Covid-19 Vaccination Concerns: Perspectives of Youths in a Developing Nation's Context

Comment [TP1]: COVID-19

Comment [TP2]: 1. You are including from the age 15-44.
A.I thin the questionaries were sent to the participants they reply online. The level of understanding for 15yrs old participants and 44 yrs old participants were not equal.
B. Participants education level from Non formal education, Primary education...to tertiary degree participated. However, there level of understanding not equal.
C. You are using Online data collection, those who are not using smartphone, Laptop, desktop etc not included in your study.
Considering these, the strengthen and limitation of the study should be exhaustively explained.

Abstract

Background

The success of vaccination programmes lies on acceptability and understanding of vaccine concerns among diverse population groups. This study investigates the covid-19 vaccination concerns among Nigerian youths.

Methods

We conducted a cross-sectional study of 631 youths (343 females and 270 males) aged between 15-44 years who were randomly recruited online and offline from the six geo-political regions of Nigeria. The questionnaire was administered between 10 February and 15 March 2021. SPSS (Chi-square and Cramer's VStatistic) was used to determine the association ($p<0.05$)between covid-19 vaccination concerns and participants' demographic characteristics.

Results

Among the 12 identified covid-19 vaccination concerns, side-effects ($p=0.037$), not necessary ($p=0.007$), negative reaction to vaccines ($p=0.026$) and assumed non-exposure to covid-19 patients ($p=0.004$) were statistically associated with gender. For age, efficacy doubt ($p=0.023$), political/economical construct ($p=0.023$), family disapproval ($p=0.018$), and non-exposure to covid-19 patients ($p=0.000$) were statistically significant. Efficacy doubt ($p=0.029$) and vaccine is a hoax ($p=0.020$) were associated with marital status. Side effect ($p=0.182$), a mere human experiment ($p=0.777$), doubt on efficacy ($p=0.305$), not necessary

(p=0.457), political/economical construct (p=0.673), negative reaction to vaccine (p=0.162), and vaccine may not be affordable (p=0.506) were not associated with occupation. For level of education, side effects (p=0.140), a mere human experiment (p=0.580), efficacy doubt (p=0.243), and negative reaction to vaccine (p=0.386).

Conclusion

Amongst youths in developing nations, especially in institutions of learning, health promotion and vaccine advocacy strategies should be intensified. The strategies should incorporate reinstating trust in vaccine efficacy, vaccine education, and target youths and their family health decision makers.

Keywords: Covid-19 vaccine, coronavirus, vaccine concerns, vaccine advocacy, developing nations, Nigeria.

Introduction

The devastating effect of the current covid-19 pandemic on global health, health systems, and the global economy is crystal. Since its inception, diverse stakeholders have unanimously established strict public health measures to contain the virus in all nations. The efficacy of such measures is in no doubt. However, with the alarming infection rate (r) of the virus and the emergence of new variants, it remains obvious that public health measures alone may not permanently halt the virus. For instance, systematic evaluation of global covid-19 infection fatality rate posits an average of ~0.15% and ~1.5□2.0 billion infections(1). Further, simulations forecast a global covid-19 mortality of 1.58-8.76 million between 2020 and 2024 (2). Consequently, over 300vaccinesare being developed to aid public health measures in eliminating covid-19(3).However, for emergency purpose, WHO has only recommended

vaccines from Pfizer/BioNTech, Astrazeneca-SK Bio, Moderna, Janssen, and Serum Institute of India(4).

It may be arguable that the problem of developing nations is vaccine availability. However, even more important is concerns and acceptability of such vaccines in developing nations. Vaccine acceptability creates soft landing pad for vaccines with a fast-tracked improved health outcomes for nations.Despite the increasing covid-19 infection and mortality rate and the efficacy of vaccine, vaccine concerns and hesitancy has been reported among different population groups globally but, especially in the developing nations.For instance, in the United Kingdom (UK), an overall 18% vaccine hesitancy was recorded while among black ethnicity, UK recorded 72% vaccine hesitancy with about 37% vaccination rate among black healthcareworkers (5). In the developing nations context, Nigeria reports 78% covid-19 vaccine hesitancy among the youth and 40% among healthcare workers, 68% overall hesitancy was reported in Jordan,and46% in Ghana (6,7,8,9). This is unsurprising as historically; polio vaccine has been boycotted in 2003-2004 in the Northern Nigeria due to vaccine distrust and fallacies (10).Therefore, the success of any vaccination program hinges on availability, coverage, and acceptance rates(11).

