Vaccine Hesitancy and Factors Related to Vaccine Hesitancy in COVID-19 Vaccination among a Tribal Community of Meghalaya: A Mixed Methods Study

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Abstract

Vaccine hesitancy should be dealt as an important issue as it carries both individual- and community-level risks; however, it lacks proper assessment in particular among the indigenous tribal population. A community-based sequential explanatory mixed methods study was conducted among 238 eligible individuals in Ri-Bhoi district, Meghalaya. The quantitative part involved a cross-sectional study to determine the proportion of vaccine hesitancy and the qualitative part comprised in-depth interviews among the eligible residents and key informant interviews among the health workers providing the vaccination services, to explore the facilitators and barriers of vaccine uptake. A total of 113 [47.5% (95% confidence interval [CI]: 41.0%-54.0%)] participants were found to be hesitant to vaccination, among which 16.8% (95% CI: 12.4%-22.3%) were initially hesitant and 30.7% (95% CI: 24.9%-37.0%) had vaccine refusal. The themes generated through qualitative interviews were individual-related, disease-related, vaccine-related, healthcare system and provider related and socio-cultural and religious. The main barriers for the likelihood of action were perceived susceptibility and perceived severity under the individual perception along with ambiguity aversion, scepticism about the efficacy, mistrust, concerns on side effects, rumors, and socio-cultural and religious misbeliefs. Vaccine hesitancy is found to be considerably higher and it depends on complacency toward the vaccine, confidence in its safety, perceived susceptibility to the disease and perceived severity to the disease coupled with modifying factors for cues for action. Healthcare workers should better communicate to improve the uptake of vaccines by reducing the barriers to the vaccine acceptance.

Keywords

vaccine hesitancy, vaccine refusal, in-depth interview, key informant interview, COVID vaccination

Introduction

Having produced a remarkable decline in the incidence of diseases that have long plagued humankind, vaccines are considered one of the greatest medical innovations of all time. From the inception of vaccination, there has been skepticism toward vaccination, though there is no outright antagonism.[1] Initially, the public expressed a greater need for the COVID-19 vaccine out of concern for its limited availability. However, as the supply caught up with the demand, reluctance or hesitancy to take the vaccine became a serious issue and has been recognized as a significant aspect of the pandemic situation.

Vaccine hesitancy is defined as the delay in acceptance or refusal of a safer vaccine in spite of the availability of services for vaccination.[2] Vaccine hesitancy and refusal should be dealt with as an important issue as it carries both individual and community-level risks. World Health Organization has announced vaccine hesitancy as 1 of the top 10 threats to global health in 2019.[3] Vaccine hesitancy is a complex phenomenon that varies across the place, time and type of vaccines. In India, as on June 28, 2021, the percentage of people who were administered at

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least 1 dose and fully vaccinated with COVID vaccine were 27% and 5% respectively[4] and as of June 17, 2022, the percentage of people who were administered with at least 1 dose and full dose of vaccination with coronavirus disease 2019 (COVID-19) vaccine were 73% and 65%, respectively.[5] When it comes to the Northeastern states of India, only Sikkim has met the national average for fully vaccinated individuals. In contrast, states such as Meghalaya, Nagaland, and Manipur have rates well below the average, with percentages ranging from 32 to 39. In fact, Meghalaya (32%) has the lowest vaccination coverage rate in the entire country.[5] This could be well compared with the coverage rates of immunization of children, in which the districts in tribal areas showed 56% coverage, which is lower when compared to the national average. The vaccination coverage remains lowest among the north-eastern states of Nagaland (35.7%) and Arunachal Pradesh (38.2%).[6]

The challenges for successful vaccination could be addressed under 4 dimensions namely, development and production, allocation, affordability, and deployment. These 4 dimensions of the global vaccination challenge are closely related, and the development and production steps have important implications for pricing, allocation, and public confidence.[7]

Published research carried out largely in high-income countries has stated concerns about the safety of vaccines against COVID-19, including the rapid pace of vaccine development, as 1 of the primary reasons for hesitancy,[7] but data from low- and middle-income countries have been limited.

