



“Better to die trying”: Vaccine perceptions and COVID-19 experiences in rural Namibian pastoralists

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ABSTRACT

Substantial research indicates that local explanatory models of disease shape health behaviors. However, less is known regarding how cultural models of disease influence interpretations of vaccines. Vaccination decisions are based around a plethora of social and cultural factors, including beliefs about disease, cultural-historical experiences with healthcare, and recent vaccination experiences. To understand how local interpretations of vaccination influence vaccination-decision making, we explore cultural models of health, vaccine norms, and COVID-19 beliefs and experiences in Himba and Herero pastoralists of the Kunene region of northern Namibia. Mixed sex focus groups were conducted in July and August of 2024 in communities across a rural and peri-urban gradient. Discussion prompts were designed to elicit dialogue on vaccination beliefs, norms, and experiences, as well as their recent experience with COVID-19. Results from these focus groups indicate that there was substantial confusion differentiating vaccinations from other types of injections. For childhood vaccines, immunization is normative and expected. Women were the primary decision-makers for childhood immunization, reflecting the matrilineal bias of Himba and Herero kinship. For adults, while local leaders had some influence interfacing with public health outreach, the decision to get vaccinated was largely a personal one. Beliefs about COVID-19 were interpreted through pre-existing cultural models of illness, and beliefs about the origins of COVID-19 reflected mistrust in international actors. Fears about COVID-19 vaccines were common, particularly concerns about vaccine safety. However, fears of the illness typically overrode fears of the vaccine, and most report receiving the vaccine despite these worries. These results highlight the importance of extending research beyond a knowledge, attitude, practice framework to incorporate local explanatory models and cultural-historical experiences in understanding vaccine-decision making. These features are particularly important in more traditional, rural, and marginalized populations where medical mistrust is common and local explanatory models of disease drive healthcare decision-making.

1. Introduction

Indigenous communities face a dual burden of higher levels of chronic and infectious diseases combined with lower access to healthcare [1,2]. One consequence of this is that these communities are both at higher risk for communicable diseases and are less likely to receive the vaccines that prevent them [3–6]. We know that there are many influences on vaccine decision making, from structural factors like inadequate access, to socio-cultural, political, and historical factors like discrimination, misinformation, and medical mistrust [7–10]. But in indigenous communities, medical pluralism, the coexistence of multiple medical subsystems, is common, and can be another important factor in

vaccine-decision making. Indigenous groups often have sophisticated culturally derived models of illness and health, which may conflict with biomedical recommendations and impact beliefs about vaccines and the broader medical system that provides them [11]. However, local indigenous beliefs and perceptions of vaccines are rarely taken into consideration when planning healthcare outreach. Increasing vaccine uptake to control infectious disease ultimately requires a tighter integration of how vaccination is perceived by indigenous communities and how vaccination is promoted by government entities [12–15]. Doing so requires additional research on how vaccines are interpreted, particularly when the community in question is rural, marginalized, or underserved.

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Considerations of ethnic and indigenous understandings and interpretations of vaccinations are typically viewed through the lens of the “knowledge, attitude, and practice” framework. In these studies lack of synchrony between local explanatory models of disease and perceptions of vaccines and biomedical perspectives is often interpreted simply as a lack of vaccine knowledge by an uninformed population [16]. However, biomedical knowledge isn’t always integrated in a straightforward way, and instead may be merged with pre-existing beliefs and ideas in a syncretic fashion [17]. Similarly, negative feelings and beliefs about vaccination are often interpreted as “vaccine hesitancy,” without consideration of the wider cultural-historical framework within which vaccines are understood [10]. For example, Anishinaabe of Ontario, Canada, who have a particularly contentious history with the Canadian government, interpret interactions with healthcare and vaccination practice through the lens of racism, colonialism, and mistrust [18]. Construing vaccination decisions solely as a lack of vaccine knowledge or vaccine hesitancy lays the blame on these marginalized groups and reduces nuanced decision-making into simplistic one-dimensional frames.

