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VACCINE HESITANCY AMONG TRIBAL KHASI COMMUNITY IN MAWPHLANG PROVINCE OF MEGHALAYA: A MIXED METHODS CROSS SECTIONAL STUDY CONDUCTED IN JANUARY TO MARCH 2021

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Abstract

RATIONALE : As the COVID 19 vaccine uptake in Meghalaya is quite low compared to the rest of India this knowing their perception on the same will help us counter the issue.
METHODS : A Cross sectional study using mixed methods in Ten villages chosen in Adult Khasi population of Mawphlang province in Meghalaya with Sample Size of 300.
RESULTS : 8.8% of those surveyed were vaccinated, 88.4% of those surveyed were hesitant to take the vaccine, included those who are already vaccinated and obviously willing, 2.6 % of those surveyed among those who were unvaccinated were willing to get vaccinated now. 2.6 % of those parents who were surveyed were willing to let their children get vaccinated. Major reasons identified for vaccine hesitancy include religious reasons, fear of side effects, ignorance about it's benefits etc.
CONCLUSION : The vaccine hesitancy for Covid 19 vaccinations was high in this area (88.4%), the reasons identified for vaccine hesitancy lack of knowledge, fear of side effects and religion, the best approach to increase coverage in this area is health education, involving all key stakeholders especially religious and Tribal leaders.
KEYWORDS : Khasi population, vaccine hesitancy, Covid 19 vaccination, Tribal leaders

INTRODUCTION

SARS-CoV-2 virus causes an illness called Covid 19. Those that get infected with the will develop mild to moderate illness that affects the respiratory system. Only rarely will people become seriously ill and require special medical attention. Older folks and those with chronic medical conditions like cardiovascular disease, diabetes etc. are more prone to develop serious illness. Anyone can get sick with COVID-19 and become seriously ill or die at any age. [1]

GLOBAL STATISTICS :

As of 9th December 2021, 260 million documented cases of COVID-19 have been documented all over the world, including 5.2 million deaths. South East Asia alone had 44 million documented cases of COVID 19. USA had the largest number of cases for a single country with 49 million cases and 7 lakh deaths. As of 10th July 2022 551,226,298, confirmed cases of COVID-19, including 6.3 million deaths, have been reported to WHO. [2]

INDIAN STATISTICS :

India had 34 million confirmed cases and 4 lakh documented deaths as of December 9th 2021. [2] The state of Maharashtra has 66 million confirmed COVID cases, most of them already recovered and the state also experienced the most deaths due to the pandemic. The state of Meghalaya as of now has a confirmed case tally of 84643 with 1476 deaths. As of July 7th 2022. [3]

VACCINATION STATISTICS :

India has managed to vaccinate 133 crore population among whom 810 million had received first dose vaccination, and 510 had received the second dose of vaccination this data was from December of 2021. In Meghalaya has vaccinated 11,95000 people at least a single time and 8,49,997 second dose vaccinations. The above-mentioned data is of December the 13th in the year 2021. [5]

MEGHALAYA DEMOGRAPHIC INFORMATION:

Meghalaya has a population of 2.9 million according

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to 2011 census out of which predominant number of the population are scheduled tribes (86%). There are 1.42 million males and 1.47 million females. Most of the people who live in the rural areas (23 million). The literacy rate among men and women are seventy five percent and seventy two percent respectively. Khasi are the most prominent tribal group in Meghalaya, comprising of 34 % of the population. [6]

LITERATURE REVIEW

VACCINE HESITANCY :

The common factors associated with vaccine hesitancy include, a lower fear for health and fear of COVID-19, a belief of lower risk of contracting COVID-19, believing that COVID-19 is not severe, having low trust in health system and thinking that vaccination is useful were most commonly studied links with increased vaccine hesitancy. Influenza vaccination taken prior was the most common determinant associated with lower vaccine hesitancy. A total of 10 themes were found for vaccine related determinants. [10,11,12]

