

COVID-19 Vaccine Acceptance among People in Kailali, Nepal

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Abstract

Background: The coronavirus disease, better known as COVID-19, pandemic has caused massive disruption and destruction worldwide, with millions of deaths since 2019. Vaccination plays a vital role in ending COVID-19. The objective of the study was to assess the acceptance of the COVID-19 vaccine and its determinants among the general population aged 18 years and above.

Methods: A total of 506 participants were interviewed in the study. A structured questionnaire was used for data collection where quantitative questionnaire covered socio-demographic characteristics of the respondents knowledge related to the vaccine, misconceptions related to the vaccine, perceived reliable sources, and acceptability of vaccine. Bivariate and multivariate analysis methods were employed to determine the associations between these predictors and vaccine acceptance.

Result: The COVID-19 vaccine acceptance rate was 76% in the study area. Vaccine acceptance rate was a slightly lower among female participants (74%) in comparison to their male counterparts (78%). The Bivariate analysis showed a significant association of acceptance of COVID-19 vaccine with the Municipality/Rural Municipality (M/RM), caste/ethnicity and family type. Similarly, in the multivariate analysis (M/RM), religion, caste/ethnicity and disability statuses were found to be significantly associated with the COVID-19 vaccine acceptance. Likewise, respondents from Bhajani RM (aOR = 0.03, 95% CI = 0.01 - 0.1), Lamkichuwa M (aOR = 0.13, 95% CI = 0.04 - 0.4) and Bardagoriya RM (aOR = 0.218, CI 0.069 - 0.685) were less likely to accept the COVID-19 vaccine compared to the respondents of Tikapur M. It was found that respondents who follow the Hindu religion were six times (aOR = 5.6, 95% CI = 1.5 - 20.6) more likely to accept the COVID-19 vaccine than the non-Hindu respondents. In addition, respondents who were from Janajati were less likely (aOR = 0.5, 95% CI = 0.3 - 0.8) to accept the COVID-19 vaccine than Brahmin/ Chhetri. Furthermore, respondents with disabilities (aOR = 0.4, 95% CI = 0.2 - 0.9) were less likely to accept the COVID-19 vaccine than those without disabilities.

Conclusion: The COVID-19 pandemic cannot be curbed if people do not accept the vaccine. The findings of the study showed that a considerable proportion of the respondents did not accept the vaccine due to fear of the side effects and doubt on vaccine efficacy. Hence, there is a need to increase advocacy and awareness of the COVID-19 vaccine to gain people's trust and increase the vaccine acceptance rate.

Keywords: COVID-19; COVID Vaccine; Vaccine Acceptance; Kailali; Nepal

Introduction

Equitable access to safe and effective vaccines is the key to ending the COVID-19 pandemic [1]. Different prevention measures have been followed to control the infection rate of COVID-19 and its severity. For the past year, just after the emergence of the pandemic, researchers have focused on developing and implementing a vaccine that can serve as a reliable and cost-effective preventive tool to combat the disease [2].

The COVID-19 pandemic has caused massive disruption and destruction worldwide, affecting billions of people's lives [3,4]. Incidences of the COVID-19 pandemic has increased at the global level, where the Eastern Mediterranean Region reported the largest increase in the number of new cases (39%), followed by the South-East Asia Region (36%) and the European Region (13%) and the number of new weekly deaths has also increased in the South-East Asia Region (44%) [5].

In Nepal, the first case of COVID-19 was detected on 27 January 2020, and the number of cases began increasing from the third week of March 2020. A total of 9, 78,452 cases have been confirmed and 11,951 people have died from the virus as of 2 April 2022 [6]. Nepal has already faced two deadly waves of COVID-19 infections and deaths, which were among the highest in Asia and the world. Vaccination campaigns conducted by the government of Nepal across the country have shown positive results. The Ministry of Health and Population revealed that people have developed antibodies up to 90 percent as per a sample test conducted with 13,161 persons from various parts of the country [7]. The first phase of COVID-19 vaccination was initiated in Nepal on January 27, 2021, using the Covishield vaccine, also known as the Oxford, AstraZeneca vaccine in other parts of the world [8].