Contemporary vaccination beliefs and practices, particularly when it comes to adult vaccines, must be interpreted in light of the COVID-19 pandemic and subsequent vaccination programs. In Africa, there are numerous systemic issues that helped drive COVID-19 vaccine inequality, including lack of vaccination production facilities, supply chain issues, corruption, mistrust, and political instability [19]. Outside of access issues, vaccine anxiety is a concern, as worries about side effects, vaccine safety, and misinformation impact vaccine acceptance rates [20,21]. There is a surprising lack of work to better understand beliefs and experiences around COVID-19 vaccination in Africa, and how they shape vaccine decisions more broadly, particularly within more rural and marginalized communities. In one scoping review focused on the impacts and experiences of indigenous people as the result of the COVID-19 pandemic, the majority of work was done in high-income countries, and only a single publication examining an African population was found [22]. Given recent experiences with COVID-19 and subsequent outreach efforts worldwide, it is likely that future adult vaccine decisions will be interpreted through the lens of COVID-19 vaccine experiences.

Namibia, where this study takes place, historically has had success with vaccination programs. In one 23 country comparison, Namibia had the highest full immunization coverage of any African country [23]. This is despite the hurdles of being a country that is predominantly rural, with a low population density, high levels of inequality, and a large indigenous population [24]. In fact, Namibia tends to have higher full vaccine coverage in rural areas compared to urban ones, and tends to have better vaccine coverage in poor households than in rich ones [23,25]. However, these successes have not extended to COVID-19 vaccination. As of December 2023, only 22 % of the population has completed COVID-19 vaccination, and only 12 % have received at least one booster dose [26]. As with many other countries, Namibia’s COVID-19 vaccination outreach was stymied by misinformation and concerns about vaccine safety [27,28]. Worries about COVID-19 vaccinations, including both concerns about vaccine safety and lack of interest in the vaccine, extend to the indigenous communities of the Kunene region [29]. This is despite the fact that, particularly in rural communities, concerns about COVID-19 are high. As these areas are rural, poor, and have limited access to healthcare, understanding vaccination beliefs and experiences is needed to address barriers to vaccination.

To better understand how vaccine beliefs and experiences impact vaccine-decision making in an indigenous population, this study aimed to (1) elucidate local cultural understandings of vaccination, and (2) describe norms and decision-making processes surrounding vaccination. Since this study was conducted following the COVID-19 pandemic, and COVID-19 vaccines provide a useful frame to reflect on vaccination decisions and experiences, we also (3) seek to understand the influence of COVID-19 pandemic on perceptions of vaccines, and COVID-19

experiences and perceptions more broadly. To address these aims, we conducted focus group discussions with Himba and Herero pastoralists of the Kunene region. We analyze the results with the goal of advising future vaccination outreach to rural indigenous groups.

2. Materials and methods

2.1. Study area

This study was conducted with two Otjiherero speaking pastoralist groups, Himba and Herero, in the Kunene region of northern Namibia. This region is largely dry and arid, with seasonal rainfall that supports small-scale horticulture that supplements subsistence pastoralism. Opuwo, the regional town center, is home to several thousand residents and the only hospital. Kunene residents may also seek care at one of nearly two dozen rural clinics, which use a local ambulance service to assist in delivery of medical treatment. However, distance to medical treatment, including cost of transportation, is a significant hurdle for many rural Kunene residents, who despite subsidized healthcare costs, struggle to pay for transport and hospital or clinic fees. As with many healthcare clinics in Namibia, staffing is a major issue at the regional hospital, resulting in a high doctor-to-patient ratio [30]. According to the World Bank, the Kunene has only 9 physicians and 209 nurses (or 0.09 and 2.09 per 1000 respectively) for a population just over 100,000 [24].

Himba residents in the region tend to live in rural locations, practicing subsistence agro-pastoralism. They also have low rates of formal education. Himba have a conflict-ridden history of interaction with colonial governments, making them more prone to socioeconomic marginalization [31]. This marginalization can have negative consequences in healthcare settings [32]. In comparison, most Herero in this sample are engaged in the cash economy, while maintaining connections with pastoralism and traditional practices. Most also have some level of formal education. Herero also have a history of conflict with colonial powers, including resistance movements against colonial governments, and experienced what is often called the twentieth century’s first genocide by the German colonial government [33]. Additional ethnographic information on these groups can be found elsewhere [34–37].

