

Community Knowledge and Engagement in COVID-19 Vaccination Efforts in Dori, the Capital of Burkina Faso's Sahel Region, Facing Security and Humanitarian Challenges

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Abstract

Background: The global COVID-19 crisis significantly impacted socioeconomic structures worldwide. To enhance the response, international authorities approved experimental vaccines, and the COVAX initiative facilitated their distribution to various countries. However, successful vaccination campaigns depended on strong public adherence. This study aimed to evaluate the knowledge level of populations in crisis-affected areas and assess their acceptance of the vaccination. **Methodology:** A descriptive cross-sectional study was carried out from November to December 2022 in the city of Dori. Data were gathered through interviews and a specially designed survey tool. The collected data were processed using Excel and analyzed with SPSS software version 25. **Findings:** Among the participants, 91.2% (67 out of 73) were informed about COVID-19, and 93.06% perceived the disease as severe. Communication efforts were made, with radio being the most frequently mentioned source of information on the disease and vaccination. Those who remained unvaccinated primarily cited a lack of willingness, distrust, or unawareness of being part of the priority group. **Conclusions:** The study revealed a commendable level of adherence among respondents, indicating that further efforts are needed to enhance the role of social media as a communication tool to improve outreach and effectiveness.

Keywords

Community, Knowledge, Engagement, COVID-19, Vaccination, Burkina Faso

1. Introduction

The COVID-19 pandemic, caused by the SARS-CoV-2 virus [1], first reported in China [2], and has led to an unprecedented global crisis. In response to its rapid transmission, which prompted the World Health Organization (WHO) to declare it a public health emergency of international concern [3], various stringent measures were implemented worldwide. These measures included restrictions on personal freedoms, such as lockdowns and curfews, alongside health protocols like physical distancing, mask-wearing, hand hygiene, and vaccination [4]. Despite these interventions and numerous WHO guidelines [5], the pandemic severely disrupted healthcare services, particularly those targeting maternal and child health [6], and resulted in significant morbidity and mortality within a year [2] [7] [8]. Burkina Faso reported its initial cases in March 2020 [9], followed by a steady rise in case numbers [10]. The pandemic also had profound economic repercussions [4] [11], severely affecting low- and middle-income countries and underscoring the urgent need for effective crisis resolution strategies, with vaccination being a well-established method for controlling various infectious diseases [12].

In this context, several vaccines were proposed at atypical stages of formulation, with an expedited authorization process [13] [14], occasionally raising concerns about regulatory issues and side effects. Nonetheless, all COVID-19 vaccines received WHO approval for emergency use and were subjected to randomized clinical trials to validate their quality, safety, and potential efficacy. Despite these international precautions, community distrust of these vaccines could lead to non-compliance with vaccination campaigns. Vaccine hesitancy is particularly pronounced in developing countries, despite the high mortality rates associated with infectious diseases [12]. The WHO characterizes vaccine hesitancy as a delay in acceptance or refusal of safe vaccines, even when vaccination services are available. Various factors contribute to this hesitancy, including convenience, trust, sociodemographic contexts, misinformation and conspiracy theories, health inequalities, socio-economic disadvantages, and systemic racism [15] [16].

Despite the potential for populations to resist new vaccines developed rapidly due to the urgency of the situation, and considering the significant impact of the disease, equitable vaccine supply solutions that address logistical challenges [14] [17] have been conceived, resulting in the creation of the COVAX mechanism [18]. Following this development, Burkina Faso formulated and implemented its plan for the introduction of COVID-19 vaccination. Mass vaccination campaigns commenced in June 2021 [19] [20]. All health regions were tasked with executing these campaigns and related interventions to ensure optimal vaccine coverage

among the population, aiming to establish herd immunity against COVID-19 [20]. Achieving enhanced vaccination coverage in communities required access to pertinent information within the context of Burkina Faso, particularly as the country has faced an escalating security crisis since 2015 [21]-[23], leading to concentrations of displaced and vulnerable populations in regions such as the Sahel [24]. This was crucial to positively influence factors contributing to vaccine hesitancy [25] [26], as a high level of COVID-19 vaccine acceptance among the general population is vital for achieving community herd immunity [27].