In Nepal, nearly 28 million doses of COVID-19 vaccines have been safely administered to date, achieving 52% of first dose coverage and 40% of second dose or full vaccination coverage among the total population. Similarly, the first dose and second dose coverage for target group of 18 years and above is 71% and 61%, respectively. The COVID-19 vaccination for adolescents in the age group of 12 - 17 years has also begun recently in 60 out of 77 districts [9]. According to WHO, dealing with misinformation is as important as ensuring efficient supply and equitable access to vaccines.

The National Immunization Program of Nepal has a huge experience in conducting nation-wide immunization campaigns. The immunization sessions are planned and conducted at fixed site/health facility immunization sessions, outreach immunization sessions/sites (for routine), mobile clinics (in geographically hard-to-reach areas), and expanded outreach immunization sessions/sites beyond the routine immunization outreach sessions for campaigns. These sites are as follows: (i) Health facilities: Nepal has 5,188 health facilities, out of which > 80% are providing fixed site routine immunization throughout the country every month. This includes all government health facilities at provincial level, district level, and local level health facilities. Further, designated private hospitals also provide immunization services through the National Immunization Program. (ii) Routine outreach immunization sites: Each government health facility has 3 - 5 outreach immunization sites providing immunization sessions routinely covering their catchment area. These outreach sites along with the health facility sites amounts to total of > 16,000 immunization sessions per month. (iii) Vaccination campaign immunization sites: On average this modality has 10 session sites in each ward of a metropolitan and sub-metropolitan city, eight session sites in each ward of urban municipality, and six session sites in each ward of rural municipality and can amount up to 48,000 booths. Currently, there are over 3,000 active immunization sites. The further expansion in the number of sites depends on the supply status of COVID-19 vaccines. More than 8,000 trained vaccinators in Nepal who conduct regular immunization session are being mobilized for COVID19 vaccination campaign [10].

Integrated advocacy, digital and mainstream media mobilization, and mobilization of community volunteers, influencers, and frontline workers are the major activities of the Nepal government for the vaccine demand generation and vaccine acceptance. Vaccine task teams at provincial and local levels adapt, plan, implement, monitor, and report all communication and social mobilization activities based on

guidance from the federal level. At the household and community levels, Female Community Health Volunteers (FCHV) have been capacitated and mobilized to disseminate the timely and appropriate vaccine risk communication messages. Community, religious and political leaders and other celebrities are also being leveraged to motivate communities towards vaccine uptake as per the plan. Training materials and messages have been endorsed by the National Immunization Advisory Committee for further adaptation and dissemination at provincial and local levels. In addition, the government has initiated various vaccine communication activities to improve the vaccine awareness of public such as public service announcement videos, hotline for COVID-19 vaccine, various webinars on COVID-19 vaccines etc. Similarly, the government has also partnered with the mass media at the federal, provincial, and local levels for regular engagement to amplify key messages through the utilization of existing broadcast platforms for effective dissemination of COVID-19 vaccine information [10].

Understanding factors that may lead people to accept COVID-19 vaccination is a global concern. Additionally, in order to effectively promote the vaccination, we need to know if people are willing to take the vaccine, the reason behind their hesitance, and the factors that influence their decision-making [11]. Therefore, increasing acceptance of the COVID-19 vaccine among the people and overcoming hesitancy are key steps towards the full population inoculation against COVID-19. This survey contributed to understanding the factors associated with vaccine acceptance.

Objective of the Study

The objective of this study was to assess the COVID-19 vaccine acceptance rate and its associated factors among the people living in the Kailali district.

Materials and Methods

This study was conducted at four working municipalities (M/RMs) of CARE Nepal at Kailali district. This study was carried out using a mixed study design, i.e. quantitative (structured questionnaire) and qualitative (Key Informant Interviews) design to get different perspectives from the respondents. However, this article only uses the quantitative components of the study. The quantitative methods, i.e. structured questionnaires, were used to examine vaccine acceptance changes among vulnerable people through individual household interviews.