2.2. Data collection and analysis

In July and August of 2024, known Himba and Herero communities were opportunistically sampled within driving distance of the regional town center of Opuwo. This resulted in sampling from 6 rural and peri-urban villages to the south, east, and north of Opuwo (Fig. 1). Median distance from village to town was 24 km, but some villages were as far as 57 km from town, and some more than 10 km from a main gravel road. Participants were opportunistically recruited during these village visits. All Otjiherero speaking adults had the opportunity to participate, although authors made sure to include relatively equal proportions of men and women, and a mix of ages. Participants gave oral consent to participate in this research, in accordance with IRB approvals, as the population is largely non-literate. A total of 7 mixed sex focus groups, with 4–8 participants per group, were interviewed. Interviews typically ranged between one in two hours in length. Participants were compensated with small gifts of maize meal, washing powder, or cellular phone minutes. Interviews were recorded and later transcribed into English. Taguette was used to qualitatively analyze transcribed interviews [38], which were thematically coded. Initial codes were derived based on the goal of evaluating the cultural interpretations of COVID-19 and vaccination from an ethnographic lens, but iteratively updated following best practices [39]. We report our interview guide and COREQ checklist in the supplementary material [40].

vaccines received by adults, including the COVID-19 vaccine. Participants instead stated that adult vaccinations were largely up to the individual. As one Herero man described it:

Everyone is owner of his own life. Everyone decides for themselves. Whoever wants to take, go take. Whoever doesn't want to, doesn't go take. But when they come, when they inform people, they inform the head of the area or the homestead. Once they are here, everyone decides for themselves.

Local leaders, such as chiefs and heads of households, were only moderately influential in the process. For example, the chief might mediate outreach between the hospital workers and government officials and the local population and help inform the community. However, it was emphasized by most participants that the decision to get vaccinated was largely a personal one.

3.3. COVID-19 knowledge and perceptions

Focus group discussions yielded very little knowledge of COVID-19 generally, typical symptoms, or treatment. COVID-19 was referred to as *corona* across all focus groups. Participants often reported that they knew nothing about this disease, particularly in rural areas. For example, Himba women in one focus group reported:

Participant 1: *We just heard there will be a disease like this. Wash your hands. So we don't know where its coming from or who is going to be mostly affected.*

Participant 2: *Yeah we heard about this and we didn't know. We just knew it was going to kill everybody.*

Several focus groups noted that they suspected this new disease was like *otjindjumba*, the *Otjiherero* word for flu, or a new type of *otjindjumba*. Others reported *corona* was more like malaria in terms of symptomology. However, queries about more specific symptomology yielded little information, particularly with Himba, who argued that since they had not experienced *corona* in rural areas it was impossible to have further information about this disease:

Interviewer: *How do you know if someone has corona?*

Participant: *We don't know because we haven't seen anyone with corona. We just heard about it.*

Interviewer: *You don't know anyone?*

Participant: *No we just heard there was corona, but here it didn't come here. We don't know of anyone that got corona. Corona didn't reach us.*

Interviewer: *You haven't heard about any symptoms? If someone got sick, would they know if it was corona or something else?*

Participant: *Did you hear what I said? Here from there to there [gestures toward a wide area] nobody had corona, we only heard about corona.*

Interviewer: *You heard stories about it?*

Participant: *No, we didn't hear, we just heard wear masks in case someone gets infected.*

Herero focus groups tended to be more specific in naming particular symptoms, including loss of smell and taste:

Interviewer: *What happens when you get corona?*

Participant 1: *Its otjindjumba [flu], you can't smell, can't taste. Half of malaria. Your body gets weak. Like the symptoms of malaria are the symptoms you get.*

Participant 2: *Malaria at least sometimes you can eat, but with corona you can't eat at all because there is no taste, no smell.*

For Herero, living closer to Opuwo, participants reported that they learned about the disease and its vaccine through radio, newspapers, and in-person public health outreach. In rural areas, any knowledge about *corona* was via word of mouth, and visits to town, suggesting public health outreach didn't extend to these locations. While knowledge of this new threat was lacking, universally participants describe

extreme concern with regards to this disease. As one Herero man described:

Corona kills people, it doesn't play. It killed a lot of people. Even when you mention corona I want to cry because it killed a lot of loved ones.