For communications and media environment factors, the use of social media or internet as a main source of information and the lack of widely accessible information on COVID-19 vaccination were associated with vaccine hesitancy. Other notable factors associated with vaccine hesitancy included healthcare workers in non-clinical roles, increased religiosity, residing in rural areas, reduced trust in government and pharmaceutical industry, and increased passage of time in a pandemic. [13,14,15,16]

Respondents with low socio-economic status, those without a job and education constituted the primary reason for vaccine hesitancy and resistance [17,18]. In our study, females and the younger age group were more vaccine hesitant. Dube et al. reported that young individuals have an active immune status and are seldomly associated with severe forms of viral illnesses; hence, they tend to deny vaccination in a large proportion of cases 19. This misnomer can be addressed by conducting active seminars/webcast talks by senior professional faculty members citing the advantages of vaccine administration. The COVID-19 behavioral aspects were also important to be noted. Respondents who were serious in adhering to COVID-19 preventive and safety measures had strong intentions for vaccine administration [20]. An individual who would download the COVID-19 update mobile app was more likely to intend to be vaccinated. An individual who was more serious about maintaining social distancing in public places had 7% higher intentions to be vaccinated.

Previous studies have shown the importance of societal disagreements and anti-vaccine groups mainly associated with vaccine hesitancy or resistance [21,22]. This has been the main concern even in our study. The respondents who considered COVID-19 more of an exaggerated disease, along with individuals who had dissent with their government's approach to fighting COVID-19, composed a significant percentage of vaccine-hesitant or resistant cases. This also included respondents who had no positive sense of their regional COVID-19 healthcare facility [23,24].

COVID 19 VACCINE HESITANCY AMONG TRIBAL COMMUNITIES IN INDIA :

COVID-19 vaccine hesitancy among indigenous people of India is also challenging. Rumors about the development, efficacy, and reliability of COVID-19 vaccines made Adivasi people hesitant to take the COVID-19 vaccines. Some of the indigenous people of India consider the COVID-19 vaccines as ineffective to combat this deadly disease. Some believe that vaccines cause infertility and other problems and some think that vaccines can increase the susceptibility to become infected with COVID-19. [25]

It is also believed by people of different tribes of India that vaccines are not safe and they can even increase the mortality rate. Indigenous people of India usually don't trust the government officials due to economic and healthcare inequalities among these tribal communities, which is also a major factor contributing to vaccine hesitancy among them [26].

Unequal distribution of the COVID-19 vaccines between big cities and tribal areas of India has also been an emerging problem for the indigenous people. This is due to the lack of technological literacy in these people and the poor availability of proper refrigeration facilities required for the storage of some vaccines. Indigenous people of India also do not know how to use the vaccine registration portal, such as Co-WIN, which may also hamper vaccination drive in these areas. [27]

COVID 19 VACCINE HESITANCY FOR CHILD VACCINATIONS :

In a survey conducted in USA 62.6% of parents were willing to have a domestic vaccine, while only 33.9% were willing to have a foreign vaccine. A study by Reiter et al found that nearly 70% of adults in the United States would be willing to accept a COVID-19 vaccine.[6] Yilmaz Bas et al determined that approximately 74% of the participants in their study would get a COVID-19 vaccine. [31] In the present study, the preference of participants with a history of vaccine rejection for the domestic vaccine was significantly higher. Since there are vaccine development studies underway in different centers in Turkey, it is essential for the national immunization program to recognize the preference for the

domestic vaccine, which was demonstrated in this study for the first time. [32]

When the attitude toward vaccination was examined according to gender, the acceptance rate for domestic and foreign vaccines was found to be higher in men. Detoc et al also found that men were more accepting of vaccines than women. [33]

RATIONALE

Meghalaya is a state that is predominantly occupied by Scheduled tribes, they make 86.15 % of the state's population 6, the Covid 19 vaccination rates in Meghalaya are 40.30% and 28.64 % for the first and second dose of Covid respectively, this is less than the Indian vaccination rate of India as of December 13th 2021, which is 58.69 % and 37.41% for first and second doses. This is attributed to its predominantly tribal population.

