Original Article

Willingness to Pay for Covid-19 Vaccine by Frontline Health Workers in Tertiary Institutions in Nigeria

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ABSTRACT

OBJECTIVE: To explore the willingness to pay (WTP) for COVID-19 vaccines among the frontline Health workers in Nigeria and the determinants of payment for COVID-19 Vaccines.

METHODOLOGY: A descriptive cross-section survey was carried out among 115 randomly nominated frontline healthcare workers using a multistage sampling technique in Kwara and Ogun States of Nigeria. The workers aged 18 years and above who consented to participate in the survey were eligible for the study. Data analysis was done using SPSS version 23, and ethical approval was obtained from the institution.

RESULTS: The results showed a 35.7% level of WTP, of which 78.6% of WTP respondents were ready to pay USD$10 for the Vaccine. More respondents with chronic diseases were eager to pay for the Vaccine at 77.8%, which was statistically significant.

CONCLUSION: The predisposition of frontline healthcare workers to pay for the COVID-19 Vaccine increased with vaccine efficacy and less vaccine cost. The study revealed that most respondents were WTP USD$10 for COVID-19 vaccines. Trusted policy makers should be used for advocacy in combating the misinformation on COVID-19 vaccines.

KEYWORDS: COVID-19 Vaccine, Willingness to pay, Frontline healthcare workers, Efficacy, Safety, Pandemic

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INTRODUCTION

The covid-19 pandemic has affected countries' economies globally, especially developing countries, including Nigeria, with minimum wages of USD 64 for their workers.[1] Nigeria has about 167,155 confirmed COVID-19 cases with more than 2,117 deaths, and healthcare workers make up 10% of this mortality.[2,3] Globally, we have 178 million documented cases, while over 3.8 million deaths have occurred.[4]

The pandemic has negatively affected the day-to-day lives of individuals and families all over the globe, with healthcare workers (HCWs) among the highest risk groups for COVID-19 infection. This has negatively affected their wellbeing, finances and mental capabilities through the alteration of their daily patterns of existence.[5] To curb this pandemic, apart from non-pharmaceutical methods, administering a potent vaccine is essential for controlling this infection, death and even the gradual economic impact.[6] The research and development of the COVID-19 Vaccine by pharmaceutical companies through subsidized by some governments have been at a high cost.[6] The need to transfer this cost to the individual is becoming inevitable and essential to the willingness to pay. Being a healthcare worker and having a high income were factors related to a greater readiness to pay for the Vaccine.[7] Are health workers willing to pay for this preventive Vaccine if the need arises?

Healthcare workers are an essential source of evidence for the efficacy of vaccines. Their readiness to part with a fee for the Vaccine will promote and validate the immunization against this life-threatening disease among the general population.[7,8] These workers are ranked among the high-risk groups measured as contenders for early vaccination. It is therefore imperative to consider the readiness of these frontline workers to pay for immunization against this disease to tackle and debunk the identified rejection driven by myths and conspiracy theories.[7]

The information obtained from the willingness of healthcare workers to pay would provide the basis for a payment plan for the vaccination of individuals against the illness.[9] However, to achieve increased acceptance of the Vaccine, there may be a need to partly provide financial subsidies to selected categories of people affected by health inequities and develop risk communication materials to provide adequate information to members of the public within the country.[7,9]

The objectives of this study hinge on the level of

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willingness to pay (WTP) and factors of readiness to pay for the COVID-19 Vaccine amongst frontline healthcare workers.

