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Communities' knowledge and perception on covid-19 vaccine and vaccination in the Bamenda Health District

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Abstract

Background: Vaccine hesitancy has become the focus of growing concern and attention worldwide, despite overwhelming evidence of the importance of vaccines. Research shows that vaccine hesitancy is rising, resulting in alarming figures on disease outbreaks reported globally. **Objective:** The objective of this study was to determine the approaches for increasing acceptability and voluntary uptake of Covid-19 vaccine in the Bamenda Health District, North-West Region of Cameroon. **Methods:** The research was a cross sectional study design. A multistage sampling method was used where data was collected at a point in time. Data was collected from the multistage sampling of the 13 health areas of the Bamenda Health District of the North-West Region. All community inhabitant who were aged from 17 - 80 years old in the 13 health areas of the Bamenda Health District who gave their consent were included in the study. The main instrument was a interview guide, to gather information such as knowledge and perception on covid-19, vaccines, and vaccination. Data was analysed using SPSS and result presented on tables and charts. **Result:** Many of the community participants feel that vaccination against covid-19 is a good idea (57.5%), but fear safety concern. Majority liked to take vaccines (54.3%), but 41.3% ($P<0.001$) refused that they would not like to take vaccines. **Conclusion:** The clear and transparent communication of COVID-19 vaccines' risks and benefits is an approach to increasing vaccine uptake among the public, a means of maintaining public trust in science, and as an ethical imperative

Keywords: covid-19, vaccines, vaccination, perception, perspectives, challenges, community members

Introduction

Vaccine hesitancy (VH) or refusal has been defined as "a delay in acceptance or refusal of vaccines despite availability of vaccine services" according to the World Health Organization (WHO) Strategic Advisory Group of Experts (SAGE) Working Group on vaccine hesitancy [1]. Vaccine hesitancy has become the focus of growing concern and attention worldwide, despite overwhelming evidence of the importance of vaccines [2]. This is increasingly affecting the rate at which immunization regimes are effectively implemented. Research shows that vaccine hesitancy is rising, resulting in alarming figures on disease outbreaks reported globally. This led the WHO to announce that, as of 2019, vaccine hesitancy is one of the top ten threats to global health [3]. Apparently, there is no single cause of VH because many factors come into play. Important drivers of VH include perception that vaccines are not beneficial, pain and needle fear, concern about the safety of vaccines or distrust of the pharmaceutical industry in the implementation of vaccination programs [4]. "Fake news" or negative information about vaccination online and in social media is also an important cause of VH. In fact, many studies have shown that the equivocal nature of anti-vaccination information on the Internet contributes to an increase in VH [5] [6]. Another frequently identified cause of VH is lack of knowledge about vaccines [7]. With the advent of the COVID-19 pandemic and with the numerous

vaccine candidates under development, it is imperative that an eventual efficacious vaccine should have an excellent uptake worldwide and Cameroon specifically.

As of 26 April 2022, there were over 500 million COVID-19 confirmed cases worldwide with over 6 million deaths recorded [8]. Aside from the loss of human lives, the pandemic also continues to disastrously affect the global economy [9]. To lessen its impact, a lightning fast quest for COVID-19 vaccines were initiated to combat this public health threat. Only a year into this tragedy, vaccines were introduced and authorized for use by international health regulatory bodies.

Previous studies in the literature linked vaccine uptake and acceptability to sociodemographic factors and psychological factors. Among the sociodemographic factors that were consistently found to be significant in explaining vaccine uptake and willingness to get vaccinated are age [10] and education [11]. Since the outbreak of COVID-19 in December 2019, no global consensus treatment has been developed and generally accepted for the disease. As of 17th August 2020, Cameroon had registered 18,599 cases of COVID-19 with 16,540 recoveries and 406 deaths. This gives a recovery rate of 88.9% and a with an overall death rate of 2.1% [12]. This study was therefore aimed at developing strategies for increasing acceptability and uptake of covid-19 vaccine in the Bamenda Health District.

