Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Research paper

Public trust, information sources and vaccine willingness related to the COVID-19 pandemic in Trinidad and Tobago: an online cross-sectional survey

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ABSTRACT

Background: The response of populations to public health measures may rely on the degree to which the population trusts sources of information and institutions. There has been little research in this area in the Caribbean. This exploratory study aimed to evaluate public trust in information sources, confidence in institutions and COVID-19 vaccine willingness in Trinidad and Tobago.

Methods: An exploratory online survey was conducted in Trinidad and Tobago from November 10th to December 7th 2020. The survey instrument was a validated questionnaire developed by the World Health Organisation (WHO) and adapted to the local setting. Descriptive statistics and regression analyses were used to analyse the data.

Findings: The most trusted sources of information included health workers (32.5%) and the ministry of health (23.6 %). Increasing levels of trust in the medical sector were associated with decreasing levels of believing misinformation. Overall, 62.8 % of participants said they would take the COVID-19 vaccine if available. Regression analyses showed those who agreed that everyone should adhere to the national immunization schedule and those who would take the flu vaccine, were 2.77 (95% CI 1.77-4.35) and 4.60 (95% CI 3.11-6.84) timesmore likely to take the vaccine, respectively.

Interpretation: Our study found increasing trust in health sources, confidence in medical sector, adherence to the national immunisation schedule and acceptance of the flu vaccine may increase COVID-19 vaccine willingness rates. Although the generalisability of the findings is limited, the results of this exploratory survey may be used to identify areas for prioritisation and improvement in future research.

Research in context

Evidence before this study

Understanding public trust and confidence during health emergencies is important as greater levels of trust and confidence can lead to greater compliance with recommendations and measures. Further, knowledge on how populations perceive their risk may also contribute to the development of effective public health programmes. The acceptance of COVID-19 vaccines is also paramount to curbing the pandemic.

In the Caribbean region, there has been little research exploring this area in public health emergencies and pandemics. One previous study conducted in Trinidad and Tobago explored public awareness and attitudes towards H1N1 in 2015. Another study assessed health concerns related to COVID-19 in Jamaica. However, this study was limited in the variables assessed. As the Caribbean is particularly vulnerable to the longer term effects of the pandemic, it is important to conduct local and regional research to understand the impact of risk perception, where public trust lies and whether the population is willing to accept COVID-19 vaccines.

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Added value of this study

This exploratory study is the one of the first to evaluate public trust, information sources and COVID -19 vaccine willingness in the English-speaking Caribbean region during the current COVID-19 pandemic. The results have shown that less than 50% of participants felt they were at risk for contracting COVID-19 or developing severe illness. The health sector, inclusive of health workers and the ministry of health were the most trusted sources of information and respondents were more confident in the health sector compared to non-health sector institutions.

Implications of available evidence

The findings of this study may provide useful insights for a better informed and acceptable pandemic response in Trinidad and Tobago. Using trusted sources to communicate information on COVID-19 and its associated public health measures may promote transparency and increase compliance with the measures. This may also help to increase and sustain public trust. In the longer term, improving health literacy and encouraging scientific literacy amongst the general population may help individual's differentiate misinformation from accurate information as well as increase a person's confidence in the safety and efficacy of the vaccines. Credible information on the available vaccines, the vaccination process and safety protocols should be shared with the public in order to alleviate any concerns surrounding the process.

1. INTRODUCTION

On March 11th 2020 the World Health Organisation (WHO) declared COVID-19 a pandemic.[1] At the time of writing, there are approximately 200 million confirmed cases and more than 4 million deaths globally.[2] Alongside this pandemic is the occurrence of a parallel emergency, termed the 'COVID-19 infodemic'. The term infodemic refers to an overabundance of information which may or may not be accurate.[3] Subsequently, this may lead to issues surrounding trust, reliability and willingness of populations to comply with guidelines.[3,4]

The response of populations to public health measures may rely on the degree to which the population trusts the sources of information as well as institutions.[5,6] In the Democratic Republic of the Congo, during the Ebola virus outbreak in 2018, a lack of trust, misinformation and inaccuracy hampered early efforts to control the spread of the infection.[6] Similar patterns are also being observed with the COVID-19 pandemic. Patients refused to use common pain medication believing that it led to an increased risk of contracting COVID-19 and abused other supplements thinking it would prevent the spread of the infection.[7] With the growing use of social media and the global scale of COVID-19, the risks associated with mistrust and misinformation may be greater than previous public health emergencies.

