking the COVID-19 vaccine?
4. What are teachers’ views about COVID-19?

## **Review of Related Literature**

### ***COVID-19 Pandemic***

The transmission of the SARS-CoV-2 virus occurs through human-to-human interaction, i.e., direct, contact with oral, nasal, and eye mucous membranes, and airborne by the inhalation of droplets from coughs and sneezes (Umakanthan et al., 2021). The clinical manifestations of COVID-19 include fever, cough, malaise in mild cases to acute respiratory distress syndrome, and shock. Kricorian et al. (2021) found that in the US, based on a national survey conducted, the most susceptible population to contract COVID-19 were older adults, especially males, with higher death rates for 65-74-year-olds compared to 18-29-year-olds. In the Caribbean, Umakanthan et al. (2021) noted that the median age of COVID-19 patients was 55 years, especially due to complications resulting from chronic disorders and decline in immune function. Morey (2021) indicated that in Belize between March 2020 to October 25, 2021, the highest hospitalizations due to COVID-19 complications were among 50-69-year-olds. He also shared that 44% of deaths occurred among 50-69-year-olds compared to 7% among 20-39-year-olds. In this period, there were more male deaths (306), as compared to female deaths (193), linked to comorbidities such as diabetes and chronic renal failure (Morey, 2021).

COVID-19 has had an impact on the health system, economy, and schooling in Belize. In initial efforts to educate the populace on the treatment of the COVID-19 disease, the Ministry of Health and Wellness announced that there were no specific treatments or cure for COVID-19 and that unauthorized products of medications and herbal medicines advertised through social media can adversely affect health and wellness of patients (Government of Belize, Press Office, 2020b). Throughout the pandemic, the Government of Belize provided frequent updates, preventive strategies, and quarantine measures to the nation. The preventive measures included active surveillance, border controls, state of emergency curfews, school closure, and restrictions for social/recreational activities (Government of Belize, Press Office, 2020b).

Across the world, vaccines were researched so that their development and rapid deployment could end the pandemic in an effort to alleviate the burdens on health systems and economies. Due to the rapid spread of the disease and the severe clinical manifestations, the COVID-19 vaccines were critical to combat the disease

(Umakanthan et al., 2021). Belize received its first vaccine, AstraZeneca/Oxford, through the Pan American Health Organization's (PAHO) assistance on March 31, 2021 (Government of Belize, Press Office, 2021). Other vaccines such as Pfizer, Janssen (Johnson & Johnson), and Sinopharm (Beijing) were eventually available in Belize. With the rollout of the vaccination program in Belize, public officers, frontline workers, and teachers were encouraged to obtain the recommended doses of the vaccines ("Vaccinations Aren't mandatory for teachers", 2021).

### ***Vaccine Hesitancy – Contributing Factors & Prevalence***

Vaccine hesitancy is a complex issue relating to the delay in accepting or refusing a vaccination even when it is available (MacDonald & SAGE, 2015; Razai et al., 2021). Prior to COVID-19, vaccine hesitancy was a concern for countries and organizations involved with immunization campaigns leading the WHO to include it as one of the top ten threats to global health (WHO, 2019). It is viewed as an obstacle to an immunization program aiming to vaccinate individuals to lessen the transmission of an infection (Murdan et al., 2021; Dhama et al., 2021). Vaccine hesitancy became more pronounced during the COVID-19 pandemic as individuals had apprehensions about the vaccines and authorities were concerned that those individuals who are not vaccinated could act as reservoirs of the SARS-CoV-2 virus, which could further propagate the spread of the disease (Dhama et al., 2021).

