Factors Associated with the Uptake Severe Acute Respiratory Syndrome Corona Virus Two Vaccination in Zambia: Case of Mongu District

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Abstract

Since the vaccination against severe acute respiratory syndrome corona virus two (SARS-CoV-2) became accessible in Zambia, there has been limited uptake. The study aimed to determine social cognitive aspects linked with SARS-CoV-2 vaccination in Mongu. A descriptive quantitative Survey was conducted from December 2021 to April 2022. Cochrane single proportion formula was used to determined sample size of 369 respondents based on 60% herd immunity criterion. Stata version 14 was used to perform Chi square and binary logistic regression. Findings indicated that, vaccination level is still below average, and most non-vaccinated people were unwilling to be vaccinated because they "simply haven't gotten around to it". 'Views on Covid-19 news', 'worrying about getting sick/a household member getting sick from Covid-19," real financial effect of Covid-19 at personal level,' 'ages of household Members,' marital status, religion, academic qualification, and ages of respondents were associated with SAR-CoV-2 vaccination. Social cognitive predictors of vaccination were 30-49-year-old household members and worry about household members being sick. Misconceptions about SARS-CoV-2 vaccinations prevent vaccination. Therefore, there is need scale-up sensitisation, and sensitisation messages should address the need to protect household members and especially having the most mobile age groups (30-49 years) to be vaccinated to reduce on community spread of the infection. Future studies should analyze the proportions of AstraZeneca's one-dose recipients who did not return for the second dose and the willingness of the completely vaccinated to accept a booster shot.

Keywords: *Mongu, SARS-CoV-2, Social cognitive Theory, Vaccine, Uptake, Zambia.*

Introduction

Globally, the number of confirmed sever acute respiratory syndrome coronavirus 2 (SARS-CoV-2) cases reduced from 1,138, 820 as of 23 April to 99,749 20 June 2021, at the same time the number of persons that received vaccination increased from 18,386,591 to 32,405,836 with a slight reduction in deaths from 11,781 to 11,707. As of July 2021, Africa's case fatality rate was 2.6%, compared to 2.2% globally [1]. Zambia reported its first Covid-19 case in March 2020 and had 96,563 cases and 1,284 fatalities by 4 June 2021 [2].

Currently, vaccination campaign is the most assurance of bring the pandemic under control and to attain the herd immunity as opposed to social distancing, social isolation, masking up, and hand sanitizing. There must be at least two-third of the population must be vaccinated [3]. Global trends indicated a high willingness to accept the vaccine with Latin America posting a willingness prevalence of 97% [4], 51% in the United States of America, [5], 80% in South Africa and Zimbabwe 80% [6]. In Zambia, there are no polls to suggest the willingness level of vaccinating, however, as of March 29Th 2022, 2.6 million were fully vaccinated out of 8.4

million targets, which is below average (31%) to attain herd immunity target [7].

[8] assert that governments and local and international stakeholders must ensure that public confidence is won to increase the number of people vaccinated. People are concern of the safety, efficacy, duration of protection, and number of doses one supposed to receive [9]. These fears must be addressed and messaging of the benefits of the vaccination over fears should be communicated properly, such as restoring economy at person to global level by creating herd immunity [10].

On the other hand, it is important to know the factors that are associated with vaccination to encourage the unvaccinated majority to be inoculated. Few studies conducted so far state that doubts of the efficacy of the vaccines, sides effects, lack of trust in the health care providers, access and availability of vaccines, cultural and religious beliefs as some of the factors creating hesitancy for people to get vaccinated [6].

The uptake or non-uptake of SARS-CoV-2 vaccination was modelled from the Social Cognitive Theory (SCT) in this study (Figure 1). The theory is traced to Bandura in social psychology [11] and has been widely applied in public health to understand health seeking behaviour and health promotion. The theory assumes that the cognitive aspect of an individual learns through observation, social interactions, and imitation. To accept a health service or intervention it would mean that an individual may have learned through these cognitive concepts, however, to practically accept the intervention require self-efficacy.

Self-efficacy could be applied with high or low efficiency.

The application or action self-efficacy could be affected by predisposed factors which are social, demographic, cultural, and/ or physical environment. These factors would affect the attitude and the response to an intervention; either adopting or adapting to a life-saving health behavior and/or to a health promotion information such as the SARS-CoV-2 vaccination and public health measures. A quick response or up take of a vaccine upon its introduction was considered high self-efficacy, however, the response may be enabled or hindered by internal or external factors [11].

