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A STUDY ON PERCEPTION OF COVID VACCINE AMONG ECONOMICALLY WEAKER SECTION OF THE SOCIETY IN COIMBATORE CITY

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ABSTRACT

The COVID-19 pandemic refers to the spread of novel respiratory virus that relates to SARS-CoV-2, which was originated in Wuhan, Hubei Province, China during December 2019. With the success of developing vaccine, the Indian Government took proactive steps to administer the vaccine to the people. The objective of this study was to ascertain the factors that influence public acceptance and hesitancy against COVID-19 antibodies. The study was conducted to capture the perception about the COVID 19 vaccinations by the Economically weaker section of the Coimbatore society. The questions focused on demographics of the individuals, reasons for refusal of vaccine, experience related to COVID-19, in terms of infection risk and likelihood of accepting the COVID-19 vaccination.

***KEYWORDS**: COVID-19, Vaccination, Economically Weaker Section, Acceptance, Hesitancy.*

Introduction

The acceptance of the vaccinations was varied among the diverse class of people of the society, however the level of acceptance by the economically weaker sections was less owing to various reasons. From the current status of vaccination, once the people are well informed on the vaccination process involved and its importance then the acceptance rate of the vaccination among the people would be higher which would enable the Government to suitable measures to contain the spread of the virus.

Objective

- Identifying the perception of COVID-19 vaccine among economically weaker section of the society in Coimbatore region.
- Identifying the factors affecting COVID-19 Vaccine acceptance.

Study Design and Methodology

The study was conducted in and around the areas of Coimbatore. Descriptive research design is used in this project, it assists with depicting a specific circumstance prevailing by which the essential and optional information is utilized. The weaker section people residing in the Coimbatore city formed the population for this study. The sampling technique employed in the study was convenience sampling method. The primary data for the analysis was captured by conducting survey by in person interview among the economically weaker section in the Coimbatore region. The sample size for the study is 264. Structured Questionnaire was used in the study and the questions focused on refusal of vaccine, experience related to COVID-19, in terms of infection risk and likelihood of accepting the COVID-19 vaccination. KMO Analysis, chi square test, multiple logistic regression, Hosmer and lemeshow test and CHAID are the key test used for analysis.

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Variables Used in the Study

Vaccine Hesitancy (Dependent Variable)

Respondents are asked about their willingness to free vaccination if is provided. The answers are measured in the Likert scale.

Putative Predictors of Vaccine Hesitancy (Independent Variables)

Independent variables like, socio-demographics such as age, gender, educational level, employment status, family income status, number of family members, and family member who is older than 70 years. It also included the other independent variable like diagnosis of COVID 19, experience of income reduction due to pandemic, past vaccination refusal, infection and other clinical risk due to COVID 19.

Statistical Analysis Result

There are 114 respondents who are between the ages of 18 years and 25 years, 54 respondents who are between the ages of 26 years and 40 years, 86 respondents who are between the ages of 41 years and 60 years, and 10 respondents who are above 60 years. Females are the most likely to respond, making up 74% of all respondents and 164 of those who are employed. The variables are divided into two categories: dependent and independent variables. The Kaiser-Myer-Olkin (KMO) test yielded a result of 0.727, which is more than 0.5, indicating a significant link between the variables, making factor analysis appropriate. The 2 test is used to make categorical variable comparisons between hesitant and confident people. The chi-square statistic has a p-value of.000, which is less than the alpha level of.05. As a result, there was sufficient evidence to rule out the null hypothesis. Independent variables were statistically significant, according to the findings. Because p< 0.05, all the factors were statistically significant. To find independent factors of vaccine hesitancy, researchers conducted a multivariate logistic regression analysis with backward selection. The odds ratio (OR) and 95% confidence interval are used to describe the findings (95 % CI). The Hosmer and Lemeshow tests are used to assess the model's goodness of fit. The p-value for our study was 0.00. Because the null hypothesis was not rejected, the model was determined to fit the data. To identify subgroups of respondents with varied degrees of hesitation, a classification tree analysis (CTA) based on the (CHAID) approach was applied. Overall, the study found that the majority of the population in different areas of Coimbatore has different perceptions about acceptance, hesitancy, and attitude, with 30 percent of respondents hesitant because they were afraid of the COVID-19 vaccine's side effects, and 43.3 % accepting that vaccination helps us stop COVID-19 from spreading. Wearing a mask every day to avoid vaccination was deemed a good suggestion by 49.9% of those polled. Consumers aware about the COVID-19 vaccine from television in 43.35 % of cases.