Sequel to the observed hesitancy, this quantitative research attempts to study the concerns of covid-19 vaccination among Nigerian youths. This aims to inform robust and sustained vaccination and health promotion strategies andtomake apt policy and practice recommendations. Subsequently, the methods, results, discussion, policy and practice recommendations, strength and limitations, and conclusion will be elaborated.

Comment [TP3]: The strengthen and limitation of the study was not discussed.

Methods

Study Design and Participants

This study utilized analytical cross-sectional study design conducted through a self-administered questionnaire. The eligible population consisted of Nigerian youths between the age of 15-44 years, adapted from the youth age range of the African Youth Charter (12). Nigeria, consist of six geopolitical zones with thirty-six States and the Federal Capital Territory. Nigeria has about 64,000,000 youths (13). Assuming a 5% error margin, Yamane's method of sample size calculation for finite population was utilized in determining a sample size of 400 for this study (14). Consequently, random sampling technique was used in recruiting 630 participants from Nigeria's six geopolitical zones to increase the study's power.

Instrument and Data Collection

An English based Google form self-administered questionnaire shared through diverse digital platforms (emails, WhatsApp, Facebook, Twitter, Telegram, and Instagram) was the study instrument for conducting the survey (Acceptability of Covid-19 Vaccine among Youths in Nigeria (google.com). To ensure a representative sample and avoid bias, hardcopies of the questionnaire was made available to youths without access to a smart device or internet. These were randomly distributed by trained research volunteers while adhering to covid-19 public health protocols.The instrument was developed following a global survey of potential acceptance of a COVID-19 vaccine, having two parts: 'demographics' and 'knowledge, attitudes and perceptions' (KAPs) (15). The demographic variables consisted of age, gender, marital status, occupation, level of education, and state of origin while the second part included 11 KAP questions on COVID-19 and vaccination. Modifications were made to the instrument following a pilot survey using 15 heterogenous participants. The modified version was tested for consistency using internal consistency (Cronbach's alpha of 0.7), inter-rater reliability (Kappa statistic, K = 0.9), and test-retest reliability and finally validated by volunteer experts. The participants were informed of the study's objectives through the first

page of the instrument and consent obtained. Thereafter, all the participants received an anonymous questionnaire sheet or page (for online participants) with the data collection process lasting from 10 February through 15 March 2021. A total of 613 questionnaire were returned, hence, 97% return rate was achieved.

Ethics

All the participants were informed about the study's objectives, its voluntary and anonymous nature, data confidentiality, their ability to withdraw from the survey at will and a signed consent form was obtained before participation. The ethics committee of the Department of Anatomy, Nnamdi Azikiwe University, Awka approved the study. The authors could not access any external institutional review board before the study's initiation. However, all the ethical guidelines for questionnaire and survey-based study as approved by the National Health Research Ethics Committee of Nigeria (NHREC) were followed. Further, the study complied with the 1975 Helsinki Declaration.

Statistical Analysis

The collected data were extracted using Excel, cleaned, coded, and analyzed using the IBM SPSS 23.0 software. Nominal and Categorical data of the demographic variables were presented using descriptive statistics as frequencies and proportions. The Chi-square test was used in testing the associations between independent variables and the primary outcomes (Covid-19 vaccination concerns).Associated variables ($p<0.05$) in the unadjusted analysis were further analyzed using Cramer's V Statistic to determine the relative strength of the association. The significance level was set ata two-tailed p-value of 0.05.

Results

Sociodemographic Characteristics of Study Participants

As evident in table 1 below, 565 of the participants are female while 44% are male. The participants' modal age group is 15-19years with 40-44years as the as the age group with least occurrence (1.8%). The participants' marital status shows that majority of the participants (88.3%) are single while 69.1% are students. Most of the participants (95.1) has either graduate or postgraduate level of education. Table 1 shows categorical variables of participants in counts and percentages (in bracket). Total number of survey participant = 613. Two hundred and seventy (44%) of them were males while 343 (56%) were females. Of this total study sample, 88.3% are single, 11.4% and 0.3% are married and divorced respectively. Thirty-five percent of all respondents are aged between 15-19 years old, 27.6% are aged 20-24. The other age categories – 25-29, 30-34, 35-39 and 40-44 represent 24.5%, 7.7%. 2.9% and 1.8% respectively. Majority of the respondents (69.1%) are students. The others are; 3.9% unemployed, 75 self-employed and 5.6% & 14.4% government and private workers respectively.