So, it's important to understand their perception on Covid 19 vaccination. In future, children will also need to be vaccinated and parents may have fears that might serve as a hindrance to the Covid 19 vaccination process. Khasi being one of the most predominant tribes in the Meghalaya and them inhabiting the East Khasi hills, it will be important to understand their perspective on COVID-19 vaccination. On the other hand, to ensure the safety and efficacy of the already existing vaccines and newer vaccines, the community's vaccination and follow-up data is necessary. A few institutes also realize a need to conduct vaccine trials in tribal population. Hence, we need to also understand their perception and willingness to participate in the Covid 19 vaccine trials.

AIM

To understand the prevalence of vaccine hesitancy and reasons for the same of tribal Khasi community for COVID 19 vaccinations for themselves and their children.

OBJECTIVE

To estimate the prevalence of vaccine hesitancy for COVID 19 vaccination among tribal Khasi community in Meghalaya.

To describe the reasons for vaccine hesitancy.

MATERIALS AND METHODS

STUDY DESIGN : A cross sectional study- mixed methods.
A convergent parallel design was used by us, for collecting quantitative and qualitative data at the same time. They were then analysed separately. We them combined both the results and compared them overall conclusion.

We decided a mixed method study was considered the best option in this for this research question because, since we were primarily trying to find how many Khasi adults in Meghalaya were willing to vaccinate themselves, we could have just used descriptive statistics but this data, we thought would not be useful from a public health perspective without understanding their perceptions on the same, in order to figure out a solution, to a possible survey outcome like low willingness to take up the vaccine. This also holds true for our secondary objective which is to estimate the willingness of the same study population to participate in clinical trials, because ultimately to improve clinical trial participation rate we'll need to know the participant's perception on the same. Having a well layered qualitative data gives a good context to the quantitative data collected.

STUDY AREA : The study was conducted among tribal community adults in Mawphlang, East Khasi hills Meghalaya. The district comprises of 2 blocks and 207 villages. Mawphlang Block of East Khasi Hills district has total population of 71,491 as per the Census 2011. Out of which 35,331 are males while 36,160 are females. In 2011 there were total 13,117 families residing in Mawphlang Block. Mawphlang block has 104 villages, we decided to take 10 villages based on convenience sampling.

STUDY PARTICIPANTS : The people from Khasi community living in Mawphlang province in East Khasi hills in Meghalaya who are over 18 years of age and under 75 years of age. From ten randomly chosen villages in the district.

SAMPLING METHOD: Mawphlang village was selected as a study site through convenience sampling, out of which we had selected ten villages through convenience sampling from 104 villages present in Mawphlang block in East Khasi Hills, around 300 participants within the age group of 18 to 75 were surveyed through a pre tested and piloted questionnaire, we used quota sampling to split the 300 participants among the 10 selected villages equally, hence 30 participants were surveyed in each village. With the help of INCLEN Trust International field workers were hired, who enumerated the selected villages, in order to conduct a door-to-door survey. The house hold to start the survey in a village was picked through a random number generator, from there the field workers kept travelling leftwards to each house. From the willing adult Khasi participants who are the primary sampling unit, those who fell into the eligibility criteria were surveyed through systematic random sampling until 30 participant limit was reached per village, only one adult per household was surveyed.

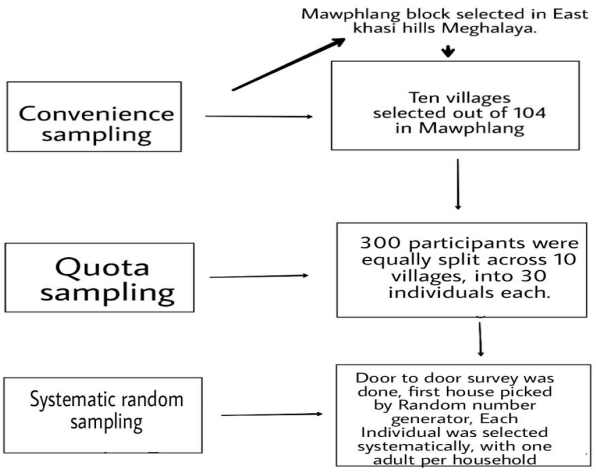

Figure 1: Sampling Method

SAMPLE SIZE ESTIMATION : The primary outcome is willingness vaccinate for Covid 19 vaccination in among those who are unvaccinated.