The issue of vaccine hesitancy could be a potential marker for the decreased coverage rates of vaccines in our country, in particular the North-eastern states, since the tribal population are the vulnerable subset of people in a resource-limited country like India. Several factors have been said to influence vaccine hesitancy, including socio-cultural context, religious beliefs, misinformation spread through social media, historical influences and mistrust, beliefs, and attitudes about vaccines, and specific characteristics of the vaccines. Moreover, according to the WHO SAGE working model, targeting the under-vaccinated and unvaccinated population directly along with increasing the knowledge and awareness of vaccination coupled with improved accessibility had proved to be the most effective strategies in causing psychological shift to overcome vaccine hesitancy.[8] Hence our study was planned to determine the extent of hesitancy and the reasons for the same toward COVID-19 vaccination among the tribal community of Meghalaya; where no proper assessment is not available to date.

Materials and Methods

A community-based sequential explanatory mixed methods study was conducted among the individuals aged 18 years and above in the rural field practice area of NEIGRIHMS, Ri-Bhoi district (Vaccination coverage rate before commencing the study was 30%), after obtaining approval from the institute ethics committee. The total number of reported cases in Ri-Bhoi district till December 2021 was 9744

cases (29339/million population) with 90 deaths (271/million population). The literacy rate of Meghalaya (2011 census) is 74.43% with a vast difference between rural (69.9%) and urban (90.8%). The rural field practice area of NEIGRIHMS caters to the population of around 20 000 in the villages around the health center.

The study was conducted from November 2021 to January 2022 and data was collected from November 20, 2021 to January 11, 2022. The quantitative part involved a cross-sectional study among individuals aged 18 years and above residing in the village under the field practice area to determine the proportion of vaccine hesitancy. The qualitative part comprised in-depth interviews among the eligible residents of the village and key informant interview among the health workers providing the vaccination services in the rural health center of NEIGRIHMS.

Quantitative (Cross-Sectional Survey)

Sample Size and Sampling

Based on the proportion of individuals with vaccine hesitancy as 29%,[9] with a relative precision of 20% at 95% confidence level, the sample size was estimated to be 235 using nMaster 2.0. A line-listing of adults (aged 18 years and above) was done and the individuals were chosen using simple random sampling until the sample size was reached.

Data Collection Procedure

The data collection process was carried out by the principal investigator and a senior resident at the rural health center. Individuals who met the criteria for the study were given a clear explanation of its purpose and were informed about the procedure before answering the questionnaire. Confidentiality regarding the information provided was guaranteed, and informed consent was obtained before data collection commenced. A semistructured questionnaire was used for collecting information related to socio-demographic factors such as an individual's perception of COVID-19 vaccine, obstruction to access vaccination delivery, and what factors were involved in convincing them to accept the vaccine if they had initially been hesitant. The questionnaire also sought to identify different reasons that contributed to vaccine hesitancy.

Qualitative (in-Depth Interview and key Informant Interview)

Data Collection Procedure. Seven in-depth interviews were conducted among the individuals at a place of their convenience using an interview guide. Individuals who were fully hesitant/ vaccine refusal (3 individuals), partially/initially hesitant (3 individuals) and nonhesitant (1 individual) were selected for the interview. Individuals with vaccine refusal were explored more on barrier factors, and individuals who accepted after initial hesitancy was interviewed to

explore the reason for accepting the vaccination even after initial hesitancy. Individuals who got vaccinated without any hesitation were interviewed to find the facilitating factors in the campaign. Two key informant face-to-face interviews were conducted with the vocal and willing health care workers who were selected purposively. Participants were interviewed regarding their perception of hesitancy toward the COVID-19 vaccine and asked to give suggestions and solutions to improve vaccine acceptance.

The interviewer was the principal investigator or co-investigator (senior resident) who was formally trained in qualitative research and also had previous experience in qualitative research. The interview started after obtaining consent and explaining the purpose and motive of the study. In order to guarantee the information's privacy, the interviews were conducted in a separate room, free of any individuals who were not participants. Participants were given assurance concerning the confidentiality of the data collected during the interview. Every interview was recorded for 15-30 min, with the prior consent of the participants, and field notes were recorded throughout. At the end of the interview, a summary was presented to the individuals for validation of the data collected. Transcription was done verbatim within 2 days of data collection to prevent the loss of information.

Statistical Analysis

Quantitative. Data entry and analysis were done using SPSS V21 for Windows. The prevalence of vaccine hesitancy is summarized as a proportion with 95% confidence interval (CI).