Graphs

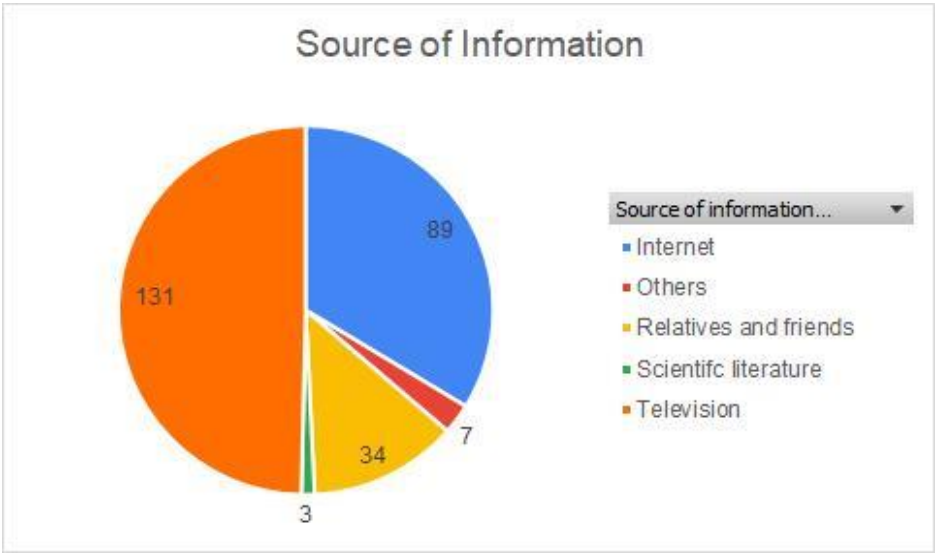

Figure 1: No of Respondent Data of Source of Information

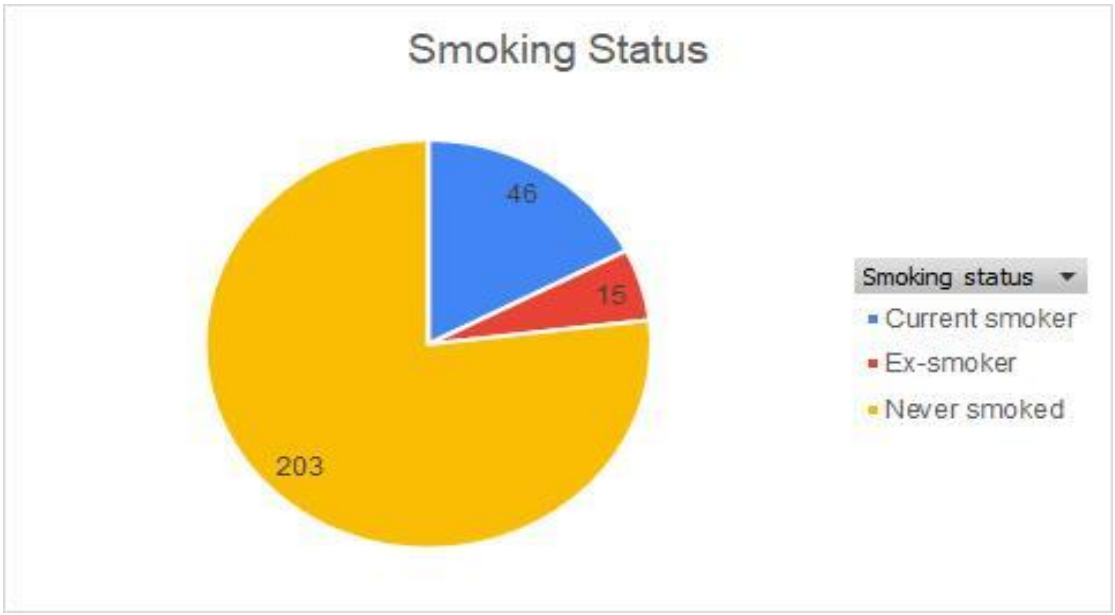

Figure 2: No of Respondent Data of Smoking Status

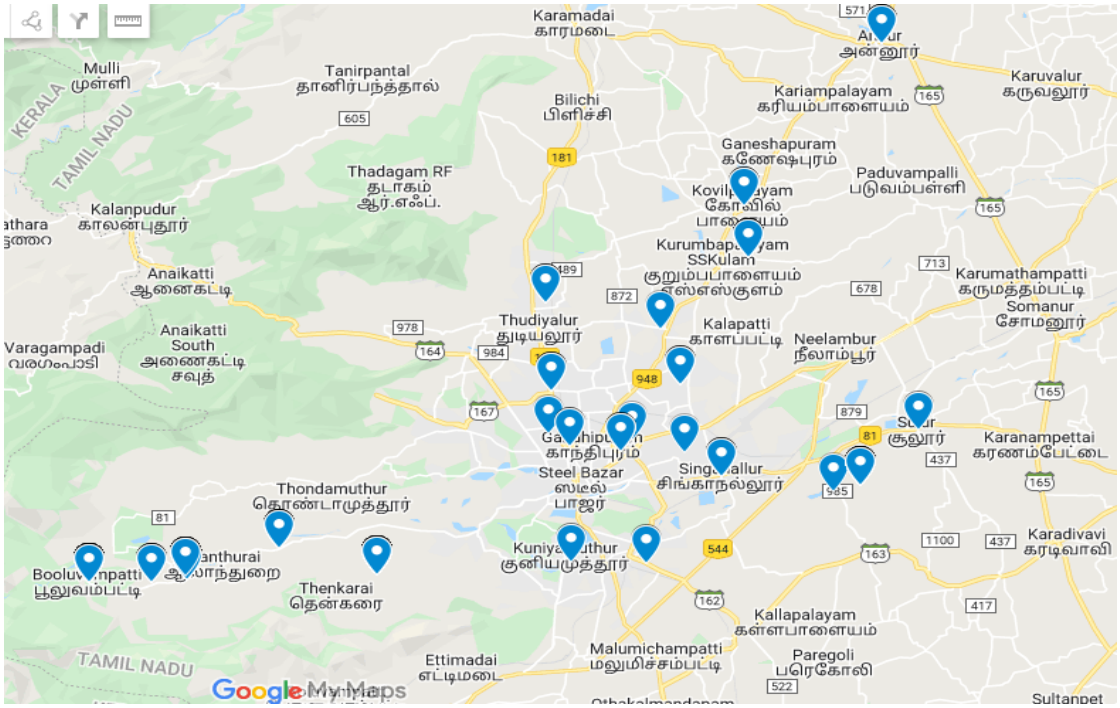

Figure 3: Geographical Distribution of Data

- **KMO and Bartlett's Test**

In measuring the Sampling adequacy, the data subjected to the KMO (Kaiser Meyer Olkin) measure and Bartlett's test of Sphericity with the KMO recording a value of 0.727 which is greater than 0.5 for factor analysis according to Kaiser.

The Bartlett's Test indicates the strong relationship among the variables. It also checks whether the correlation matrix is an identity matrix by testing the null hypothesis. The significant level of the test was small enough to reject the null hypothesis suggesting that the variables in the correlation matrix is not an identity matrix and uncorrelated. This indicates a strong relationship among the variables making it appropriate in the use of factor analysis.

- **Chi-Square Test – X^2 Test**

Null Hypothesis: H0: There is no significant association between independent variable and dependent variable for refusing to take the COVID-19 vaccine.

Alternative Hypothesis: Ha: There is a significant association between independent variable and dependent variable for refusing to take the COVID-19 vaccine.

For the purpose of this analysis, only the Pearson Chi-Square statistic is needed. The p-value for the chi-square statistic is .000, which is smaller than the alpha level of .05. Therefore, there is enough evidence to reject the null hypothesis.

Conclusion: Thus, the results shows that there is a significant association between independent variable and dependent variable for refusing to take the COVID-19 vaccine.

Multinomial Logistic Regression

The **Goodness-of-Fit** table provides two measures that can be used to assess how well the model fits the data (Table 1).

Table 1: Goodness of Fit

	Chi-Square	df	Sig.
Pearson	62650628213.855	204	.000
Deviance	655.538	204	.000

The first row, labelled "**Pearson**", presents the Pearson chi-square statistic. A statistically significant result (i.e., $p < .05$) indicates that the model does fit the data well. The table above that the *p*-value is .000 (i.e., $p = .000$ (from the "**Sig.**" column) and is, therefore, statistically significant. Based on this measure, the model fits the data well. The other row of the table 2(i.e., the "**Deviance**" row) presents the Deviance chi-square statistic. These two measures of goodness-of-fit might give the same result.