The self-efficacy was assessed from the factors that are associated with the uptake of vaccination or willing to be vaccinated [12], also source of learning about the vaccination either by observation, social interaction, or imitation (Social-Structural). Source of learning could be through people that have been vaccinated, through sensitisation, workplace policy or a combination of sources (Social Structural), however, outcome expectations are influenced by demographic, social and cultural nature (such as age, gender, education, marital status, religion, ethnicity, environmental/distance, availability). Both the social-structural factors and outcome expectations have a bearing on attaining the goal, which is to propel potential cognitive propose to kinetic on the absorption of the information and actual uptake of the vaccination or behaviour (turning the information into action/utilizing the information).
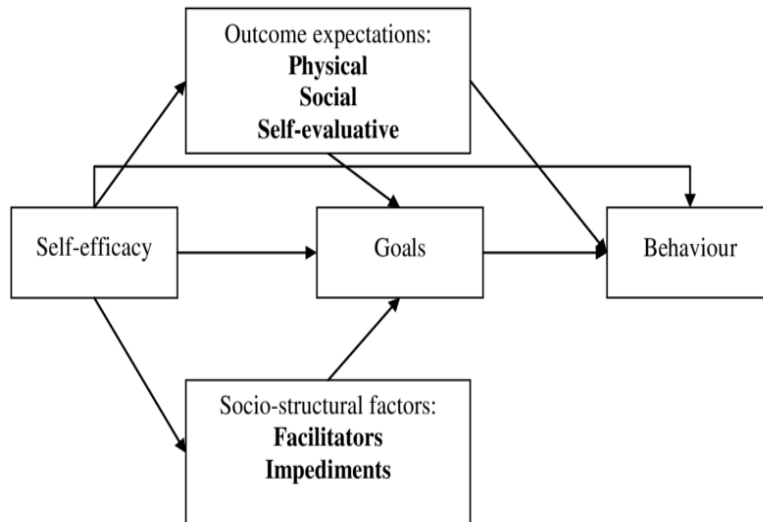
Figure 1. Social Cognitive Model on Factors associated with uptake of SARS-CoV-2 Vaccination

Zambia is not yet out of the woods considering the low vaccination levels to attain heard immunity. The threat of SARS-CoV-2 causing mortality in record numbers are still inevitable with low vaccination. The third wave caused an increase in morbidity, and mortality averaging 40 deaths per day [13]. The current national vaccination coverage as of 8[Th] July 2022 is at 42.6 % [14], which is about halfway to attain target for herd immunity.

In Mongu District, the province administrative capital of Western Province of Zambia, it is among the provincial capital with low vaccination coverage as on March, 29[Th] 2022 [7], and with SARS-CoV-2 positivity rate passing the 5 % threshold set to control community transmission [14]. It also had the lowest vaccination coverage (of 24.9%) as of May 19[Th], 2021 in the province [15]. Similarly, most rural districts consist of Shang'ombo (48%), Mwandi (46%), Luampa (4246%), Sennaga (42%), Sesheke (42%) and Nalolo (42%) featured on the top districts with highest vaccination coverage without Mongu, the cosmopolitan district as of March 29[Th], 2022 [7]. Therefore, Mongu was selected for this study in a context of a cosmopolitan district with a low vaccination coverage with the aim of establishing factors associated with uptake and non-uptake of the vaccine.

Zambia has continued to receive vaccine donation, but the uptake is still low. There is also nascent of empirical evidence to understand factors that impede uptake of SARS-CoV-2 vaccines. A local recent study used social-media platform to tease-out the motivating factors and barriers to uptake of vaccines [16]. This study derived perceptions from a literate population with access to digital space. Considering the digital divide in Zambia by geography and age [16] and it is important that more empirical evidence on social factors associated with uptake of SARS-CoV-2 vaccines are delved into to assist inform designs of interventions to scale-up vaccination. To add on to discourse on low uptake of vaccines against SARS-CoV-2, this study collected field data in a largely peri-urban district (Mongu) of Zambia which is one of the paces with low uptake of the vaccine which makes this study novelty on the topic area. Besides that, the study used social cognitive theory to situate the discussion. The theory has been used in public health to understand hesitancy to the uptake of SARS-CoV-2 vaccines [12], and locally there is limited use of SCT on SARS-CoV-2 endemic.

Materials and Methods

There are 128,844 people living in the impoverished Mongu neighborhood, including 61,745 men and 67,099 women (Zambia

Statistical Agency, 2010). By 2021, the population is expected to increase by 142,585. Most people live in rural regions, with urban areas making up 41% of the population (76, 520). The bulk of the population, as determined by the age-band of 10 years, is comprised of children (0–9) and adults (20–29), respectively (39,387) and (22,416).

Research Approach and Design

A quantitative approach was used in the survey design. Data collection was conducted in high-traffic areas of the central business district. Respondents were chosen by convenience sampling if they had lived in the Mongu District for the past six months during the SAR-CoV-2 endemic.