Qualitative. Collected data was transcribed verbatim followed by translation and back translation. Participant's statements were taken as a unit of analysis. Descriptive manual content analysis was used to derive the categories and codes and themes were generated using thematic analysis. The study was reported in accordance with the consolidated criteria for reporting qualitative research.[10]

Results

Quantitative

A total of 238 eligible participants were interviewed of which 113 [47.5% (95% CI: 41.0%-54.0%)] participants were found to be hesitant to vaccination, among which 40 participants [16.8% (95% CI: 12.4%-22.3%) were initially hesitant and 73 [30.7% (95% CI: 24.9%-37.0%) were having vaccine refusal. (Figure 1)

Qualitative

A total of 7 in-depth interviews (1- non-hesitant, 3- initially hesitant and 3- vaccine refusal) and 2 key informant interviews (1 Auxiliary Nurse Midwife [ANM] and 1 medical officer) were conducted. Table 1 shows the characteristics of the participants of in-depth interview.

Based on the thematic analysis using inductive approach, the following themes were generated from the interviews based on the health belief model conceptual framework (Figure 2)

1. Individual related.
2. Disease related.
3. Vaccine related.
4. Healthcare system and provider related.
5. Socio-cultural and religious.

Theme 1: Individual Related Factors

Lack of Awareness and Negative Attitude. There was a lack of awareness and negative attitude among most of the respondents, in particular among the responders without formal education

> Government say common cold, Coryza as COVID and so they take medicine from market (ANM)

A 28 year old female who was initially hesitant was of the opinion that "There were many people who scared me who said that the vaccine is meant to kill a person so that he
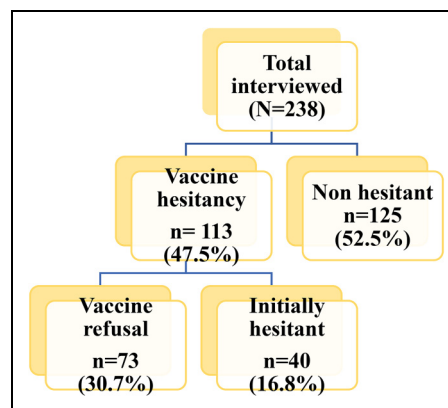
Figure 1. Vaccine hesitancy among the study participants (N = 238).

Table 1. Characteristics of the Study Participants (in-Depth Interview).

Participants characteristics (In-depth interview)

P$_1$: Female aged 28 years with education till high school level and a home maker (Initially hesitant)
P$_2$: 22-year-old male who was a graduate student (Vaccine refusal)
P$_3$: 58-year-old illiterate female and a homemaker (Initially hesitant)
P$_4$: Graduate female aged 27 years who was a homemaker (Initially hesitant)
P$_5$: 21-year-old illiterate pregnant female (Vaccine refusal)
P$_6$: 25-year-old female with higher secondary level of education (Non-hesitant)
P$_7$: 52-year-old illiterate female (Vaccine refusal)
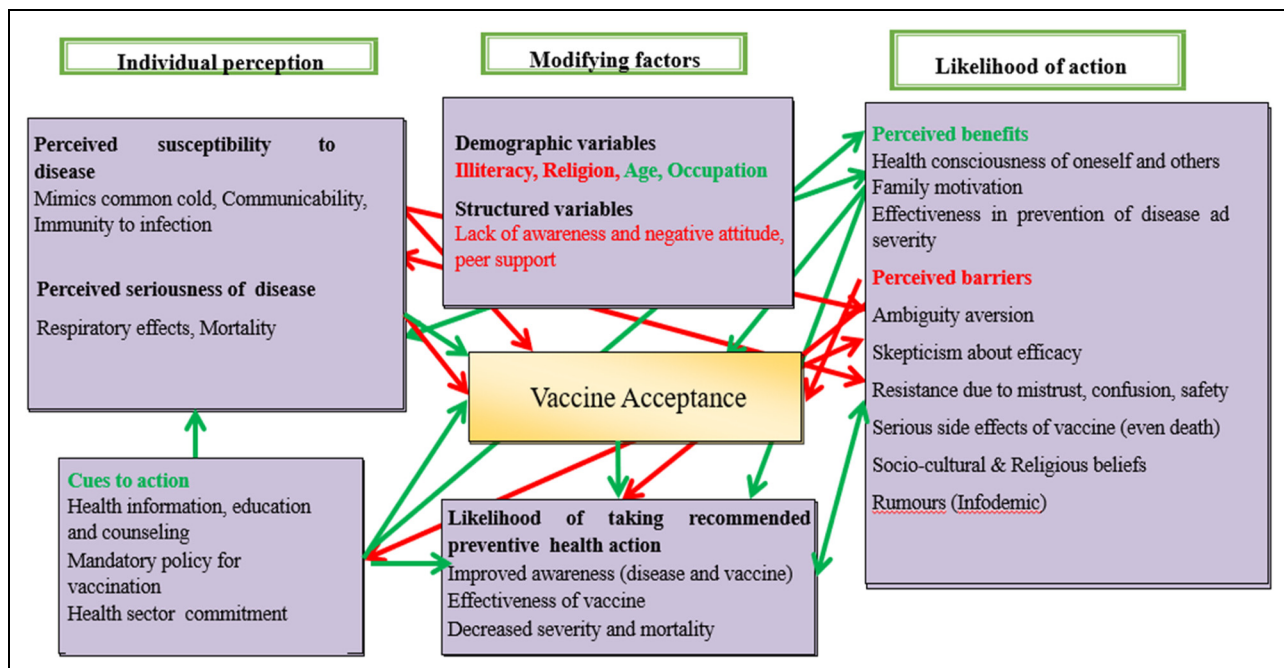
Figure 2. Conceptual framework of health belief model (1998).