Exploring the factors influencing the risk perceptions and the level of public trust and confidence that exists in populations is important to a country's pandemic response. The WHO technical advisory group on behavioural insights and science for health identified political decision makers, immunization programme managers, community and religious leaders, health workers, media outlets and digital platforms as groups that influence vaccinations in populations.[8] Evaluation of a population's willingness to accept vaccines may help tailor public health measures and strategies to increase vaccine uptake.[9]

Trinidad and Tobago is a twin island developing country in the Caribbean with an estimated population of 1.4 million. Public health measures such as border closures, social distancing and wearing of face masks were implemented to curb the spread of COVID-19 in the country.[10] Currently, there is limited research on public perceptions towards infectious diseases as well as vaccines in Trinidad and Tobago and the wider Caribbean. In the 2009 H1N1 pandemic, less than 2% of the local population were vaccinated with the influenza vaccine, with similar rates noted in other Caribbean islands.[11] One previous study in Trinidad and Tobago assessed influenza awareness in the general population during an outbreak in 2015/2016. The majority of participants did not consider influenza to be a serious illness and only 52% agreed that vaccination was a preventative measure.[12] Although the routine immunisation coverage is above 90% for the majority of vaccines in Trinidad and Tobago, the low vaccination rates seen during the H1N1 pandemic may indicate potential uncertainty with COVID-19 vaccine acceptance.[13]

In order to provide timely insights considering the restrictions imposed by public health measures, this study therefore aimed to conduct a preliminary exploratory survey assessing the levels of public trust in information sources, institutions and COVID-19 vaccine willingness among the population in Trinidad and Tobago that had access to internet services.

2. METHODOLOGY

2.1. Study design and participants

The study was conducted in Trinidad and Tobago using an online cross-sectional survey design consisting of members of the population with internet access. The survey was approximately 15-20 minutes and was disseminated from 10th November 2020 to 7th December 2020. This was approximately ten months after the first case was detected in the country and when the country was preparing for the implementation of COVID-19 vaccination programmes.

The survey instrument was a validated questionnaire developed by the World Health Organisation.[14] As per the WHO protocol, the questionnaire was adapted to focus on variables considered important and relevant to the local pandemic. The adapted survey consisted of 36 closed ended questions inclusive of: socio-demographics, COVID-19 personal experience, health literacy, COVID-19 risk perception, information sources, confidence in institutions, misinformation and conspiracies, COVID-19 vaccines and willingness to get tested and share names of contacts (Supplementary file).

Online surveys are suitable for time- sensitive situations such as this pandemic. They allow rapid data collection while maintaining adherence to local public health measures such as limiting face to face interactions and physical distancing.[15] This method is easy and convenient for responders and has been successfully implemented in related studies in other countries.[16-18] Participants with internet access were eligible to participate once they were over the age of 18 years, English speaking, inclusive of nationals and non-nationals but residing in Trinidad and Tobago during the pandemic period. Participation was voluntary, anonymous and confidential and no compensation was provided. An online participant information and consent sheet was included with the survey. Participants consented to participate in the survey prior to starting the survey. Assuming the population size of 1,400,000, that the majority of the population had access to internet [19], 5% margin of error, 95% confidence interval and a 50% vaccine acceptance rate, the calculated sample size was 385 participants. The sample size was increased by 30% to compensate for incomplete responses, duplicate responses or ineligible responses. Thus, the final calculated sample size was 500.

2.2. Data collection

The questionnaire was adapted to the local setting and piloted on a sample of 20 participants. The pilot focused on an understanding of the questions and facilitated the recognition of concerns related to survey responses. Minor adjustments to the survey were made after the pilot. The survey was self-administered using an online platform, Google Forms. The survey was distributed using multiple social media platforms including Whatsapp, Twitter, LinkedIn and Facebook. The survey was also disseminated using professional networks.

2.3. Patient and public involvement

Patient and public involvement (PPI) in research has been defined as research being carried out 'with' or 'by' members of the public rather than 'to', 'about' or 'for' them.[20] Benefits of PPI include improving the acceptability and appropriateness of data collection methods and improving patient information for informed consent.[20] Patient and public involvement in research is uncommon in Trinidad and Tobago. This study incorporated the PPI concept by involving one public representative, a secondary school teacher, in the research process. This representative advised the research team on the data collection method and choice of words used in the survey and information sheets so that it would be easy to understand.