METHODOLOGY

An analytical cross-sectional study was conducted among 115 respondents in 2 Federal Tertiary hospitals. FMC Abeokuta 45 respondents and 70 respondents at UITH Ilorin. The study period was from January to April 2020. HCWs (doctors, nurses, pharmacists and administrators) aged 18 years or older currently employed in the two hospitals were accepted as respondents for the study. Younger (aged less than 18 years) HCWs and those absent during the survey were excluded. After providing adequate information about the study, all participants agreed to and signed a consent form. The ethics committee approved the study of UITH. The multistage sampling method of which frontline HCWs were stratified into doctors, nurses, pharmacists and administrators, and the systemic sampling technique was later used to select respondents from the sample frame for the study sample size. Data were analyzed using SPSS 23.0 software. Categorical data related to demographic variables are presented as frequencies and proportions. The associations between independent variables and the primary outcomes were tested using the Chi-square test as appropriate and multiple logistic regressions. The level of significance was set to 0.05 (two-tailed).

RESULTS

Table I WTP for COVID-19 Vaccine with Social Demographic variables. The modal age range of respondents (46.2%) who were WTP (31-40 years). This was not statically significant. Male respondents (43.6%) were more WTP for the Vaccine when compared with their female counterparts. A higher proportion of married staff had a greater WTP at 37.4%. Laboratory scientists were WTP (62.5%) among HCW though not statically significant; a statistical significantly WTP was seen with a higher proportion of respondents with Chronic Diseases were (77.8%).

TABLE I: WTP FOR COVID-19 VACCINE WITH SOCIAL DEMOGRAPHIC VARIABLES

	WTP				
	Yes	**No**	**Total**	**χ^2**	***p*-value**
Variable	**n(%)**	**n(%)**	**N**		
Age (years)					
≤ 30	6 (42.9)	8 (57.1)	14	6.953	0.073
31 – 40	18 (46.2)	21 (53.8)	39		
41 – 50	12 (37.5)	20 (62.5)	32		
51 – 60	5 (16.7)	25 (83.3)	30		
Gender					
Male	17 (43.6)	22 (56.4)	39	1.621	0.203
Female	24 (31.6)	52 (68.4)	76		
Marital status					
Single	4 (33.3)	8 (66.7)	12	1.968^F	0.441
Married	37 (37.4)	62 (62.6)	99		
Widowed	0 (0.0)	4 (100.0)	4		
Number of children					
None	7 (70.0)	3 (30.0)	10	5.712	0.057
1 – 3	23 (31.5)	50 (68.5)	73		
> 3	11 (34.4)	21 (65.6)	32		
Cadre					
Doctor	12 (37.5)	20 (62.5)	32	8.423	0.077
Nurse	6 (20.0)	24 (80.0)	30		
Pharmacist	10 (52.6)	9 (47.4)	19		
Lab scientist	5 (62.5)	3 (37.5)	8		
Admin	8 (30.8)	18 (69.2)	26		
History of chronic Disease					
Yes	7 (77.8)	2 (22.2)	9	7.553^F	**0.010***
No	34 (32.1)	72 (67.9)	106		
Ever been tested for COVID-19					
Yes positive	1 (25.0)	3 (75.0)	4	0.230^F	1.000
Yes negative	7 (35.0)	13 (65.0)	20		
No	33 (36.3)	58 (63.7)	91		
Intervention for a positive result					
Self-isolation	1 (33.3)	2 (66.7)	3	0.444^F	1.000
Isolation with treatment	0 (0.0)	1 (100.0)	1		
Knows someone tested for COVID-19 in immediate social network					
Yes	27 (44.3)	34 (55.7)	61	4.198	**0.040***
No	14 (25.9)	40 (74.1)	54		
Result of test (n = 61)					
Positive	19 (46.3)	22 (53.7)	41	0.570^F	0.888
Negative	7 (38.9)	11 (61.1)	18		
I don't know	1 (50.0)	1 (50.0)	2		
Treatment offered to positive cases					
Self-isolation	6 (46.2)	7 (53.8)	13	1.169^F	0.859
Isolation without treatment	1 (100.0)	0 (0.0)	1		
Isolation with treatment	12 (44.4)	15 (55.6)	27		

χ^2: Chi square test; F: Fisher's exact test; *: p value <0.05

Table II: WTP for COVID-19 vaccine

Amongst the respondents, 35.7% are willing to pay for the COVID-19 Vaccine. However, those willing to pay $67.00 for the Vaccine were about 34.1%, at $37.00, they were 65.3% of respondents, but at a lower cost of $10.00, those willing to pay (WTP) jumped to 78.6%. The table also shows that when Vaccine had a 50% chance of prevention, WTP among respondents were (65.9%) but rose significantly to (78.00%) when the

chance of prevention stood at 90%.