The information about the change in vaccine acceptance among the vulnerable population (of 18 years and above) was gathered through a Household Survey using the multistage stratified cluster sampling strategy. The sample was representative of the population of the age group of 18 years and above in Kailali district Nepal, from which the COVID-19 Vaccine Acceptance indicators can be derived at provincial and national levels.

A recent study conducted in Nepal showed that the prevalence of vaccine acceptance rate was 80% [12]. Based on this prevalence, the sample size was calculated. A total of 506 community people aged 18 years and above were covered in this study, where 266 were vaccinated and 240 were not vaccinated. The data collection was conducted in the community with the use of both the probability and non-probability sampling techniques. The multistage cluster sampling methodology was adopted in the survey to select respondents to ensure the representation of the study population.

In the first stage, two wards (clusters) in each Palika were randomly selected - the first step was defining the cluster and constructing the sampling frame. In the case where the number of the households within the ward are more than 200, it was divided into different segments and among them one segment was selected randomly. Once the segments were selected, a listing approach was used to gather information about the total number of households located within the segment. Similarly, in the case where any household had a member who was less than 18 years, those households were not included in the household listing.

In the second stage, household numbers were assigned to every household after completing the listing process. A fixed number of 58 households per segment was selected using the systematic random sampling. Once the households were selected, the next step was to select the respondents. The unit of analysis was the individual of the household who were above the age of 18.

Quantitative data was collected in tablets/mobile applications (KOBO). Data were analyzed using descriptive statistics bivariate and multivariate analysis. The SPSS Software was used to analyze the quantitative survey. Bivariate (Chi-square test) and multivariate analysis (Binary logistic regression) were performed to find relationships between acceptance of COVID-19 vaccine and other socio-demographic variables.

Respondents were interviewed after taking their verbal consent. The consent process ensured that the respondents were well-informed about the organization and interviewer, the purpose of the study, their voluntary participation, the confidentiality of information, anonymity of the informants, time duration, and risk and benefits of their participation in the study. Moreover, they were informed that they could skip any questions they felt uncomfortable with or leave the interview anytime. Each respondent was provided with a unique code to ensure the confidentiality of the respondents. No personal identifiers were disclosed anywhere in the study. All other ethical issues were considered.

Findings

Background characteristics of respondents

A total of 506 respondents were interviewed in the study. More than half (53%) of the respondents were female. Likewise, more than one-fifth (27%) of the respondent were youth aged below the age of 25. A higher proportion of the respondent were Hindus (96%). Caste-wise disaggregation showed that two-fifths (40%) of the respondent were Janajati, followed by Brahmin (29%), Dalit (18%) and Chaudhary (12%). Similarly, more than three-fourths (79%) of the respondent were married. More than one-third (34%) of the respondent had completed basic education, and 61% were engaged in agriculture. Likewise, more than two-thirds (67%) of the respondents had a nuclear family type. One in ten respondents (10%) who had been sampled had some kind of disability. In terms of vaccine, more than half (53%) of the respondents were vaccinated (Table 1).

		%	N
Name of Palika/ Municipality	Tikapur M	22.9	116
	Lamkichuwa M	23.1	117
	Bhagoriya RM	22.9	116
	Bhajani RM	31.0	157
Sex of Respondent	Male	46.8	237
	Female	53.2	269
Age group	Less than 25 years	27.3	138
	25-34	27.9	141
	35-44	17.4	88
	45-54	13.0	66
	55-64	6.9	35
	65 or above	7.5	38
Religion	Hindu	96.2	487
	Muslim	.2	1
	Christian	3.0	15
	Buddhist	.6	3

