



Knowledge, Attitude and Practice of Community towards COVID-19 Vaccines in Bamyar and Daikundi Provinces

*Specialist Dr. Khawaja Mir Islam Saeed^{1,4}, Ali Sharifi², Mohammad Ibrahim Fetrat², Karim Habibi³, Mohammad Amin³, Mir Salamuddin Hakim⁴, Shoib Naeemi⁴, Sharif Ahmad Habib Ahmadzai⁵, Aziz-ur-Rahman Niazi^{6,7}

¹Afghanistan National Public Health Institute (ANPHI), Kabul, Afghanistan. Doctoral Researcher, Afghan Islamic International University (AIU), Kabul, Afghanistan.

²Daikundi Director of Public Health, Ministry of Public Health, Afghanistan

³Bamyar Director of Public Health, Ministry of Public Health, Afghanistan

⁴Eastern Mediterranean Public Health Network (EMPHNET), Afghanistan Office, Afghanistan

⁵Field Epidemiology Training Department, 1Afghanistan National Public Health Institute (ANPHI), Kabul, Afghanistan. Doctoral Researcher, Afghan Islamic International University (AIU), Kabul, Afghanistan

⁶Afghanistan Islamic International University, Ministry of Higher Education, Afghanistan

⁷Herat University, Ministry of Higher Education, Afghanistan

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| Corresponding Author Email: ksaeed@emphnet.net

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Background: Vaccination is a cornerstone strategy for controlling and preventing coronavirus disease 2019 (COVID-19) spread. This study aimed to assess the knowledge, attitude and practice (KAP) of community members towards COVID-19 vaccines in the provinces of Bamyar and Daikundi, Afghanistan.

Methods and Materials: A cross-sectional study was conducted in Bamyar and Daikundi provinces using a structured questionnaire between November and December 2022. The questionnaire encompassed sociodemographic, knowledge, attitudes, practices, and barriers related to COVID-19 vaccination. Descriptive statistics, including frequencies and percentages were calculated using Epi Info v.7.2.6.0.

Results: A total of 831 participants were enrolled in the study, of which 64.38% were females and 65.10% were illiterates. A high proportion had knowledge of COVID-19 (98.56%) and its vaccines (98.19%). The sources of information regarding COVID-19 vaccines were peers (83.03%), television (80.02%), and health workers (75.93%). Majority perceived the vaccine as safe (87.61%), effective (88.21%), and trustworthy (80.51%). A total of 70.64% of participants had received at least one dose of vaccine. Common circulating rumors included vaccine-induced death (11.79%) and vaccine safety (6.26%). We found a significant association between knowledge, attitude and practice.

Conclusion: The study found a high level of awareness, positive attitudes and good practice towards COVID-19 vaccines. Implementing targeted public health interventions is crucial to further enhance vaccine uptake and improve public health outcomes.

Keywords: Bamyar, Covid 19, Daikundi, Attitude, Knowledge, Practice

Introduction

The coronavirus disease 2019 (COVID-19), caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), was first reported to the World Health Organization (WHO) China Country Office on 31



December 2019 [1, 2]. The virus rapidly spread globally, prompting the WHO to declare a public health emergency of international concern [3]. While the pandemic phase has subsided, ongoing surveillance continues to record new cases and deaths worldwide. As of December 1, 2024, global COVID-19 cases exceeded 776 million, with over 7 million reported deaths, according to WHO data. A total of 13.6 billion vaccine doses have been administered globally [4]. Afghanistan reported its first laboratory-confirmed COVID-19 case on 24 February 2020. By December 2024, the country has recorded 235,214 cases and 7,998 deaths [5].

Since the pandemic's onset, a global scientific effort has focused on developing effective vaccines and immunizing populations. By the end of 2020, multiple vaccine manufacturers had successfully produced COVID-19 vaccines, and mass vaccination campaigns were initiated [6]. Successful COVID-19 vaccination campaigns depend heavily on adequate knowledge about the vaccine and a positive attitude towards vaccination [7]. Knowledge serves as a foundation for competence, influencing individual awareness and ultimately impacting performance. Attitude, encompassing thoughts and feelings significantly influences the level of engagement in any practice. A positive attitude fosters motivation and enhances performance [8]. Conversely, limited knowledge and negative attitudes can contribute to vaccine hesitancy and refusal hindering the successful implementation of vaccination strategies. Numerous studies have investigated the relationship between knowledge, attitude, and practices regarding COVID-19 vaccination in diverse settings. A cross-sectional study involving 869 adults in Singapore demonstrated a strong association between higher levels of knowledge, perceived vaccine efficacy, safety and a greater willingness to receive the COVID-19 vaccine [9]. Similarly, research conducted in India highlighted the significant impact of knowledge and attitude on COVID-19 vaccination uptake [10]. A study in Kazakhstan revealed that vaccine hesitancy was prevalent among respondents with trust in the vaccine-producing country identified as a key factor influencing vaccination decisions [11].