Sample Determination

Using a single proportion sampling formula [17], the sample size was determined as shown below. Since it is important to acquire herd immunity without the aid of natural causes, the sample size was estimated using the 0.6 (60%) proportion (World Health Organization, 2021; Zambian Ministry of Health, 2021). The study preferred the 60 percent proportion over the 70 percent proportion to get a large sample size.

$$n = \frac{z^2 P(1 - P)}{e^2}$$

"e" is the margin of error at 0.05 (5 percent) at the confidence level of 0.95, where "n" is the sample size to be determined, "Z" is the 1.96 score or critical value, "P" is the known proportion goal for herd immunity (0.6), "1" is the overall proportion, and (95 percent). A sample size of 369 was determined.

Data Collection Method, Instruments, and Management

An electronic web form that was based on a Microsoft form served as the data gathering instrument. Interviews conducted by researchers were used to gather data. Some respondents, however, got the link to the survey delivered to their WhatsApp, email, or short messaging service inboxes so they could complete it whenever it was convenient for them. The five components of the questionnaire were each thoroughly organized, and the questions were aligned with the goals of the research. There were sections on the respondent's profile, whether they had had vaccinations or not, their desire to get vaccinations, and their social and cultural backgrounds. Data were gathered via a Microsoft form and transferred to an Excel spreadsheet for cleaning and coding.

Data Analyses

Results were displayed using frequencies and percentages of adults who were already vaccinated, willing to get vaccinated, aware of vaccination, and able to receive the vaccine, as well as profiles of respondents' demographic, social, and cultural traits. The Chi Square test and STATA Version 14 were used in the statistical analysis of the binary logistic regression on the bivariate data. The results were binary: willingness to accept vaccination and vaccination status (vaccinated or not) (willing and not willing to accept vaccination). The Chi-square test was reported with frequencies, percentages, Pearson value, and probability value in the statistical test, and the binary logistic regression was reported with unadjusted and adjusted odds ratio, probability value, and 95 percent confidence interval.

Ethic Consideration

The study was authorized by the Zambia National Health Research Authority, Texila American University, the University of Zambia Bio-Ethics Committee, and permission reference number 2076-2021. The research team made sure that the autonomy of the respondents prevailed, respected the decision of the potential respondents to withdraw from the study, and protected the identity of the respondents by making sure that the information collected is not linked to identifiers like the respondents' name, address, or phone number to uphold the protection of human respondents. They had the

privacy and flexibility to complete the questionnaire at their own pace. This made guaranteed that privacy would be maintained. To guarantee that the risk of transmitting SARS-CoV-2 is minimized, the study employed an online electronic questionnaire, and social distance and masked up were enforced during interviews as part of public health precautions.

There were 68.7% (255/371) respondents that reported that they were vaccinated. However, 43.9 % (163/371) were fully vaccinated or they received both first and second dose while others received the johns-johns single dose vaccine whereas 24.8% (92/371) only received a single dose of the two doses or AstraZeneca vaccine (Table 1).

Results

Table 1. Vaccination Prevalence and Factors Associated with Vaccination

Parameters	Vaccination Status						
	Overall	Vaccinated		Unvaccinated			
	N=371(%)	N=255	68.7%	N=116	31.3 %	X^2	P
Age							
19-24	119 (32.1)	77	64.7	42	35.3	16.3	0.038
25-29	24 (11.3)	23	54.8	19	45.2	-	-
30-34	68 (18.3)	50	73.5	18	26.5	-	-
35-39	31 (8.4)	24	77.4	7	22.6	-	-
40-44	30 (8.1)	21	70.0	9	30.0	-	-
45-49	23 (6.2)	19	82.6	4	17.4	-	-
50-54	19 (5.1)	18	94.7	1	5.3	-	-
55-59	7 (1.9)	4	57.1	3	42.9	-	-
60 $\geq$	32 (8.6)	19	59.4	13	40.6	-	-
Gender							
Male	234 (63.1)	159	67.9	75	32.1	0.18	0.670
Female	137 (36.9)	96	70.1	41	29.9	-	-
Qualification Levels							
None	13 (3.5)	6	46.1	7	53.9	15.0	0.015
Primary	16 (4.3)	11	68.7	5	31.3	-	-
Junior Secondary	61 (16.4)	46	75.4	15	24.6	-	-
Senior Secondary	145 (36.1)	89	61.4	56	38.6	-	-
Diploma	72 (19.4)	50	69.4	22	30.6	-	-
Degree	50 (13.5)	43	86.0	7	14.0	-	-
Master's	14 (3.8)	10	71.4	4	28.6	-	-
Marital Status							
Single	100 (26.9)	53	53.0	47	47.0	24.8	0.001
Married	128 (34.5	87	68.0	41	32.0	-	-
Cohabiting	80 (21.6)	66	82.5	14	17.5	-	-
Separated	39 (10.5)	30	76.9	9	23.1	-	-
Divorced	15 (4.0)	14	93.3	1	6.7	-	-
Widowed	9 (2.4)	5	55.6	4	44.4	-	-
Ages of household Members							