Materials and methods

The research was a cross sectional study design. Data was collected from the multistage sampling of the 13 health areas of the Bamenda Health District of the North-West Region.

Inclusion and exclusion criteria

All community inhabitant who were aged from 17 years old to 80 years old in the 13 health areas of the Bamenda Health District were included in the study.

The study excluded all those below 17 years old and above 80 years old and those who refused to give their consent to participate in the study. The study population constituted community inhabitants randomly selected within the Bamenda Health District.

Sampling technique

The study sample was 457 participants drawn from the sampled health areas in the Bamenda Health District. The study made use of multi-stage sampling technique, where the population was distributed into all the 13 health areas of the Bamenda Health District and for each health area, the health units was randomly selected, within which households were sampled by convenient sampling.

Data collection procedure

Interview guide, was used to gather information such as knowledge and perception on covid-19, vaccines, and vaccination. In each of the selected health units, the communities were sampled by convenient sampling from household to household.

Data management and analysis

Data entry was done using unique identifiers and cross-checked for entry errors and range checks. Data analysis was done using the Statistical Package for Social Science (SPSS) for Windows version 25.0. Descriptive statistics was obtained for different variables. Frequency distribution tables, as well as charts were used to present results. Statistical significance was set at P=0.05 or 5% confidence level.

Ethical considerations

Ethical clearance was sought from the University of Bamenda, Faculty of Health Sciences Institutional Review Board. Administrative clearance was obtained from the Regional Delegate of Public Health for the North-West Region. All information obtained was kept confidential and anonymous.

Result

Demographic information

According to the inclusion criteria, the ages of research participants range from 20 to 61+ years. This range was stratified into groups, with the result recording those aged 20-30 as the majority who took part in this study 223(46.9%), followed by those aged 31-40 years old 134(28.2%). There were more females 253(53.3%) who took part in the study than males 178(37.5%). Majority of the participants were single 230(48.3%), followed by those that were married 189(39.8%). Majority of the participants were Christians 367(77.3%). Participation increased with increase education, as majority of them had reached university education 184(38.7%), followed by secondary school 136(28.6%), though those without education 63(13.3%) were slightly more than those with primary education 56(11.8%) (Table I).

Table I: Distribution of respondents by demographic information

Variable	Frequency	PERCENT
AGE		
20-30	223	**46.9**
31-40	134	**28.2**
41-50	70	**14.7**
51-60	27	**5.7**
61+	10	**2.1**
GENDER		
Female	253	**53.3**
Male	178	**37.5**
MARITAL STATUS		
Single	230	**48.4**
Married	189	**39.8**
Divorced	16	**3.4**
Widow/widower	17	**3.6**
RELIGION		
Christianity	367	**77.3**
Muslim	51	**10.7**
None	15	**3.2**
EDUCATION		
No education	63	**13.3**
Primary education	56	**11.8**
Secondary education	136	**28.6**
University	184	**38.7**

Knowledge on covid-19 and vaccination

According to the result, 454(95.6%) of the respondents have heard about covid-19 and majority of them new what covid-19 is 376(79.2%) as well as when it started 352(74.1%). They also knew how it affect its victims 409(86.1%), how it can be prevented 209(44%), as well as the role it plays in the prevention of the disease such as stopping the multiplication of the virus 143(30.1%), killing the virus 139(29.3%) and deactivating the virus 110(23.2%) (Table II).

Table II: Distribution of respondents' knowledge on covid-19 and vaccination

Variable	Frequency	Percent
Have you heard of covid-19 before?		
Have heard about Covid-19	454	95.6
Have not heard about Covid-19	14	2.9
If heard, what it is		
It is a deadly disease caused by a SARS CoV-2 virus	376	79.2
It is a disease caused by bacteria	29	6.1
It is a chronic disease like diabetes	15	3.2
Don't Know	41	8.6
When Covid-19 started		
December 2019	352	74.1
December 2018	16	3.4
December 2020	63	13.3
Don't Know	35	7.4
When Covid-19 finished		
In 2022	60	12.6
In 2021	14	2.9
Not over yet	310	65.3
Don't Know	85	17.9
How it affects people		
Cause difficulty in breathing	409	86.1