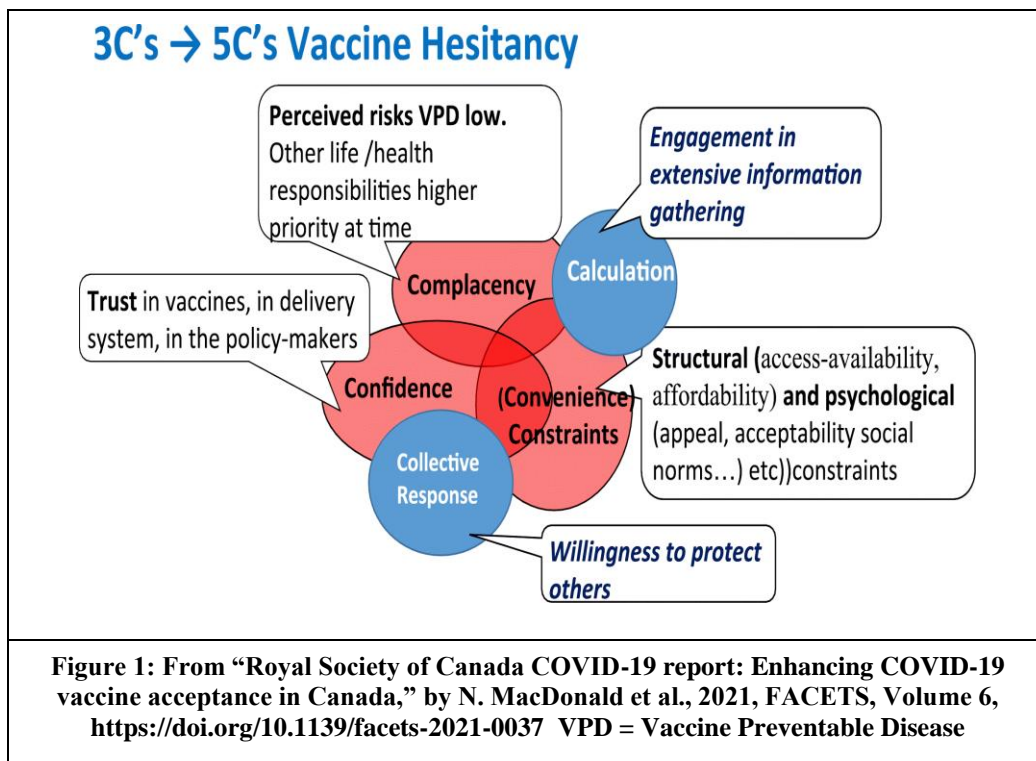
Many factors influence vaccine hesitancy including safety, efficacy, and cultural concerns (Lockyer et al., 2021; Dhama et al., 2021). In a cross-sectional survey, Gao et al. (2021) reported that 58.2% of 612 medical students from six universities in China who responded to a questionnaire were reluctant to get vaccinated for reasons varying from possible side effects, safety, and underestimation of the risk of exposure. This hesitancy was attributed to lack of knowledge of vaccines, lack of training related to COVID-19 vaccines, and low education level related to COVID-19 information not fully covered in their medical training (Gao et al., 2021). Furthermore, in a qualitative study in Bradford, United Kingdom, Lockyer et al. (2021) highlighted that negative stories and misinformation on vaccines fueled the participants' unwillingness to take the vaccine as they were confused and did not trust the health authorities. A recent study by Estrela et al. (2022), conducted in Portugal with 1,062 teachers from preschool to higher education, found that 10% of the participants were hesitant to take the COVID-19 vaccine mainly for concerns of safety and effectiveness of the vaccines with confidence and trust being the most contributing factors for the hesitancy. Eberwein et al. (2021) stated that from 816 household surveys, Belize had a vaccine hesitancy rate of 28.4% with safety concerns as the main reason given by respondents who indicated a refusal to be vaccinated. Similar to this study, a household survey of 1,250 participants implemented in 2021 by the Inter-American Development Bank (IDB) in Belize indicated that 20.7% of the sample had not been vaccinated and 65.4% of the unvaccinated were hesitant to take the COVID-19 vaccine with the main concerns being side effects, low trust in the vaccine, and doubts on vaccine efficacy (Boo et al., 2022). Notably, in a study in Canada among 5,076 primary and secondary school teachers, 89.7% of respondents were likely or very likely to take a COVID-19 vaccine if they had low levels of vaccine hesitancy, high general vaccine knowledge, and believed that COVID-19 was a serious illness (Racey et al., 2021).

Umakanthan et al. (2021) reported that in the Caribbean, vaccination uptake was influenced by race/ethnicity, perceptions about risks, exposure to media on COVID-19 news, and trust in scientists. The extant literature indicated that vaccine hesitancy levels were higher in women, ethnic minorities, and people with lower income (Eberwein et al., 2022; Gao et al., 2021; Kricorian et al., 2021). Freeman et al. (2020) also shared that conspiracy theories held by individuals hindered the acceptance levels of the COVID-19 vaccine. Ethnic minorities, especially Black Americans, are skeptical about the COVID-19 vaccine. Dhama et al. (2021) attributed this to institutional bias where the trust in the government and the health care policies is low. Furthermore, Kricorian et al. (2021) attributed historical experiences of Black Americans, such as the Tuskegee experiments, as a possible cause of their high COVID-19 vaccine reluctance and negative perception. Ogbu and Simons (1998) believe that minorities are affected by structural barriers, and that they should be viewed as human beings who can understand and act based on their circumstances.