TABLE II: WTP FOR COVID-19 VACCINE

Variable	Frequency	Percent
Would you pay for the COVID-19 Vaccine if it is available		
Yes	41	35.7
No	62	53.9
I don't know	12	10.4
Would you pay the US $67 (Minimum wage) for the COVID-19 Vaccine (n = 41)		
Yes	14	34.1
No	27	65.9
Would you pay the US $38 for the COVID-19 Vaccine (n = 41)		
Yes	20	48.3
No	21	51.7
Would you pay US$10 for the COVID-19 Vaccine (n = 41)		
Yes	32	78.6
No	9	21.4
If the Vaccine has a 50% chance of prevention from COVID-19 (n = 41) Would pay for this		
Yes	27	65.9
No	13	31.7
I don't know	1	2.4
If the Vaccine has a 90% chance of prevention from COVID-19 (n = 41)		
Would pay for it even with a 90% chance of preventing COVID-19		
Yes	32	78.0
No	8	19.5
I don't know	1	2.4

**US$67.00 Current Country Minimal wage US$10 Previous minimal wage*

Table III: Level of trust and confidence of persons/ influencers involved in management and WTP for COVID-19 in Nigeria.

This table depicts the level of confidence among respondents in sources of information and influencers about vaccines on COVID-19 and willingness to pay WTP were found to be highest in their doctors (mean rank =2.00) with varying degrees of confidence and trust in other organizations/influencers such as the Nigerian Centre for Disease Control (NCDC) with a mean rank of 4.16 and religious leaders (4.77). However, the level of trust was lowest in patent drug store owners (mean=7.21).

DISCUSSION

The level of willingness to pay and the cost of the COVID-19 Vaccine will be based on many factors when the inevitable era of payment for the vaccine surface. Developing Countries such as Nigeria, with meager incomes, will have to design a cost-efficient model to ensure individuals get vaccinated without unduly getting financially over-burdened or weakening the health system's finances. The ideal cost people are willing to incur to be vaccinated would be based on market forces such as demand and supply while taking into consideration the peculiarities of the health care market.

The study respondents were predominantly female, 76 (66.1%). The mean age of respondents was 42.95 ± 10.71. This finding was in agreement with the mean age of Nigeria's Federal workers.[8] More than three-quarters of respondents are married with a mean family size of four, which aligns with the national average of 4.14± 2.67.[8.] The rate of conducting COVID 19 tests among the respondents was found to be poor, with less than one-fifth of HCW having been tested for the disease and less than a tenth being positive. The predominant course of action among those who tested positive was that they proceeded

TABLE III: LEVEL OF TRUST AND CONFIDENCE OF PERSONS/INFLUENCERS INVOLVED IN MANAGEMENT AND WTP FOR COVID-19 IN NIGERIA

	Very Little	Little	Some	Much	Very Much	Don't know	Level of confidence
Variable	**n(%)**	**n(%)**	**n(%)**	**n(%)**	**n(%)**	**n(%)**	**Mean rank**
Your own doctor	2(1.7)	2(1.7)	15(13.0)	47(40.9)	47(40.9)	2(1.7)	2.00
Patent Drug Seller	57(49.6)	33(28.7)	8(7.0)	9(7.8)	6(5.2)	2(1.7)	7.21
Primary Health Centre	7(6.1)	25(21.7)	33(28.7)	26(22.6)	22(19.1)	2(1.7)	4.90
State Health Department	6(5.2)	14(12.2)	38(33.0)	40(34.8)	15(13.0)	2(1.7)	4.72
Nigerian Centre for Disease Control (NCDC)	3(2.6)	14(12.2)	30(26.1)	40(34.8)	26(22.6)	2(1.7)	4.16
Presidential Taskforce on COVID-19 (PTF)	5(4.3)	32(27.8)	34(29.6)	28(24.3)	14(12.2)	2(1.7)	4.66
Professional Organizations (e.g: NMA)	5(4.3)	7(6.1)	32(27.8)	39(33.9)	31(27.0)	1(0.9)	4.00
Religious Leaders	3(2.6)	24(20.9)	27(23.5)	35(30.4)	25(217)	1(0.9)	4.77
Traditional Leaders	34(29.6)	28(24.3)	34(29.6)	11(9.6)	4(3.5)	4(3.5)	6.80