2.4. Statistical approach

The analyses were based on the statistical analysis template of the WHO protocol [14] with minor necessary adjustments to match the modifications in the questionnaire. For descriptive statistics, mean, standard deviation, median and interquartile range (IQR) were used to describe continuous variables, such as age; while frequencies were used to describe categorical data, such as gender, education level and willingness of getting tested, contact tracing and vaccination. All the variables measured by 7-point scale were presented as categorical variables in the descriptive statistics and were treated as continuous variables in the inferential statistical analysis. Variables like trust in non-medical institutions, trust in medical sectors and trust in media resources were treated as continuous variables, using a mean score across relevant questions. Further details can be found in Supplementary Tables 3 and 4. All of the above followed the WHO protocol [14].

Regression analyses were used to investigate factors that affected risk perceptions, belief in misinformation/conspiracies and willingness to be tested, to share names of contacts and to be vaccinated. The full models contained the following predictors/variables: age, gender, education, chronic disease, health literacy, trust in non-medical institutions, in medical sectors or in media sources to manage COVID-19, being infected with COVID-19, knowing someone who was infected with COVID-19, being a health professional and frequency of media consumption. Variables such as 'belief in everyone should be vaccinated according to the national immunisation schedule' and 'willingness of taking the flu vaccine' were only included when the willingness to be vaccinated with a COVID-19 vaccine variable was evaluated. A backward elimination approach based on the Akaike Information Criterion (AIC) was used to obtain the best fit model, following the WHO protocol [14]. All dependent and independent variables are presented in supplementary table 1.

Linear regression was applied to evaluate the factors influencing the continuous outcomes, such as risk perception (scale 1-7), probability of contracting COVID-19 (scale 1-7), perceived severity of illness (scale 1-7), and belief in misinformation and conspiracies (scale 1-7). The answers to each of the four questions under the misinformation category were first dichotomised into 'yes' and 'no' responses based on the whether or not the information was accurate. 'Yes' scored 1 and 'no' scored 0. A score of the four questions was then taken ((4-Q1-Q2-Q3-Q4)/4). This technique and the choice of regression method followed the WHO approach[14]. For the belief in conspiracies variable, the answer to the question 'many very important things happen in the world which the public is never informed about' was used to present the generic belief in conspiracies.

Binary logistic regression was applied to evaluate factors influencing the categorical outcomes, such as willingness to be tested, to share names of contacts and to be vaccinated with a COVID-19 vaccine. This was considered the appropriate method since the dependent variables (i.e. willingness to be tested and to share names of contacts) were dichotomised. For ease of understanding, the dependent variable of willingness to be vaccinated with a COVID-19 vaccine was also dichotomised. A 'yes' to vaccine willingness was determined by combining the latter three items in the scale (somewhat agree, agree, strongly agree). Mean estimates and odds ratios were calculated for the linear and logistic regressions respectively. Goodness of fit tests, such as R-square and Pearson and deviance chi-square tests, were conducted. Confidence intervals of 95% were also calculated and p values < 0.05 were considered significant. All the analyses were performed using R version 3.6.0.

3. RESULTS

3.1. Participant characteristics and COVID-19 Personal Experience

A total of 642 responses were received during the study period. Of these, 27 responses were excluded as they either did not reside in Trinidad and Tobago (n=11), were less than 18 years (n=5), were incomplete (n=11). Therefore, 615 responses were analysed. The majority of participants were nationals of Trinidad and Tobago. The mean age was 31.4 years and the median age was 28 years. Of the sample, 31.7% (n=195) were healthcare professionals. Detailed information on participant characteristics are presented in Table 1.

Approximately 96.7% (n=595) of the participants were not previously infected with COVID-19. Of those who said they were previously infected with COVID-19, 85% (n=17) classified it as mild and 15% (n=3) classified it as severe. Among those infected, 55% (n=11) stated that the infection was confirmed by a test. When participants were asked if anyone in their immediate social environment had been infected by COVID-19, 35.3% (n=217) said yes. Of these participants, 27.6% (n=60) knew someone who died from COVID-19.

3.2. Risk Perceptions and Health Literacy levels

When asked about the probability of contracting COVID-19, 46.5% (n=286) of participants thought they were likely to contract it while 38.0% (n=234) considered themselves at high risk of contracting the illness. Approximately 35% (n=215) felt they would develop severe illness if they did contract COVID-19. Linear regression analyses are presented in Table 2. Females were more likely to think they would develop severe disease if they did have COVID-19 (β: 0.35; 95% CI: 0.10-0.60). Those who were health professionals perceived that they were more likely to contract COVID-19 compared to those who were not (β: 1.42; 95% CI: 1.18-1.66).