< 18 years	97 (26.1)	28	28.9	69	71.1	100.3	0.001
19-29 years	160 (43.1)	127	79.4	33	20.6	-	-
30-49 years	96 (25.9)	86	89.6	10	10.4	-	-
50-64 years	18 (4.9)	18	77.8	4	22.2	-	-
Occupation							
Formally employed	60 (16.2)	46	76.7	14	23.3	2.7	0.443
Self-employed	66 (17.8)	45	68.2	21	31.8	-	-
Unemployed	171 (46.1)	112	65.5	59	34.5	-	-
Student	74 (20.0)	52	70.3	22	29.7	-	-
Income Per Month							
< 2 US$	191 (51.5)	128	67.0	63	33.0	2.5	0.500
2-8 US$	100 (27.0)	67	67.0	33	33.0	-	-
9-31 US$	58 (15.6)	42	72.4	16	27.6	-	-
≥ 32 US$	22 5.9)	18	81.8	4	18.2	-	-
Residence							
Low density	63 (17.0)	46	73.0	17	27.0	5.9	0.053
Moderate density	222 (59.8)	159	71.6	63	28.4	-	-
High density	86 (23.2)	50	58.1	36	41.9	-	-
Religion							
Catholic Christian	71 (19.1)	47	66.2	24	33.8	19.3	0.013
SDA Christian	78 (21.0)	62	79.5	16	20.5	-	-
New Apostolic Christian	88 (23.7)	64	72.8	24	27.3	-	-
Pentecostal Christian	22 (5.9)	10	45.4	12	54.6	-	-
UCZ Christian	52 (14.0)	39	75.0	13	25.0	-	-
Native Believer	12 3.2)	7	58.3	5	41.7	-	-
Anglican Christian	19 (5.1)	12	63.2	7	36.8	-	-
JW Christian	6 (1.6)	4	66.7	2	33.3	-	-
None	23 (6.2)	20	43.5	13	56.5	-	-
Are you a native of Western Province?							
No	74 (19.9)	46	62.2	28	37.8	1.9	0.173
Yes	297 (80.1)	209	70.4	88	29.6	-	-
Reason for residence in Western Province							
Born here	238 (64.2)	152	63.9	86	36.1	7.5	0.060
Work/Business	75 (20.2)	57	76.0	18	24.0	-	-
Marriage	10 (2.7)	8	80.0	2	20.0	-	-
Other Circumstances	48 (12.9)	38	76.2	10	20.8	-	-
Your views on Covid-19 news							
Generally underestimated	33 (8.9)	20	60.6	13	39.4	18.7	0.001
Generally, correct	130 (35.0)	100	76.9	30	23.1	-	-

Generally exaggerated	164 (44.2)	116	70.7	48	29.3	-	-
Do not know	44 (11.9)	19	43.2	25	56.8	-	-
How worried are you that you or household member will get sick from Covid-19?							
Not at all worried	28 (7.6)	9	32.1	19	67.9	28.6	0.001
Somewhat worried	163 (43.9)	121	74.2	42	25.8	-	-
Not too worried	57 (15.4)	31	54.4	26	45.6	-	-
Very worried	123 (33.2)	94	76.4	29	23.6	-	-
What real effect has Covid-19 had on your personal financial situation?							
Negative effect	203 (54.7)	154	75.9	49	24.1	52.2	0.001
Positive effect	81 (21.8)	65	80.3	16	19.7	-	-
No real effect	55 (14.8)	30	54.6	25	45.4	-	-
Do not know	32 (8.6)	6	18.8	26	81.2	-	-

Source: Author (2022)

Percentage of People Willing to be Vaccinated

Of the 116 that did not get vaccinated, the majority 33.6% (39/116) stated that they were 'not too willing' to get vaccinated and 32.8 % (38/116) also indicated that they were 'not willing' to be vaccinated. The main reason for not getting vaccinated was that they "Just haven't gotten around to it" (Table 2).