will not live long, its meant to reduce the population but later …………, I realized that I need to take the vaccine in order to protect myself since everyone was taking it.*"*

Health Consciousness. "I'm just you know a little want to take every precaution so that none of us catch it." (A 25-year-old non-hesitant female with higher secondary level of education).

Theme 2: Disease-Related Factors

Some individuals were with a belief that the disease just mimics common cold and it is not severe.

The medical officer said that a patient was of the opinion that "I will probably wait. Is the cure worse than the actual virus itself? I might be a little concerned that if it is rushed that there may be some long-term side effects."

"We heard here and there when they made announcements in the village. They said the disease spreads from one person to another."—A 25-year-old nonhesitant female replied when asked about the facilitating factor for taking the vaccine without any hesitancy.

Theme 3: Vaccine-Related Factors

Skepticism About Efficacy and Fear of Side Effects. Majority of the individuals had vaccine-related mistrust in its efficacy and were concerned about the side effects.

I thought I will take it later because I'm breastfeeding but they assured us that even if I'm breastfeeding, it is still okay to get vaccinated. There is no harm to the baby so

that is why I agree to take the vaccine. (A 28-year-old female who was initially hesitant)

They are some people who were complaining that after giving the injection, they start getting sick and chills. (After a pause) Moreover we do not know what we carry in our body, ……. I have asked the Anganwadi worker [worker who provides the services under Integrated Child Development Services program, a type of rural child care centre in India] whether they test before giving the vaccine, she said no. (A graduate female aged 27 years who was initially hesitant)

……..people were scared of the side effects (ANM)

Scared because I am pregnant (21-year-old pregnant female with Vaccine refusal)

Theme 4: Healthcare System and Provider Related Factors

Because they said you just get the vaccine (not that you are not sick), so I was hesitant but when I understood it properly then I went to get vaccinated. (A 58-year-old illiterate female)

An initially resistant 27-year-old female said that "Initially, I did not believe that it is for the COVID-19 disease. It was my little brother who told me even if people were saying whatever I took the vaccine."

I thought I will take it later because I'm breastfeeding but they assured us that even if I'm breastfeeding, it is still ok

to get vaccinated. There is no harm to the baby so that is why I agree to take the vaccine. (A 2- year-old female who was initially hesitant)

Theme 5: Socio-Cultural and Religious Related Factors

The religious beliefs were highly prevalent among those who refused taking the vaccine.

A 52-year-old female refused taking vaccine saying that "I Believe in God. If God wants me to die, it's okay."

Similarly, a 22-year-old replied that "In God we trust"

Discussion

Across the world, while most people are willing to be vaccinated, a significant group of people either refuse certain vaccines while accepting others, or postpone vaccination, or agree to vaccination without certainty. Hence, vaccine hesitancy could be defined on a continuum from those who accept the vaccine without any doubts to those who completely refuse taking the vaccines and the hesitant individuals are the heterogenous group of individuals between the 2 extremes. This mandates the assessment of individuals preference for COVID-19 vaccine acceptance which could remain key for formulation of strategies for addressing the problems due to hesitancy and refusal. Furthermore, since there is a dearth for data on the level of hesitancy in this part of the country, our study could well be a preliminary step to know the individuals' concerns, preferences, and willingness for COVID-19 vaccine.

