Research Article

Attitude and Perception of Young Adults Regarding Uptake of COVID-19 Vaccine in Nepal: A Cross-Sectional Study

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ABSTRACT

Introduction: A new corona virus strain SARS-COV-2 had emerged as a global challenge to human health. Vaccines are most effective strategy and important public health measures but still people were hesitated to accept the vaccine. For the vaccine's acceptance by the people, many influencing factors were playing role. Study was designed to assess the perception of young adult on acceptance of vaccines.

Methodology: A web-based cross-sectional study was used and quantitative methods were conducted among the 390 young adults from all seven provinces of Nepal. The online survey was conducted to enroll all the young adults using Simple Random Sampling (SRS) techniques. Participants were asked to fill out a survey form that was made available through email and social media outlets such as Facebook and Viber. The data were downloaded in Excel and imported to SPSS version 16 for analysis.

Results: More than half (53.1%) of participants had favourable attitude whereas, around three-fourth (72.8%) of participants had satisfactory perception towards COVID vaccine. The study showed significant associations between i) Faculty of study and perception ii) enrolled in health insurance and perception iii) Fear from COVID 19 and perception iv) Education status and attitude v) vaccine increase allergic reaction and attitude.

Conclusion: The findings reflect favourable attitude among half of the respondents but more young adults had favourable perception towards vaccine in Nepal. Vaccine safety and its efficacy should be disseminated through the public domain which is trustable to change the attitude of the young adult through understanding domain of health belief model, information about the vaccines and its consequences should be clearly stated. Efforts must be made to restrain the spread of misinformation about the vaccine. Interventional educational campaign through internet regarding vaccine should be focused targeting non-health sciences background people to avoid low inoculation rates.

Keywords: Attitude; Perception; Vaccine; COVID-19

INTRODUCTION

A new corona virus strain SARS-COV-2 has emerged as a global challenge to human health and invading the world [1]. With this, most heated disputes happening around the world is use of vaccine to halt ongoing COVID-19 infection. Various sources of information are available, ranging from scientific logics to social media, all of which provide inconsistent information, causing public confusion [2]. COVID-19 vaccines are permitted by a number of nations after clearing various stages of studies and trials [3]. Nepal government has also begun to roll out the COVID-19 vaccine campaign on 27th January 2021, with some hopefulness as a part of resolving the pandemic [4]. Although government provides many vaccination services in Nepal, the new launch of the COVID-19 vaccine raises questions about the acceptance of vaccines within the country [5]. Vaccines is most effective strategy and important public health measures and a game changing tool but still many questions raises about the acceptance of vaccines

within the country [5,6]. Equitable access to safe and effective vaccines is critical to ending the COVID-19 pandemic, so it is hugely encouraging to see so many vaccines proving and going into development [4].

Despite of the immense efforts made by different countries and developed a safe and effective vaccine; people are hesitant to accept the vaccine [7]. For the vaccine's acceptance by the people, many influencing factors are playing role such as knowledge and perception on the perceived likelihood of the COVID-19 spread, perceived safety of vaccine, logistics, perceived efficacy of the vaccine and perceived risk etc. It is pivotal to understand the perception of young adult on acceptance of vaccines [8]. Most portion of the country is occupied by the young people; they are the future pillars so it is foremost important to know about their perception and attitude on COVID vaccine. Thus knowing their attitude, we can formulate programs and activities to motivate them for up taking vaccine. COVID-19 cases are at peak again in different countries of world including Nepal, it is vital that vaccination must be accelerated among all the age group. Information about the attitude and perception of young people towards COVID-19 vaccine must be understood. It also raised questions on the overall general public's knowledge, attitudes and perceptions about the vaccine as results of which the outcomes of a new study undertaken to understand the attitude and perception regarding COVID-19 vaccine among young people in Nepal. Therefore, this study aims to find out the attitude and perception regarding vaccine among young people in Nepal.