The objective of this study was to assess the financial expenditures associated with the COVID-19 vaccination campaign targeting internally displaced persons (IDPs) during the first half of 2021 in the commune of Dori, located within the Dori health district in the Sahel region of Burkina Faso.

2. Methods

2.1. Study Context and Design

A cross-sectional study with a descriptive purpose was undertaken, with data collection occurring between November 25 and December 5, 2022. The study took place in Dori, a city located in the northeast of Burkina Faso, which serves as the capital of the commune sharing its name, within the S eno province and the Sahel region, home to the Dori health district [28]. Dori's population is approximately 35,000, predominantly from the Fulani ethnic group, but also includes Tuareg and Songhai communities, spread across 8 sectors, primarily involved in livestock farming and trade [29]. It is a significant crossroads on the third highway leading to the Republic of Niger. The city contains three primary health centers and is home to the regional hospital, the largest referral center in the health region. As of November 30, 2022, just before the study commenced, the commune had received 65,020 displaced individuals, the majority of whom settled in Dori. These displacements are attributed to numerous terrorist attacks that intermittently target civilian populations [22] [24]. (Figure 1)

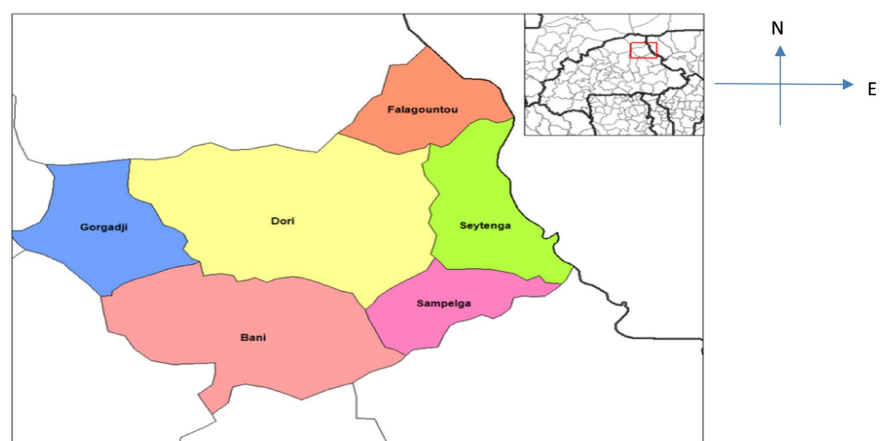


Figure 1. Map of the Dori Health District, Sahel Health Region, Site of Participant Recruitment.

The stratified random sampling method was used for this study. We determined our sample using the formula ($n = Z_{1-\alpha/2}^2 \times P \times Q / I^2$) [30], taking into account the following conditions: 1) a margin of error of 5%; 2) a small deviation corresponding to the accepted statistical risk (for a confidence interval (Z) of 95%) of 1.96; 3) an assumed coverage rate of 50% due to the lack of reliable COVID-19 vaccination coverage surveys at the time; and iv) a non-response rate of 10%. The calculated sample size was 73.

The sample was distributed proportionally, taking into account the population of the sectors of the town of Dori covered by the health facilities. The pen toss method was used for data collection. Starting from the centre of the health facility, the first household to be interviewed was identified and the head of the household (male or female) was approached for the interview.

This study included all individuals residing in the city of Dori at the time of the survey who consented to participate and were at least fifteen years old, as this age is considered beyond the pediatric category according to the health information system of Burkina Faso.

Excluded from the study were individuals who did not reside in the city of Dori and those who did not provide consent, regardless of their status as household heads.

2.2. Methods and Tools for Data Collection

Data were collected through interviews using a structured interview guide administered during semi-structured face-to-face interviews. This guide was developed based on key variables of interest, including sociodemographic characteristics, knowledge of COVID-19 and vaccination, sources of information about the disease and vaccination, participation in vaccination and underlying reasons, actual vaccination status or reasons for non-vaccination, and advice related to the COVID-19 vaccine. The tools were pretested, and necessary amendments were incorporated.

Education sector agents received a briefing from a nursing and obstetric care engineer with expertise in epidemiology regarding the questionnaire. The data collection process was manual.