Cause rashes	9	1.9
Cause running stomach	22	4.6
Don't Know	25	5.3
Method of prevention		
By Treatment	62	13.1
Vaccines	209	44.0
Both A and B	164	34.5
Don't Know	32	6.7
If by vaccines, function of the vaccine		
Kills the virus	139	29.3
Deactivate the virus	110	23.2
Stop the multiplication of the virus	143	30.1
Don't Know	54	11.4

According to table III, education had high influence on knowledge. The result showed that knowledge increases with education, as those with university level of education were more knowledgeable than other lower educational levels (P<0.001). Next to the university was the secondary school and then primary and lastly, those who did not go to school at all. The P-value showed that the difference in knowledge across educational levels was statistically significant (P<0.05).

Table III: Distribution of relationship between knowledge and education

Variable	Educational				P Value
	None	Primary	Secondary	University	
Knows what vaccines are	50(13%)	31(8%)	104(27%)	170(44%)	0.000**
Knows when it is given and why it is given	44(11%)	34(9%)	116(30%)	170(43%)	0.000**
Have heard and knows about covid-19	55(12%)	52(12.5%)	131(29%)	180(40%)	0.025*
Knows when Covid-19 stated and when it finished	41(9%)	36(13%)	110(31%)	135(38%)	0.000**
Knows how Covid-19 can be prevented	29(14%)	18(9%)	54(26%)	91(44%)	0.000**

*Statistically significant. **highly significant statistically.

Also, the difference in terms of religion was significant in some knowledge variables, but not statistically significant in some. Knowledge of when covid-19 started and how it can be prevented was not statistically significant, but other knowledge variables were statistically significant, though it was not highly significant (Table IV).

Table IV: Distribution of relationship between knowledge and religion

Variable	Religion			P Value
	Christian	Muslim	None	
Knows what vaccines are	307(80%)	36(9%)	12(3%)	0.016*
Knows when it is given and why it is given	318(81%)	38(10%)	10(3%)	0.000**
Have heard and knows about covid-19	294(78%)	40(11%)	8 (2%)	0.008*
Knows when Covid-19 stated and when it finished	274 (78%)	37 (11%)	9 (3%)	0.787
Knows how Covid-19 can be prevented	167(80%)	18(9%)	5(2%)	0.101

*Statistically significant. **highly significant statistically.

Perception on covid-19 vaccine and vaccination

Based on the result from analysis (Table VIII), many of the respondents feel that vaccination against covid-19 is a good idea 273(57.5%). On the views on if they would like to take vaccines, 258(54.3%) accepted, while 196(41.3%) refused that they would not like to take vaccines. Reason for wanting to take vaccine was that it will protect them from Covid-19 256(53.9%), while some did not want to take the vaccine because they think it a weapon to kill Africans by the white 100(21.1%), while others do not like the vaccine 73(15,4%).

Table V: Distribution of respondents' perception on covid-19 vaccines

Variable	Frequency	Percent
Feeling about the covid-19 vaccine		
It is good	273	57.5
It is bad	74	15.6
It is a weapon to kill Africans by the white	61	12.8

None of the above	57	12.0
Taking the vaccine		
Would want to take the vaccine	258	54.3
Would not want to take the vaccine	196	41.3
If want to take vaccine, reasons		
It will protect me from Covid-19	256	53.9
Because everyone at my workplace must take it	7	1.5
Because everyone other people are taking it	5	1.1
I just like to take it	10	2.1
If not, reasons		
It is a weapon to kill Africans by the white	100	21.1
I don't like the vaccine	73	15.4
It has deadly side effect	41	8.6
None of the above	75	15.8
Feelings about vaccination		
Vaccination is a good idea to prevent diseases	355	74.7
Vaccination is a bad idea	29	6.1
It has bad site effect	44	9.3
both B and C	22	4.6