METHODOLOGY

Participants and procedures

The anonymous population based online survey was conducted among young adults aged above 18 to 40 years using cross-sectional study design. The web based study applying quantitative methods was conducted among the young adults from all seven provinces of Nepal. The online survey was conducted to enroll all the young adults using cluster sampling techniques. The participation was considered as voluntary based on their self-interest to fill up the online survey questionnaire.

The semi-structured questionnaire was designed based on extensive review and incorporated into the Google survey tool (KOBO toolbox) and a shareable link was generated. Then, the link was shared through various social media such as Facebook, Instagram, Twitter, Gmail and LinkedIn webpage site. Similarly, questionnaire was shared among contact lists of the investigators as well as research assistants. The online approach was used as an alternative to face-to-face data collection during pandemic situation.

Sampling procedures

The sample size was computed using single proportion based on Cochrane's formula. Since there was no prior similar research study on knowledge, attitude and practice's regarding COVID vaccine proportion, so it was assumed as 0.5. With 5% margin of error and 95% confidence interval. The sample size was computed as 390. This sample size was obtained proportionately based on total population in each province. Among all seven provinces, 64 participants were enrolled from province 1; 82 from province 2; 83 from Bagmati province, 34 from Gandaki province; 66 from Lumbini province; 24 from Karnali province and 37 from Sudurpaschim province. Those young adults aged 18 to 40 years and who were not vaccinated with COVID vaccine till now was

included in the study. In the survey form, question was kept to screen the vaccinated and unvaccinated young adults.

Measures

The semi-structured questionnaire consisting socio-demographic characteristics, knowledge, attitude and perception related to COVID vaccine was used for data collection through self-administration. The questionnaire was developed based on extensive literature search and was then translated in national language (Nepali). The Google forms were created including all the questionnaire of the study. The online questionnaire was shared with participants through various websites. The validity of the tool was maintained by consulting with subject experts in each stage of research design and tools development. The final tool was then pretested among 10% (n=39) of participants using the survey tool through email and messenger. The social media was used to promote online survey by increasing the access of maximum number of participants.

Socio-demographic characteristics

The questions related to socio-demographic characteristics such as age, sex, marital status, educational status, family type, monthly family income and current residence were asked during the survey.

Knowledge, attitude and perceptions

All questions in this section were based on validated tools used in previous literature. The level of knowledge, attitudes, and perceptions was assessed based on total items of questions in the respective section. The score less than or equal to 10 was considered as unfavourable whereas above 11 was considered as favourable attitude. Likewise, score less than or equal to 5 was considered as unsatisfactory whereas score greater than 5 was considered as satisfactory.

Statistical analysis

Data collected was exported to excel format and cleaned for any inconsistency. Data was analyzed using SPSS V 16 software. The composite score was computed for knowledge, attitude and perceptions section for calculating actual score. The final score was interpreted based on the range.

Ethical considerations

The ethical approval for the study was obtained from Institutional Review Board (IRC) of Manmohan Memorial Institutes of Health Sciences (MMIHS). The informed consent was obtained from each participant prior data collection. The participation on the study was voluntary based on their self-interest. The rationale, expected benefits and possible harms regarding the study was explained to participants. The privacy and confidentiality of data was maintained to the extent possible.

RESULTS

The mean age of the respondents was 24.70 ± 5.11 years, ranging from 19 to 40 years. More than one-third (37.9%) of the respondents were male. Majority (94.1%) of the respondents followed Hinduism. More than one-fourth (27.2%) of respondents were married. Majority (87.9%) of the respondents were staying with family during the lockdown. Around one-third (31%) of the respondents were enrolled in health insurance. Majority (79.2%) of the respondents had received all necessary vaccines in lifetime. Majority (90%) of the respondents had fear of COVID-19. More than one-tenth (14.1%) of respondents didn't know about the

COVID-19 vaccine. Majority (73.6%) of respondents know about effectiveness of COVID 19 vaccine (Table 1).