Health literacy was assessed by asking five questions related to ease of finding and understanding COVID-19 related information. The most common response to the questions was 'easy' or 'very easy'. However, 20.3% (n=125) of participants thought it was difficult to judge information in the media (supplementary Table 2).

Table 1
Characteristics of Respondents

Variable	Number (N)	Percentage (%)
Nationality		
Trinidad and Tobago	610	99.2
Other	5	0.8
Gender		
Male	209	34.0
Female	406	66.0
Age		
Mean (standard deviation)	31.4 (10.4)	
Median (interquartile range)	28 (10)	
18-29	331	53.8
30-39	183	29.7
40-49	49	8.0
50-59	38	6.2
Over 60	14	2.3
Level of Education		
Up to 9 years (primary and secondary)	45	7.3
Non-university (technical and vocational education)	50	8.1
University or higher	520	84.6
Healthcare Professional		
Yes	195	31.7
No	420	68.3
Chronic Illness		
Yes	72	11.7
No	514	83.6
Do not know	29	4.7
County		
Caroni	137	22.3
Mayaro	18	2.9
Nariva	7	1.1
St.Andrews	68	11.1
St. David	8	1.3
St. George	166	27.0
St. Patrick	42	6.8
Victoria	160	26.0
Tobago	9	1.5
Financial Situation		
Improved	57	9.3
Remained the same	351	57.1
Worse	191	31.0
Do not know	16	2.6

3.3. Trust in information sources and confidence in institutions

When asked how often they sought information related to COVID-19, 49.6% (n=305) of participants said they never/rarely searched for information. Supplementary Tables 3 and 4 present results on trust in information sources and confidence in institutions. The most trusted sources of information were those related to the health sector, with most trust placed in the health workers (n=200; 32.5 %) and Ministry of Health (n=145; 23.6 %). Participants were moderately confident or very confident that health institutions were capable of managing the COVID-19 pandemic (Hospitals: n=212, 34.5 %; Ministry of Health: n=207, 33.7 %).

3.4. Belief in Misinformation and Conspiracies

The most common response to the misinformation questions was *'very untrue of what I believe'* (supplementary Table 5). Approximately 32.5 % (n=200) of participants believed that it was probably true that *'many important things happen which the public are not aware of'* and 41.0 % (n=252) felt that it was definitely true that '*politicians usually did not tell their true motives for doing things*' (supplementary Table 6). Table 3 presents the regression results on belief in misinformation and conspiracy. People with high levels of trust in the medical sector were less likely to believe in misinformation (β: -0.03; 95% CI: -0.05- -0.01). Those with lower levels of health literacy were more likely to believe in conspiracies (β: 0.09; 95% CI: 0.03- 0.15) and misinformation (β: 0.03; 95% CI: 0.02- 0.04).

3.5. Getting tested for COVID-19 and sharing names of contacts

When asked if they would get tested if exposed to COVID-19 and if they would share names of contacts if tested positive for COVID-19, 83.6 % (n=514) of participants stated they would get tested and 93.8% (n=577) stated they would share names of contacts.

The top two reasons given for why they would not get tested were *'testing would be painful'* (n=38, 38.8 %) and *'getting tested would cost money'* (n=33, 33.7 %). When asked for reasons why they would get tested for COVID-19, the top two reasons were: '*this way I can protect other people*' (n=438, 85.5 %) and *'I want to receive the appropriate care in case of a positive test'* (n=372, 72.7 %). The top two reasons for participants sharing names of contacts, were '*this way I can protect other people*' (n=523, 91.0 %) and *'I believe this helps stop the spread of COVID-19'* (n=494, 84.9%). When asked for reasons why they would not share names of contacts, the top two reasons were '*I do not trust the authorities*' (n=18, 48.6 %) and *'I would cause inconvenience for those people whose names are shared'* (n=18, 48.6%). The detailed results for these questions are presented in supplementary tables 7 and 8.

Based on the binary logistic regression analyses (Table 4), increasing age (OR 0.98, 95% CI: 0.96-1.00), having a chronic illness (OR 2.92, 95% CI: 1.26- 8.00), trusting in the medical sector (OR1.39, 95% CI 1.19-1.62), not being a health professional (OR 1.66, 95% CI: 1.05-2.63) and not knowing someone infected with COVID-19 (OR 2.01, 95% CI: 1.28-3.16) were all statistically significant for getting tested for COVID-19. Higher levels of trust in medical institutions (OR 1.95, 95% CI: 1.54-2.52) and not being infected with COVID-19 (OR 11.37, 95% CI: 3.48- 34.69) were statistically significant for sharing names of contacts if tested positive for COVID-19.