Table 2. Willingness to Vaccinate and Reasons for not Vaccinating

Parameters	Frequency (N=116)	Percentage (%)
Willingness to be vaccinated		
Not too willing	39	33.6
Not willing	38	32.8
Somewhat willing	27	23.3
Willing	9	7.8
Very willing	3	2.6
Main reasons for not being vaccinated		
Do not trust/believe in the vaccine	12	10.3
Concerned about safety	10	8.6
Vaccine is too new/not enough research	11	9.5
Unsure about getting it	9	7.8
Do not want to it/need it	7	6.0
Do not have proper documentation/not sure if eligible	14	12.1
Waiting for medical reasons	11	9.5
Busy/did not have time/schedule conflict	5	4.3
Just have not gotten around to it	24	20.7
Already had Covid	4	3.5
Afraid/scared (unspecified)	5	4.3
Other people need it more than I do	1	0.9
Have not been sick	3	2.6

Sociodemographic Factors Associated with Vaccination

Sociodemographic factors that were statistically significant associated with vaccination were 'views on Covid-19 news' (p = 0.001), 'worried of being sick or household member getting sick from Covid-19' (p = 0.001),'real financial effect has Covid-19 at personal level' (p =0.001)', 'ages of household Members' (p = 0.001), marital status (p =0.001), religion (p = 0.013), levels of academic qualification (p =0.015) and ages of respondents (p = 0.038) as illustrated in table 1.

However, sociodemographic predictors of vaccination were 'ages of household Members' and 'worried of getting sick or household member getting sick from Covid-19. In the AOR, having a household members aged 30-49 years was 23.9 (95 CI: 10.4, 54.8) times more likely to have the respondent get vaccinated as compared to having household members and this was statistically significant with p = 0.001 accounting for household members aged 19-29 years-old (9.9, 95% CI: 5.3, 18.3, p =0.001) and 50-64 years-old (10.9, 95 CI: 3.1, 39.2, p = 0.001). Whereas, those that were 'very worried' of getting sick or household member getting sick from Covid-19 were 10.3 (95% CI: 3.6, 29.2) times more likely to get vaccinated than those that were 'not at all worried' accounting for those that were 'somewhat worried' (6.9, 95% CI: 2.6, 18.5, p =0.001) and 'not too worried (3.7, 95 CI: 1.2, 11.1, p = 0.001) as shown in Table 3.

Table 3. Predicates associated with Vaccination

Parameters	Vaccination Status					
	Unadjusted Odds Ratios (UOR)			Adjusted Odds Ratios (AOR)		
	Odds	95% CI	P	Odds	95%CI	P
Age						
19-24	1	-	-	-	-	-
25-29	0.7	0.2,2.2	0.569	-	-	-
30-34	1.1	0.4, 3.0	0.919	-	-	-
35-39	0.7	0.2, 2.9	0.657	-	-	-
40-44	0.6	0.2, 2.6	0.519	-	-	-
45-49	1.9	0.4, 9.8	0.452	-	-	-
50-54	3.7	0.4, 36.5	0.269	-	-	-
55-59	0.2	0.0, 1.5	0.107	-	-	-
60 ≥	0.2	0.1, 0.8	0.026	-	-	-
Qualification Levels						
None	1	-	-	-	-	-
Primary	2.9	0.3, 32.8	0.379	-	-	-
Junior Secondary	1.3	0.2, 10.4	0.785	-	-	-
Senior Secondary	0.7	0.1. 5.1	0.723	-	-	-
Diploma	0.7	0.1, 5.3	0.714	-	-	-
Degree	1.6	0.2, 13.4	0.658	-	-	-
Master's	0.1	0.1, 14.7	0.918	-	-	-
Marital Status						
Single	1	-	-	-	-	-
Married	1.6	0.7, 4.0	0.274	-	-	-
Cohabiting	2.9	1.1, 7.7	0.035	-	-	-
Separated	1.2	0.3, 4.1	0.820	-	-	-