Since the initial COVID-19 case in Afghanistan, numerous challenges have hindered pandemic response efforts. These challenges included insufficient diagnostic and testing capacity, inadequate treatment facilities, exacerbated by shortages of medical equipment, oxygen and limited adherence to infection prevention and control measures [12, 13]. Vaccination efforts commenced on February 21, 2021, in the country [13]. However, despite significant efforts and funding, vaccine coverage remains suboptimal, with approximately half (49.00%) of the population having received at least one dose as of December 2024 [5]. There are challenges and barriers, despite efforts and financing against vaccination program in the country [14].

Limited research has specifically examined the knowledge, attitudes and practices (KAP) of healthcare workers and communities regarding COVID-19 and its vaccination in post-pandemic Afghanistan. Existing evidence suggests that low levels of knowledge and awareness, negative attitudes, and vaccine refusal within communities pose significant barriers to successful vaccination programs. An online survey conducted among the general public in main Afghan provinces revealed substantial vaccine hesitancy, with a significant proportion expressing unwillingness to receive the vaccine, posing a major challenge to vaccine implementation in a resource-constrained setting [12]. A study conducted in Herat city found that 66.50% of respondents expressed concerns about vaccine safety and side effects, while 29.00% feared vaccine-transmitted infection [15]. A national-level survey provided valuable insights into the KAP of Afghan communities, contributing to the design and implementation of targeted interventions [16]. Other studies have



also explored the impact of knowledge and attitudes on disease prevention and vaccination uptake in the country [17–20].

However, to date, no studies have assessed the knowledge, attitudes, and practices (KAP) regarding COVID-19 vaccination within the two underserved central provinces of Afghanistan: Bamyan and Daikundi. This study aims to fill this research gap by investigating the KAP of communities towards COVID-19 vaccination within these provinces.

1. Materials and Methods

1.1. Study Design

This cross-sectional study was conducted as part of a field group project by residents of the Afghanistan Field Epidemiology Training Program (AFETP), organized and implemented by the Afghanistan National Public Health Institute (ANPHI) within the Ministry of Public Health (MoPH). The study encompassed five districts, including both urban and rural areas in the central Afghan provinces of Bamyan and Daikundi.

1.2. Sample Size and Sampling Techniques

Sample size was determined using Epi Info v7.2.6. A 95% confidence level. An expected frequency of 50%, and an acceptable margin of errors of 5% were specified. This calculation yielded a required sample size of 384 households. To account for potential non-response, a 10% contingency was added ($384 + 38 = 422$). As the study encompassed two provinces, the sample size was doubled, resulting in a final sample size of 844 households. The capital city of each province was purposively selected to represent urban settings. Rural areas were selected randomly from a list of districts within each province. Eligible participants were residents of the selected areas, aged 18 years or older, of both sexes, and willing to participate in the study. Trained data collectors approached households within randomly selected series in the center of each designated area. Informed consent was obtained from one eligible member per household prior to conducting the interview.

1.3. Data Collection

Prior to data collection, surveyors underwent rigorous training and the data collection tool underwent pilot testing. The reason for this small-scale testing was to know whether the responses to questions were providing the data needed, to identify its appropriateness with culture of the community, duration of interview, technical issues and duplication of questions. We did not find any significant results to bring considerable changes in the questionnaire. However, this process led to few refinements of the questionnaire, including the elimination of redundant questions, the determination of the required interview duration, and ultimately, an overall enhancement of the questionnaire's quality.

Data quality assurance measures, including checks for accuracy and completeness, were implemented throughout the data collection process and rigorously monitored by AFETP supervisors. Data were collected through face-to-face interviews using a structured questionnaire administered between November and December 2022. The questionnaire included sections on demographics, knowledge, attitudes, practices and barriers related to COVID-19 vaccination. In each province, the provincial capital was purposefully selected to represent urban settings, while rural districts were randomly chosen from the available list.