The factors affecting vaccine hesitancy vary and warrant a multi-sectoral approach to move individuals in a positive direction on the Vaccine Acceptance Continuum proposed by the WHO's Strategic Advisory Group of Experts on Immunization (SAGE). In this continuum, individuals fall in various ranges from refusing all vaccines with conviction to accepting all vaccines with confidence (SAGE, 2014).

### Vaccine Hesitancy Models

Countries have researched the best ways to address vaccine hesitancy with the intent of increasing the number of vaccinated individuals; thus, lowering the COVID-19 cases, transmission of infection, and deaths. The theoretical framework used in the literature for vaccine hesitancy models was introduced by SAGE as the three C's - i.e., confidence, complacency and convenience (SAGE, 2014). Betsch et al. (2018) proposed the five C scale as a measure for the predictors of vaccination behavior in which calculation, and collective responsibility were added to the SAGE model (Figure 1). Razai et al. (2021) modified the SAGE model by proposing that there are multiple variables and contextual factors that contributed to vaccine hesitancy; hence, adding communication and context to it. The relevant literature suggests that whichever model is used to tackle vaccine hesitancy, it should be multifaceted so as to design and evaluate interventions for the key behavioral factors that lead to low vaccination uptake (MacDonald & SAGE, 2015; Betsch et al., 2018; Razai et al., 2021; Estrela et al., 2022).



### Method

A quantitative research method with a descriptive cross-sectional survey design and a correlational research design were applied to explore the prevalence of teachers’ vaccine hesitancy and views about COVID-19 during the COVID-19 pandemic in Belize. The population for this study was pre-school, primary and high school (K-12) teachers in Belize (N ≈ 5,207 – Males = 1,414, Females = 3,793). Data were collected using a survey instrument that was developed and administered online via Qualtrics to teachers in the Summer of 2021. The survey instrument was divided into three sections. Section one included items that collected data about teachers’ demographic profiles including gender, level of work, educational attainment, age, location, and ethnicity. Section two of the survey included items about teachers’ vaccine hesitancy. Section three of the survey included items intended to capture teachers’ views about COVID-19.

## Participants

The sample consisted of 351 teachers from across the six districts in Belize. This sample was representative of the target population of teachers with a 95% confidence level and 5.05% margin of error. Of the 351 teachers who participated in the study, 15.5% ( $n = 65$ ) were males, and 81.5% ( $n = 286$ ) were females. Majority of the teachers worked at the primary (64.1%) and high school (33.0%) levels. In terms of educational attainment, the majority of teachers had an associate's (50.7%) or bachelor's (41.6%) degree. Teachers' age ranged from 19 to 56 years, with an average age of 36.7 years ( $SD = 8.34$ ) and most were between the ages of 21-30 (26.8%) and 31-40 (39.9%) years. In terms of location by district, most teachers were from the Belize (25.1%) district. A similar number of teachers were from Corozal (18.5%), Stann Creek (17.7%), Toledo (16.8%) and Cayo (14.2%) districts. The smallest representation of teachers was from the Orange Walk district (7.7%). Most teachers self-identified as Mestizo (39.6%) and Creole (23.1%). Several teachers self-identified as Garifuna (16.8%) and Maya (11.1%). However, only few teachers self-identified as Multi-Ethnic (4.0%), East Indian (3.7%) and others (1.7%).

## Data Analysis

To determine the prevalence of teachers' vaccine hesitancy and views about COVID-19, data were analyzed by performing several statistical manipulations using IBM SPSS version 23 statistical software. Specifically, frequency and percent distributions were computed from teachers' responses for the survey design component of the study. Additionally, correlation coefficients, such as Phi, Cramer's V, and Contingency Coefficient, were computed to estimate the relationships between nominal variables for the correlational design component of the study. Thus, two major groups of statistical manipulations were conducted.