Ethnicity	Brahmin/Chhetri	29.4	149
	Indigenous/Janajati	40.1	203
	Dalit	18.2	92
	Muslim	.2	1
	Chaudhary	12.1	61
Marital Status	Unmarried	18.2	92
	Married	79.1	400
	Widowed	2.8	14
Educational Status	Illiterate	24.3	123
	Informal Education	8.7	44
	Basic education (1 - 8)	34.2	173
	Secondary Education (9 - 12)	30.2	153
	Bachelor's Degree	2.0	10
	Masters and above	.6	3
Source of Income	Agriculture	60.9	308
	Business	9.5	48
	Craftmanship (Skill labour)	3.8	19
	Government Job	1.8	9
	Private Service	1.0	5
	Daily Wage Worker	10.5	53
	Foreign Employment	5.7	29
	NGO/INGO (Project)	.2	1
	Does not Work	6.5	33
	Others	.2	1
Family Type	Nuclear	66.8	338
	Joint	33.2	168
Have any type of disability	Yes	10.1	51
	No	89.9	455
COVID Vaccinated	Vaccinated	52.6	266
	Not Vaccinated	47.4	240
Total		100.0	506

Table 1: Socio-demographic characteristics of respondents.

Bivariate analysis

The COVID-19 vaccine acceptance rate was 76% in the study area. The Bivariate analysis showed a significant association of acceptance of COVID-19 vaccine with the Municipality/Rural Municipality, caste/ethnicity and family type. The acceptance of the COVID-19 was significantly higher among the respondents of Tikapur Municipality (96%) and Bhagoriya RM (86%) ($p < 0.001$). Vaccine acceptance was higher among the Dalit caste groups (89.2%) followed by Hindus/Chhetri (83%) and Janajati (67%) ($p < 0.001$). In the same manner, re-

spondents who had joint families (82%) have a higher acceptance of the COVID-19 vaccine ($p < 0.001$). Furthermore, disability status was also found to have significant association with vaccine acceptance, as a higher proportion of respondents who were not disabled (78%) were found to accept the COVID-19 vaccine than those who were disabled (55%).

		Acceptance of COVID-19 Vaccine		Total
		Not Acceptance	Acceptance	N
Municipality/Rural Municipality*** (Chi-square = 76.6, $p = 0.000$)	Tikapur M	4.3	95.7	116
	Lamkichuwa M	23.9	76.1	117
	Bhagoriya RM	13.8	86.2	116
	Bhajani RM	47.1	52.9	157
Sex of the respondents (Chi-square = 1.35, $p = 0.244$)	Male	21.9	78.1	237
	Female	26.4	73.6	269
Age group (Chi-square = 1.67 $p = 0.796$)	Less than 25 years	22.5	77.5	138
	25 - 34	25.5	74.5	141
	35 - 44	25.0	75.0	88
	45 - 54	28.8	71.2	66
	55 or above	20.5	79.5	73
Religion (Chi-square = 0.567 $p = 0.451$)	Non-Hindu	31.6	68.4	19
	Hindu	24.0	76.0	487
Caste/Ethnicity*** (Chi-square = 23.84, $p = 0.000$)	Brahmin/Chhetri	17.4	82.6	149
	Janajati	33.0	67.0	264
	Dalit	10.8	89.2	93
Marital Status (Chi-square = 2.29, $p = 0.130$)	Unmarried/Never married	30.4	69.6	92
	Ever married	22.9	77.1	414
Level of education (Chi-square = 2.30, $p = 0.317$)	Illiterate	24.4	75.6	123
	Informal/Basic	27.2	72.8	217
	Secondary and more	20.5	79.5	166
Source of income (Chi-square = 1.51, $p = 0.680$)	Agriculture	25.8	74.2	341
	Business	18.8	81.3	48
	Skilled labor/Job	21.9	78.1	64
	Unskilled labor/Daily wage workers	22.6	77.4	53
Family type* (Chi-square = 5.7, $p = 0.017$)	Nuclear	27.5	72.5	338
	Joint	17.9	82.1	168
Disability status*** (Chi-square = 13.32, $p = 0.000$)	Not disabled	22.0	78.0	455
	Disabled	45.1	54.9	51
Status of Vaccinated (Chi-square = .481, $p = 0.488$)	Vaccinated	25.6	74.4	266
	Non-vaccinated	22.9	77.1	240
Total		24.3	75.7	506

Table 2: Acceptance of COVID-19 vaccine by socio-demographic characteristics of respondents.

Note: Chi-square test significant at *** = $P < 0.001$, ** = $P < 0.01$ and * = $p < 0.05$.

