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A Study to Evaluate The Prevalence of Morbidity in Covid 19 and Vaccination Status Among Patients Admitted in A Tertiary Care Institute, Puducherry

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Abstract

COVID-19 is a mild to moderate illness caused by SARS-CoV-2, however it can cause life-threatening consequences in some cases. The study looks at how a COVID-19 immunization campaign in Tamil Nadu and Pondicherry reduced incidence, hospitalizations, and mortality. The purpose of this study is to compare the effectiveness of covid vaccination and its morbidities among covid 19 patients, as well as to determine the relationship between covid vaccination and morbidity prevalence among covid 19 patients. For this study, a descriptive cross-sectional research design was used. This study includes individuals aged 20 to 60 years who have been diagnosed with Covid -19 of all cycles and post-Covid patients with cardio-respiratory problems. Approximately 67.6% of those vaccinated had no comorbidities, 26.3% had Diabetes, 16.7% had Hypertension, 0.8% had Hypothroidism, and 0.4% had Epilepsy. In terms of Oxygen Support, nearly half of the patients (44%) required it, whereas less than 5% (4.4%) required mechanical ventilation. More than three-quarters of the patients (85.3%) were cured when they were discharged. Nearly half of the patients (50% had a CORADS score of 6). The majority of patients (38.7%) had a CT Severity Score of 9-15. The value of biophysiological variables increased by 20-25%. The mortality rate among vaccinated patients is 8 (10.7) and 101 (15.2), respectively. In conclusion, getting vaccinated can limit viral transmissions and prevent the virus from evolving into new types that can be lethal.

Keywords: C*ovid 19, Morbidity, Vaccination, Prevalence*

1. Introduction

COVID-19 caused by SARS-CoV-2 infection, is mild to moderate in the majority of previously healthy individuals, but can cause life-threatening disease or persistent debilitating symptoms in some cases. Global vaccine development efforts have been accelerated in response to the devastating COVID-19 pandemic. We evaluated the impact of a COVID-19 vaccination campaign on reducing incidence, hospitalizations, and deaths in Tamilnadu and Pondicherry.

Objectives of the study: 1. to assess the level of morbidity among covid 19 patients, 2. to compare the effectiveness of covid vaccination and its morbidities among covid 19 patients, 3. to find out the correlation between covid vaccination and its morbidities among covid 19 patients, 4. to find out the association between covid vaccination, its morbidities and selected socio-demographic variables, clinical variables in covid 19 patients.

2. Materials And Methods

Research Approach: Quantitative approach

Research Design: Descriptive cross sectional research design

Setting: Selected Tertiary hospital at Puducherry

Population: Covid patients residing in Puducherry & Tamilnadu

Sample: All Covid patients admitted in MGMCRI

Sample Size: 739

Sampling Technique: Purposive sampling technique

Inclusion Criteria: 1**.** Adult Patients between the age group of 20 to 60 years who had been diagnosed to have Covid -19 of all cycles. 2. Post Covid patients with cardio-respiratory complications admitted in selected tertiary care hospital at Puducherry.

Exclusion Criteria:1**.** Pregnant mother 2. Patients under palliative care 3. Patients who are unconscious/Critically ill/ haemodynamically unstable

Data analysis

The collected data was analyzed using descriptive and inferential statistics. Description of subjects with respect to demographic variables was presented using frequency and percentage. Data was presented in tables and diagrams.

3. Results and Discussion

A total of 739 RT-PCR confirmed patients who are admitted during the study period were included in the study. The characteristics of the patient admitted were described in Table 1

The median age of the population is 55 and IQR was 44-66. Majority of the patients were male (66.4%). More than three-fourth of the patients were not vaccinated (89.9%). Among the vaccinated less than one-fourth had completed two doses (21.3%). The top five symptoms were fever, dyspnea, cough, diarrhoea and myalgia. Majority of the patients don't have any co-morbidity.