The data collection will be conducted by trained investigators following this protocol. The tools will undergo pretesting, and amendments will be made as needed.

Data will be entered into a database created with Epi Data and subsequently processed and analyzed using Excel and IBM SPSS version 25 software. Observations were coded and analyzed in Word to extract prevailing opinions or themes.

2.3. Ethical Considerations

The study protocol was submitted to the Regional Health Director of the Sahel, who, representing the Ministry of Health, approved it via official note (note N° 2022-328/MSHP/RSHL/DRSHP dated November 14, 2022). Participation in this study was voluntary, with consent obtained and documented on the form prior to

engaging with any further questions. Interviews were conducted with strict adherence to confidentiality. We maintained the confidentiality of our database by using coded identifiers instead of individuals' names. The data was secured with password protection. The use of the results from our study will be strictly confined to purposes directly aligned with the study's objectives.

3. Results

3.1. Sociodemographic Characteristics

The study included 73 participants, with females comprising 66% of the sample. Participants under the age of 40 accounted for 47%. Literacy or participation in Quranic education was reported by 71.24% of the subjects, with 23.29% having no formal schooling (table S2). Of the respondents, 31% were housewives, and 43.84% were identified as Internally Displaced Persons (IDPs).

3.2. Knowledge of Respondents on COVID-19

A significant 91.2% (67 out of 73) of the respondents were knowledgeable about COVID-19. The sources of information were highly varied and are detailed in **Table 1** below.

Table 1. Respondents' sources of information about COVID-19.

CHW	Frequency	Percentage
No	64	87.7
Yes	9	12.3
Total	73	100.0
Radio station		
No	20	27.4
Yes	53	72.6
Total	73	100.0
Media		
No	72	98.6
Yes	1	1.4
Total	73	100.0
Television		
No	51	69.9
Yes	22	30.1
Total	73	100.0
Town crier		
No	16	21.9
Yes	57	78.1
Total	73	100.0

Continued

Health workers		
No	66	90.4
Yes	7	9.6
Total	73	100.0
Formation/School		
No	73	100.0
Affiches		
No	71	97.3
Yes	2	2.7
Total	73	100.0
Social networking sites		
No	72	98.6
Yes	1	1.4
Total	73	100.0

In terms of the respondents' perception of risk, their responses are cataloged in **Table 2** below.

Table 2. Based on the evaluation of the severity of COVID-19.

Level of seriousness of COVID-19 according to respondents	Frequency	Percent
Very serious	39	54.17%
Serious	28	38.89%
Not serious	3	4.17%
Don't know (NSP)	2	2.78%
Total	72	100.00%

3.3. Participation in COVID-19 Vaccination

In terms of vaccination coverage among the respondents, 54.8% (40 out of 72) reported having received the COVID-19 vaccine.

The respondents also indicated the sources through which they learned about COVID-19 vaccination, as shown in **Table 3** below.

Table 4 below enumerates the reasons for respondents' non-participation in the COVID-19 vaccination program.

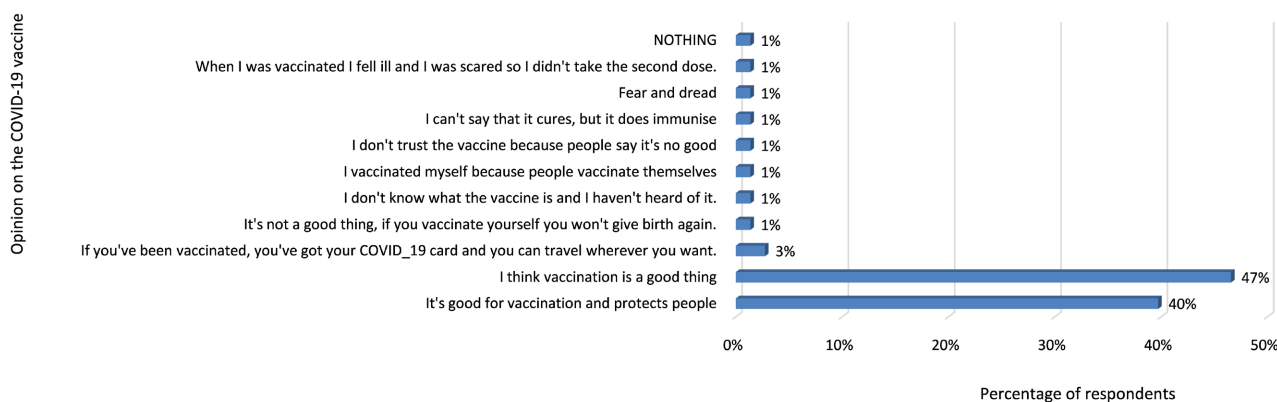
The reasons for non-participation in vaccination against COVID-19 revolved around 1) not perceiving the interest or added value of vaccination against COVID-19 or poor mastery of the organisational details of vaccination campaigns for 17.8% (13/73) of survey participants in the first instance, and secondly 2) fear of the potential effects of the vaccine or refusal to vaccinate for 23.3% (17/73) of survey participants.