1.4. Statistical Analysis

For description of demographic, knowledge, attitude and practice the proportions, percentages and central tendencies were calculated. To find the association of knowledge, attitude and practice with each other chi-square test with significance level of 0.05 were used. Data were managed and analyzed using Epi Info v7.2.6.0.

1.5. Ethical Consideration

The research protocol received ethical approval from the Institutional Review Board (IRB) at ANPHI. Informed consent was obtained from all study participants. Confidentiality was strictly maintained throughout the study, with personal identifiers excluded from the database.

2. Results

2.1. Sociodemographic Characteristics

After exclusion of incomplete data, a total of 831 adult participants were enrolled in the study, with 419 (50.42%) from Bamyan and 412 (49.58%) from Daikundi provinces. Most of the participants were married (82.19%). We conducted the normality distribution of the age which resulted to be abnormal with p value of <0.001) in Kolmogorov-Smirnov. The median of age was 32 years with interquartile range (IQR) of 24 to 44 years (20 years).

Over half (58.6%) of participants were aged 18-35 years. Females constituted 64.3% of the study population. A significant proportion of the population (65.10%) were illiterate. A high proportion of both males (99.6%) and females (97.94%) reported awareness of COVID-19 and its vaccines. Table 1 presents the sociodemographic characteristics of the study participants in detail.

Variables	Subcategories	Number/frequency	Percentage
Age group			
	18-36	487	58.60%
	35-56	280	33.69%
	55-76	58	6.98%
	75-91	6	0.72%
Sex			
	Female	535	64.38%
	Male	296	35.62%
Study Settings			
	Bamyan	419	50.42%
	Daikundi	412	49.58%
Districts			
	Markaz Bamyan	202	24.31%
	Nili	205	24.67%
	Shiber	96	11.55%
	Yakawlang	121	14.56%
	Shahristan	207	24.91%
Occupation			
	Government job	68	8.18%

Private business	381	45.85%
Jobless	382	45.97%
Marital status		
Married	683	82.19%
Single	134	16.13%
Widow	14	1.68%
Education		
High School	178	21.42%
Bachelor	15	1.81%
Higher than Bachelor	97	11.67%
Illiterate	541	65.10%

Table 1: Sociodemographic characteristics of the study participant of KAP survey from Bamyan and Daikundi provinces about COVID-19 vaccine 2022

A high proportion of participants (98.19%) demonstrated awareness of COVID-19 and its vaccines. Furthermore, 79.06% of participants recognized the importance of vaccination in preventing COVID-19, and 70.64% reported having received at least one dose of a COVID-19 vaccine. Figure 1 provides a detailed comparison of these findings between male and female participants.

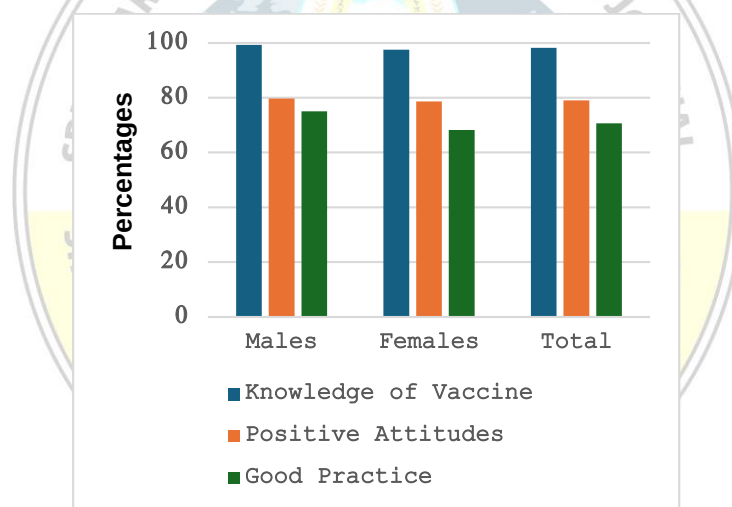


Figure 1: Comparison of knowledge, attitude and practice of community regarding COVID-19 vaccine in Bamyan and Daikundi provinces among study participants, 2022

2.2. Knowledge about COVID-19 vaccines

A substantial majority of study participants (98.56%) demonstrated awareness of COVID-19. Among these, friends and relatives emerged as the primary sources of information (83.03%), followed by social media (28.65%).