Reason for not accepting the vaccine among non-vaccinated respondents

Non-vaccinated respondents were further explored on whether they have planned to take the vaccine if it was made readily available. Simultaneously, the respondents who stated vaccine refusal even if it was made readily available, were asked for the reason behind their unacceptance. Out of the 240 respondents who had not received the vaccine, more than two-fifths (43%) of them revealed that they have the plans to receive the COVID-19 vaccine if it was made available, whereas 8% mentioned they have not decided yet, and 10% didn't want to receive the vaccine even if the vaccine is available. The reason behind not receiving the vaccine mentioned by the respondents were due to fear of side- effects (53%), religious or cultural values (22%), doubt about the effectiveness of the vaccine (18%) and other reasons (16%) which include, i.e. pregnancy status, disability status, people who take the medicines for chronic diseases.

		Total	Name of Palika/Municipality			
			Tikapur M	Lamki Chuha M	Bardagoriya RM	Bhajani RM
Plan if there is the availability of COVID-19 vaccine (Hesitancy)	Definitely No	10.4	1.7	3.4		33.3
	Probably No	4.6		8.6		9.1
	Not decided yet	7.9		12.1	8.6	10.6
	Possibly yes	34.6	41.4	60.3	3.4	33.3
	Definitely yes	42.5	56.9	15.5	87.9	13.6
Total		100.0	100.0	100.0	100.0	100.0
	N	240	58	58	58	66
The reason behind not receiving the vaccine*	Fear of Side effects	52.7	100.0	35.7	40.0	60.0
	Doubt about the effectiveness of the vaccine	18.2		7.1	80.0	14.3
	Religious/Cultural values	21.8				34.3
	Other reasons (pregnant/ disabled/ took other medicine)	16.4		57.1		2.9
Total		100.0	100.0	100.0	100.0	100.0
	N	55	1	14	5	35
* Multiple responses						

Table 3: Acceptance of vaccine and reasons for not accepting among non-vaccinated respondents.

The Multivariate analysis shows that Municipality/Rural Municipality, religion, caste/ethnicity, and disability status were significant for the COVID-19 vaccine acceptance. It was found that respondents from Bhajani RM aOR = 0.03, 95% CI = 0.01 - 0.1; Lamkichuwa M aOR = 0.13, 95% CI = 0.04 - 0.4; and Bardagori RM aOR = 0.218, CI 0.069 - 0.685) were less likely to accept the COVID vaccine compared to the Tikapur municipality. It was found that respondents who follow the Hindu religion were six times (aOR = 5.6, 95% CI = 1.5 - 20.6) more likely to accept the COVID 19 vaccine than the non-Hindu respondents. Furthermore, respondents from Janajati were less likely (aOR = 0.5, 95% CI = 0.3 - 0.8) to accept the vaccine than Brahmin/ Chhetri. Additionally, the respondent with disabilities (aOR = 0.4, 95% CI = 0.2 - 0.9) were less likely to accept the COVID-19 vaccine than those without.

Selected predictors		Adjusted odds ratio (aOR)	95% CI	
			Lower	Upper
Municipality/Rural Municipality	Tikapur M	1.00		
	Lamkichuwa M	0.130***	.042	.400
	Bhagoriya RM	0.218**	.069	.685
	Bhajani RM	0.032***	.010	.102
Sex of the respondents	Male	1.00		
	Female	0.663	.397	1.106
Age group	Less than 25 years	1.00		
	25-34	0.589	.295	1.176
	35-44	0.814	.359	1.848
	45-54	0.580	.224	1.501
	55 or above	0.798	.286	2.227
Religion	Non-Hindu	1.00		
	Hindu	5.552*	1.495	20.620
Caste/Ethnicity	Brahmin/Chhetri	1.00		
	Janajati	0.460**	.258	.819
	Dalit	0.984	.406	2.389
Marital Status	Unmarried/Never married	1.00		
	Ever married	1.500	.771	2.918
Level of education	Illiterate	1.00		
	Informal/Basic	1.101	.543	2.230
	Secondary and more	1.213	.497	2.959
Source of income	Agriculture	1.00		
	Business	1.615	.669	3.903
	Skilled labor/Job	1.202	.572	2.529
	Unskilled labor/Daily wage workers	0.728	.312	1.696
Family type	Nuclear	1.00		
	Joint	0.604	.328	1.114
Disability status	Not disabled	1.00		
	Disabled	0.432*	.212	.883
Status of Vaccinated	Vaccinated	1.00		
	Non-vaccinated	0.918	.546	1.542
Constant		12.632**		
-2 Log likelihood		444.75		
Cox & Snell R Square		0.206		