Table 2 shows the Descriptive analysis of covid-19 concerns and their association with gender. A total of 31% of the respondents are hesitant to take the vaccine due to anticipated side effect. This response was significantly higher in females. More males acknowledge that the covid-19 vaccine is not necessary. On a whole, 2.9% of respondents see no need for the vaccine. Some 11.4% expressed worry that the vaccine may not be affordable. Similarly, both male and female expressed equal hesitancy on the basis of culture, family and friends disapproval, the pandemic being a hoax, and the believe that the whole thing was created for political and /or economic reasons.

Table 3 represents age related concerns about the covid-19 vaccines. A total of 31.5% of the study population were hesitant to take the vaccine due to perceived side effects, the highest being from those aged 15-19 years (10.4%). 16% of the respondents have doubts about its efficacy, 38% actually believe its all politics and all about business gains. Results also show that sentiments including culture, religion and peer pressure play a lot of role in vaccine acceptance among Nigerian youths. 4.4% avoid the covid-19 vaccine due to family disapproval. 2% and 2.6% are hesitant because of culture and peer pressure respectively. Economic reasons play a big role in response to vaccines as 11.4% believe they cannot afford the vaccine.

Table 4 shows the role marriage played in the response to vaccination in our study. For the unmarried respondents, 27.1% are worried about the possible side effect of the vaccine. 14.4%, 2.6% and 5.1% are reluctant to take the vaccine for doubt of its efficacy, in doubt about its necessity and believe it's a political and economic construct respectively. For the married, it is 0.5%, 1.6% and 0.3% respectively. More of the single people (10.3%) are concerned about the cost and affordability of the vaccine. Only 0.8% of the married share the same concern. More of those who are married are gainfully employed compared to the majority of the singles who are students.

Table 5 is a descriptive analysis of covid-19 concerns and its association with occupation. A total of 22% of students and the unemployed were concerned about the side effects while a total of 9.5% of those working share the same concern. Family disapproval and peer pressure had very little effect on the decision of the workers compared to those who are not employed.

Table 6 analyzes covid-19 concerns and its association with education. Undergraduates showed the highest concern over possible side effects, doubt of efficacy and the believe that it's a hoax and the vaccine may not be necessary. They were also the most influenced by

culture and friends. Those with lesser education (primary and secondary) and no education showed the least concern over these factors.

Discussion

Six hundred and thirteen (613) participants were used in this study, comprising of 56% (343) females and 44% (270) males. This may suggest that females were more interested in giving their concerns about covid-19 vaccines. Attanasi et al., (16) explained that the restrictions of covid-19 pandemic, especially the lock downs impacted more on females than males especially as regards dieting, and the use of smart phones to ease boredom and emotional stress.

The study population comprises of ages fifteen to forty four (15-44) and six sample sizes. The most numerous age range in the study was 15-19 (35.5%) majority of who were students of tertiary institutions in Nigeria. This population is also among the most enlightened portion of the Nigerian population who are also internet compliant.

Only 0.8% of our study population have no formal education. The others are literate and attained some form of formal education. Magon et al., (17) reported that literacy and better health enlightenment reduces vaccine hesitancy. Hence, data gathered from this study represents the enlightened minds of the Nigerian youth population. It means the outcome (hesitancy) will likely be worse among the uneducated youth population who represent 9.36 million of the youth population according to the report of Inko-Tariah(18). Fayehun and Isiugo-Abanihe(19) reported that youths below age 30 makes up above 70% of Nigeria's 206 million estimated population (speaking of about 145 million youths).

The result of our study showed that females were more concerned the side effects of the Covid-19 vaccine compared to their male counterparts. Reports have shown that females suffer more from the effect of pandemics as their male counterparts. Attanasi et al., (16)showed that women were 1.6 times more likely than men to lose control of their usual diet and 2.3 times more prone to increased smart phone use during a lock down. Women are also generally more concerned about their health compared to the male folks (Green et al., 2022). Apparently women seem to have more to worry about due to their varying reproductive cycle. So a woman considers the possibility of being pregnant or not wanting to be pregnant as the case may be as a precondition to accept or reject a medication.

Amongst the female population of the sample studied, 9.6% had doubt on the efficacy of the vaccine. This constitutes a higher percentage of what most females felt about the covid-19 vaccine. 0.8% of the female population felt it was not necessary to take the vaccine. This constitutes a lower number of females for the sample studied. The male population of the sample studied were more particular about the side effect of the vaccine.13.7% of the males made up this value. A minor male population of 0.7% of the sample size felt the vaccine was a hoax.