In Herero focus groups, many participants noted that they saw people in their community dying from *corona*. This is in sharp contrast to Himba focus groups, where the majority reported that they had only heard about the disease, but had not experienced it first-hand, or known anyone who had become ill. When asked about the disconnect between extreme concern about *corona* on one hand, and lack of any significant impact to their community on the other, one Himba participant explained:

Participant: *Yeah we were a little surprised it's something that didn't happen to us but happened to other people. When we didn't even move and didn't do any efforts to get injected, one gets a bit surprised.*

Interviewer: *Is there a specific reason why corona didn't come here?*

Participant: *No there is nothing special about it, those are all things of nature or god. Because sometimes we would lose here 10 sheep from disease, but our neighbor there would lose not even one. So this is just how the world works.*

When queried on the origins of *corona*, focus groups tended to be split in indicating the origin of the illness as being either from China or from the US. Some discussants suggested that these two countries had a large proportion of scientists, indicating they would be the likely culprit. Participants also indicated that it was travelers from one of these countries that brought the disease to Namibia. Irrespective of presumed country of origin, focus groups generally agreed that white people were the source of *corona* and other illnesses. As one elderly Himba man explained:

The corona is coming from out of Namibia. From China. White people. Especially from China. Never meet before with white people and never get corona. Now we meet with you white people and we get corona from you.... Every disease comes from you white people. Wash your hands! It's from white people. Do this! It's from white people!

Most focus groups, when queried about potential treatments for *corona*, indicated that "sour vegetables" including garlic, onions, and ginger were useful medicines. Many focus groups also recommended *okanjembo*, or homemade alcohol, as a preventative treatment for *corona*. Several different types of traditional remedies were also offered. *Omandumba*, a traditional medicine made from the wild sage *Pecheul-Loeschea leubnitziae*, was the most common. This plant is crushed and boiled as a tea, or boiled to create a steam, and is typically used to treat respiratory conditions. Focus groups indicated that this and other traditional medicines used for *otjindjumba* may also work for *corona*.

3.4. COVID-19 vaccination

Focus groups were questioned about their feelings and experiences with the COVID-19 vaccine. Approximately 70 % of participants across all focus groups reported having received at least one dose of the vaccine. In one Himba focus group, no-one reported having received the vaccine. When asked why, they explained that due to their rural location, vaccine campaigns did not travel there:

We didn't see a doctor, no one came here. They didn't come, they didn't reach out to us. We only heard but they didn't reach out.

For others that reported not receiving the vaccine, difficulty traveling to the hospital or to a vaccination point was one consideration, particularly for the elderly. The remainder of non-vaccinated participants report worries over vaccine safety.

In explaining their decision to get vaccinated, many people noted that they feared *corona* and sought out vaccines to protect themselves.

For example, as one Herero woman described:

We were told by the nurses and doctors that the vaccine was safe. I believed, and also I saw many people dying and thought that maybe I should take the vaccine, it would be better because people are dying without it.

Others noted that mandates by the government persuaded them, despite concern over the vaccine. These were usually viewed in a negative light, obliging participants to begrudgingly seek vaccination.

Because of the government I was told if you don't get this vaccine card you won't get jobs, you won't have access to so many things. When you come to the shops you have to come present your card. If you don't have one you won't be allowed to be helped or to enter the shop.

Whether or not participants received the vaccine, many reported concerns about the safety of the vaccine. Most often, these concerns revolved around the suspicion that the vaccine contained the disease they were trying to avoid, and that receiving the vaccine would cause people to become ill. In asking why Himba might chose not to get vaccinated, one woman responded:

I'm gossiping, but some people said 'look we are not going to get vaccinated because you know this vaccine that you are getting is disease they are putting inside of you.' People were talking like this. This is why some probably didn't get vaccinated.

Others, in describing why they chose not to be vaccinated, argued for the effectiveness of their traditional medicines in treating the disease, alongside concerns that the vaccine might negatively impact their health. One Herero man, in a focus group where he was the only unvaccinated member, described his reasoning for not receiving the vaccine:

I'm the only one that didn't get vaccinated because I thought this disease is in the air, plus these injections may make me worse. Let me just deal with my traditional medicine and look after myself, and I did. And look, with luck, I'm here, I have life. My efforts paid off.