Similarly, a high proportion of participants (98.16%) were aware of the COVID-19 vaccines. Television remained the dominant source of vaccine-related information (80.02%), while religious centers and individuals associated with them (Masjids/Imams) contributed to a smaller extent (4.45% and 4.45%, respectively). A minor proportion (0.36%) attributed their vaccine knowledge to other sources, please refer to Table 2.

Variables	Subcategories	Number/frequency	Percentage
Knowledge of COVID-19			
	Yes	819	98.56%
	No	12	1.44%
Source of Information			
	Television	665	80.02%
	Radio	52	6.26%
	Social media	238	28.64%
	Masjids	37	4.45%
	Friends and Relatives	690	83.03%
	Health Workers	631	75.93%
	Others	3	0.36%
Knowledge of COVID-19 Vaccine			
	Yes	816	98.19%
	No	12	1.44%
Source of Information about Vaccine			
	Television	665	80.02%
	Radio	52	6.26%
	Social media	238	28.64%
	Friends and Relatives	690	83.03%
	Masjids	38	4.46%
	Health Workers	631	75.93%
	Others	3	0.36%
Knowledge of type of Vaccine			
	Yes	450	54.15%
	No	381	45.85%
Knowledge of how vaccine works			
	Yes	349	42.00%
	No	482	58.00%
Knowledge of place of administration			
	Yes	815	98.07%
	No	16	1.93%

Table 2: Distribution of knowledge of participants about COVID-19 and its Vaccine in Bamyán and Daikundi provinces

2.3. Attitude of Participants towards COVID-19 vaccines

A significant proportion of respondents (79.06%) believed that the COVID-19 vaccine is effective in preventing the disease. Moreover, 87.61% perceived the vaccine as safe and secure and 88.21% considered it to be effective. Furthermore, 79.30% of participants reported that the vaccine had been approved by both the WHO and MoPH. A high level of confidence in the vaccine was observed among 84.84% of participants, and 76.77% agreed that COVID-19 vaccination should be implemented within the community to prevent disease transmission. For further details on participant attitudes towards the COVID-19 vaccine, please refer to Table 3.



Variables	Subcategories	Number/Frequency	Percentage
Vaccination prevent COVID-19			
	Agree	657	79.06%
	Disagree	87	10.47%
	No comment	87	10.47%
Safety of COVID-19 Vaccine			
	Agree	728	87.61%
	Disagree	13	1.56%
	No comment	90	10.83%
Effectiveness of COVID-19 Vaccine			
	Agree	733	88.21%
	Disagree	17	2.05%
	No comment	81	9.75%
Existence of side-effects of COVID-19 Vaccine			
	Agree	763	91.82%
	Disagree	20	2.41%
	No comment	48	5.78%
Approval of COVID-19 Vaccine by WHO and MoPH			
	Agree	659	79.30%
	Disagree	9	1.08%
	No comment	163	19.61%
Establishment of Immunization by COVID-19 Vaccine			
	Agree	705	84.84%
	Disagree	37	4.45%
	No comment	89	10.71%
Trustworthiness of COVID-19 Vaccine			
	Agree	669	80.51%
	Disagree	16	1.93%
	No comment	146	17.57%
All should get COVID-19 Vaccine			
	Agree	638	76.77%
	Disagree	72	8.66%
	No comment	121	14.56%

Table 3: Attitudes of the participants regarding COVID-19 and its vaccine in Bamyan and Daikundi

2.4.Practice of COVID-19 Vaccine

Among the 831 participants, 583 (70.64%) had received at least one dose of the COVID-19 vaccine, of whom 70.16% possessed vaccination cards. Regarding vaccination locations, 21% of vaccinated individuals received their doses at health centers, while 29.72% received them during COVID-19 vaccination campaigns. Vaccine dosage data revealed that 72.26% of vaccinated participants had received one dose, 25.17% had received two doses, and 2.57% had received more than two doses.

With respect to vaccine type, 15.75% of vaccinated participants received the AstraZeneca (Indian) vaccine, 21.06% received the Sinopharm (Chinese) vaccine, and 63.18% received the Johnson & Johnson (American)

vaccine. Regarding the timing of vaccination, 29.05% of participants were vaccinated within the three months preceding the survey, 18.18% were vaccinated six months prior and 39.79% were vaccinated one year or more before the survey. For further details on vaccination characteristics, please refer to Table 4.