Our study results show that vaccine hesitancy was present among 47.5% (95% CI: 41.0%-54.0%) participants, among which 16.8% (95% CI: 12.4%-22.3%) were initially hesitant and 30.7% (95% CI: 24.9%-37.0%) were having vaccine refusal. A nationwide study by Chandani et al,[11] on vaccine hesitancy for COVID-19 concluded that vaccine hesitancy was present among 37% of participants, which is considerably lower than our study results. Previous studies by Chowdhury et al[9] and Umakanthan et al,[12] reported hesitancy rates of 29% and 12%, respectively. Our study results were similar to the immunization rates of children aged 12-23 months, with only 63.8% vaccinated according to NFHS-5 reports.[13] This suggests that vaccine hesitancy/refusal is already a significant issue in this region. A study in Tamil Nadu by Danabal et al[14] also found a similar prevalence of vaccine hesitancy and refusal at 40.7% and 19.5%, respectively.

With regards to factors contributing to vaccine hesitancy, most of the factors are well-defined by various studies conducted elsewhere.[15,16] The health belief model was utilized in our study to create a conceptual framework that identifies the factors linked to vaccine hesitancy.[17] Health belief model is one of the commonly used frameworks for the prediction of human behavior and it is independently employed by various researchers to predict the intention to vaccinate.[18,19] At the individual level, the factors were built upon the perceived susceptibility and perceived severity with lack of awareness and negative attitude serving as a major barrier among the majority, in particular among the responders without formal education. A study by Chandani et al[11] had also shown that the hesitancy was greater among those respondents who did not perceive COVID-19 as a severe and serious disease. This is similar to previous vaccine drives, such as for Measles and Rubella, where insufficient knowledge and lack of trust were significant obstacles.[20] Similarly, along with the lack of awareness, health consciousness, skepticism about the efficacy, and the fear of safety, and mistrust on the vaccine and the delivery system were acting as major factors in the perceived benefits and perceived barriers; which eventually determined the acceptance of the vaccine. Similarly, the available literature also shows that the panic-driven side-effects following vaccination, lack of proper information on the safety and effectiveness of the drug and co-morbidities were identified as the most common reason for vaccine acceptance.[12,21] One interesting finding in a study by Umakanthan et al[12] is that spread of rumors through social media was 1 of the reasons contributing to the vaccination denial. Not surprisingly, false information/rumors and religious beliefs negatively impacted vaccine acceptance among our study respondents. Societal disagreements as an important predictor of hesitancy have been established in various other studies.[22,23] The results of a study by Mello et al[24] highlighted that the respondents who were adherent to COVID-19 preventive and safety measures strictly were found to have a higher vaccine uptake, which is also similar to our study findings. The involvement of community-level personnel, healthcare workers, and the political commitment could well be helpful in the development of a positive attitude toward vaccine acceptance.

Strengths and Limitations

Adopting a mixed methods approach added strength to our study by making it possible to explore the barriers and facilitators of vaccine uptake both individual perspective and the healthcare worker perspective; not forgetting the fact that all the stakeholders could not be involved in the interview; which could have added more robustness to our results. Additionally, the study was conducted in a community setting which added further strength to the validity of our study findings. Nevertheless, our study findings could well have some programmatic implications. Primary care physicians; as always believed remain a source of trusted information and are the primary source of overcoming fear due to vaccine-related problems and hence they are burdened with the duty of counseling hesitant individuals in improving confidence and hence vaccine acceptance. This is well supported by similar literature addressing vaccine hesitancy.[25,26]

Hence it could be concluded that reluctance to get vaccinated can be influenced by factors such as their confidence in the safety and efficacy of the vaccine, their perceived susceptibility to and severity of the disease, and other factors like age, gender, literacy level, occupation, socio-cultural factors, religious beliefs, and accessibility. It is the

responsibility of healthcare workers, particularly primary care physicians, to counsel hesitant individuals and establish a safe system that will help increase people's confidence in the vaccine. Additionally, conducting larger community-based studies would provide more comprehensive data for making better policy decisions.

Author Contributions

Acknowledgments

Declaration of Conflicting Interests

Ethics Statement

The study was conducted after obtaining approval from the Institute Ethics Committee (NEIGR/IEC/M15/F10/2021).

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Informed Consent

Informed consent was obtained from the study participants.

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