According to the result, majority of the participants 450(94.7%) have heard and understood what covid-19 vaccination is 311(65.5%) and majority of them 319(67.2%) heard about it since 2020. From their understanding, majority of them know that it protects someone from getting covid-19 329(69.3%). Out of 435 participants, only 183 (38.5%) of them had taken the covid-19 vaccines, while 252 (53.1%) of them had not taken the vaccine. Majority of them took the vaccine in 2021, 112(23.6%), while 91(19.2%) took the vaccines in 2022. They all went to the hospital to receive the vaccine 199(41.9%) with the motive of preventing covid-19 infection. Those who have not taken the vaccine belief that the vaccine is dangerous 104(21.9%) or they do not have time to go for the vaccine 72(15.2%) Table VI).

Table VI: Distribution of respondents' perception on covid-19 vaccination

Variable	Frequency	Percent
Hearing about covid-19 vaccination		
Have heard	450	**94.7**
Have not heard	11	**2.3**
If heard, what it is		
It is taking the vaccine to prevent covid-19	311	**65.5**
It is taking the vaccine to treat covid-19	32	**6.7**
A and B	80	**16.8**
Don't Know	24	**5.1**
When heard about it		
Since 2020	319	**67.2**
In 2021	122	**25.7**
In 2022	13	**2.7**
I have never heard about it	7	**1.5**
How it affects someone		
It protects someone from getting covid-19	329	**69.3**
It makes the person sick	62	**13.1**
It makes the person very strong	14	**2.9**
Don't Know	50	**10.5**
Taking the covid-19 vaccine		
Have taken the vaccine	183	**38.5**
Have not taken the vaccine	252	**53.1**
If taken, when it was taken		
In 2021	112	**23.6**
In 2022	91	**19.2**

In 2023	2	**.4**
I can't remember	18	**3.8**
The place where it was taken		
Hospital	199	**41.9**
My house	7	**1.5**
My office	5	**1.1**
Restaurant	2	**.4**
Reason for taking		
To prevent covid-19	179	**37.7**
I don't want to die	13	**2.7**
A and B	21	**4.4**
Don’t Know	16	**3.4**
If not taken, reasons		
It is dangerous	104	**21.9**
I don't have time	72	**15.2**
It has high side effect	38	**8.0**
I don't just like to take it	59	**12.4**
likeness to take the vaccine		
like to take the vaccine	202	**42.5**
Do not like to take the vaccine	191	**40.2**
If likeness to take the vaccine, how soon		
Very soon	117	**24.6**
Next month	20	**4.2**
Next year	14	**2.9**
When I am chance	55	**11.6**
Reasons		
I am very busy and don’t have time	95	**20.0**
It is not available for the moment	53	**11.2**
If the site effect is no longer affecting others	68	**14.3**

The way different age groups perceive are different. The result showed that the perception of covid-19 vaccines and vaccination as important was higher in youths than the aged. Majority of the youth (aged 20-40) see vaccines as an ultimate solution to the risk of covid-19. Perception of the benefit of the vaccine decreases as age groups increases. The difference was statistically significant (P<0.05). Bu the difference in not taking the vaccines for perceived danger from the vaccine and those who would like to take the vaccine was not statistically significant, as P value was high (P>0.05) (Table VII).

Table VII: Distribution of relationship between age groups of participant and perception

Variable	**Age (Years)**					**P Value**
	20-30	**31-40**	**41-50**	**51-60**	**61+**	
Perception about covid-19 vaccines for disease prevention	141(52%)	73(27%)	31(11%)	20(7%)	3(1%)	0.008*
Perception about covid-19 vaccination as a good idea to prevent diseases	177(50%)	102(29%)	46(13%)	19(5%)	3(1%)	0.006*
Perception on the function of vaccines to protects someone from getting covid-19	164(50%)	96(30%)	39(12%)	18(6%)	4(1%)	0.000*
Not taken the vaccines for perceived danger from the vaccine	48(46%)	30(29%)	15(14%)	6(6%)	2(2%)	0.987
Those who would like to take the vaccine	99(49%)	63(31%)	22(11%)	12(6%)	1(0.5%)	0.183

The perception of participants in terms of education was the contrary to their perception in terms of age groups. The way those with high education perceived things, either positively or negative is completely different from those with little or no education. From the result on table VIII, majority of those with positive perception of the role of vaccine in the prevention of covid-19 were those with university level of education. This shows that perception increases with increase education, due to better reasoning. The difference was statistically significant (P<0.05).