## Results

The focus of the first research question sought to determine how prevalent vaccine hesitancy was among teachers in Belize. To answer this question, teachers were asked to respond to two items on the survey about their vaccine hesitancy. The first item asked teachers if they hesitated or refused a vaccination for themselves or their child(ren) in the past. The second item asked teachers if they were hesitant to take the COVID-19 vaccine. Frequency and percent distributions for these two items related to teachers' vaccine hesitancy were computed. As it relates to the first item that asked teachers if they hesitated or refused a vaccination for themselves or their child(ren) in the past, 59.3% of teachers reported no and 40.7% reported yes. However, for the second item which asked teachers if they were hesitant to take the COVID-19 vaccine, 47.9% of teachers reported no and 52.1% reported yes. Thus, the prevalence in teachers' vaccine hesitancy prior to the COVID-19 pandemic was at 40.7%. Alarming, during the COVID-19 pandemic, the prevalence in teachers' vaccine hesitancy increased to 52.1%, a rise of more than 11 percent (+11.4%).

Furthermore, for the second research question, the focus was on identifying factors that were significantly related to teachers' hesitancy in taking the COVID-19 vaccine. To answer this question, the relationship between teachers' hesitancy in taking the COVID-19 vaccine and 12 factors were explored. These factors included teachers': Gender, Age, Educational attainment, Level of Work, Location (Area), Location (District), Ethnicity, Hesitancy or refusal of vaccination for self/child(ren) in the past, Belief that vaccines protect from serious diseases, View about receiving enough information on vaccines and their safety, Belief that there are other (better) ways to prevent diseases, and Status of chronic disease diagnoses in the past 5 years. To explore the relationships between teachers' hesitancy in taking the COVID-19 vaccine and the 12 factors, correlation coefficients, such as Phi, Cramer's V, and Contingency Coefficient, were computed to estimate the relationships. Based on the results (See Table 1) of the 12 factors explored, seven were found to be significantly related to teachers' hesitancy in taking the COVID-19 vaccine. These seven factors were: Gender ( $\phi = .116$ ,  $p = .030$ ), Location by District ( $\phi_c = .245$ ,  $p = .001$ ), Ethnicity ( $\phi_c = .263$ ,  $p = .000$ ), Hesitancy or refusal of vaccination for self/child(ren) in the past ( $\phi = .516$ ,  $p = .000$ ), Belief that vaccines protect from serious diseases ( $\phi = .327$ ,  $p = .000$ ), View about receiving enough information on vaccines and their safety ( $\phi = .376$ ,  $p = .000$ ), and Belief that there are other (better) ways to prevent diseases ( $\phi = .318$ ,  $p = .000$ ).

**Table 1. Factors Related to Teachers' COVID-19 Vaccine Hesitancy**

<b>Factors Explored</b>	<b>r Coefficients</b>	<b>P-Values</b>
Gender	$\phi = .116$	$p = .030$
Age	$C = .147$	$p = .099$
Educational attainment	$C = .128$	$p = .120$
Level of Work	$C = .103$	$p = .151$
Location (Area)	$\phi = .039$	$p = .467$
Location (District)	$\phi_c = .245$	$p = .001$
Ethnicity	$\phi_c = .263$	$p = .000$
Hesitancy/Refusal of vaccination for self/child	$\phi = .516$	$p = .000$
Believes vaccines protect from serious diseases	$\phi = .327$	$p = .000$
Got enough information on vaccines and their safety	$\phi = .376$	$p = .000$
Believes there are other/better ways to prevent diseases	$\phi = .318$	$p = .000$
Chronic disease diagnoses in the past 5 years	$\phi = .029$	$p = .585$

Based on the results from the contingency tables for the seven significant factors, female teachers were more likely to be hesitant in taking the COVID-19 vaccine than male teachers. Teachers from the Belize and Stann Creek districts were more likely to be hesitant in taking the COVID-19 vaccine than teachers from the other districts. Based on ethnicity, Creole, Garifuna, Maya, and East Indian teachers were more likely to be hesitant in taking the COVID-19 vaccine than teachers from other ethnicities. Teachers who hesitated or refused a vaccination for self/child(ren) in the past were more likely to be hesitant in taking the COVID-19 vaccine than teachers who did not hesitate or refuse a vaccination for self/child(ren) in the past. Similarly, teachers who do not believe that vaccines protect from serious diseases were more likely to be hesitant in taking the COVID-19 vaccine than teachers who believe that vaccines protect from serious diseases. Further, teachers who reported not receiving enough information on vaccines and their safety were more likely to be hesitant in taking the COVID-19 vaccine than teachers who reported receiving enough information on vaccines and their safety. Finally, teachers who believed that there are other (better) ways to prevent diseases were more likely to be hesitant in taking the COVID-19 vaccine than teachers who do not believe that there are other (better) ways to prevent diseases.