The sample size has been calculated by applying the formula:

$$N = \frac{Z^2 P (1-P)}{d^2}$$

Where:

n= sample size

Z= statistic corresponding to CI (95%)

P= expected prevalence

d= precision

Prevalence was taken as 50% as there aren't studies available that have calculated the willingness of tribal populations in Meghalaya to get vaccinated twice, A sample size of 273, with 90% CI and 5% margin of error was calculated. Keeping 10% for non-response, a final sample size of 300 was calculated.

DATA COLLECTION : Data was collected through paper based semi-open-ended questionnaire designed for the study, to collect quantitative as well as qualitative information, the qualitative data was collected as numbers and categories, while qualitative data was collected using open ended questions. We pre-tested the self-made questionnaire, after translating it to local language; necessary changes were made prior to use for the main study. Participants included in pilot study were not considered for the final study. The data was collected though door to door survey by trained field workers who were two in number, who had all passed higher secondary school, and knew English and the local language Khasi quite well, the questionnaire was administered by the field workers to adults who fell in our eligibility criteria, after obtaining necessary consent. In order to reduce error during data collection one person looked while the other wrote down the information.

The questionnaire that we made collected data on socio-demographic aspects, history of covid infections, covid vaccination status, if a person has not taken the COVID 19 vaccine then we proceed to ask question on willingness to take the vaccine for them, open ended question on the Individual's knowledge and perception of COVID 19 vaccination. If the person had a child, then we asked them about their willingness to allow their children to the vaccine if the government eventually allowed the vaccine to be given to all age groups.

Since we collected on printed questionnaires, we had to manually enter the data in Microsoft excel sheet on a daily basis on one computer that was be password protected, the data was entered and then cross checked by another person in order to reduce errors. The electronic data was be password protected and was accessible only to the investigators (Dr Sudharsan and Dr Samiksha Singh). We had cleaned, coded, labelled and arranged prior to analysis. We had ensured safe keeping of the paper forms and signed informed consent forms.

DATA ANALYSIS : The Data analysis was performed using STATA 16, vaccine hesitancy was calculated in percentage and frequency. Thematic analysis of data was done to make meaningful conclusions from the in-depth interviews.
ecial children home.

ETHICAL CONSIDERATIONS : This study was be undertaken after obtaining necessary approvals from the Institutional Ethics Committee at Indian Institute of Public Health-Delhi. All participants were explained about the purpose of the study in simple language using the Participant Information Sheet (PIS) in local language.

STUDY COORDINATION AND FUNDING : This study was undertaken with guidance and overall supervision by Dr Samiksha Singh, "Additional Professor, Indian Institute of Public Health-Delhi". It was be done in collaboration with INCLEN trust international in Meghalaya, DR Vaishali (Senior Program Manager) was helpful in facilitating the project from the side of INCLEN trust. The study was be funded by INCLEN trust international.

RESULTS

The analysis was done on 300 observations. There were missing values in a few of variables, number of missing values has been listed in the bottom of the table.