From the sample population with regards to their concerns and their association with age. 10.4% of 15-19 age range showed more side effects when compared the other age ranges, with 35-39 and 40-44 age ranges showing the least side effects of 0.7% .They equally felt it was more of a human experiment, alongside with 2.6% of 20-24 age range. 15-19 age range equally showed 7.0%, the highest doubt on efficacy of the vaccine with age ranges 35-39 and 40-44 showing the least doubt of 0.2%. The younger population in our study were more inclined to the convictions that the whole covid-19 saga is a hoax. These convictions were

stronger with the lower age ranges and diminished as the ages went higher. The younger respondents among other factors are more glued to the mobile phones and to the social media and so are more exposed to potentially deceiving information than the older ones. At the same time, rumors that the pandemic is a hoax to sell vaccines are spreading faster in the social media space than the virus itself (20). This is a build up to several reports of misappropriation in the production and dissemination of vaccines over the years as well as misinformation. Across the globe, an increasing number of parentsare choosing to delay and/or refuse some or all vaccines for their children (21).

Vaccine hesitancy, or thereluctance to receive recommended vaccination because of concerns and doubts about vaccines(22), was identified by the World Health Organization (WHO) as one of the top ten threats toglobal health in 2019 (23).Parental concerns about vaccine safety, which led to the declinein vaccine uptake, were caused by widespread misinformation spread by documentaries broadcastedon national television and lobbying by anti-HPV vaccine groups. There is therefore no doubt that this will greatly influence the decision from majority of our respondents who are students under the sponsorship of their parents. Expectedly, the age ranges of 15-19 and 20-24 had a higher percentage of 1.3% family disapproval to vaccination. This may be due to the fact that they were probably required to seek approval from their parents/guardian before receiving vaccination. Age 40-44 showed the least as they probably needed no approval to be vaccinated.

Some of the parental refusal on vaccination for their children stem from a cultural point of view. 1% of ages 15-19 were of the opinion that their culture forbids vaccination. This is the highest of the sample size and age range 40-44 having the least cultural opposition to vaccination. Others are due to peer pressure and collective decision with friends and

colleagues. This means that the decision by one notable member of the class not to be vaccinated that affect the decision of other students. Age 20-24 were probably engaging themselves more as they had a higher value of 1.3%, with their friends/colleagues advising against vaccination, while 40-44 had the least.

Many who took precautions as stated by the CDC for the prevention of the spread of covid-19 felt there was no further need of taking the vaccine since they never got close to a sufferer. This stems of course from an underlying deep seated hesitancy for vaccination. Age 15-19 showed a higher value of 3.3%, stating that they were not exposed to covid-19 patients, while 40-44 showed the least value. Also, 4.2% of 15-19 were of the opinion that vaccination may not be affordable as against the lowest percentage value of 0.2% seen in ages 30-34, 35-39 and 40-44 respectively. Most vaccines are hardly given at the expense of the patient. So the perception of financial impediment must have been due to misinformation or corrupt practices in the system where persons may be charged a fee for the vaccination of their ward.

Perceived importance of vaccination is a well-known individual determinant of vaccine acceptance (24). Several factors influence the acceptance or refusal of vaccines, the most given reasons being dislike for vaccines in general, concerns about safety/thinking that a vaccine produced in a rush is too dangerous, considering the vaccine useless because of the harmless nature of COVID-19, general lack of trust, doubts about the efficiency of the vaccine, belief to be already immunized, doubt about the provenience of vaccine (24).

There is considerable justification for vaccine hesitancy in Africa for obvious reasons. Many globalists have seen Africans as lower humans and 2nd class members of the world society. As such, Africans over the years have suffered from discriminatory attitudes from the western world in their remarks, hence the need to be more careful with ‘kind gestures’ coming from