The goal of the third research question was to ascertain why teachers were hesitant in taking the COVID-19 vaccine. To answer this research question, teachers were asked to rate their level of agreement with 10 reasons why they were or are hesitant in taking the COVID-19 vaccine. The 10 reasons included: I am already healthy, Infection helps develop natural immunity, Vaccines are not needed/helpful, I am afraid of injections/needles, I am concerned about vaccine side effects, I am concerned about allergic reactions, I just don't want the vaccine, I lack trust in the vaccine's effectiveness, My religious beliefs, and My cultural beliefs. Based on the results of teachers' ratings (See Table 2), 4 of the 10 reasons were rated as somewhat agree and strongly agree by the majority of the teachers ( $n > 50\%$ ). These 4 factors were: I am already healthy (55.7%), I am concerned about vaccine side effects (96%), I am concerned about allergic reactions (89.2%), and I lack trust in the vaccine's effectiveness (71%).

**Table 2. Teachers' Reasons for hesitancy in taking the COVID-19 Vaccine**

Reasons	Strongly Disagree	Somewhat Disagree	Neither agree nor Disagree	Somewhat Agree	Strongly Agree
Already healthy	13.1%	13.1%	18.2%	31.3%	24.4%
Infection help Develop Natural Immunity	11.9%	12.5%	28.4%	38.6%	8.5%
Vaccine not Needed/Helpful	15.9%	19.9%	30.7%	18.8%	14.8%
Afraid of Injection/Needles	51.7%	4.5%	9.1%	17.6%	17.0%
Concerned about Vaccine Side effects	3.4%	0.0%	0.6%	18.2%	77.8%
Concerned about Allergic Reaction	2.8%	2.8%	5.1%	25.6%	63.6%
Just don't want Vaccine	25.6%	12.5%	22.2%	15.9%	23.9%
Lack Trust in Vaccine's Effectiveness	10.2%	7.4%	11.4%	29.0%	42.0%
Religious Beliefs	51.1%	6.3%	24.4%	8.0%	10.2%
Cultural Beliefs	54.0%	5.7%	25.6%	8.0%	6.8%

Subsequently, the goal of the final research question was to capture teachers' views about COVID-19. Based on the results presented in Table 3, most teachers reported that the age group that the COVID-19 affects most was between 50 to 60 years (62.9%). Furthermore, 64.7% of teachers reported that they did not consider themselves as part of the high-risk group for COVID-19. The vast majority of teachers (84.6%) reported that a person who is not sick or who does not show symptoms cannot spread the coronavirus as a false statement. Surprisingly, 64.7% of teachers reported that they believe in other/better ways to prevent diseases than using vaccines. However, an overwhelming majority of teachers (93%) reported that it was very important or extremely important to continue taking precautions after receiving the COVID-19 vaccine.

**Table 3. Teachers' Views on COVID-19**

Views	Frequency	Percent	
Which age group does the COVID-19 virus affects most?	15-19	3	0.9%
	20-25	5	1.4%
	25- 30	15	4.3%
	30-35	15	4.3%
	35-40	33	9.4%
	40-45	28	8.0%
	45-50	31	8.8%
	50- 55	39	11.1%
	55- 60	45	12.8%
Do you consider yourself as part of this high-risk group?	Over 60	137	39.0%
	Yes	124	35.3%
A person who is not sick or who does not show symptoms cannot spread the coronavirus.	No	227	64.7%
	True	54	15.4%
Believe in other/better ways to Prevent Diseases	False	297	84.6%
	Yes	227	64.7%
After receiving the COVID-19 vaccine, how important do you think it is to continue to take precautions?	No	124	35.3%
	Not at all important	6	1.8%
	Slightly important	6	1.8%
	Moderately important	12	3.5%
	Very important	98	28.7%
	Extremely important	220	64.3%

## **Conclusions and Recommendations**

The purpose of this quantitative study, utilizing a descriptive cross-sectional survey and correlational design, was to determine the prevalence of vaccine hesitancy and views about COVID-19 among teachers in Belize. The results revealed that vaccine hesitancy was lower (40.74%) among teachers prior to COVID-19, but increased (52.14%) during the early part of the COVID-19 vaccination campaign. The factors that were significantly related to teachers' COVID-19 vaccine hesitancy were: hesitated/refused a vaccination for self/child(ren), got enough information on vaccines and their safety, believe vaccines protect from serious diseases, believe there are other (better) ways to prevent diseases, location (district), and ethnicity. The reasons given by the teachers for the hesitancy were: believed that they were healthy, concerned about the side effects of the vaccine, concerned about allergic reaction to the vaccine, and lacked trust in the vaccine's effectiveness. Religion and cultural beliefs did not play a significant role in the vaccine hesitancy of teachers. The majority of teachers (64.7%) believed that there are other and better ways to prevent disease other than the COVID-19 vaccine. However, an overwhelming majority (93%) of the teachers believed that it is important to continue to take precautions after taking the COVID-19 vaccine.