NB: Ranking of persons/organization ranges between 1 - 9, with 1 being the highest level of confidence and 9 being the lowest

with self-isolation. The self-isolation of the positive respondents reflects the relative mildness of the symptoms experienced as they do not require hospitalization, which would have occurred in more severe manifestations of the disease. The respondents reported a higher positivity rate among their acquaintances, with about two-thirds (67.2%) reporting knowledge of individuals who had tested positive. Among those with positive results, 65.7% were treated in the isolation centres, which may also reflect the severity of the symptoms and signs of the disease.

The willingness to pay for COVID -19 vaccine was found to be below average in our Nigeria study, with only 41(35.7%) of the respondents willing to pay for a Vaccine against COVID-19 when it becomes available. This study further shows lower respondents among those WTP at a mean of US$67.00 to be 14 (37,7%), which later appreciated significantly when the cost was reduced to US$10 to 32(78,65% among those WTP). Prevention chance of the Vaccine to 90% also increased the WTP among respondents to 32 (78%). A related study in Ethiopia shows the magnitude of willingness to pay for a COVID-19 vaccine was 42.8%. Respondents were willing to pay the mean amount of money (US$ 10.04).[9] A study from Kenya also showed higher values of willingness to pay, with estimates of individuals' mean WTP for the Vaccine ranging from US$ 49.81.[10] Sex, income, affordability of the Vaccine, fear of side effects, support for the Vaccine, and perceived probability of acquiring COVID-19 infection were factors significantly associated with WTP for a COVID-19 vaccine similar to our study.

In a similar study in Jakarta, Indonesia, among those willing to pay, results showed more significant respondents that 78.3% (1,065) were WTP for the COVID-19 Vaccine with a median WTP of US$ 57.20 [11]. In the same Indonesian study, 16.1% (203) expressed that they were not willing to pay US$ 15.47. This advocates that if the vaccine price is higher than US$ 15.47, one-fifth of the population, at least in studied populations, may not become immunized.[11] This is similar to our study where respondents can only pay US$10, and 22% are unwilling to pay despite the limited cost.

This study shows WTP is about three times lower than that originated in the study in Malaysia (US$30.70) but within the variety of the WTP found in the study in Romania, which was US$59.26–US$474.08 for the high-income people, and US$23.70–US$237.04 for the whole population [12,13]. This will postulate a cross-subsidy model for the rich to subsidize the poor as a funding gap mechanism. Any country that cannot fully procure the vaccines for its citizens due to financial constraints could explore the route of providing the Vaccine at no cost to those at most significant risk and those within the identified vulnerable groups while levying a fee to individuals within the high-income bracket. The WTP among those in the high-income group would be predicated on their insight into the efficiency and safety of the vaccination process. Moreover, the results show that Front line Health workers are becoming scared of being infected with Virus as the pandemic progresses.[7] Also, government and public adherence to the non-pharmaceutical preventive protocol are becoming weak, and frontline health workers are more susceptible and at higher risk of becoming infected; perception is evident that the administration's performance in speaking to the pandemic is gradually becoming deteriorating, and fatigue has set in.