Table VIII: Distribution of relationship between perception and education

Variable	Educational				P
	None	Primary	Secondary	University	Value
Perception about covid-19 vaccines for disease prevention	35(13%)	18(7%)	74(25%)	124(45%)	0.008*
Perception about covid-19 vaccination as a good idea to prevent diseases	38(11%)	30(9%)	104(29%)	157(44%)	0.000*
Perception on the function of vaccines to protects someone from getting covid-19	42(13%)	27(8%)	90(27%)	145(44%)	0.003*
Not taken the vaccines for perceived danger from the vaccine	21(20%)	20(19%)	26(25%)	29(28%)	0.036*
Those who would like to take the vaccine	31(15%)	13(6%)	66(33%)	80(40%)	0.000*

*Statistically significant. **highly significant statistically

In terms of religion, there were variations in level of significance. The difference across religion in some variable was statistically significant (P<0.05), while in some, it was not statistically significant (P>0.05). The Christian had better perception compared to Muslims, though the difference could be from the difference in the number of participants sampled (Table IX).

Table IX: Distribution of relationship between perception and religion

Variable	Religion			P Value
	Christian	Muslim	None	
Perception about covid-19 vaccines for disease prevention	219(80%)	27(10%)	5(2%)	0.008*
Perception about covid-19 vaccination as a good idea to prevent diseases	286(81%)	30(9%)	6(2%)	0.001**
Perception on the function of vaccines to protects someone from getting covid-19	260 (79%)	33(10%)	9(3%)	0.087
Not taken the vaccines for perceived danger from the vaccine	70(67%)	22(21%)	7(7%)	0.000**
Those who would like to take the vaccine	157(78%)	24(12%)	5 (3%)	0.078

*Statistically significant. **highly significant statistically

The result shows that the respondents did not have any real belief that prevent them from taking vaccines, as only 114(24%) of them indicated that there is belief that hinder them from taking vaccines. Only few of the respondents identified religion and culture as a reason for not accepting vaccines. Majority of the participants accepted to encourage others to change their belief system and accept vaccination 291(61.3%) by telling them about the advantage of the vaccine 308(64.8%) because of the deadly nature of covid-19 172(36.2%) (Table X).

Table X: Distribution of respondents' belief on covid-19 vaccines and vaccination

Variable	Frequency	Percent
Belief that forbids vaccines		
There are	114	24.0
There are not	318	66.9
If there are, those belief are		
My religion	42	8.8
My culture	50	10.5
A and B	29	6.1
None	138	29.1
Reasons		
It is a sine against God	31	6.5
It is a sin against our cultural values	57	12.0
A and B	19	4.0
None	152	32.0
If there are not,		
Would encourage others to change their belief and accept vaccine	291	61.3
Would not encourage others	115	24.2
How others can be encouraged		

Telling them about the advantage of the vaccine	308	64.8
Tell them how bad the vaccine is	8	1.7
Tell them not to take the vaccine	10	2.1
None of the above	38	8.0
When to encourage them		
Soon	290	61.1
Next month	22	4.6
Next year	12	2.5
Not at all	55	11.6
Reasons for encouraging them		
Its a pandemic	148	31.2
Its an epidemic	9	1.9
Covid-19 is deadly	172	36.2
I am too busy for now	45	9.5

Discussion

Many of the respondents feel that vaccination against covid-19 is a good idea (57.5%), but in terms of practice, they do not take the vaccine, neither do they accept it. Because of unacceptability, many people are forced to take the vaccines like health workers and students on internship. These further compromises the information as vaccination is supposed to be voluntary, by scaring many others from taking the vaccines. Therefore, vaccination should be voluntary, and the right information must be given to the public about the vaccines and vaccination. Hence, rejecting the hypothesis that there is no statistical significant relation between Community knowledge and perception on the acceptability and uptake of covid-19 vaccine, because there is a significant relationship, as they need the information for informed decision-making.