Table 2 showed more than half (53.1%) of the respondents had favourable attitude towards COVID 19 vaccine. More than two-third (72.8%) of the respondents had favourable perception.

In bivariate analysis, age, faculty of study, enrolled in Health insurance were found statistical associated with perception (p<0.05), as presented in Table 3. Fear from COVID-19 was significantly associated with perception on COVID vaccine. Participants who had got information through Internet were 1.71 times more likely to had favourable perception towards COVID vaccine. (p 0.018, OR 1.718, 95% CI 1.095-2.694) is illustrated in Table 4. Ethnicity, education was found statistical associated with attitude. With reference to respondents who had informal education, the odds were 3.16 times higher among the respondents who had formal

education, as presented in Table 5. Know about COVID vaccine, effectiveness of COVID vaccine, know about allergic reaction were found statistical significant with attitude (p<0.05) (Table 6).

In multiple logistic regression analysis, faculty of study, enrolled in health insurance, fear from COVID-19, information through internet was found significantly associated with perception on COVID vaccines (p<0.05). Respondents who were enrolled in health insurance were 1.76 times more likely to had favourable perception compared to not enrolled participants (Table 7). Education status, vaccine increase allergic reaction were significantly associated with attitude towards COVID-19 vaccine (P<0.05). With reference to respondents who had informal education, the odds were 2.682 times higher among the respondents who had formal education, as presented in Table 8.

Table 1: Knowledge on COVID-19 vaccine.

Variables	Frequency	Percentage
Do you know about the COVID-19 vaccine?		
Yes	335	85.9
No	55	14.1
Do you know about the effectiveness of COVID-19 vaccine?		
Yes	287	73.6
No	103	26.4
Is it dangerous to use overdose vaccines?		
Yes	143	36.7
No	247	63.3
Does vaccine increase allergic reaction?		
Yes	115	29.5
No	275	70.5
Does vaccine increase autoimmune diseases?		
Yes	84	21.5
No	306	78.5
How you came to know about COVID-19 vaccine?		
Social media (eg: Facebook, Twitter)	262	67.2
Internet	229	58.7
Mass media (eg: Radio, TV)	206	52.8
Family members and relatives	99	25.4
Friends and neighbors	89	22.8
Newspaper	77	19.7

Table 2: Categorization of the variables.

Characteristics	Frequency	Percentage
Knowledge	77	77
Adequate	84	21.5
Inadequate	306	78.5
Attitude	77	77
Unfavorable	183	46.9
Favorable	207	53.1
Perception	77	77
Unfavorable	106	27.2
Favorable	284	72.8

Table 3: Bivariate analysis of socio-economic variables and perception on COVID-19 vaccine.

Characteristics	Perception		P-value	OR	CI
	Unfavorable (%)	Favorable (%)			
Age					
Young (18-30 Years)	85 (25.3%)	251 (74.7)	0.037*	1.879	1.031-3.424
Adult (30-40 Years)	21 ((38.9%)	33 (61.1%)		1	Ref
Sex					
Female	58 (24.0%)	184 (76.0%)	0.068	1.523	0.968-2.396
Male	48 (32.4%)	100 (67.6%)		1	Ref
Religion					
Hindu	101 (27.5%)	266 (72.5%)	0.545	0.732	0.265-2.023
Non-Hindu	5 (21.7%)	18 (78.3%)		1	Ref
Ethnicity					
Upper Caste Groups	65 (27.1%)	175 (72.9%)	0.957	1.013	0.640-1.601
Others	41 (27.3%)	109 (72.7%)		1	Ref
Marital Status e					
Unmarried	70 (24.6%)	214 (75.4%)	0.066	1.572	0.969-2.551
Married	36 (34.0%)	70 (66.0%)		1	Ref
Family Type					
Joint	47 (27.2%)	126 (72.8%)	0.966	1.001	0.639-1.569
Nuclear	59 (27.2%)	158 (72.8%)		1	Ref
Education status					
Formal Education	96 (26.8%)	262 (73.2%)	0.589	1.241	0.567-2.715
Informal education	10 (31.2%)	22 (68.8%)		1	Ref
Favorable					
Health Sciences	47 (20.7%)	180 (79.3%)	0.001*	2.173	1.381-3.417
Non-Health Sciences	59 (36.2%)	104 (63.8%)		1	Ref
Place of Residence					
Urban	90 (26.5%)	249 (73.5%)	0.47	1.265	0.668-2.396
Rural	16 (31.4%)	35 (68.6%)		1	Ref
With whom staying during this lockdown					
With family	88 (25.7%)	255 (74.3%)	0.068	1.799	0.952-3.398
Without family	18 (38.3%)	29 (61.7%)		1	Ref
Occupational Status					
Employed	26 (31.7%)	56 (68.3%)	0.3	0.756	0.445-1.284
Unemployed	80 (26.0%)	228 (74.0%)		1	Ref
Enrolled in Health Insurance					
Yes	24 (20.0%)	96 (80.0%)	0.034*	1.745	1.040-2.926
No	82 (30.4%)	188 (69.6%)		1	Ref
Family Income					
Nrs>50000	26 (27.7%)	68 (72.3%)	0.94	0.969	0.576-1.629
Nrs<50000	80 (27.0%)	216 (73.0%)		1	Ref