3.6. COVID-19 vaccine decisions

Overall, 62.8% (n=386) of participants said they would take a COVID-19 vaccine if available. In the health professionals subgroup, 61.5% (n=120) agreed they would take a COVID-19 vaccine if available. 76.1% (n=468) of participants felt that everyone should be vaccinated according to the national immunization schedule and 63.4% (n=390) stated they would receive the flu vaccine (supplementary table 1). Regarding, COVID-19 vaccine opinions, 39.5% (n=243) of participants strongly disagreed with the statement *'when everyone is vaccinated against COVID-19, I don't have to get vaccinated too'*. (Supplementary table 9).

Factors influencing the decision to take a COVID-19 vaccine are presented in Table 5. Whether the vaccine had been in use for a long time with no serious adverse effects was considered extremely important by 44.2 % (n=272) of participants. Binary logistic regression analyses showed those who agreed that everyone should adhere to the national immunization schedule and those who would take the flu vaccine were 2.77 (95% CI: 1.77- 4.35) and 4.60 times (95% CI: 3.11- 6.84) more likely to take the vaccine, respectively (Table 6).

4. DISCUSSION

This preliminary exploratory study evaluated the public trust, information sources and vaccine willingness amongst the general population of Trinidad and Tobago with internet access during the current COVID-19 pandemic. The study was conducted ten months after the start of the local epidemic at which point there was community spread in Trinidad and Tobago. The results of this study

Table 2
Factors associated with probability, risk and severity of COVID-19

Predictors	Probability of contracting COVID-19[a]		Perceived severity of illness[b]		Risk perception[c]	
	Estimates (95% CI)	P value	Estimates (95% CI)	P value	Estimates (95% CI)	P value
Age	0,01 (-0.00, 0.02)	0.064			0.01 (0.00, 0.03)	**0.025**
Gender						
Male	Reference		Reference			
Female	-0.17 (-0.40, 0.06)	0.151	0.35 (0.10, 0.60)	**0.007**		
Education level						
Under 9 years	-0.58 (-1.01, -0.16)	**0.007**	-0.16 (-0.62, 0.31)	0.502	-0.54 (-1.02, -0.07)	**0.024**
Non-university	0.05 (-0.36, 0.46)	0.812	0.56 (0.12, 1.00)	**0.014**	0.14 (-0.32, 0.6)	0.554
University or higher	Reference		Reference		Reference	
Having a chronic illness						
Yes			1.11 (0.74, 1.48)	**<0.001**		
No or do not know			Reference			
Health literacy	0.05 (-0.02, 0.11)	0.139			1.06 (0.98, 1.15)	0.143
Trust in non-medical institutions to manage COVID-19	-0.14 (-0.23, -0.05)	**0.002**	-0.14(-0.23, -0.04)	**0.005**	-0.09 (-0.18, 0.01)	0.081
Being a health professional						
Yes	1.42 (1.18, 1.66)	**<0.001**	-0.25 (-0.51, 0.02)	0.065	1.53 (1.27, 1.79)	**<0.001**
No	Reference		Reference		Reference	
Being infected with COVID-19						
Yes	0.66 (0.05, 1.28)	**0.035**				
No	Reference					
Knowing someone in your immediate social network who has or had COVID-19						
Yes	0.26 (0.03, 0.49)	**0.027**	-1.39 (-1.87, -1.03)	**0.031**	0.40 (0.15, 0.66)	**0.002**
No	Reference		Reference			
R^2 / Adjusted R^2	0.25/0.24		0.10/0.09		0.22/0.21	
F-statistics	<.001		<.001		<.001	

Note: Linear regression was performed for all three models using the backward elimination approach based on the Akaike Information Criterion for model selection. The full model for all three models were adjusted for age (continuous), gender, education level, chronic disease, health literacy (continuous), trust in non-medical institutions (continuous), trust in the medical sector (continuous), trust in media sources (continuous), being a health professional, being infected with COVID-19, knowing someone who was infected with COVID-19 and frequency of media consumption.

[a] Probability of contracting COVID-19: What do you consider to be your own probability of getting infected with COVID-19? (1: extremely unlikely; 7: extremely likely)

[b] Perceived severity of illness: How severe would contracting COVID-19 be for you (how seriously ill do you think you will be)? (1: not severe, 7: very severe).