Vaccine hesitancy is a global phenomenon and the empirical evidence in this paper is strongly supported by the extant literature. Analogously, in a study in Portugal, teachers had concerns about the safety and effectiveness of the COVID-19 vaccines due to low levels of trust in the vaccines (Estrela et al., 2022). The low trust levels were also emphasized in Canada, where teachers were more likely to be vaccinated if their general vaccine knowledge increased (Racey et al. (2021). Furthermore, studies conducted with the general population of Belize cited safety (Eberwein et al., 2021), side effects, trust, and doubts on the vaccine's efficacy (Boo et al., 2022) as factors contributing to vaccine hesitancy. Similar findings to this study were also documented in research conducted in China among medical students (Gao et al., 2021), and via household surveys in the United Kingdom (Lockyer et al., 2021) and the Caribbean (Boo et al., 2022). Ethnicity was also a factor related to COVID-19 vaccine hesitancy as Dhama et al. (2021), Kricorian et al. (2021), and Umankanthan et al. (2021) have shared similar conclusions in their studies. Lastly, the finding that women were more hesitant to take the COVID-19 vaccine was also established in the literature (Eberwein et al., 2022; Gao et al., 2021; Kricorian et al., 2021).

Vaccine Hesitancy is one of the top ten threats to global health (WHO, 2019). Therefore, governments, international organizations such as the WHO and IDB, local non-governmental organizations, schools and other stakeholders can plan, design, and evaluate their activities using the five C model proposed by Razai et al. (2021) to tackle vaccine hesitancy. These actions would assist in addressing COVID-19 vaccine hesitancy among teachers and vaccine hesitancy in general through a well-planned immunization program - i.e., one precipitated on the pillars of advocacy and education. With a high percentage of the teachers vaccinated, schools would then be able to function better while minimizing the spread of the virus (Estrela et al., 2022).

The confidence and trust in the vaccine and of those administering them can be increased with clear and transparent information on the authorization, distribution, effectiveness, and effects of the vaccines. Teachers believe there are better ways of protection other than the vaccine, yet they affirm that they should continue to protect themselves after taking the vaccine. The complacency regarding the risk of contracting the disease and the severity of the symptoms can be emphasized through trusted community leaders, health workers, and others the population can identify with. This approach can convince teachers and the public to become vaccinated. They will be reassured of the importance of the vaccine to the individual and the society through communication that shares powerful and authentic experiences of those that have taken the vaccine. The authentic stories, especially of teachers' experiences with the vaccine, would be more influential for the personal approach to reduce vaccine hesitancy rather than just the statistics of COVID-19. Furthermore, to combat false and/or misleading information and anecdotes, counter narratives might be helpful.

Teachers of Belize live in urban and rural areas; therefore, the health workers can provide the convenience of accessing the vaccine at health centers and on-site locations (home, church, school, workplace), which would be especially helpful for rural teachers. The myths and misinformation of the COVID-19 vaccine emphasize the need for accurate information to be shared through multiple communication avenues such



as digital campaigns, bulletins, and radio shows by the relevant government and non-governmental organizations. In schools, teachers can start science literacy programs to protect against misinformation and fake news regarding vaccines. Finally, vaccine hesitancy can be addressed through a collective response that is culturally sensitive to marginalized groups who do not trust the system and its representatives due to historical experiences with slavery, invasion, colonialism, and other means of oppression (Ogbu & Simmons, 1998; MacDonald, 2015). Teachers and citizens, especially in a democracy, should then be given the right to make an informed decision on taking the vaccine without coercion by having available literature and stories from trusted leaders and health workers on the COVID-19 vaccines.

Lastly, given this study's findings, it is recommended that further research be conducted on vaccine hesitancy and views on COVID-19 with a more diverse sample including frontline workers and members of special sub-populations. Regional research can also be conducted among Central American and Caribbean countries of similar populations to address vaccine hesitancy through regional collaboration.

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### **Competing Interests**

The authors have no competing interests to declare. Also, there was no compensation given for participating in this study.

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