Variable	Subcategories	Number/Frequency	Percentage
Taken COVID-19 vaccine			
	Yes	587	70.64%
	No	244	29.36%
COVID-19 vaccination card			
	Yes	583	70.16%
	No	248	29.84%
Place of vaccination			
	Health/vaccine centers	408	69.86%
	Campaigns	175	29.97
	Other	1	0.17
Doses of COVID-19 vaccines			
	One dose	422	72.26%
	Two doses	147	25.17%
	More than two doses	15	2.57%
Type of Vaccine			
	Astra Zeneca (Indian)	92	15.75%
	Sino Pharm (Chinese)	123	21.06%
	Johnson & Johnson (American)	369	63.18%
Time of vaccination			
	3 months ago	172	29.50%
	6 months ago	106	18.18%
	1 year ago	232	39.79%
	more than one year ago	73	12.52%

Table 4: Practice of participants with respect of COVID-19 Vaccine in Bamyan and Daikundi Provinces

2.5. Relationship of knowledge, attitude and practice

We conducted *chi-square* test to explore the relationship between each pair of knowledge, attitude and practice regarding COVID-19. It should be noted that in 2 by 2 where the data in each cell was less than 5 individuals, the *Fisher Exact Test* data were reported. Therefore, there was statistically significant association between knowledge and positive attitude ($P=0.005$), knowledge and practice ($P=0.008$). Furthermore, there was statistically significant association between attitude and practice ($P=0.004$).

2.6. Barriers/Refusal for Vaccination

Almost one-third of participants (29.36%) had not received the COVID-19 vaccine. Among those who declined vaccination, the most frequently cited reason was the fear of experiencing adverse health effects following vaccination (15.64%). Conversely, concerns about religious prohibitions ("Haram") were cited by a very small minority (0.36%). Figure 2 provides a detailed overview of the reasons for vaccine refusal. To

further explore participant perspectives, the study assessed their reflections on circulating rumors about COVID-19 vaccines. These findings are presented in detail in Figure 3.

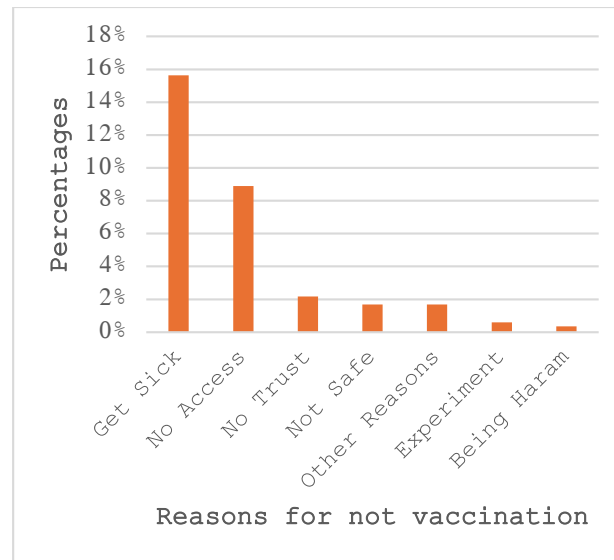


Figure 2: Reasons for refusal of COVID-19 vaccine in Bamyán and Daikundi among sample participants

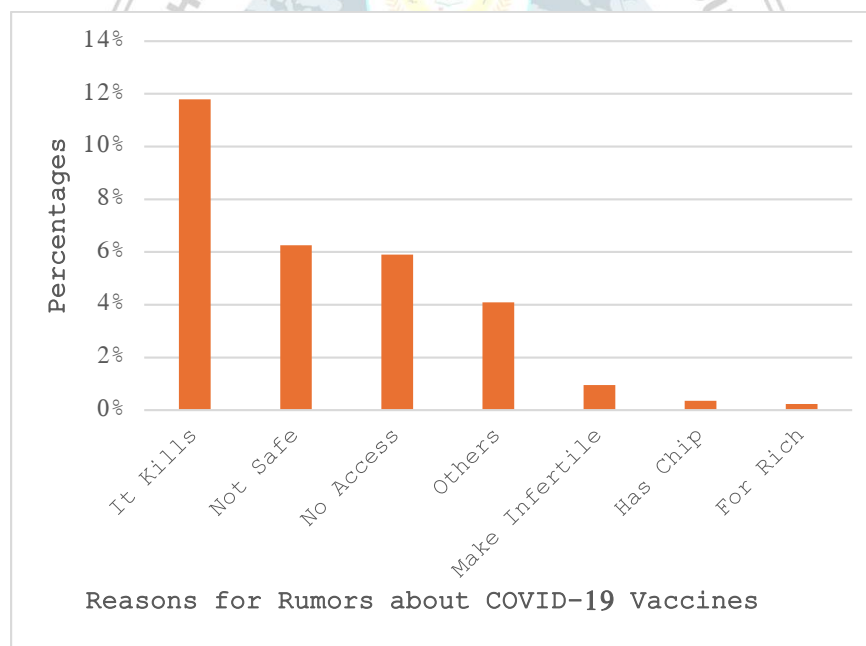


Figure 3: Rumors about COVID-19 vaccine reflected by study participants from Bamyán and Daikundi provinces