Table 4: Multivariate analysis: Adjusted odds ratios (aOR) and 95% confidence interval (CI) of accepting the COVID-19 vaccine among the respondents in Kailali district.

Note: *** = $P < 0.001$, ** = $P < 0.01$ and * = $p < 0.05$, ref. = Reference category.

Discussion and Conclusion

The present study assessed and revealed that vaccine acceptance is 76%. This finding is lower than that of a similar study conducted in India, (84%) [11]. Similar to our study findings, a cross-sectional study conducted in Southeast Asia shows that nearly three-fourths (74%) of the participants were willing to get vaccinated against COVID-19 [13]. Likewise, a study which is conducted nationwide in the US shows that the COVID-19 vaccine acceptance rate was 81% [14].

In contrast to these findings, the study conducted in Kuwait shows that 53% of respondents were willing to accept the vaccine once available [15]. The vaccine-acceptance rates were the highest amongst adults in Ecuador (97%), Malaysia (94.3%), and Indonesia (93.3%) and the lowest amongst adults was in Lebanon (21.0%). The general healthcare workers (HCWs) in China (86%) and nurses in Italy (92%) had the highest acceptance rates, whereas HCWs in the Democratic Republic of Congo had the lowest acceptance (28%) [16]. The Global Survey shows that the differences in acceptance rates ranged from almost 90% (in China) to less than 55% (in Russia) [17]. A study, which is conducted among the health worker in Chitwan, found that 91.2% had received the first dose of the Covishield vaccine, among which (78.9%) reported one or more side effects [8]. Another study conducted in Nepal shows that 61% of the participants had received at least one dose of the vaccine. Among the unvaccinated group, 93% were willing to get vaccinated when their turn came and the physicians were the most willing among others [18]. A cross-sectional study conducted in Saudi Arabia found that approximately 64% showed a desire to accept the COVID-19 vaccine [19].

Our study showed that the vaccine acceptance rate varied with municipalities/rural municipalities and religion, caste/ethnicity, and disability status of the respondents. The acceptance rate was lower among the other three administrative units than Tikapur municipality. Similarly, the acceptance rate is lower among non-Hindu followers. Other studies also show that the COVID-19 vaccine acceptance is lower among Muslims compared to other religions. Our study found that people with disabilities were less likely to accept COVID-19 vaccine which could be due to misconceptions regarding the vaccine. However, this finding needs further exploration.

This study was conducted only at four-working municipality/rural municipality of CARE Nepal in Kailali district. Therefore, the result obtained can't be generalized for a larger population. Similarly, due to the cross-sectional nature of the study, the cause-and-effect relationship cannot be explained.

In conclusion, the COVID-19 pandemic cannot be curbed if people do not accept the vaccine. The study shows that a considerable proportion of the respondents did not accept the vaccine due to the fear of side effects and doubt on vaccine efficacy. Hence, there is a need to increase advocacy and awareness of the COVID-19 vaccine to gain people's trust and increase the vaccine acceptance rate.

Understanding the population's perspectives is crucial for the government and relevant agencies to formulate the best approach to implement the COVID-19 vaccination program in Nepal. It is believed that the COVID-19 Vaccine acceptance survey will contribute to increasing access and maximize the utilization of the COVID-19 vaccine to the targeted populations at the national level and especially support to roll out the vaccine campaigns. In addition to that, this type of survey will also aid in understanding factors associated with vaccine hesitancy that encourage and discourage people from adopting health-related behaviors such as vaccination [19].

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