[c] Risk perception: How susceptible do you consider yourself to an infection with COVID-19? (1: very low risk, 7: very high risk)

Table 3
Factors associated with belief in Misinformation and Conspiracies

Predictors	Belief in misinformation[a]		General conspiracy belief[b]	
	Estimates (95% CI)	P value	Estimates (95% CI)	P value
Age			0.09 (0.03, 0.15)	0.075
Education level				
Under 9 years	0.06 (-0.02, 0.13)	0.152		
Non-university	0.10 (0.03, 0.17)	**0.006**		
University or higher	Reference			
Having a chronic illness				
Yes			-0.37 (-0.71, -0.03)	**0.035**
No or do not know			Reference	
Trust in non-medical institutions to manage COVID-19	0.04 (0.02, 0.06)	**<0.001**	-0.11 (-0.19, -0.02)	**0.014**
Trust in medical sectors to manage COVID-19	-0.03 (-0.05, -0.01)	**<0.001**		
Health Literacy	0.03 (0.02, 0.04)	**<0.001**	0.09 (0.03, 0.15)	**0.005**
Being a health professional				
Yes	-0.08 (-0.12, -0.04)	**<0.001**		
No	Reference			
Being infected with COVID-19				
Yes			-1.08 (-1.68, -0.48)	**<0.001**
No			Reference	
Knowing someone in your immediate social network who has or had COVID-19				
Yes			0.26 (0.03, 0.48)	**0.025**
No			Reference	
Frequency of media consumption				
Never/Rarely			Reference	
Sometimes			-0.52 (-0.78, -0.26)	**<0.001**
Often/Very often			-0.10 (-0.36, 0.16)	0.461
R^2/Adjusted R^2	0.11/0.10		0.10 / 0.08	
F-statistics	<.001		<.001	

Note: Linear regression was performed for both models using the backward elimination approach based on the Akaike Information Criterion for model selection. The full model for both models were adjusted for age (continuous), gender, education level, chronic disease, health literacy (continuous), trust in non-medical institutions (continuous), trust in the medical sector (continuous), trust in media sources (continuous), being a health professional, being infected with COVID-19, knowing someone who was infected with COVID-19 and frequency of media consumption.

[a] Belief in misinformation: average score of four misinformation questions (0: not misinformed, 1: high misinformed)

[b] General conspiracy belief: many very important things happen in the world which the public is never informed about. (1: definitely false, 7: definitely true)

Table 4
Factors associated with getting tested for COVID-19 and sharing names of contacts

Predictors	Willingness to be tested[a]		Willingness to share names of contacts[b]	
	Odds Ratio(95% CI)	P value	Odds Ratio(95% CI)	P value
Age	0.98 (0.96, 1.00)	**0.024**	1.03 (0.99, 1.08)	0.130
Having a chronic illness				
Yes	2.92 (1.26, 8.00)	**0.021**		
No	Reference			
Trust in medical sectors to manage COVID-19	1.39 (1.19, 1.62)	**<0.001**	1.95 (1.54, 2.52)	**<0.001**
Being a health professional				
Yes	Reference			
No	1.66 (1.05, 2.63)	**0.030**		
Being infected with COVID-19				
Yes	Reference		Reference	
No	2.60 (0.90, 7.00)	0.063	11.37 (3.48, 34.69)	**<0.001**
Knowing someone in your immediate social network who has or had COVID-19				
Yes	Reference			
No	2.01 (1.28, 3.16)	**0.002**		
Tjur R^2	0.10		0.10	
Pearson chi-square test	0.24		0.22	
Deviance chi-square test	0.95		0.98	

Note: Binomial logistic regression was performed for both models using the backward elimination approach based on the Akaike Information Criterion for model selection. The full model for both models were adjusted for age (continuous), gender, education level, chronic disease, health literacy (continuous), trust in non-medical institutions (continuous), trust in the medical sector (continuous), trust in media sources (continuous), being a health professional, being infected with COVID-19, knowing someone who was infected with COVID-19 and frequency of media consumption.

[a] Willingness to be tested: If you have been in contact with someone who tested positive for COVID-19 and have no symptoms yourself – would you get tested if you had the opportunity?

[b] Willingness to share names of contacts: If you test positive for COVID-19 and are asked to share with health authorities the names of people you had been in contact with – would you share all names?