them. The immediate past president of the United States of America, President Donald Trump in a viral speech referred to Africa as a shit hole (25). Bill gates in his constant advocacy on world population reduction have always insisted that Africa is over populated and something must be done to drastically reduce her population (26). He suggested among other things that contraceptives should be made very available in Africa, especially Democratic Republic of Congo and Nigeria. He also stressed that something should be done about the health of African youths. A report from 2010 accused Bill gates as saying the world population needs to be reduced by 10-15% in order to address population growth. An October 6 2021 article published on the website Tech Start-ups added a new claim to the list by alleging that 11 years ago, Bill Gates talked about reducing the global population by 10% to 15% "using new vaccines for population control". Bill Gates talked about using vaccines to control population growth, here is the unedited 2010 TED Talk video," the headline said. Whether these claims are true or not is not the subject of this research. However, it sheds light into the expected hesitancy of Covid-19 vaccines that has anything to do with the Bill and Melinda Gates Foundation. The United Nations world population prospects estimates the global human population of 2010 at 6.9 billion. This figure is estimated to be close to 8 billion today. So any suggestion that looks at cutting down this population by 10 to 15% is looking at between 690 million to over 1 billion people around the world. It is no news that most proponents of this world population reduction agenda point to Africa as the continent that need the most reduction in population considering the level of 'poverty' in the continent and what the future holds for such countries. It is therefore a shock that Bill Gates is at the forefront of funding of a Covid-19 vaccine to save the life of Africans from a disease that should naturally achieve the 10% or more population reduction, hence the hesitance. Available data shows that GAVI is among the leading sponsors and propagators of mass

Africa vaccination and Bill and Melinda Gates foundation are their highest sponsors (https://www.afro.who.int/news/new-push-drive-africas-covid-19-vaccination).

Survival is an inherent human and animal instinct. Hence, nobody naturally wants to die or take their own life. The hesitancy of Nigerian youths towards vaccines from the western world is therefore an expected outcome. This is not unfounded. Reports have revealed possible "weaponization' of past vaccine programs in Africa. It has been rumored that the packaging and content of various vaccines sent to Africa is different from what is obtainable in the country of manufacture. Some pictures of vaccines with the inscription 'FOR AFRICA' circulated on the social media space. Why should the vaccines shipped down to Africa be different from the ones consumed by the parent country? To validate this skepticism, the British Government announced (https://www.thecable.ng/nigeria-missing-as-uk-recognises-covid-vaccine-certificates-from-over-50-countries) that persons entering the UK from Nigeria and other African countries need to be quarantined for at least 10-days followed by a PCR- test before allowed entry into the UK whether vaccinated or not. Several reactions trailed these actions on social media which happens to be the greatest source of information for African youths (27). Some of the reactions read –'No African country is included in the list of countries whose vaccine certificate is recognized by the UK. This has led many Nigerians to question the validity of the vaccines administered in the country. Another reads - I don't understand this policy. Is there a difference between the vaccine they donated and the one they are using? Did they send something that doesn't work (Agayiba (@agayiba) (28) Concerns like this are the reasons for vaccine hesitancy in Nigeria. Ozawa and Stack (29) rightly stated that public trust on vaccines is poor in Africa, especially DR Congo and Nigeria.

One year since the COVAX Facility delivered the first COVID-19 vaccines to Africa, around 400 million doses have been administered – the region's largest ever vaccine rollout in a single year. However, vaccination rates in the continent are the lowest in the world. To help bolster uptake, World Health Organization (WHO), UNICEF, Gavi, the Vaccine Alliance, and partners are supporting mass vaccination campaigns in 10 priority countries to reach 100 million people by the end of April 2022. There is therefore compelling evidence to justify the hesitation of Nigerian youths to accept whatever is shipped down to us in the guise of vaccine.

Another reason for hesitancy from our study among youths is the lack of confidence in the leaders and the health care system. Research have documented that thimoseral, a mercury loaded vaccine preservative have been restricted in vaccines for children less than 7 years of age in the US several years ago (30, 31). But we find vaccines shipped down to Nigeria in recent years from these same countries still containing thimoseral. All we can make out of these reports in the lack of genuineness and lack of honesty in the handling of vaccines produced for Africa. People hide under the sharade of "Africa is poor and cannot afford their own vaccines' to produce poisons and ship down to the continent.

Therefore, vaccine hesitancy will remain a subject and the frequency will be on the increase if the confidence of African youths is not restored to know that they are seen and treated equally like youths in other parts of the world. As a founding partner of Gavi, the Gates Foundationhas brought international attention to the cause of immunisation and has made several commitments to Gavi, totalling USD 4.1 billion to-date. In 2000, the foundation made

an initial USD 750 million commitment to the Vaccine Fund, which was catalytic in bringing other donors to support vaccine delivery and creating Gavi, the Vaccine Alliance.