Table 2: Model Fitting Information

Model	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	1536.549			
Final	655.538	881.011	132	.000

The "**Final**" row presents information on whether all the coefficients of the model are zero (i.e., whether any of the coefficients are statistically significant). From the "**Sig.**" column that $p = .000$, which means that the full model statistically significantly predicts the dependent variable better than the intercept-only model alone. SPSS Statistics calculates the Cox and Snell, Nagelkerke and McFadden pseudo R^2 measures. Of much greater importance are the results presented in the **Likelihood Ratio Tests** table 3,

Table 3: Likelihood Ratio Test

Effect	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood of Reduced Model	Chi-Square	df	Sig.
Intercept	.000[a]	.	6	.
Has any one in your family or of your colleagues or friends had COVID19	717.557[b]	62.020	6	.000
Have you been tested for COVID19	725.223[b]	69.686	6	.000
If "yes" were you positive	692.913[b]	37.375	6	.000
Do you have any chronic diseases	214112.318[b]	213456.780	6	.000
Is COVID19 a serious disease	652.340[b]	.	6	.
Can COVID19 vaccines are effective to prevent COVID19	475.094[b]	.	6	.

Need to maintain the health regulations after being vaccination	651.335[b]	.	6	.
Vaccine will also help keep from getting seriously ill from COVID19	668.390[b]	12.852	6	.045
People being vaccinated can start to do normal activities	678.036[b]	22.499	6	.001
Do you know that COVID19 can result in complications	2317999.669[b]	2317344.132	6	.000
Can COVID19 be acquired after full vaccination	1452.127[b]	796.589	6	.000
Do you know where you can be vaccinated when a COVID19 vaccine becomes availa	559.132[b]	.	6	.
Vaccine has the potential for some side effects	642.525[b]	.	6	.
Side effects due to the vaccination normally goa way in a few days	692.771[b]	37.234	6	.000
If this vaccine can create a long-term physical problem	9231.589[b]	8576.051	6	.000
Are older people and chronic disease patients most likely to experience sev	466.088[b]	.	6	.
Importance of taking COVID19 vaccine to protectself	.000[a]	.	6	.
Importance of taking COVID19 vaccine to protect others	20768.800[b]	20113.263	6	.000
If vaccination was concerned about the pandemic	731.301[b]	75.764	6	.000
This vaccine is safe and effective	686.888[b]	31.350	6	.000
My family members and neighbors should take the vaccine and I should be aware	762.804[b]	107.266	6	.000
Vaccination helps us to stop spreading COVID19	730.243[b]	74.705	6	.000

The chi-square statistic is the difference in -2 log-likelihoods between the final model and a reduced model. The reduced model is formed by omitting an effect from the final model. The null hypothesis is that all parameters of that effect are 0.

a. The log-likelihood values are approaching zero. There may be a complete separation in the data. The maximum likelihood estimates do not exist.

b. unexpected singularities in the Hessian matrix are encountered. This indicates that either some predictor variables should be excluded, or some categories should be merged.

This table shows which of your independent variables are statistically significant. All the above rows were statistically significant because p <0.05. This table is mostly useful for nominal independent variables because it is the only table that considers the overall effect of a nominal variable.

Table 4: Classification of the Model

Classification

Observed	Predicted							
	I already had COVID-19, so I think I am immune to the disease	I am scared of side-effects of the vaccine	I don't think COVID-19 exists	I think the vaccine is designed to harm us	I think the vaccine is not effective	My body is naturally strong, I don't need a vaccine to fight COVID-19	The COVID-19 pandemic is finished in my country, no need for a vaccine now	Percent Correct
I already had COVID-19, so I think I am immune to the disease	73	0	6	3	0	0	3	85.9%
I am scared of side-effects of the vaccine	0	146	6	5	8	5	3	84.4%
I don't think COVID-19 exists	0	0	17	9	0	2	0	60.7%
I think the vaccine is designed to harm us	0	3	0	5	0	0	0	62.5%
I think the vaccine is not effective	0	0	0	9	48	0	2	81.4%
My body is naturally strong, I don't need a vaccine to fight COVID-19	0	0	0	0	0	12	0	100.0%
The COVID-19 pandemic is finished in my country, no need for a vaccine now	9	0	0	0	10	0	96	83.5%
Overall Percentage	17.1%	31.0%	6.0%	6.5%	13.8%	4.0%	21.7%	82.7%

The classification results, with almost 80% correct classification the model is not too bad (Table 4).

Hosmer and Lemeshow Test

Table 5: Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	96.434	7	.000

Our p-value was 0.00(Table 5). We fail to reject the null hypothesis and therefore our model *fits the data*.