Table 5
Decisions influencing willingness to get vaccinated with a COVID-19 vaccine

Variable	Not important N (%)	Low importance N (%)	Some importance N (%)	Neutral N (%)	Moderately important N (%)	Very important N (%)	Extremely important N (%)
Whether vaccine has been in use for a long time with no serious adverse effects	16 (2.6)	18 (2.9)	25 (4.1)	44 (7.2)	81 (13.2)	159 (25.9)	272 (44.2)
Whether the vaccine has been in use in other countries	27 (4.4)	26 (4.2)	25 (4.1)	53 (8.6)	100 (16.3)	189 (30.7)	195 (31.7)
Risk of getting infected at the time the vaccine is available	42 (6.8)	48 (7.8)	36 (5.9)	103 (16.7)	107 (17.4)	146 (23.7)	133 (21.6)
How easy it is to get the vaccine	66 (10.7)	43 (7.0)	40 (6.5)	98 (15.9)	110 (17.9)	146 (23.7)	112 (18.2)
Whether the vaccine is free	81 (13.2)	69 (11.2)	46 (7.5)	108 (17.6)	87 (14.1)	122 (19.8)	102 (16.6)
Whether a high vaccine uptake would lift restrictions	99 (16.1)	66 (10.7)	49 (8.0)	128 (20.8)	74 (12.2)	105 (17.1)	94 (15.3)
Recommendation from MOH	66 (10.7)	52 (8.5)	57 (9.3)	98 (15.9)	133 (21.6)	118 (19.2)	91 (14.8)
Country in which vaccine is produced	126 (20.5)	92 (15.0)	56 (9.1)	81 (13.2)	99 (16.1)	91 (14.8)	70 (11.4)
Recommendation from my family doctor	95 (15.4)	63 (10.2)	42 (6.8)	116 (18.9)	127 (20.7)	111 (18.0)	61 (9.9)

may have possible implications for the public health approach to COVID-19 in Trinidad and Tobago,

The study found that increasing levels of trust in the medical sector were associated with decreasing levels of belief in misinformation as well as a greater likelihood of getting tested and sharing names of contacts. This demonstrates the importance of public trust in managing public health emergencies and is consistent with results in other settings.[5] In the early phase of the COVID-19 pandemic in the United States, one study found higher levels of trust in government sources such as the Centers for Disease and Control and lower levels of trust in social media such as Facebook.[5] This is important for public health communicators when deciding which media to use to share information on COVID-19 as well as ensuring that these media outlets share accurate and reliable information. Our study also found that lower levels of education health literacy were associated with increased levels of belief in misinformation. Previous studies have shown that belief in misinformation negatively affected compliance with public health measures.[6]· [21]· [22] Thus, correcting misinformation, implementing targeted health education campaigns and continuing to build trust in the medical sector may support compliance with public health measures in this pandemic and future public health emergencies.

Our exploratory study may also provide some early insights into the behavioural factors influencing vaccine willingness and hesitancy in Trinidad and Tobago. Vaccine hesitancy is a complex phenomenon which the WHO has defined as the delay in acceptance or refusal of vaccines despite availability of vaccination services.[23] In our study, 62.8% of participants were willing to take a COVID-19 vaccine if available. Similar rates were seen in other regional countries such as Paraguay and the Dominican Republic while high rates of vaccine willingness (above 80%) were seen in Mexico, Brazil and Puerto Rico [18]. In the non-English speaking Caribbean, Haiti had the lowest rate of vaccine willingness at 43.6%. [18] In Ghana, a notable increase in vaccine willingness was observed from 62.9% in August 2020 to 82.9% in March 2021, after the first batch of vaccines arrived in the country.[24] This suggests that vaccine decision-making is a dynamic process and may be situation dependent.

The WHO has identified three factors that contribute to vaccine hesitancy. These include confidence -trust in vaccine safety and the

Table 6
Factors associated with willingness to take a COVID-19 vaccine

	Willingness to be vaccinated with a COVID-19 vaccine[a]	
Predictors	Odds Ratios (95% CI)	P value
Gender		
Male	Reference	
Female	0.68 (0.45, 1.01)	0.059
Trust in medical sectors to manage COVID-19	1.16 (1.02, 1.33)	**0.023**
Belief in everyone should be vaccinated according to the national immunisation schedule		
Yes	2.77 (1.77, 4.35)	**<0.001**
No	Reference	
Willingness of taking flu vaccines		
Yes	4.60 (3.11, 6.84)	**<0.001**
No	Reference	
Tjur R^2	0.23	
Pearson chi-square test	0.18	
Deviance chi-square test	0.20	

Note: Binomial logistic regression was performed using the backward elimination approach based on the Akaike Information Criterion for model selection. The full model was adjusted for age (continuous), gender, education level, chronic disease, health literacy (continuous), trust in non-medical institutions (continuous), trust in the medical sector (continuous), trust in media sources (continuous), being a health professional, being infected with COVID-19, knowing someone who was infected with COVID-19, frequency of media consumption, everyone should be vaccinated according to the national vaccination schedule and willingness of taking flu vaccines.