Table 4: Bivariate analysis on COVID-19 related Information and perception on COVID-19 vaccine.

Characteristics	Perception		P-value	OR	CI
	Unfavorable (%)	Favorable (%)			
Received all the necessary vaccines in your lifetime?					
Yes	85 (25.5%)	224 (72.5%)	0.776	0.922	0.529-1.609
No	21 (25.9%)	60 (74.1%)		1	Ref
Infected with COVID -19?					
Yes	15 (28.3%)	38 (71.7%)	0.843	1.067	0.560-2.032
No	91 (27.0%)	246 (73.0%)		1	Ref
Did you experience the death of your relatives due to COVID-19?					
Yes	27 (24.3%)	84 (75.7%)	0.424	1.229	0.741-2.038
No	79 (28.3%)	200 (71.7%)		1	Ref
Do you have fear from COVID-19?					
Yes	89 (25.4%)	262 (56.4%)	0.015*	0.44	0.223-0.865
No	17 (43.6%)	22 (56.4%)		1	Ref
Do you know about the COVID-19 vaccine?					
Yes	88 (26.3%)	247 (73.7%)	0.318	1.365	0.739-2.522
No	18 (32.7%)	37 (67.3%)		1	Ref
Do you know about the effectiveness of COVID-19 vaccine?					
No	25 (24.3%)	78 (75.7%)	0.439	1.227	0.730-2.061
Yes	81 (28.2%)	206 (71.8%)		1	Ref
Is it dangerous to use overdose vaccines?					
Yes	37 (25.9%)	106 (74.1%)	0.659	1.111	0.697-1.770
No	69 (27.9%)	178 (72.1%)		1	Ref
Does vaccine increase allergic reaction?					
Yes	24 (20.9%)	91 (79.1%)	0.072	1.611	0.959-2.706
No	82 (29.8%)	193 (70.2%)		1	Ref
Does vaccine increase autoimmune diseases?					
No	82 (26.8%)	224 (73.2%)	0.746	1.093	0.639-1.869
Yes	24 (28.6%)	60 (71.4%)		1	Ref
How you came to know about COVID-19 vaccine?					
Mass media (eg: Radio, TV)					
Yes	47 (25.5%)	137 (74.5%)	0.492	0.855	0.546-1.338
No	59 (28.6%)	147 (71.4%0		1	Ref
Social media (eg Facebook, Twitter)					
Yes	71 (27.1%)	191 (72.9%)	0.959	1.012	0.630-1.627
No	35 (27.3%)	93 (72.7%)		1	Ref
Internet					
Yes	52 (22.7%)	177 (77.3%)	0.018*	1.718	1.095-2.694
No	54 (33.5%)	107 (66.5%)		1	Ref
Newspaper					
Yes	23 (29.9%)	54 (70.1%)	0.554	0.847	0.489-1.467
No	83 (26.5%)	230 (73.5%)		1	Ref
Family members and relatives					
Yes	21 (21.2%)	78 (78.8%)	0.122	1.533	0.889-2.641
No	85 (29.2%)	206 (70.8%)		1	Ref
Friends and neighbors					
Yes	23 (25.8%)	66 (74.2%)	0.747	1.093	0.638-1.871
No	83 (27.6%)	218 (72.4%)		1	Ref