Table 3. Distribution of information sources among respondents regarding COVID-19 vaccination.

Radio	Frequency	Percent
No	17	23.3
Yes	56	76.7
Total	73	100.0
Television		
No	59	80.8
Yes	14	19.2
Total	73	100.0
Press and social networks		
No	73	100.0
Health Center		
No	59	80.8
Yes	14	19.2
Total	73	100.0
Town crier		
No	29	39.7
Yes	44	60.3
Total	73	100.0
Health workers		
No	53	72.6
Yes	20	27.4
Total	73	100.0
CHW		
No	56	76.7
Yes	17	23.3
Total	73	100.0
Market		
No	65	89.0
Yes	8	11.0
Total	73	100.0
When distributing food to IDPs		
No	71	97.3
Yes	2	2.7
Total	73	100.0
Water points		
No	72	98.6
Yes	1	1.4
Total	73	100.0
Other		
	72	98.6
In the neighborhood	1	1.4
Total	73	100.0

Table 4. Reasons for non-vaccination among respondents.

Reason	Frequency
I don't trust the vaccine	2
Missed appointment	5
I was in the village during the vaccinations where there's no health center.	4
I was pregnant	4
I didn't just leave	5
Campaign coincided with busy day	3
Those who are vaccinated, I don't know the differences vaccination site	1
I want to eat first	1
I don't want	1
I thought it was made for people who travel	1
I was sick	2
Vaccines can cause disease	1
Lack of willpower	1
Because I couldn't get vaccinated	1
Because I'm old	1
Not aware of vaccination day	1
Cannot travel for vaccination	1
My husband's refusal	1
No opinion	4

**Figure 2.** Main opinions on the COVID-19 vaccine.

Respondents' opinions on vaccination against COVID-19

Most of our respondents said they had to travel less than 2 km to access this vaccination (Figure 2).

4. Discussions

Our research examined a predominantly female population with low educational attainment, yet the majority were aware of COVID-19. They accessed information

from various sources regarding both the disease and vaccination, with radio and television being the most prevalent. Over fifty percent of respondents reported being vaccinated, and they indicated that the distance to vaccination centers was not significant. The reasons for not being vaccinated were varied, including vaccine hesitancy and gender-related issues, such as requiring the husband's approval before vaccination.

The rollout of COVID-19 vaccination was supported by a strong governmental commitment [19] and by technical and financial partners, which was crucial given the logistical challenges of this vaccination campaign [14] [18] [20]. This robust commitment, identified by [31] as a factor enhancing the acceptability of COVID-19 vaccination, should be reinforced when introducing new vaccines.