Between 2011 and 2015, the Bill & Melinda Gates Foundation have donated over 1.5billion USD to vaccine production and distribution, especially to Africa. They committed over 250 million USD between 2015 and 2018 to support polio vaccines. At the Berlin Pledging Conference 2015, the Bill & Melinda Gates Foundation announced USD 1.55 billion for Gavi's next 2016-2025 strategic period. In addition to this funding, the Foundation pledged USD 150 million in support of Gavi's COVAX AMC to ensure equitable access to vaccines for AMC-eligible economies.

Parents' decisions to vaccinate their child often involve a mix of psychological, sociocultural and political factors in addition to scientific and economic evidence (32). In the Netherlands, higher levels of intention to receive vaccination were associated with greater trust in government, fear/worry and perceived vulnerability to the disease (33). In the Democratic Republic of the Congo, deeply entrenched religious and traditional beliefs as well as a strong distrust of government health services have undermined some of the polio eradication efforts where child absenteeism often conceals vaccine avoidance behaviour (34). In certain pockets of Nigeria, reasons for opposition to vaccines by mothers and/or fathers include rumors about vaccine safety, community suspicions about motives behind immunization promotion and pre-existing political, religious and ethnic tensions (35). In order to reach more children with life-saving vaccines, communication about vaccines needs to take into account the specific social, cultural and political contexts of each country.

Conclusion

The results of this study confirm high degree hesitancy for the covid-19 vaccine among Nigeria youths in tertiary institutions. This hesitancy may continue even for future vaccine programs if the confidence of the Nigeria youths is not restored by proving the genuineness of the vaccines and ascertaining the authenticity of the products supplied to Africa.

Declarations:

Ethical approval and consent to participate

All participants were duely informed of the voluntary nature of participation in the research and the liberty to withdrew at any point in the course of the research. The study was approved by the research ethics committee of the faculty of Basic Medical Sciences, Nnamdi Azikiwe University, Awka with the number NAU/CHS/NC/FBMS/215.

Availability of data and material

Data for this research is readily available upon request.

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Table 1: Descriptive analysis of sociodemographic characteristics of survey participants

Categories	Count (%)
Gender	
Male	270 (44)
female	343 (56)
Age (Years)	
15-19yrs	217 (35.5)
20-24yrs	169 (27.6)
25-29yrs	150 (24.5)
30-34yrs	47(7.7)
35-39yrs	18 (2.9)
40-44yrs	11 (1.8)
Marital Status	
Single	541 (88.3)
Married	70 (11.4)
Divorced	2 (0.3)
Widowed	0(0)
Occupation	
Student	423 (69.1)
Unemployed	24 (3.9)
Self-employed	43 (7.0)
Government worker	34 (5.6)
Private organization worker	88 (14.4)
Level of Education	
No formal education	5 (0.8)

Primary education	6 (1.0)
Secondary education	19 (3.1)
Tertiary education	480 (78.3)
Postgraduate level	103 (16.8)

Table 2: Descriptive analysis of covid-19 concerns and their association with gender

Covid-19 Vaccination Concerns	**Gender**		**Total**	**p-value**
	Female	**Male**		
Side effects	109(17.8%)	84(13.7%)	193(31.5%)	0.037
A mere human	24(3.9%)	27(4.4%)	51 (8.9%)	0.695

experiment				
Doubt on efficacy	59(9.6%)	39(6.4%)	98(16%)	0.303
Not necessary	5(0.8%)	13(2.1%)	18(2.9%)	0.007
Political/economical construct	23(3.8%)	15(2.4%)	38(6.2%)	0.502
A hoax	7(1.1%)	4(0.7%)	11(1.8%)	0.811
I react negatively to vaccines	7(1.1%)	8(1.3%)	15(2.4%)	0.026
Family disapproval	14(2.3%)	13(2.1%)	27(4.4%)	0.341
My culture forbids it	6(1%)	6(1%)	12(2%)	0.088
My friends/colleagues advise against it	10(1.6%)	6(1%)	16(2.6%)	0.063
I am not exposed to covid-19 patient	33(5.4%)	31(5%)	64(10.4%)	0.004
Vaccination may not be affordable	46(7.5%)	24(3.9%)	70(11.4%)	0.918
Total	**343(56%)**	**270(44%)**	**613(100%)**	

Values are presented as counts and percentages (%). Chi-square test was used to statistically test association and p-value <0.05 shows association. Covid-19 means coronavirus disease 2019.