Table 5: Bivariate analysis on Sociodemographic variables and attitude on COVID-19 vaccine.

Characteristics	Attitude		P-value	OR	216 (73.0%)	CI
	Unfavorable (%)	Favorable (%)				
Age						
Adult (30-40 Years)	22 (40.7%)	32 (59.3%)	0.327	1.338		0.747-2.398
Young (18-30 Years)	161 (47.9%)	175 (52.1%)		1		Ref
Sex						
Female	111 (45.9%)	131 (54.1%)	0.593	1.118		0.742-1.684
Male	72 (48.6%)	76 (51.4%)		1		Ref
Religion						
Non-Hindu	8 (34.8%)	15 (65.2%)	0.229	1.709		0.707-4.129
Hindu	175 (47.7%)	192 (52.3%)		1		Ref
Ethnicity						
Upper Caste Groups	102 (42.5%)	138 (57.5%)	0.027*	0.630		0.418-0.949
Others	81 (54.0%)	69 (46.0%)		1		Ref
Marital Status						
Married	47 (44.3%)	59 (55.7%)	0.532	1.154		0.737-1.806
Unmarried	136 (47.9%)	148 (52.1%)		1		Ref
Family Type						
Nuclear	98 (45.2%)	119 (54.8%)	0.435	1.173		0.786-1.750
Joint	85 (49.1%)	88 (50.9%)		1		Ref
Education Status						
Formal Education	160 (44.7%)	198 (55.3%)	0.005*	3.163		1.423-7.026
Informal education	23 (71.9%)	9 (28.1%)		1		Ref
Faculty of study						
Health Sciences	101 (44.5%)	126 (55.5%)	0.257	1.263		0.844-1.891
Non-Health Sciences	82 (50.3%)	81 (49.7%)		1		Ref
Place of Residence						
Urban	157 (46.3%)	182 (53.7%)	0.533	1.206		0.669-2.173
Rural	26 (51.0%)	25 (49.0%)		1		Ref
With whom staying during this lockdown						
Without family	20 (42.6%)	27 (57.4%)	0.522	1.223		0.660-2.263
With family	163 (47.5%)	180 (52.5%)		1		Ref
Occupational Status						
Employed	36 (43.9%)	46 (56.1%)	0.537	1.167		0.715-1.905
Unemployed	147 (47.7%)	161 (52.3%)		1		Ref
Enrolled in Health Insurance						
Yes	56 (46.7%)	64 (53.3%)	0.946	1.015		0.660-1.562
No	127 (47.0%)	143 (53.0%)		1		Ref
Family Income						
Nrs>50000	44 (46.8%)	50 (53.2%)	0.980	1.006		0.632-1.602

Table 6: Bivariate analysis on COVID-19 related Information and attitude on COVID-19 vaccine.