Table 1 *Depicting the vaccine status and symptoms of the admitted patients*

Demographic variables	Frequency	Percentage
Gender (n=739)		
Female	248	33.6
Male	491	66.4
Vaccination status		
No	664	89.9
Yes	75	10.1
Name of vaccine (n=75)		
Covaxin	8	10.7
Covishield	67	89.3
Vaccination dose completed (n=75)		
1st Dose	59	78.7
2nd Dose	16	21.3
Vaccinated as a part of vaccine trial (n=75)		
No	42	56.0
Yes	32	42.7
Symptoms (n=739)		

Fever	416	56.8
Dyspnea	221	30.2
Cough	297	40.5
Diarrhoea	34	4.6
Myalgia	101	13.8
Nasal symptoms	65	8.9
Fatigue	48	6.5
Throat irritation	51	7.0
Nausea/vomiting	11	1.5
Tastelessness	2	0.3
Headache	2	0.3
Asymptomatic	90	12.3
Comorbidities (n=739)		
Hypertension	123	16.7
Diabetes	194	26.3
Epilepsy	3	0.4
Hypothyroidism	6	0.8
None	499	67.6

Regarding age, 33.6% (248) patients were under male category and 66.4% (491) patients were under female category. Majority of the patients were male.

About vaccination status, 89.9% (664) patients were vaccinated and 10.1% (75) patients were not vaccinated. More than three fourth of the patients were not vaccinated.

Pertaining to the category of vaccine, 89.3% (67) patients were vaccinated covid shield and 10.7% (8) patients were vaccinated covaxin.

Regarding no. of vaccination dose completed, 78.8% (59) patients were completed 1st dose vaccine and were completed 21.3% (16) patients were completed 2nd dose vaccinated. Among the vaccinated less than one - fourth had completed two doses.

In view of vaccination as a part of vaccine trial, 56.0% (42) patients were involved as part of vaccine remaining 42.7% (32) patients were not involved in vaccine trial.

Regarding covid 19 symptoms, 56.8% (416) had fever, 30.2% (221) had dyspnea, 40.5% (297) had cough, 4.6% (34) had diarrhoea, 13.8% (101) had myalgia, 8.9% (65) had nasal symptoms, 6.5% (48) had fatigue, 7.0% (51) had throat irritation, 1.5% (11) had nausea/vomiting, 0.3% (2) had headache, 12.3% (90) had asymptomatic.

About comorbidities, 67.6% found no comorbidities, 26.3% had Diabetes, 16.7% had Hypertension, 0.8% had Hypothroidism, 0.4% had Epilepsy.

Table 2 *Depicting the Patients Course at hospital (N=739)*

Clinical Variables	**Frequency**	**Percentage**
Patient required oxygen support		
No	414	56.0
Yes	325	44.0
Patient required mechanical ventilation		
No	705	95.4
Yes	34	4.6
Course in hospital		
Improved	629	85.1
Needed Mechanical ventilation	31	4.2
Worsened and shifted to ICU	79	10.7
Outcome		
Cured	630	85.3

Death	109	14.7
Patient had hypoxia		
No hypoxia	455	61.6
Mild hypoxia	149	20.2
Moderate hypoxia	86	11.6
Severe hypoxia	42	5.7
CORADS Score (N=417)		
Highly Unlikely	47	11.3
Unlikely	3	0.7
Equivocal	7	1.7
Probable	33	7.9
Highly likely	139	33.3
PCR confirmed	188	50
CT Severity score (N=375)		
Mild	108	28.8
Moderate	145	38.7
Severe	122	32.5

Concerning Oxygen Support, nearly half of the patients required oxygen support (44%) and less than five percent required mechanical ventilation (4.4%). More than three-fourth of the admitted patients were cured at discharged (85.3%). Nearly half of the patients had CORADS score of 6 (50%). Majority of the patients had a CT Severity Score of 9-15 (38.7%).