Table 3: Descriptive analysis of covid-19 concerns and their association with age

Covid-19 Vaccination Concerns	**Age in years**						**Total**	**P-value**
	15-19	**20-24**	**25-29**	**30-34**	**35-39**	**40-44**		
Side effects	64(10.4%)	52(8.5%)	54(8.8%)	15(2.4%)	4(0.7%)	4(0.7%)	193(31.5 %)	0.842

A mere human experiment	16(2.6%)	16(2.6%)	12(2.0%)	4(0.7%)	2(0.3%)	1(0.2%)	51(8.3%)	0.297
Doubt on efficacy	43(7.0%)	26(4.2%)	18(2.9%)	9(1.5%)	1(0.2%)	1(0.2%)	98(16.0%)	0.023
Not necessary	6(1.0%)	8(1.3%)	3(0.5%)	0(0.0%)	0(0.0%)	1(0.2%)	18(3.0%)	0.521
Political/economical construct	15(2.4%)	8(1.3%)	7(1.1%)	5(0.8%)	1(0.2%)	2(0.3%)	38(6.2%)	0.023
A hoax	1(0.2%)	8(1.3%)	1(0.2%)	0(0.0%)	1(0.2%)	0(0.0%)	11(1.8%)	0.642
I react negatively to vaccines	5(0.8%)	4(0.7%)	3(0.5%)	3(0.5%)	0(0.0%)	0(0.0%)	15(2.4%)	0.719
Family disapproval	8(1.3%)	8(1.3%)	5(0.8%)	5(0.8%)	1(0.2%)	0(0.0%)	27(4.4%)	0.018
My culture forbids it	6(1.0%)	3(0.5%)	3(0.5%)	0(0.0%)	0(0.0%)	0(0.0%)	12(2.0%)	0.745
My friends/colleagues advise against it	7(1.1%)	8(1.3%)	0(0.0%)	0(0.0%)	1(0.2%)	0(0.0%)	16(2.6%)	0.161
I am not exposed to covid-19 patients	20(3.3%)	12(2.0%)	20(3.3%)	5(0.8%)	6(1.0%)	1(0.2%)	64(10.4%)	0.000
Vaccination may not be affordable	26(4.2%)	17(2.8%)	24(3.9%)	1(0.2%)	1(0.2%)	1(0.2%)	70(11.4%)	0.193
Total	**217(35.4%)**	**170(27.7%)**	**150(24.5%)**	**47(7.7%)**	**18(2.9%)**	**11(1.8%)**	**613(100%)**	

Values are presented as counts and percentages (%).Chi-square test was used to statistically test association and p-value of <0.05 shows association. Covid-19= coronavirus disease 2019.

Table 4: Descriptive analysis of covid-19 concerns and their association with marital status

Covid-19 Concerns	**Vaccination**	**Marital Status**			**Total**	**p-value**

	Single	Married	Divorced		
Side effect	166(27.1%)	27(4.4%)	0(0.0%)	193(31.5%)	0.635
A mere human experiment	48(7.8%)	3(0.5%)	0(0.0%)	51(8.3%)	0.660
Doubt on efficacy	88(14.4%)	10(1.6%)	0(0.0%)	98(16.0%)	0.029
Not necessary	16(2.6%)	2(0.3%)	0(0.0%)	18(2.9%)	0.828
Political/economical construct	31(5.1%)	7(1.1%)	0(0.0%)	38(6.2%)	0.061
A hoax	9(1.5%)	2(0.3%)	0(0.0%)	11(1.8%)	0.020
I react negatively to vaccines	12(2.0%)	3(0.5%)	0(0.0%)	15(2.4%)	0.929
Family disapproval	23(3.8%)	4(0.7%)	0(0.0%)	27(4.4%)	0.893
My culture forbids it	11(1.8%)	1(0.2%)	0(0.0%)	12(2.0%)	0.807
My friends/colleagues advise against it	15(2.4%)	1(0.2%)	0(0.0%)	16(2.6%)	0.100
I am not exposed to covid-19 patients	59(9.6%)	5(0.8%)	0(0.0%)	64(10.4%)	0.084
Vaccination may not be affordable	63(10.3%)	5(0.8%)	2(0.3%)	70(11.4%)	0.316
Total	**541(88.3%)**	**70(11.4%)**	**2(0.3%)**	**613(100.0%)**	

Values are presented as counts and percentages (%). Chi-square test was used to statistically test association and p-value of <0.05 shows association. Covid-19= coronavirus disease 2019.