Table 1 :Socio-demographic characteristics of the participants

Characteristics	N (%)
Location	
1. Mawngap Rim	30 (10%)
2. Mawngap khlieh shnong	30 (10%)
3. Mawngap mawsmai	30 (10%)
4. Marbisu mawsmai	30 (10%)
5.Sawlad Marbisu	30 (10%)
6.Ummylle	30 (10%)
7.Khar la khar	30 (10%)
8.Nongrum Mawphlang	30 (10%)
9.Mission Mawphlang	30 (10%)
10.Traw saitkhlieh.	30 (10%)
Age in years (Mean ± SD)	36 (±13.8)
Sex	
Female	167 (55.6%)
Religion ^^	
Christians	246 (91.1%)
Non-Christians	24 (8.8%)
Education &&	
1. No school education	37 (14.6%)
2.Primary school	30 (11.8%)
3. Middle school	31 (12.2%)
4. Secondary and higher secondary	103 (40.7%)
5. Graduation and above	51 (20.1%)
Occupation **	
1.Unemployed	11 (4.1%)
2. Self employed	39 (14.6%)
3. Daily wage worker	44 (16.4%)
4. Student	59 (22.1%)
5.Agricultural labor	6 (2.2%)
6. Home makers	91(34.4%)
7. Salaried Service	16 (4.9%)
Marriage ++	
1. Married	200 (67.8%)
2. Unmarried	60 (20.3%)
3. Widowed	35 (11.8%)

Missing values - (^^)- 30, (&&)-47, (**)- 33, (++)- 5.

A total of 300 participants were recruited into the study. Equal number of participants were interviewed from the ten randomly chosen villages in Mawphlang province of east Khasi hills. The mean (±SD) age of the study participants was 36 years (±13.8). Majority of those who were interviewed were female participants (n= 167) (55.6 percent). Out of 300, majority of the participants were educated, amongst which primary education was received by 30 (11.8%), middle school education 31 (12.2%), secondary and higher secondary education by 103 (40.7 %) and graduation and higher 51 (20.1 %). The illiterate participants were 37 (14.6 percent). Majority of participants who were interviewed were homemakers 91 (34.4%), students 59 (22.1%), daily wage workers 44 (16.4%) and self-employed 39 (14.6%) also constituted a large chunk of the participants. Those who were unemployed among those interviewed were 11 (4.1%). The people who worked salaried jobs in an office were 16 in number close to 5% of the population. The people who participated in the study were predominantly Christians 246 (91.1%), the rest were non-Christians.

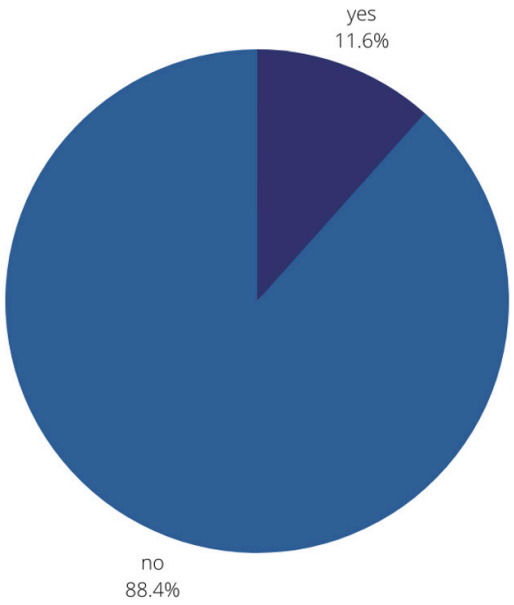

Figure 2: Vaccine hesitancy

Willingness to take for COVID 19 vaccine among those surveyed, vaccine hesitancy was found in 88.4% of those surveyed, but this includes those that are already vaccinated, among the unvaccinated only 2.6% were willing to get vaccinated, hesitancy was 97.4% among this demographic.

Among those surveyed percentage of those that had done schooling below middle school (0- 2.8%) among those willing to get vaccinated, seem less when compared to those who have studied middle school or above (2-5.9%). Higher

percentage of Students (5%) and home makers (4.5%) were willing to get vaccinated than the other occupational groups. More percentage of unvaccinated females (4.8%) more inclined to get vaccinated than males (2.9%). More percentage of unvaccinated unmarried women (2.6) are willing to get vaccinated for Covid 19, compared to married (2.6) or widowed ones (2.6%).