Many describe facing a quandary, both fearing the vaccine and the disease it was intended to prevent. As one Herero focus group, who all received the vaccine, described:

Interviewer: *Were you scared to get vaccinated?*

Participant 1: *Yeah, we were afraid. We thought maybe these guys were infecting us.*

Participant 2: *Then we thought, we thought, we thought, then said 'no let's just take a risk' and we went to get it.*

Interviewer *Why did you decide?*

Participant 2: *I was afraid maybe I was making a mistake, and I will die. Let me just go. We just realized let's just accept it. Either way we might die or survive, it's better to die trying.*

Interviewer: *You went to Opuwo to get the vaccine?*

Participant 2: *No they came to inject us under one of those trees. [gestures].*

4. Discussion

In this study, we sought to understand how vaccines are interpreted and understood in two groups of Kunene pastoralists. Our results indicate that for childhood immunization, receiving vaccines is normative and largely uncontroversial. Women report being expected to take their children to the clinic or hospital for immunization, with little discussion with the family or others. Women may not be able to recall which vaccines their child received but are largely unconcerned with the process. Notably, women make this decision with little input from their

husbands. In cultures like Himba and Herero, which practice matrilineal inheritance, women have more autonomy and freedom of decision-making [41]. In places where women have higher autonomy, they tend to also have higher child immunization rates [42]. In our previous work, we find that Himba men can suffer from harsh fines and penalties for violating norms that transgress matrilineal expectations [43]. However, increasing exposure to out-group norms, formal education, and market integration may erode women's autonomy in this region [44], and could negatively impact child immunization rates in the future should men seek to exert more control. In other, more patriarchal populations, women have little say in healthcare decisions of the family [45]. Overall, the broad acceptance of childhood vaccines is positive for future vaccine efforts, and is in line with Namibia's high immunization rates overall [23]. This may be due, in part, to the high status of women in this community [46], and suggests that policies that empower women's autonomy and healthcare decision-making may influence immunization rates as well.

Our results indicate hurdles for vaccine decision-making based on the word used for vaccine: *ovenda*. Use of this term introduces confusion, as it can mean both injection and vaccination in *Otjiherero*. While Himba and Herero differentiate between *ovenda* for prevention of disease and *ovenda* for treatment of existing health conditions, this nuance is often lost in casual conversation, blurring the lines between these two types of injection. General confusion about vaccines may be common in populations with little formal education. For example, in Hadzabe hunter-gatherers of Tanzania, the majority of respondents studied viewed vaccines as safe and effective, but half of all participants didn't know what a vaccine was [47]. In the Kunene, one unfortunate consequence of this may be that perception of vaccine effectiveness could be challenged when people have negative experiences with an injection and use these experiences to inform on future vaccine decision-making. If Kunene residents interpret negative experiences with clinics and hospitals more liberally to include vaccination outreach, then vaccination campaigns may be less effective. These results suggest that health practitioners in Namibia should take care to clarify which types of injections are given out (*ovenda yo kupanga* versus *ovenda yo kutjura*), to minimize misperception and confusion. More broadly, these findings suggest that vaccination campaigns may benefit from research that explores how vaccination is understood and interpreted by communities, particularly in rural areas and where formal education is rare.

Discussions around COVID-19 reveal that this illness is interpreted through two important elements: local explanatory models of disease, and a history of mistrust. Himba and Herero have explanatory models for both flu (*otjindjumba*) and malaria (although these two illnesses are often confused), including a breadth of traditional remedies [48]. Novel diseases which lack a deep cultural history, may be understood through these existing models, interacting and melding with pre-existing perceptions of illness. In the case of COVID-19, it was described as a type of *otjindjumba*, or "half of malaria," referring to its symptoms and severity. These disease categories come with a specific set of norms and expectations regarding treatment. Here we found that for COVID-19, participants reported that traditional medicines typically used for malaria or flu were also applied to *corona*. *Corona* also had an independent set of medicines and preventative treatments, including "sour" vegetables and locally distilled alcohol, not used for malaria or flu. This type of "medical syncretism", the mixing and melding of extant illness models with new and biomedically oriented knowledge, can have important implications for how health knowledge and treatments are interpreted [17]. For Himba and Herero, the perception of COVID-19 as *otjindjumba* could result in a delay seeking healthcare until the disease becomes severe [48]. This suggests that Kunene residents may benefit from additional health promotion and education initiatives.