3. Discussion

This study was conducted approximately three years after the global onset of the COVID-19 pandemic and one and a half years following the initiation of COVID-19 vaccination programs in the provinces of Bamyán and Daikundi Afghanistan. The findings suggest that over this period, significant improvements may have occurred in community KAP related to COVID-19. Notably, nearly 99.00% of study participants demonstrated awareness of COVID-19 and its vaccines. It is crucial to emphasize that increased knowledge



and positive attitudes towards a disease and its vaccination are strongly associated with the adoption of positive health behaviors, including COVID-19 vaccination [21, 22].

These findings suggest that effective information dissemination and educational campaigns have been implemented within these provinces. This observation aligns with the results of a previous national KAP survey conducted in April 2021 [16, 23, 24]. The study demonstrated a substantial female representation (approximately two-thirds), indicating good female participation in the survey. This may be attributed to the higher likelihood of females being available during daytime data collection in these provinces, given the potential for higher male engagement in daytime activities. While male participants exhibited slightly higher rates of COVID-19 vaccination compared to females, this difference was not statistically significant in this study. However, it is important to note that other study reported higher rates of COVID-19 vaccination among males [25].

Consistent with previous research, television, radio, health workers, social media, religious centers and social networks (friends and family) emerged as the primary sources of information for the study population. These findings are aligned with prior studies conducted among Afghan and Iranian communities [22, 26, 27]. Furthermore, vaccine hesitancy among healthcare workers has been documented in several Central and West Asian nations, including Armenia, Georgia, Tajikistan, and Kyrgyzstan. Key themes associated with this hesitancy include concerns regarding vaccine efficacy, perceived conflicts with religious beliefs, anxieties about potential side effects and concerns surrounding the relatively rapid development of COVID-19 vaccines [28].

A substantial majority (87.61%) of respondents perceived COVID-19 vaccines as safe, effective, and trustworthy. Notably, approximately 70.64% of participants in these two underserved provinces had received at least one dose of a COVID-19 vaccine. These findings align with a previous study conducted within Afghanistan [26] and are consistent with a systematic review and meta-analysis that reported comparable levels of vaccine acceptance among migrant and refugee populations across 12 countries [29]. Furthermore, a significant proportion of vaccinated individuals (70.16%) possessed vaccination cards, indicating a positive trend in maintaining vaccination records. This finding surpasses the national average, where only 50% of the population has received at least one dose of the COVID-19 vaccine [5]. Among those who declined vaccination, common concerns included the fear of adverse health effects (e.g., becoming sick), perceived safety concerns, lack of trust in the vaccine, religious objections ("Haram"), and concerns about potential infertility. These concerns echo the findings of other studies that have identified misconceptions regarding the content, source, effectiveness, and side effects of COVID-19 vaccines within Afghan communities [23].

3.1. Limitations

Few limitations are acknowledged while interpreting the results. Firstly, the study population primarily comprised adults aged 18-55 years, potentially limiting the generalizability of findings to older age groups. Secondly, the study may have been limited by a relatively narrow scope of variables, potentially hindering a more in-depth understanding of the factors influencing vaccination decisions. Furthermore, the analysis was primarily descriptive, potentially limiting the ability to draw more robust conclusions. Previous research has demonstrated the effectiveness of raising public awareness and addressing misinformation (infodemics) related to vaccines [30].



4. Conclusion

This study provides valuable insights for policymakers at both national and local levels regarding community perceptions of COVID-19 vaccination. These insights can be utilized to inform the development of targeted interventions. Implementing targeted public health campaigns to enhance knowledge and counter misinformation is crucial. Promoting social mobilization for COVID-19 vaccination is essential to improve public health outcomes and reduce the disease burden on communities and the healthcare system. To effectively address vaccine hesitancy, it is imperative to refine communication strategies to effectively address public concerns and dispel misinformation, particularly in the context of future public health emergencies.

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