Our research also discovered the determinant link between those with chronic diseases and their willingness to pay for the Vaccine 77,8 %. The association has been expressed to indicate a positive association between willingness and capability to pay or the negative correlation where those having existing chronic diseases would have greater consideration of the significant value of being immunized. Also, having close acquittance tested positive for COVID-19 influenced people's WTP by 46.3%, which was statistically significant at P<0.004.

Likewise, to combat the disinformation regarding vaccination and vaccine hesitancy, as a result of this affecting willingness to pay for the Vaccine, attitudinal change must be preceded by vital information and health education on the importance of vaccination and the high benefit-risk ratio associated with vaccines, and the COVID-19 vaccines in this instance. Therefore, the confidence and trust in vaccines must be advocated for by trusted individuals and influencers to provide adequate and correct information to the people to influence their knowledge and WTP for the Vaccine when it arises. Providers, such as healthcare workers, health authorities, and policymakers, could provide the vaccine information, benefits, and safety.[14] Level of trust and confidence of persons/influencers involved in the management of Covid19 in Nigeria's study indicated that medical doctors (mean rank=2.00), professional bodies NMA (mean rank =4.00) and the Nigerian Centre for Disease Control (NCDC) with a mean level of 4.16 were trusted to provide truthful information on vaccination. This finding may be an invaluable tool for advocacy to discourage vaccine hesitancy. The misinformation on poor vaccine quality being conveyed by mass and social media, which includes rumours as offensive as the reduction in the population of Africans through vaccination, could influence healthcare workers on vaccine hesitancy, which could have a snowball effect on the decisions of their patients affecting WTP [15-17]. The need for advocacy campaigns by these trusted individuals and groups to combat this rising "infodermic" cannot be overstressed to ensure herd immunity against the

pandemics.

Another significant aspect is to consider the explanations for declining to pay for the Vaccine since results showed that about half of the frontline Health Workers (53.9%) are a risk to public health. Therefore, any campaign that is developed should consider subsidizing this group as well.[7]

The course of the change in the WTP in the imminent future will vary liable on how individuals consider the different factors of the socioeconomic and health atmosphere, including the vaccine efficacy and safety. From our research, those with a regular income provided the highest determinant for WTP for the Vaccine. The finding confirms results from a previous study.[10] From the preceding, it could be inferred that there is a direct correlation between the WTP and the ability to pay. However, there may be an indirect correlation in that those with a greater WTP could be due to greater appreciation for the benefit of being immunized against the disease.[13,14] In addition, individuals who perceive a higher vulnerability to disease are more willing to support and utilize vaccination support.[13] It is not surprising that those with a higher perceived risk of contracting COVID-19 were more willing to pay for vaccination against the disease.[14] It is also imperative to consider other predictors of vaccine uptake, such as the ease of access and recognition of the Vaccine.[7,11] The vaccination plans should incorporate these factors and those with perceived higher risk for contracting COVID-19 which are strong indicators for WTP for a new vaccine.[9,10,15]

CONCLUSION

The availability of a potent and safe COVID-19 Vaccine could lead to greater acceptance and WTP for the Vaccine. More than two-thirds of frontline healthcare workers in this study would be ready to pay for the Vaccine, with the mean amount at US$10. This could imply that frontline health workers who have a good source of income would have a greater WTP for immunity against the Virus. To this end, the Vaccine may be subsidized or provided free to lower-income people while higher-income groups could pay for it. One significant modifiable predictor of WTP is the apparent risk of contracting COVID-19, which should be considered for future health promotion drives.

RECOMMENDATIONS

We recommend that the Vaccine be subsidized or made free to low-income groups while levying a fee on those in high-income groups. This would be valuable, particularly for nations with economic problems. Thus, the part of healthcare workers (HCWs) becomes typically important in assuring clients and societies through role-exhibiting behaviors.

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AUTHOR CONTRIBUTIONS

Jimoh SM: Conceptualization of the study
Ahmed A: Collection of data
Kehinde OH: Data analysis, write-up
Emmanuel OS: Collection of data, write-up

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