Characteristics	Attitude	P-value	OR	CI	50 (53.2%)
	Unfavorable (%)	Favorable (%)			
Received all the necessary vaccines in your lifetime?					
Yes	143 (46.3%)	166 (53.7%)	0.618	1.133	0.694-1.848
No	40 (49.4%)	41 (50.6%)		1	Ref
Infected with COVID -19?					
Yes	22 (41.5%)	31 (58.5%)	0.396	1.289	0.717-2.318
No	161 (47.8%)	176 (52.2%)		1	Ref
Did you experience the death of your relatives due to COVID-19?					
No	124 (44.4%)	155 (55.6%)	0.120	1.418	0.912-2.205
Yes	59 (53.2%)	52 (46.8%)		1	Ref
Do you have fear from COVID-19?					
Yes	169 (48.1%)	182 (51.9%)	0.146	1.658	0.834-3.296
No	14 (35.9%)	25 (64.1%)		1	Ref
Do you know about the COVID-19 vaccine?					
Yes	150 (44.8%)	185 (55.2%)	0.036*	1.850	1.035-3.307
No	33 (60.0%)	22 (40.0%)		1	Ref
Do You know about the effectiveness of COVID-19 vaccine?					
Yes	60 (58.3%)	43 (41.7%)	0.007*	1.860	1.179-2.936
No	123 (42.9%)	164 (57.1%)		1	Ref
Is it dangerous to use overdose vaccines?					
No	111 (44.9%)	136 (55.1%)	0.302	0.805	0.533-1.216
Yes	72 (50.3%)	71 (49.7%)		1	Ref
Does vaccine increase allergic reaction?					
Yes	63 (54.8%)	52 (45.25%)	0.044*	0.639	0.412-0.990
No	120 (43.6%)	155 (56.4%)		1	Ref
Does vaccine increase autoimmune diseases?					
Yes	38 (45.2%)	46 (54.8%)	0.727	1.090	0.671-1.770
No	145 (47.4%)	161 (52.6%)		1	Ref
How you came to know about COVID-19 vaccine?					
Mass media (eg Radio, TV)					
Yes	94 (45.6%)	112 (54.4%)	0.589	1.116	0.749-1.663
No	89 (48.4%)	95 (51.6%)		1	Ref
Social media (eg Facebook, Twitter)					
Yes	56 (43.8%)	72 (56.2%)	0.380	0.827	0.540-1.265
No	127 (48.5%)	135 (51.5%)		1	Ref
Internet					
Yes	102 (44.5%)	127 (55.5%)	0.261	1.261	0.842-1.889
No	81 (50.3%)	80 (49.7%)		1	Ref
Newspaper					
Yes	30 (39.0%)	47 (61.0%)	0.118	1.498	0.901-2.492
No	153 (48.9%)	160 (51.1%)		1	Ref
Family members and relatives					
No	133 (45.7%)	158 (54.3%)	0.408	1.212	0.768-1.914
Yes	50 (50.5%)	49 (49.5%)			Ref
Friends and neighbors					
Yes	40 (44.9%)	49 (55.1%)	0.670	1.109	0.689-1.783
No	143 (47.5%)	158 (52.5%)		1	Ref

Table 7: Multiple logistic regression analysis with perception on COVID-19 vaccine.

Characteristics	Perception		P value	OR	CI	AOR	143 (47.5%)	CI
	Unfavorable	Favorable (%)						
Age								
Young (18-30 Years)	85 (25.3%)	251 (74.7)	0.037*	1.879	1.03-3.42	1.345		0.692-2.614
Adult (30-40 Years)	21 ((38.9%)	33 (61.1%)		1	1			Ref
Faculty of study								
Health Sciences	47 (20.7%)	180 (79.3%)	0.001*	2.173	1.38-3.41	1.712*		1.049-2.792
Non-Health Sciences	59 (36.2%)	104 (63.8%)		1	1			Ref
Enrolled in Health Insurance								
Yes	24 (20.0%)	96 (80.0%)	0.034*	1.745	1.04-2.92	1.767*		1.031-3.029
No	82 (30.4%)	188 (69.6%)		1	1			Ref
Do you had fear from COVID-19?								
Yes	89 (25.4%)	262 (56.4%)	0.015*	0.440	0.22-0.86	0.470*		0.225-0.978
No	17 (43.6%)	22 (56.4%)		1	1			Ref
Internet								
Yes	52 (22.7%)	177 (77.3%)	0.018*	1.718	1.09-2.69	1.665*		1.044-2.654
No	54 (33.5%)	107 (66.5%)		1	1			Ref

Table 8: Multiple logistic analysis of different variables and attitude on COVID-19 vaccine.