Such findings align with Health Belief Model theoretical framework which positions the perceived risks and benefits of a given health behaviour as key predictors of intentions to engage in that behaviour (alongside perceptions of disease threat) [13] [14]. The Health Belief Model has informed previous vaccine communication research. For example, Jones et al. (2015) show that exposure to vaccination campaign advertisements is associated with increased willingness to receive a H1N1 vaccine, and that this effect is partially mediated by belief that the vaccine will prevent disease and belief that the vaccine would not have a negative impact on one's health. The authors conclude that addressing perceived barriers (e.g., perceptions of vaccine risk) may be the most effective target for interventions to improve vaccine uptake.

The youth ages 20-40 are exposed to information, especially the social media. This helps them to have access to information, including information about vaccines and covid-19 vaccination. The difference may not be highly significant because the difference may be coming from the difference in the number of participants, and not necessarily the difference in knowledge. The Major problem with Covid-19 vaccine rejection was lack of sensitization on the importance of the vaccination to the public. But because the awareness campaign did not take place, and with many controversies surrounding the vaccines and the disease, most especially coming from the West where the vaccines are being manufacture, many people did not see the vaccine as import. Some saw it as a threat to the existence of humanity, especially the black (Africans).

This perceived view from misinformation align with few studies that have experimentally investigated the effects of COVID-19 vaccine information on related attitudes and intentions, and most have focused on hypothetical vaccines due to the lack of approved vaccines at the time of research. In discrete choice type experiments, participants unsurprisingly express greater preference for more effective (hypothetical) vaccines with fewer side effects, ceteris paribus [15]. Hence, rejecting the hypothesis that there is no statistical significant relation between Community knowledge and perception on the acceptability and uptake of covid-19 vaccine, because there is a significant relationship, as they need the information for informed decision-making.

Conclusion

Majority of people do not want to take vaccines because of the misinformation and myth surrounding vaccination in the world. The youths ages 20-40 are exposed to miss-information, especially the social media. The result show that people are forced to take vaccine because of the vaccine rejection from the public.

Majority of participants express their feelings about the Covid-19 vaccination that is a good idea to prevent Covid-19 disease. Majority of the respondents indicated that they would encourage people to take the vaccines when they feel that it is safe, though influenced by safety concern. Encouraging others to take vaccine can increase acceptability but it would depend on

the trust accorded to the health workers for information. This would also depend on the efficacy concern by the vaccine and its effectiveness. Therefore the following are uptake measures to increase acceptability of vaccines and vaccination scale up:

- The clear and transparent communication of COVID-19 vaccines' risks and benefits is an approach to increasing vaccine uptake among the public, a means of maintaining public trust in science, and as an ethical imperative.
- Vaccination should be voluntary, and the right information must be given to the public about the vaccines and vaccination. This would give the public good perception about vaccines and vaccination. This would lead to acceptability and uptake of Covid-19 vaccines.

Recommendation

The clear and transparent communication of COVID-19 vaccines' risks and benefits is an approach to increasing vaccine uptake among the public, a means of maintaining public trust in science, and as an ethical imperative.

Vaccination should be voluntary, and the right information must be given to the public about the vaccines and vaccination. This would give the public good perception about vaccines and vaccination. This would lead to acceptability and uptake of Covid-19 vaccines.

Low vaccination intention among younger adults is that they tended to show a low level of trust toward the government for political reasons. Therefore, the government must ensure public trust on its information, activities and services.

Conflict of interest

There was no conflict of interest

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