Table 5: Descriptive analysis of covid-19 concerns and theirassociation with occupation

Covid-19	**Total**	p-

Vaccination Concerns	Student	Unemployed	Self-employed	Government worker	Private organization worker		value
Side effect	128(20.9%)	7(1.1%)	14(2.3%)	14(2.3%)	130(4.9%)	193(31.5%)	0.182
A mere human experiment	32(5.2%)	1(0.2%)	2(0.3%)	4(0.7%)	12(2.0%)	51(8.3%)	0.777
Doubt on efficacy	71(14.4%)	2(14.4%)	13(14.4%)	3(14.4%)	9(14.4%)	98(14.4%)	0.305
Not necessary	14(2.3%)	1(0.2%)	1(0.2%)	0(0.0%)	2(0.3%)	18(2.9%)	0.457
Political/economical construct	26(4.2%)	1(0.2%)	1(0.2%)	4(0.7%)	6(1.0%)	38(6.2%)	0.673
A hoax	8(1.3%)	1(0.2%)	1(0.2%)	0(0.0%)	1(0.2%)	11(1.8%)	0.000
I react negatively to vaccines	12(2.0%)	1(0.2%)	0(0.0%)	1(0.2%)	1(0.2%)	15(2.4%)	0.162
Family disapproval	21(3.4%)	0(0.0%)	1(0.2%)	1(0.2%)	4(0.7%)	27(4.4%)	0.023
My culture forbids it	11(1.8%)	1(0.2%)	0(0.0%)	0(0.0%)	0(0.0%)	12(2.0%)	0.011
Myfriends/colleagues advise against it	15(2.4%)	0(0.0%)	0(0.0%)	0(0.0%)	1(0.2%)	16(2.6%)	0.015
I am not exposed to covid-19 patients	38(6.2%)	5(0.8%)	6(1.0%)	4(0.7%)	11(1.8%)	64(10.4%)	0.001
Vaccination may not be affordable	48(7.8%)	4(0.7%)	4(0.7%)	3(0.5%)	11(1.8%)	70(11.4%)	0.506
Total	**424(69.2%)**	**24(3.9%)**	**43(7.0%)**	**34(5.5%)**	**88(14.4%)**	**613(100%)**	

Values are presented as counts and percentages (%). Chi-square test was used to statistically test association and p-value of <0.05 shows association. Covid-19= coronavirus disease 2019.

Covid-19	Education	Total	p-

	No formal education	Primary	Secondary	Tertiary	Post-graduate		
Side effect	2(0.3%)	0(0.0%)	6(1.0%)	146(23.8%)	39(6.4%)	193(31.5%)	0.140
A mere human experiment	0(0.0%)	1(0.2%)	2(0.3%)	41(6.7%)	7(1.1%)	51(8.3%)	0.586
Doubt on efficacy	1(0.2%)	2(0.3%)	5(0.8%)	75(12.2%)	15(2.4%)	98(16.0%)	0.243
Not necessary	0(0.0%)	0(0.0%)	0(0.0%)	17(2.8%)	1(0.2%)	18(2.9)	0.045
Political/economical construct	1(0.2%)	1(0.2%)	1(0.2%)	29(4.7%)	6(1.0%)	38(6.2%)	0.526
A hoax	0(0.0%)	1(0.2%)	0(0.0%)	9(1.5%)	1(0.2%)	11(1.8%)	0.000
I react negatively to vaccines	0(0.0%)	0(0.0%)	0(0.0%)	10(1.6%)	5(0.8%)	15(2.4%)	0.386
Family disapproval	0(0.0%)	0(0.0%)	0(0.0%)	24(3.9%)	3(0.5%)	27(4.4%)	0.003
My culture forbids it	0(0.0%)	1(0.2%)	1(0.2%)	10(1.6%)	0(0.0%)	12(2.0%)	0.000
My friends/colleagues advise against it	0(0.0%)	0(0.0%)	0(0.0%)	15(2.4%)	1(0.2%)	16(2.6%)	0.001
I am not exposed to covid-19 patients	1(0.2%)	0(0.0%)	2(0.3%)	49(8.0%)	12(2.0%)	64(10.4%)	0.116
Vaccination may not be affordable	0(0.0%)	0(0.0%)	2(0.3%)	55(9.0%)	13(2.1%)	70(11.4%)	0.630
Total	**5(0.8%)**	**6(1.0%)**	**19(3.1%)**	**480(78.3%)**	**103(16.8%)**	**613(100%)**	

Table 6: Descriptive analysis of covid-19 concerns and their association with level of education

Values are presented as counts and percentages (%). Chi-square test was used to statistically test association and p-value of <0.05 shows association. Covid-19= coronavirus disease 2019.