Characteristics	Attitude		P value	OR	CI	AOR	CI
	Unfavorable (%)	Favorable (%)					
Ethnicity							
Upper Caste	102 (42.5%)	138 (57.5%)	0.027*	0.630	0.418-0.949	1.332	0.863-2.057
Others	81 (54.0%)	69 (46.0%)		1	1		Ref
Education Status							
Formal Education	160 (44.7%)	198 (55.3%)	0.005*	3.163	1.423-7.026	2.682*	1.152-6.242
Informal education	23 (71.9%)	9 (28.1%)		1	1		Ref
Do you know about the COVID-19 vaccine?							
Yes	150 (44.8%)	185 (55.2%)	0.036*	1.850	1.035-3.307	1.406	0.689-2.869
No	33 (60.0%)	22 (40.0%)		1	1		Ref
Do You know about the effectiveness of COVID-19 vaccine?							
Yes	60 (58.3%)	43 (41.7%)	0.007*	1.860	1.179-2.936	1.565	0.899-2.722
No	123 (42.9%)	164 (57.1%)		1	1		Ref
Does vaccine increase allergic reaction?							
Yes	63 (54.8%)	52 (45.25%)	0.044*	0.639	0.412-0.990	0.540*	0.342-0.852

DISCUSSION

The findings reflect that a wide range of socio-demographic factors influence the attitudes and perceptions towards COVID-19 vaccine.

Attitude

Importantly, the finding from our study is similar with study from Bangladesh, Italy and China demonstrating that the over half of participants showed positive attitude towards COVID-19 vaccine [2,3,9]. Upper caste groups were 1.332 times more likely to possess favourable attitude on COVID-19 vaccine as compare d to other groups. In line with our finding, a study from UK also showed that distrustful attitudes towards vaccination were higher amongst individuals from ethnic minority backgrounds [10]. Compared to those with informal education, respondents having formal education were 2.682 times more likely to have favourable attitude towards COVID-19 vaccine which is related with finding from UK [10]. With support to this, a study from China also showed that majority of the college student were having favourable attitude and were willing to accept a COVID-19 vaccine in near future. More interestingly it showed that those studying health related course were more likely to own positive attitude towards COVID-19 vaccine [9]. On other hand, a study showed that although educational background had no influence on willingness to take the vaccine, those with a tertiary education were more likely to believe that the vaccine will protect the people who take it [11]. Further, in US studies people with a bachelor's degree or higher were more likely to be willing to get vaccinated [12,13]. A scoping review

revealed that educational status is significantly associated with attitude towards Covid-19 vaccine [14]. As review concludes that, as knowledge about COVID-19 vaccines is limited as illustrated in numerous studies [14], majority of the young people in our study also had inadequate knowledge about the COVID-19 vaccine. This inadequacy of information on COVID-19 vaccinations found in our study could be possibly due to limited government exposures to information or publicity on COVID-19 vaccinations since the vaccine rollout started. Respondents who are known about COVID-19 vaccine were 1.406 times more likely to have favourable attitude towards COVID-19 vaccine compared to those who do not know. Further, those who are known about effectiveness of COVID-19 vaccine are 1.565 times more likely to have favourable attitude towards COVID-19 vaccine as compared to those who don't know. Regarding increase of allergic reaction by vaccine, as compared to those who replied no, respondents who replied with yes were 0.540 times more likely to have favourable attitude towards COVID-19 vaccine. In support to our findings, a study from UK showed that those who were having poor knowledge on Covid-19 had unfavourable attitude towards COVID-19 vaccine [10]. It's well established that a lower level of education and knowledge of vaccinations is associated with vaccine hesitancy [15]. Good knowledge about COVID-19 and vaccination were also found to be significantly linked with positive attitude and vaccine acceptability in Bangladesh [16]. Additionally, a study from China showed that people who heard previously about COVID-19 vaccines believed that vaccines are safe and thought that vaccines can protect people from being infected with COVID-19 were having favourable attitude towards COVID-19 vaccine [9]. The rationale behind this might be that more knowledgeable people concerned about their health and well-being, through access to more information sources, and become more engaged in life events that might impact them, such as COVID-19 vaccinations [17].