Divorced	12.1	1.0, 143.2	0.048	-	-	-
Widowed	1.4	0.1, 12.7	0.791	-	-	-
Ages of household Members						
< 18 years	1	-	-	-	-	-
19-29 years	10.4	4.8, 22.4	0.001	9.9	5.3, 18.3	0.0001
30-49 years	34.4	116, 101.6	0.001	23.9	10.4, 54.8	0.001
50-64 years	21.2	3.6, 124.6	0.001	10.9	3.1, 39.2	0.001
Religion						
Catholic Christian	1	-	-	-	-	-
SDA Christian	1.9	0.7, 5.1	0.224	-	-	-
New Apostolic Christian	1.7	0.6, 4.5	0.284	-	-	-
Pentecostal Christian	0.9	0.2, 3.5	0.825	-	-	-
UCZ Christian	1.0	0.3, 3.1	0.989	-	-	-
Native Believer	0.4	0.1, 2.4	0.293	-	-	-
Anglican Christian	0.5	0.1, 2.0	0.300	-	-	-
JW Christian	1.7	0.2, 14.7	0.617	-	-	-
None	0.7	0.2, 3.2	0.636	-	-	-
Your views on Covid-19 news						
Generally underestimated	1	-	-	-	-	-
Generally, correct	1.9	0.5, 6.7	0.314	-	-	-
Generally exaggerated	0.8	0.2, 2.8	0.751	-	-	-
Do not know	0.6	0.1, 3.0	0.574	-	-	-
How worried are you that you or household member will get sick from Covid-19?						
Not at all worried	1	-	-	-	-	-
Somewhat worried	3.0	0.7, 12.1	0.124	6.9	2.6, 18.5	0.001
Not too worried	2.4	0.5, 10.3	0.247	3.7	1.2, 11.1	0.001
Very worried	4.7	1.1, 20.7	0.0038	10.3	3.6, 29.2	0.001
What real effect has Covid-19 had on your personal financial situation?						
Negative effect	1			-	-	-
Positive effect	1.2	0.5, 2.7	0.704	-	-	-
No real effect	0.9	0.4, 2.3	0.821	-	-	-
Do not know	0.2	0.1, 0.6	0.007	-	-	-

Sociocultural factors associated with vaccination

Only religion as a sociocultural factor was associated with being vaccinated and the majority that are Seventh Day Adventist Christian (79.5 % [62/255) being associated with vaccination as demonstrated in table 1. There were 31 % (115/371) respondents that heard or anyone say or read anywhere that the Covid-19 vaccines contain fetal cells but said they 'do not know if true or false' and 48 % (178 /371) heard someone say or read somewhere that the Covid-19 vaccines have been shown to cause infertility but also they 'do not know if true or false'.

Similarly, the majority that heard anyone say or had read somewhere that the Covid-19 vaccines can change your DNA (46.4% [172/317]), you should not get the vaccine if you have already had Covid-19 (163 (43.9% [163/371]) and you can get Covid-19 from the vaccine (34.8 % % [129/371]) said they do not know if true or false as displayed in Table 4.

Table 4. Misconception on Vaccination

Parameters	Misconception on Vaccination			
Have you heard anyone say or have you read anywhere that?	No, have not heard or read this (N/%)	Yes, do not know if true or false (N/%)	Yes, false (N/%)	Yes, true (N/%)
The Covid-19 vaccines contain fetal cells	86 (23.2)	115 (31.0)	57 (15.4)	113 (30.5)
The Covid-19 vaccines have been shown to cause infertility	77 (20.6)	178 (48.0)	94 (25.3)	22 (5.9)
The Covid-19 vaccines can change your DNA	52 (14.0)	172 (46.4)	119 (32.1)	28 (7.6)
You should not get the vaccine if you have already had Covid-19	54 (14.6)	163 (43.9)	108 (29.1)	46 (12.4)
You can get Covid-19 from the vaccine	74 (20.0)	129 (34.8)	117 (31.5)	51 (13.8)

Discussion

The study determined that an increasing number of people are getting vaccinated, the sample shows close to 70% of the residents are vaccinated. However, those that received full vaccination were still below average because the rest that were vaccinated only received first dose of AstraZeneca dose. The risk of not receiving the second dose of AstraZeneca was not determined.

The study findings revealed that two and singled dosed vaccines were the most received vaccines, and these were potentially AstraZeneca and John-John. AstraZeneca is the first brand that was provided for by the Ministry of Health as donated by bilateral and multilateral partners. John-John was introduced later, in the last quarter of 2021. This explains there are more people that received AstraZeneca Vaccines that John-John and other brands. Even globally, Astra Zeneca was one of the first brands to be given out. [18] reports that approval of the two current widely used vaccinations were done on December 2 and 30 2020, and the vaccines were the Pfizer-BioNTech and Oxford AstraZeneca [19], respectively. In Zambia, the Oxford AstraZeneca is the vaccine that has been administered in the first vaccination campaign.

Though, there is no public concern or discussion to distinguish which vaccine is better than the other, the vaccines are perceived homogeneous, and the primary concern is to get masses inoculated as opposed to preference of a vaccine. However, these findings have shown that, the uptake of two-dosed (AstraZeneca) is still the most taken and these reasons must be further be established other than just being the first vaccine to be given out to the masses. It is expected that a single-dosed vaccines such as John-John would be more preferred because it is a one-off vaccination. Though this study partially established the reasons of high uptake of AstraZeneca, which is it was the first brand to be rolled out, other factors could be at play.

Factors such as limited supply of other vaccinates in high quantities.