A comprehensive understanding of the disease and a heightened perception of its severity have likely driven populations to attend vaccination centers, despite historical resistance characterized by numerous prejudices. Vaccine hesitancy, particularly in the context of the COVID-19 vaccination efforts, has been extensively documented [27] [31]-[35]. Research by Ayenew Mose *et al.* identified that informed knowledge and a positive outlook were critical determinants in the acceptance of the COVID-19 vaccine [27]. Our findings add depth to these insights, particularly within the framework of security and humanitarian crises. We identified a diverse array of information sources, with radio and television being the most frequently cited. Despite the proliferation of information technology and the internet, social media's role in disseminating information about the disease and vaccination in Dori was found to be inadequate. This inadequacy may stem from the absence of awareness messages in local languages, which would enable uneducated segments of the population to comprehend and engage with the content. Such gaps could be exploited for misinformation and disinformation, exacerbating vaccine hesitancy, as these powerful communication channels are often utilized in languages accessible to the targeted communities. A study on the use of technology in a pandemic situation found that television was the preferred means of communication for Ivorians, particularly those living in Abidjan (77%), while highlighting that online media and related social media were in second place (60%) in the Republic of Côte d'Ivoire. People followed digital social networks in isolation (49%), noting that this source was used almost exclusively by schoolchildren (48.1%). In another study on fake news distilled on Facebook at the time of COVID-19, the same source highlighted the use of visual and audio media on social networks to distort false information [36]. All these conclusions point to the urgent need for better control of social networks and, above all, for diversification of media to reach communities of all socio-economic levels.

Our findings indicate that the security and humanitarian context did not adversely affect the population's willingness to receive the COVID-19 vaccine, with coverage levels significantly surpassing the national average. However, it is important to note that one respondent cited "the need to eat" as a reason for not vaccinating, reflecting the priority given to finding a solution to food shortages.

This response is very much in line with the level of vulnerability of the population of the town of Dori, which includes refugees and IDPs.

Several sources of information were identified. Radio was the most common. Community Health Workers (CHWs) have not been sufficiently recognized as a source of information, primarily because they are recruited for rural areas. However, their role in enhancing access to vaccination in regions affected by security crises is crucial for sustaining vaccination services [37]. Their involvement is vital in monitoring side effects reported in several studies [38] [39], and effectively managing these side effects is also crucial to ensure continued acceptance of vaccinations by communities that will require them routinely in the future. Considering the impacts on the delivery of essential services, such as vaccination [6], it is imperative to develop tailored systems that enhance service acceptance through greater community engagement [38].

In our study, the population coverage exceeded fifty percent, indicating significant adherence in a region deeply affected by the security crisis. Comparative surveys, such as those conducted in Senegal, showed vaccination intentions ranging between 43% and 54%, although some countries reported more optimistic figures [40]. Various reasons were cited by individuals hesitant to receive the vaccine, including prioritizing food acquisition, lack of motivation, spousal disapproval, age-related concerns, or outright refusal of the vaccine. Addressing these issues may require tailored communication strategies focused on the individuals concerned and countering misinformation prevalent on social media. The responses associated with this conceptualisation of vaccination for travellers could be the perception of community members, who tended to believe that only people moving between places were at risk. This perception was created by various measures such as confinement and quarantine. Based on the lessons learned, future responses to similar public health events should include communication elements that address these issues. Effective communication should emphasize the safety of vaccination [41]. Developing messages that enhance public confidence in visiting vaccination sites is crucial, as highlighted by Ridde *et al.* [42], who identified trust in vaccines and healthcare workers as pivotal in encouraging participation in vaccine trials in Senegal. The insights gained from the COVID-19 vaccine rollout should prompt a reassessment and strengthening of health promotion strategies and community engagement efforts to more effectively reach target populations, as noted by Wirsiy *et al.* [43]. Additionally, focusing on adolescents is imperative, given the alarming levels of vaccine hesitancy observed among this group in Tanzania, as reported by [35].

5. Conclusion

This study aimed to assess the degree of acceptance of COVID-19 vaccination among populations residing in areas facing security and humanitarian challenges. The findings reveal a level of acceptance comparable to those reported in other countries. Innovative communication strategies appear to have had limited impact

on these communities and should be further developed and structured to enhance outcomes. Although COVID-19 is no longer classified as a public health emergency of international concern, the insights gained are crucial for the introduction of new vaccines and the development of crisis communication strategies for future public health emergencies. The refinement of the use of Community Health Workers (CHWs) in emergency contexts is necessary to ensure that, even in urban settings like Dori, they are better protected and actively engaged in response efforts.

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Informed Consent Statement

Informed consent was obtained from all participants involved in the study.

Data Availability Statement

The data generated has been included in the supplementary files.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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