Chaid Test

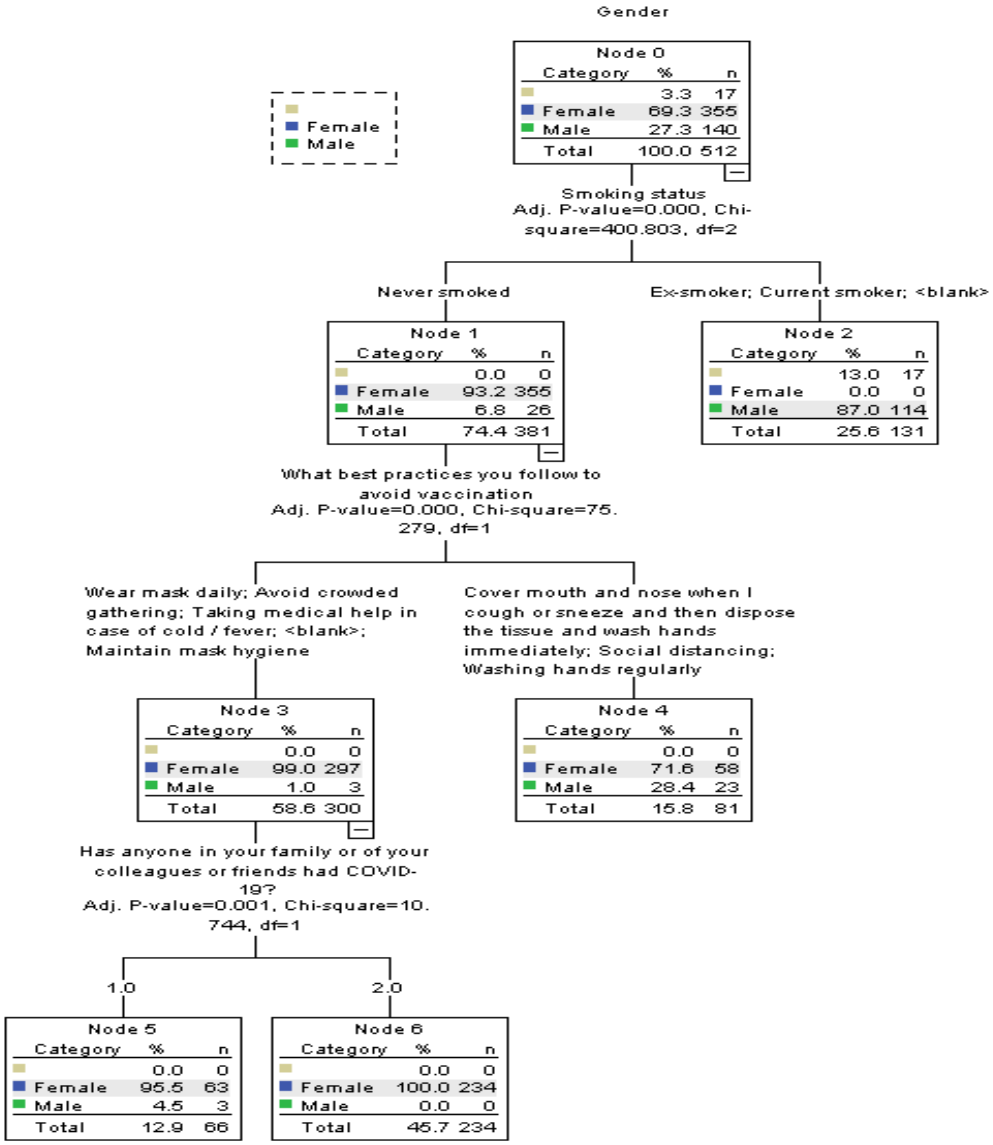

Figure 4: Separation of Tree nodes in CHAID Test

Table 6: Risk test output

Risk	
Estimate	Std. Error
.084	.012

Table 7. Classification Model for CHAID Test

Classification				
Observed	**Predicted**			
		Female	**Male**	**Percent Correct**
	0	0	17	0.0%
Female	0	355	0	100.0%
Male	0	26	114	81.4%
Overall Percentage	0.0%	74.4%	25.6%	91.6%

Growing Method: CHAID
Dependent Variable: Gender

The risk represents the proportion of cases misclassified by the proposed classification. The classification table summarizes the percentages classified correctly (Table 6). The model classified 100% of those females correctly, but only 81.4% of those who male (Table 7).

Conclusion

The Government of India has embarked on the ambitious target for 100% COVID-19 vaccination for all people. This study was aimed to capture the perception and acceptance level of vaccination among the economically weaker section of the society residing at Coimbatore. The findings of the study revealed that 3.3% of the respondents were not aware about the vaccination process & 36.7% of the respondents were thought Vaccine has the potential for some side effect. It can be inferred about 50% of the respondents belonging to the economically weaker sections of the society were not fully aware of the importance of vaccination and hence suitable awareness measures can be taken by the local Government bodies to enhance the vaccination among all people.

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