Willingness to Vaccinate

Though the risk of receiving the second dose of AstraZeneca was not determined, the study did assess the willingness to be vaccinated. However, this was assessed among those that have not been vaccinated yet, and most of them were not willing to be vaccinated. The main reason was limited information to appreciate the vaccination stating that they 'just have not gotten around to it".

This entails that there is need enhance consumption of correct information of the resident of Mongu District. The information target both the vaccinated and unvaccinated because those that are vaccinated must be role-models in their social network to encourage the partially and unvaccinated. However, debunking factors that are associated with vaccination is key to increasing vaccination to attain her immunity.

The proportion of Mongu residents showing willingness to vaccine against SARS-CoV-2 is low compared to studies in other regions. Other studies indicated that 97% of people in Ecuador [4], up to 72% in the United States [20], and 63.3% in the United Arab Emirates [10], are willing to be vaccinated. These studies: Ecuador [4], United Sates of America [20], United Kingdom, Zimbabwe and South Africa [21] indicate that the countries made preparatory measures to create public buy-in for the vaccination uptake. However, as shown at the outset, the uptake does not match the willingness stated to receive the vaccine. In Zambia, Mongu, the findings show that low uptake and low willingness to get vaccinated.

Sociodemographic Factors Associated with Vaccination

With regards to determining factors associated with vaccination, the study did reveal that 'views on Covid-19 news', 'being worried of being sick or household member getting sick

from Covid-19', 'real financial effect has Covid-19 at personal level', 'ages of household Members', marital status, religion, levels of academic qualification and ages of respondents are associated with SAR-CoV-2 vaccination. However, the study indicated that among the factors associated with vaccination the predicators of being vaccinated were having household members aged 30-49 years old and being worried of household members getting sick of respondents getting sick.

These findings show that household members are a risk factor that could spread SARS-CoV-2 when a household member is aged 30–49-year-old. It is because this age group is the most mobile, it terms of social interaction at work, and church (religion). Level of education is a catalyst to understanding SARS-CoV-2 information such as views on Covid-19 news and its effect on finances of individual and household members.

In these findings, age of respondents was associated with getting vaccinated but not a predicator to be vaccinated as reported in other studies. A global survey by [22] study demonstrated that those in the age group of 25-54, 55-64, and 65 onwards as compared to those aged 18-24 were more likely to willingly accept SARS-CoV-2. This was clearly a contrast to [20] study findings which stated that those aged 18-49 were most likely to accept the vaccination. The contrast is in the age grouping from 18 years old; the age grouping could have led to this difference in the two studies. A study [18] this year reported a high vaccination coverage of 89% and indicated that the Odds of lower vaccination coverage were statistically significant associated with being aged below 35 years old. The contrast in these findings were due to age grouping and context. The [22] was a global survey, [20] study was done in the United States, and the [18] was conducted in England. The age grouping that was used in this study was 10 years, however, age grouping was not a predicator of getting vaccinated.

Willingness of parents and guardians to have their children below the age of 18 years old to be

vaccinated was reported in a study done by [23] in the United States of America, and the findings indicated that 61% of them were willing to right away have them vaccinated. Concern for household members is similar for parents willing of have their children vaccinated to avert the risks of infection. The study implying that people would get vaccinated to protect their family members, this is attributed to capacity to assimilate information on SARS-CoV-2 such as levels of education. Religion, in particular churches have been instrumental in spreading information about SARS-CoV-2 because of the public health guideline they have been subjected to follow during endemic periods. This with levels of education, and marital status which is a key single unit for social discourse are platform for engaging in meaningful decision making to vaccinate. The study has demonstrated so far that concern for family household member is the primary predicator of vaccination as such information on vaccination must be aligned to concerns on spreading SARS-CoV-2 at household levels.

One of the earliest and largest study to establish the factors affecting the uptake of SARA-CoV-2 vaccine was conducted at a global level with representation across all continents [18]. The incidents of the uptake of vaccinations have a social and demographic face as depicted in limited studies conducted so far. Perceived severity was associated with 'willing to pay' for the vaccine in [20]. This resounds with these study findings which stated that 'being worried of being sick or household member getting sick from Covid-19' is associated and a predictor of getting vaccinated. In contrast, according to the [20] study, having a close person that had SARS-CoV-2 was associated with less likelihood to be vaccinated. Similarly, [22] reported that individuals that reported having had SARS-CoV-2 or knew a family member had it been not likely to accept the vaccination.

These findings imply that people are driven by fear of getting sick than by the 'science' of the vaccine to halt the spread of SARS-CoV-2.