Table 2 : Perception on COVID 19 vaccination

THEMES	CATEGORIES	CODES
COVID 19 Vaccine hesitancy	1. Unsure of benefits	1. It's unnecessary 2. Vaccine can't stop Covid 19 3. Not needed as I don't travel 4. Those who take the vaccine also get covid 19 5. Just a farmer, don't need the vaccine 6. Already old don't need the vaccine 7. We are not scared of the virus anymore
	2. Religious beliefs	1. Belief in God over science 2. God will take care of us 3. We should not interfere with God's plan 4. God is my vaccine 5. Our faith doesn't allow us to use vaccine
	3. Fear and mis trust	1. It's a conspiracy to cause them harm 2. Afraid of side effects 3. Covid 19 causes death 4. It can affect work because of side effects
COVID 19 Vaccine autonomy	4. Leave it to individual's choice	1. It should not be forced 2. Will take it if I feel like it 3. It should be my choice when to take vaccine 4. I will not take because they are forcing me
	5. Make it mandatory	1. Will take if made mandatory at work 2. Will take if everyone takes it 3. Will take if my parents take 4. Will take if made mandatory at school 5. Will take if government makes it compulsory to take vaccine to sell in market
Need further information	6. Rumors and fake information	1. Unsure about the benefit of the vaccine 2. Concerned about the effects of vaccine 3. Read that the vaccine causes death on WhatsApp 4. They're saying the C-19 vaccine is just water
	7. Health education and health promotion	1. Need more information before taking the vaccine 2. Don't know how vaccine works 3. Don't know difference between various vaccines not sure what to take 4. If people are more aware it will help to take more vaccine 5 The community needs more awareness 6. Government should try and educate the population

The most important themes identified for vaccine hesitancy include unsure of benefits, religious beliefs and fear and mis-trust of Covid 19 vaccine and government organizations. Themes identified for vaccine autonomy were conflicting while a large number of people wanted the government to leave the right to choose to get vaccinated or not for covid to the choice of individuals, a small number of folks were in the belief that they will get vaccinated only if it is mandatory in their workplace and study or by the government. To address the issue or vaccine hesitancy and improve coverage, there needs to be sufficient measures in place to address rumors regarding the vaccine. Health promotion activities and health education should campaigns should be initiated among the population to address the issue of vaccine hesitancy.

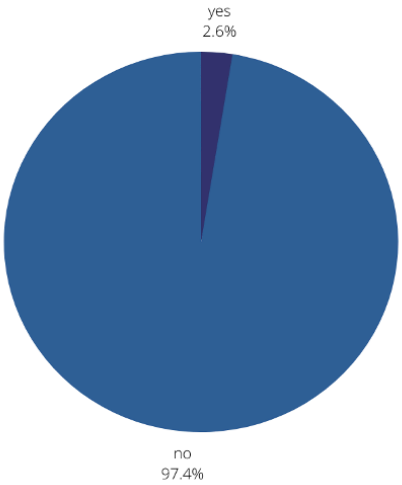

Figure 3 : Willingness to get their children vaccinated

Table 3 : Willingness to get their children vaccinated

Child Covid 19 vaccine	N (%)
YES	4 (2.6 %)
NO	147 (97.4 %)

Only 2.6 % of the parents who were surveyed were willing to get their children vaccinated.

Among those parents who were surveyed those who have graduated had more percentage (9.7%) of the population who are willing to let their children get vaccinated. Those who worked in offices (9.1%) and those who owned business (8%) had more percentage of those who were willing to get their children vaccinated compared to other occupational groups. Christians (2.5%) had more percentage of those who were willing to let their children get vaccinated compared to non- Christians. There is no significant relationship between the child's age and willingness to get their children vaccinated just like every other variable tested.

Major reasons/ themes identified for hesitancy to vaccinate

their children were fear of side effects, wanting to wait and watch, religion and God.