Perception

Majority of the respondents have favourable perception towards COVID-19 vaccine in our study which is in line with the finding from Australia [18]. Vaccine hesitancy could be a risk to the accomplishment of COVID-19 vaccination programs. Findings of our study shows that, young people (18-30 years) as compared to adult (30-40 years) were 1.345 times more likely to have favourable perception towards COVID-19 vaccine. Similar findings was found in study done in UK which showed that young people (ages 18-29) were significantly less likely than older adults to possess negative attitudes towards COVID-19 vaccine [10]. Additionally, a scoping review also concluded that age is important factor determining person's attitude towards COVID-19 vaccine [14].

Further, as compared to those from non-health science background, respondents belonging to health science background were 1.712 times more likely to have favourable perception towards COVID-19 vaccine. Similar findings was showed in study done in China which showed that those studying health-related courses were 1.581 more likely to have a positive attitude toward COVID-19 vaccines [9]. Further, this finding is similar to that of a study conducted at medical schools in the US [19]. Favourable perception towards COVID-19 vaccine among those studying health-related courses compared to those in other courses may be attributed to higher awareness of the importance of COVID-19 vaccines in disease prevention [20]. In addition, many students enrolled in health-related courses are required to visit medical institutions such as hospitals and primary care clinics on a regular basis. As a result,

they believe their risk of infection is larger than that of other students, and that they have a greater need for immunization to protect their health. However, another study in Italy did not find any differences between healthcare and non-healthcare students [21]. Such discrepancy could be because of different study periods i.e. beginning or later part of COVID-19 pandemic.

In the present study, those enrolled in health insurance were found to be 1.767 times more likely to had favourable perception towards COVID-19 vaccine as compared to those not enrolled which corresponds with the findings of the study of Australia which showed those who held private health insurance had positive perception towards COVID-19 vaccine [18].

A key determining factor in people's decision to get vaccinated is the risk they relate with the disease which the vaccine protects [22,23]. In our study, those who had fear from COVID-19 had favourable perception towards COVID-19 vaccine as compared to those who do not fear with COVID-19. This means we can say that people having fear of contracting COVID-19 intent to get vaccinated if made available by government which corresponds with finding of study from US which showed that US respondents who rated the disease higher on a risk perception index more often reported that they would accept a COVID-19 vaccine [24]. Research also shows that individuals who perceive the risk of contracting a vaccine-preventable disease as low, consider the symptoms of the disease as mild, and worry little about the disease, report less intent to take the vaccines and more often remain unvaccinated [22,23,25-27].

Receiving misguided facts regarding the COVID-19 vaccine by the general public is probably going to come up with unfavourable perception and increase hesitancy among the public to be vaccinated [28]. In our study, comparing to those who do not get information about COVID-19 vaccine from internet, those who get it from internet were 1.665 times more likely to had favourable attitude towards COVID-19 vaccine. This could be related with the practice that most of the information nowadays regarding COVID-19 and COVID-19 vaccine are being sharable worldwide through internet.

CONCLUSION

The findings reflect favourable attitude among half of the respondents but more favourable perception towards vaccine among the young adult in Nepal. Vaccine safety and its efficacy should be disseminated through the public domain which is trustable to change the attitude of the young adult, information about the vaccines and its consequences should be clearly stated. Efforts must be made to restrain the spread of misinformation about the vaccine. Interventional educational campaign through internet regarding vaccine should be focused targeting non-health sciences background people to avoid low inoculation rates.

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AUTHORS' CONTRIBUTIONS

and editing. All authors read and approved the final manuscript.

CONFLICT OF INTEREST

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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