Table 3: *Laboratory values of Admitted Patients*

Clinical Variables	Frequency	Percentage
D -dimer (N=592)		
Normal	224	37.8
Elevated	368	62.2
Urea (N=648)		
Normal	523	80.7
Elevated	125	19.3
Creatinine (N=644)		
Normal	566	87.9
Elevated	78	12.1
Ferritin (N=585)		
Normal	340	58.1
Elevated	245	41.9
AST (N=611)		
Normal	400	65.5
Elevated	211	34.5
ALT (N=613)		
Normal	471	76.8
Elevated	142	23.2
Alkaline Phosphatase(N=609)		
Normal	549	90.1
Elevated	60	9.9

Regarding the laboratory values of covid 19 patients, 37.8% (224) had normal D-Dimer level, 62.2% (368) had elevated D-Dimer level. More than half of the patients had elevated D-Dimer values.

The level of urea level in covid patients, 80.7% (523) had normal urea level and 19.3% (125) had elevated urea level.

Pertaining to creatinine of covid 19 patients, 87.9% (566) had normal creatinine level, 12.1% (78) had elevated creatinine level.

Regards to ferritin level of covid 19 patients, 58.1% (340) had normal ferritin level, 41.9% (245) had elevated ferritin level. While nearly half had raised ferritin level.

About ALT level of covid 19 patients, 76.8% (471) had normal ALT, 23.2% (145) had elevated ALT level.

Concerning Alkaline phosphate level of covid 19 patients, 90.1% (549) had normal Alkaline phosphate level, 9.9% (60) had elevated alkaline phosphate level. Majority of the patients had normal liver function test values.

Table 4: *Association between Vaccine status and Clinical course at the hospital (N=793)*

Characteristics		Vaccine Status		χ^2	p value
		Vaccinated n (%)	Not vaccinated n (%)		
Treatment Outcome	**Cured**	67 (89.3)	563 (84.8)	2.429	0.119
	Death	8 (10.7)	101 (15.2)		
Patient required oxygen support	**Required**	27 (36)	296 (44.9)	2.157	0.142
	Not required	48 (64)	366 (55.1)		
Patient required mechanical ventilation	**Required**	3 (4)	31 (4.7)	0.069	0.793
	Not required	72 (96)	633 (95.3)		
CT Severity score	**Mild**	16 (43.2)	92 (27.2)	2.236	0.105
	Moderate	10 (27)	135 (39.9)		
	Severe	11 (29.7)	111 (32.8)		
D-dimer	**Normal**	28 (46.7)	196 (36.8)	2.213	0.137
	Elevated	32 (53.3)	336 (63.2)		
Ferritin	**Normal**	41 (68.3)	299 (57)	2.865	0.091
	Elevated	19 (31.7)	226 (43)		

The clinical course of vaccinated patients were better when compared to non-vaccinated patients. **(Table 4)** Similarly the patients who had two completed doses of vaccine had better clinical outcome than patients with only single dose of vaccine. There was a cent percent cure rate among the patients who had two doses of vaccine **(Table 5).** The mean hospital days of patients with one dose of vaccine were 6.86, while it was only 3.94 in patients with two doses of vaccine and the results were statistically significant. **(Figure 1)**

Table 5: *Association between vaccine dosage and clinical course at hospital (N=75)*

Characteristics		Vaccine Status		χ^2	p value
		1st Dose n (%)	2nd Dose n (%)		
Treatment Outcome	**Cured**	51 (86.4)	16 (100)	2.429	0.190*
	Death	8 (13.6)	0		
Patient required oxygen support	**Required**	21 (35.6)	6 (37.5)	0.020	0.887
	Not required	38 (64.4)	10 (62.5)		
Patient required mechanical ventilation	**Required**	2 (3.4)	1 (6.3)	0.268	0.605*
	Not required	57 (96.6)	15 (93.8)		

CT Severity score	**Mild**	11 (40.7)	5 (50)	0.626	0.731
	Moderate	7 (25.9)	3 (30)		
	Severe	9 (33.3)	2 (20)		
D dimer	**Normal**	21 (43.8)	7 (58.3)	0.820	0.365
	Elevated	27 (56.3)	5 (41.7)		
Ferritin	**Normal**	30 (63.8)	11 (84.6)	2.033	0.154
	Elevated	17 (36.2)	2 (15.4)		