Table 4 : Reason for hesitancy

Themes	Categories	Codes
Reason for hesitancy to vaccinate children for Covid 19	Fear of side effects	1. It's a conspiracy by the government. 2. Afraid of side effects on my children 3. My child is too young
	Wait and watch	4. Unsure about it 5. Need more information to decide 6. Will wait until other children are vaccinated.
	Religion and God	7. Religious beliefs does not allow me 8. I believe my God will protect my children

DISCUSSION

The COVID-19 pandemic is considered one of biggest threat to public health to Indians and the rest of the world. The virus has spread to 200 countries and is still not fully under control. Many countries across the world have tried several methods to control the spread of the infection; not many of them have been actually been successful in reducing the impact of the problem. Safe COVID-19 vaccines have been developed. Vaccine acceptance is important to herd immunity, vaccine hesitancy is a big barrier particularly in low-middle-income countries.

We had surveyed 300 individuals located in ten villages in Mawphlang block in Meghalaya, the block and the villages were choses as per convenience sampling, while the number of participants to be recruited into the study was decided based on the proportion of willingness among the population for COVID 19 vaccination from a study based in India. The participants at village level were recruited using systematic sampling, with one adult selected per household, quota sampling was used to set limits per each village, door to door data collected was done by trained fieldworkers who had completed schooling. Our primary objectives were to estimate the willingness of the people in Meghalaya to take COVID 19 vaccinations.

The mean age of those who were surveyed was 36 (+/- 13), the percentage of females (55%) who were surveyed is slightly higher than males. Almost 60% of the sample had passed high school, one third of those who were surveyed were homemakers, the rest were predominantly agricultural laborers or daily wage workers. A large fraction of them were marries. Almost all the population were Christian except 8.8% who were non- Christians.

Irrespective of the of the educational classes most of the participants have not been vaccinated uniformly. While in occupational groups, those who belong to salaried service category were proportionately better off while compared to other occupational groups. Those who were unemployed or worked in farms they were not vaccinated at all. The vaccinated percentage among non-Christians was, in this cases male had a slight edge over the females. None of the associations were found to be significant ($p>0.05$).

Among surveyed population, only 11.6 % (88% were hesitant) of the people who were surveyed were willing to take COVID 19 vaccinations.

The most important themes identified for vaccine hesitancy include unsure of benefits, religious beliefs and fear and mis-trust of COVID 19 vaccine and government organizations. Themes identified for vaccine autonomy were conflicting while a large number of people wanted the government to leave the right to choose to get vaccinated or not for 19 to the choice of individuals, a small number of folks were in the belief that they will get vaccinated only if it is mandatory in their workplace and study or by the government. To address the issue or vaccine hesitancy and improve coverage, there needs to be sufficient measures in place to address rumors regarding the vaccine. Health promotion activities and health education should campaigns should be initiated among the population to address the issue of vaccine hesitancy.

Among those parents who were surveyed those who have graduated had more percentage (9.7%) of the population who are willing to let their children get vaccinated. Those who worked in offices (9.1%) and those who owned business (8%) had more percentage of those who were willing to get their children vaccinated compared to other occupational groups. Christians (2.5%) had more percentage of those who were willing to let their children get vaccinated compared to non- Christians. There is no significant relationship between the child's age and willingness to get their children vaccinated just like every other variable tested.

LIMITATIONS

The study was done in a predominantly rural setting where a large amount of Khasi people lived this might be applicable to Khasi population in Meghalaya in general as those living in Urban areas might have different perceptions on the same. Since the issue of vaccinations is an extremely sensitive topic in this area Indepth interview on the subjects was not received with certain level of skepticism, many questions on socio economic determinants were ignored, hence there were a lot of missing data.

RISKS

There were no risks associated with participating in the study since this was a noninvasive questionnaire-based survey.

BENEFITS

The direct benefits of participating in the survey was the participants were given health education regarding the benefits of vaccinating themselves and their children against COVID 19 towards the end of the interview. The data from the study can help identify the best possible approach to increase vaccine coverage in this area.

CONCLUSIONS

The vaccine hesitancy for for Covid 19 vaccinations was high in this area, the reasons identified for vaccine hesitancy lack of knowledge, fear of side effects and religion, the best approach to increase coverage in this area is health education, involving all key stakeholders especially religious and Tribal leaders.

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