[a] Willingness to be vaccinated with a COVID-19 vaccine: If a COVID-19 vaccine becomes available and is recommended for me, would you get it?

health system; complacency - low risk perception resulting in the vaccine viewed as unnecessary and convenience -accessibility, affordability and availability.[25] Most participants in our study had high levels of confidence in medical professionals/medical institutions and considered vaccine safety, risk of infection, cost and ease of availability of the vaccine as important factors in their decision-making. These may be key areas on which to focus to promote vaccine uptake in the country. However, we also found that vaccine willingness in the health professional group was 61.5 %. Vaccinated health professionals are more likely to recommend vaccines to patients.[26] As this group is uniquely placed to influence vaccine uptake, it is imperative to build vaccine confidence amongst health professionals by addressing their own concerns, understanding what factors influence health professionals' decision to accept and recommend the vaccine.

4.1. Potential practical implications

In order to promote compliance with public health measures and encourage vaccine uptake, two possible strategies may be considered, based on the findings of our exploratory survey study. Firstly, the various health professional associations should play a key role in delivering accurate information to the public since their opinions are likely to be highly trusted. This may help individuals differentiate misinformation as well as increase a person's confidence in the vaccines.

Secondly, we suggest the government engage communities to understand local needs and clearly communicate the reasons for implementing public health measures. Although Trinidad and Tobago and the Caribbean have performed comparatively well in containing the pandemic, adequate vaccine uptake in the region is an essential element in curbing the pandemic. As COVID-19 vaccination programmes are initiated in Trinidad and Tobago, self-reported behaviours, public trust and vaccine opinions may change either positively or negatively. Thus, it is important to have continuous campaigns reinforcing credible information on COVID-19 and public health measures.

4.2. Study strengths and limitations

This study is one of the first to evaluate public trust, information sources and vaccine willingness in the English-speaking Caribbean region during the current COVID-19 pandemic. The study used a validated WHO questionnaire tool to conduct the survey. Additionally, the results may provide insights to inform public health interventions in the country such as developing strategies for effective public communication and to support vaccine uptake.

There are limitations that should be acknowledged. Firstly, the survey was cross-sectional in nature and therefore the results are specific to that period of time. Secondly, while the online survey method has its advantages and allows for our study results to be timely generated during the pandemic, it was not possible to use probability sampling. Additionally, as a result of the recruitment method used for this online survey study it was not possible to calculate a response rate. Hence, the generalisability of the findings to the wider population is limited and results should be interpreted with caution. However, this survey study is exploratory and the results may still be valuable in providing useful insights on areas for prioritisation for future research.

Finally, this study was unable to specifically focus on the growing Venezuelan migrant population in Trinidad and Tobago. As migrant groups are especially vulnerable in the pandemic, a separate study should target this sub-population. Details on the mechanism behind vaccine hesitancy were beyond the scope of our study and should be explored in order to support effective vaccination programmes. It would also be useful to conduct qualitative research (ensuring adherence to local restrictions) to provide a deeper understanding of the factors contributing to vaccine willingness.

5. CONCLUSION

This study examined public trust, information sources and vaccine willingness related to COVID-19 in Trinidad and Tobago. Our study found that health sources were most trusted by the public and increasing trust and confidence in the medical sector may increase COVID-19 vaccine willingness rates. These results may guide public health response activities and identify areas for prioritisation and improvement with the ultimate objective being to curb the spread of COVID-19 in this country.

Contributors

LD contributed to the conception of the study. LD and DB contributed to the study design and executed the study including data collection and management; all authors verified the data. LD and HW conducted the data analysis. LD, DB, HW contributed to the interpretation of results; LD and DB wrote the first draft. All authors contributed to the writing of the final manuscript. All authors read and approved the final manuscript.

Declaration of interests

Ethical approval and consent to participate: Ethical approval was granted by the Ministry of Health, Trinidad and Tobago. A participant information and informed consent sheet was included with the survey. Participants consented to participate in the survey prior to starting the survey.

Consent for publication: not applicable

Availability of data and materials: please contact authors for data requests

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Supplementary materials

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