* p values obtained from Fisher exact test

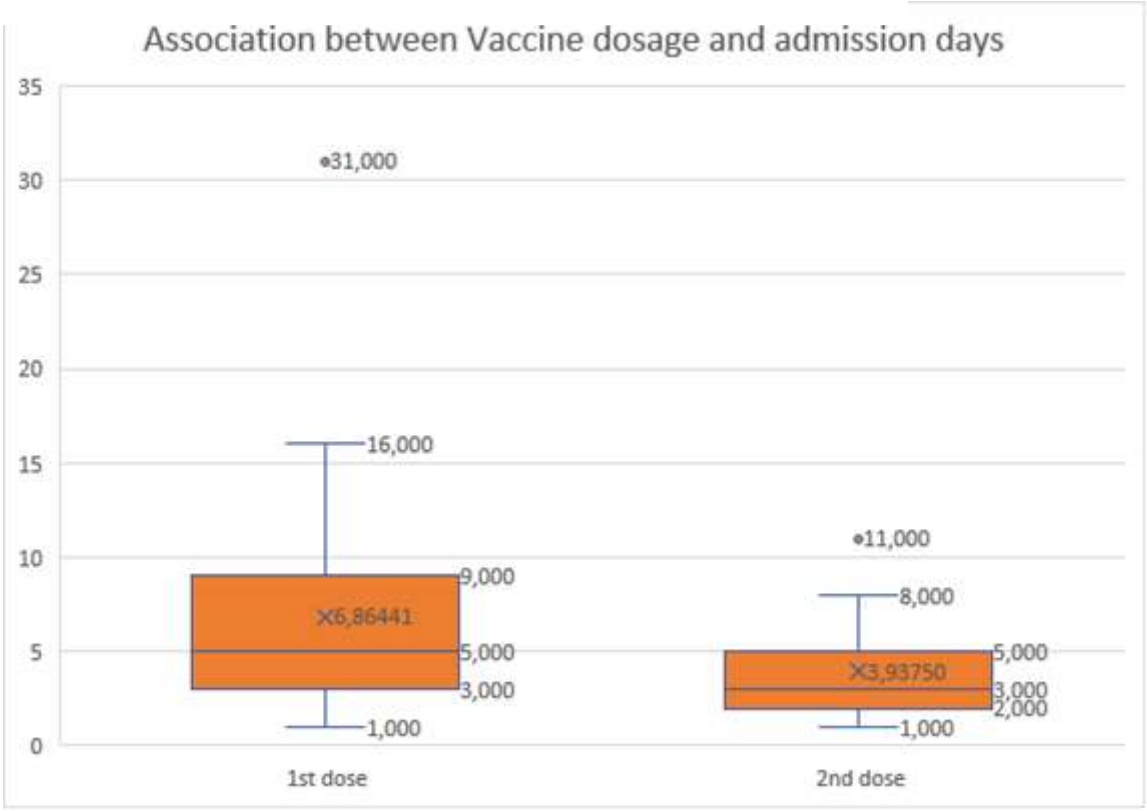

Figure 1 Box and whisker plot depicting the association between hospital days and **vaccine dosage (N=75)**

About people who required mechanical ventilation have approximately 50% lower probability of survival after 10 days of hospitalization than individuals who did not require mechanical ventilation, similarly people who required oxygen support had 30% lower probability of survival after 10 days of hospitalization than individuals who did not require oxygen support. Patients presented with severe hypoxia had 60% lower probability of survival after 10 days of hospitalization than patients with no hypoxia. Finally, individuals with elevated d-dimer had 30% lower probability of survival after 10 days of hospitalization than individuals with normal d dimer values. **(Figure 2).**