Second, perceptions of COVID-19 and the COVID-19 vaccine were interpreted through historical mistrust that Herero and Himba have toward outside groups. Both have had contentious histories with colonial governments. This includes, but is not limited to, the systematic

marginalization of Himba for economic access to cattle markets and land use, a history of Herero resistance movements, and the Herero genocide at the beginning of the 20th century [31,33]. Based on these experiences, distrust and suspicions of outside groups, including foreign governments, is to be expected. Our results suggest that Kunene pastoralists largely lay the blame of the COVID-19 pandemic on foreign countries and on “whites.” This mistrust extends to COVID-19 vaccines, where many participants were concerned about vaccine safety, the contents of the vaccine, and the motives for vaccinating Kunene residents. For some, this resulted in forsaking the vaccine in favor of traditional medicines or alternate treatments to ward off illness. For most participants we spoke to, they opted to receive the vaccine despite these apprehensions. Medical mistrust is a major concern for health communication and promotion, and can undermine healthcare through reduced testing and treatment [49]. Unfortunately, little work has been done applying the concept of medical mistrust outside of the US, despite substantial evidence that medical mistrust is salient concept in lower- and middle-income countries [50]. In our previous work, we find that mistrust is associated with negative perceptions about vaccine safety and vaccine interest, but not COVID-19 vaccination status, which was instead largely driven by access [29]. Nevertheless, these results suggest that mistrust shapes the way novel illnesses and treatments are understood, adversely impacting vaccine decision-making.

We note several limitations to our study. While we endeavored to sample across a swath of the rural and peri-urban gradient, we did not sample some of the most remote communities in the Kunene, who may have different experiences and attitudes with vaccination and COVID-19. We also limited our focus groups to Himba and Herero, which may limit the applicability to other populations. Many other ethnic groups reside in the Kunene, and may have different cultural models of disease and experiences with national healthcare systems. However, that some rural subsistence based populations have a limited understanding of vaccination or that cultural interpretations of vaccination may influence decision making are lessons that can be applied more broadly. Similarly, in these same populations, the finding that novel diseases are interpreted through existing cultural models has implications for public health communication and outreach.

5. Conclusions

Addressing health disparities in rural, underserved, and indigenous communities requires a systematic understanding of how health information is interpreted. Unfortunately, there is currently very little work examining how cultural groups interpret vaccines. Our results indicate that cultural models of disease, and the cultural-historical experiences of a group, including its interactions and conflicts with majority outgroups and national and colonial governments, influence how vaccines are understood. Where medically syncretic beliefs about disease collide with health recommendations, and where histories of exploitation and marginalization lead to mistrust of healthcare institutions, vaccination uptake is likely to be undermined. We recommend that health outreach, particularly in indigenous groups, include both components. Vaccination campaigns that incorporate culturally appropriate information in a manner sensitive to the cultural history of the population, while being mindful of past negative interactions with healthcare institutions, governments, and other entities, will ultimately engender greater trust and be more successful.

CRedit authorship contribution statement

Sean Prall: Writing – review & editing, Writing – original draft, Visualization, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization.
Aparicio Lopes: Writing – review & editing, Project administration, Methodology, Investigation, Conceptualization.

Ethics approval and consent to participate

The study received ethics approval from the Institutional Review Board (IRB) of the University of California, Los Angeles (IRB #10-000238). Verbal informed consent was obtained from all individuals participating in the study, as approved by the UCLA IRB, as the study population is largely non-literate. Within the community, permission was granted by the local leaders and household heads, and in collaboration with the Hizetjitwa Indigenous People’s Organization, which sponsored this work. All methods were carried out in accordance with relevant guidelines and regulations.

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Declaration of competing interest

The authors declare that they have no competing interests.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.vaccine.2025.127061>.

Data availability

Data will be made available on request.

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