This demonstrates that there is limited knowledge on the vaccines and SARS-CoV-2. Increased sensitisation would reduce the knowledge gap. A Survey by [10] in United Arab Emirates reported 56.9 % respondents knew kinds of SARS-CoV-2 vaccines available. Despite this level of awareness in United Arab Emirates, there is a global gap between awareness and actual vaccination trends. The gap between target to be vaccinated and willing to be vaccinated can be reduced by creating buy-in through mass awareness of the low risk and huge benefits of vaccination at population level [5, 22].

Knowledge and awareness are contrasted here, knowledge go beyond the level of just hearing about vaccines and SARS-CoV-2 but understanding the basics of the two. A capstone study conducted earlier on before this study showed that 64.7% (239/370) people in Mongu District were aware of the AstraZeneca vaccination against SARS-CoV-2. These findings show there is a social cognitive difference between being aware and acting on the message, this means that with more information people would be propelled to act on the messages.

In the United States before that roll out of SARS-CoV-2 vaccine, preparatory working group meetings were held to syntheses campaign strategies to increase the public understanding, acceptance and access of the vaccines reports a study by [20]. The study reported that the groups recommended that the messages on the vaccines should include both the benefits and the risks of receiving the vaccines. The study reports further that, the working groups advised for provision of full information in the campaign by stating the efficacy level of the vaccines, the required number of doses, the duration of the protection against the SARS-CoV-2 once the vaccine is received, uptake of the vaccine, and the need to attain herd immunity.

An alike study in the United Kingdom recommended the same strategy that among the minority groups [Black, Asians, Minority Ethics

(BAME)] that were hesitant to receive the vaccine [9]. A survey study in sub-Sahara Africa, Southern Africa Development Community (SADC) region, particularly carried in Zimbabwe and South Africa echoed similar concerns and strategies. South Africa being the first country to receive the vaccines had devised national vaccination plans. The priority was how to increase public awareness and create buy-in for the uptake of the vaccine, the campaign also focused on countering the misinformation about the vaccine to quash hesitancy.

Sociocultural Factors associated with Vaccination

The Seventh Day Adventist being associated is potentially the largest congregation in Mongu as majority of the respondents associated with vaccination were Seventh Day Adventist. However, the study determined that misconception on SARS-CoV-2 vaccines have the potential to discourage getting vaccinated. Despite most of the misconception being heard by slightly below average of the people, there is not clear conviction or certainty that it is true. This means that there is much room to convince people to vaccinate by providing correct information to counter the misconception.

[6, 21] studies revealed that religious groups forms a large part of the resisting communities to getting vaccinated. The Apostolic Faith in Zimbabwe, for example is the largest religious population, and it has the propensity of poor health seeking behaviour, of which vaccines is part of [24]. The hesitancy is associated to spirituality in that disease are caused by spirits [25]. Contrary to [6, 21] studies, this study established that the Seventh Adventist Church were more likely to get vaccinated accounting for other Christian religious groups, although non-among the Christian religious group reported was an Apostolic Faith Congregant.

[26] report observed in South Africa that a church with huge following public denounce SARS-Cov-2 vaccination at a public gathering of followers. In Nigeria, religion and perceived low risk were also attributed to low uptake of the vaccine. The hesitancy was due to myths and misconceptions generated by religion motivation in the vaccination coverage against polio [27]. Some informal sources of information on health and vaccination fuel the myths and misconceptions, which contributes to overload of information affecting making choices about vaccination [28]. Internet and source media have platforms that spread misinformation which affects the uptake of the vaccine [29]. However, internet and social media are effective platforms for creating buy-ins for the vaccination when well used to spread the correct information, especially in the era of SARS-CoV-2 which coincided with the digital generations. This finding echoes the need for flooding communities with correct information on SARS-CoV-2 vaccinations.

Conclusion

The study determined that factors associated with vaccination, the study did reveal that 'views on Covid-19 news', 'being worried of being sick or household member getting sick from Covid-19', 'real financial effect has Covid-19 at personal level', 'ages of household Members', marital status, religion, levels of academic qualification and ages of respondents are associated with SAR-CoV-2 vaccination. However, the predicators of being vaccinated were having household members aged 30-49 years old and being worried of household members getting sick of respondents getting sick. Additionally, the study determined that misconception on SARS-CoV-2 vaccines discourages residents of Mongu District from getting vaccinated. These findings imply that concern for household member being at risk of SARS-CoV-2 would influence people to get vaccinated in Mongu District. Therefore, there is need scale-up sensitisation, and sensitisation messages should address the need to protect household members and especially having the most mobile age groups (30-49 years) to be vaccinated to reduce on community spread of the

infection. Future studies should look at assessing the proportions that received one-does of the two doses for AstraZeneca lost for the return does or second dose, and to assess the willing to receive booster vaccination among the fully vaccinated.

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Conflict of Interest

The authors have no conflict of interest to declare.

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