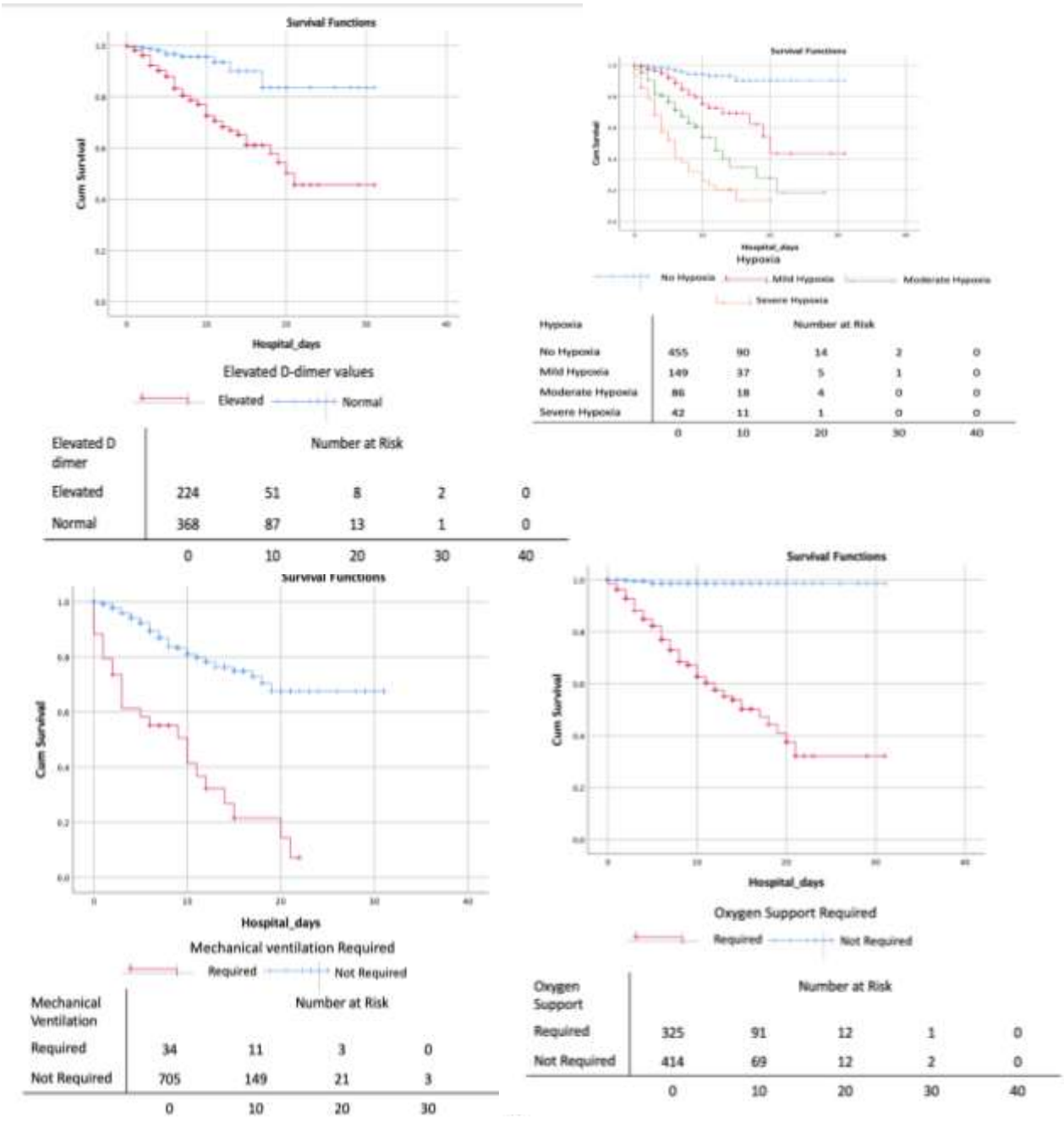

Figure 2: *Kaplan-Meier Survival plots for different predictive factors*

4. Conclusion

To our knowledge, this is study assessed the effectiveness of the COVID-19 vaccine and morbidity status from Puducherry & Tamilnadu. The results of our study are consistent with published studies showing severity of COVID-19 infection and vaccination status.

In conclusion, our study found that the incidence of patients receiving covid vaccination is higher, as is the success rate of covid vaccine in avoiding COVID-19 infection. This finding confirms that vaccination remains the single, most cost-effective measure for infection prevention. Treatment outcome is improved, patient required oxygen support is found to be less for patients with second dose of vaccination, patient required mechanical ventilation is minimal, CT Severity score is lower, D dimer and Serum Ferritin are lower. Increasing vaccination coverage would considerably reduce the number of cases.

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