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A Retrospective Observational Study to Identify the Possible Causal Factors and Root Cause Regarding Covid 19 Deaths among Covid 19 Deceased In-Patients at Selected Hospital in Coimbatore.

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Abstract
Coronaviruses (CoVs) refer to a family of enveloped, positive-sense, single-stranded, and highly diverse RNA viruses. With nearly 31 million reported COVID-19 cases and 4,10, 000 deaths, India is one of the countries with the heaviest burden of COVID-19 cases and deaths. **Methodology:** A retrospective observational study included 59 Covid positive in-patient non survivors who are affected during the second wave of Covid 19 Pandemic. Demographic and clinical Data were retrieved from the internal electronic record system of the institution. The Results were discussed using the descriptive analysis. **Results:** The data in this study revealed that majority were non vaccinated against Covid 19 and were with Diabetes Mellitus as co morbidity and major were deceased with the outcome of Covid Pneumonia. **Discussion:** The material, management and Financial factors can be a possible causal factors developed sudden out of the situation have lead to negative outcome during the first and second wave of covid 19 whereas the vaccination status is a human factor (called as the causal risk factor) against covid 19 can be intervened at the primordial level of Prevention that can alter the risk of outcome. Unfortunately the study result depicts 91.52% were not vaccinated. **Conclusion:** The above which can help us to derive a conclusion that the root cause for decease among the covid 19 in patient may be their Non vaccination status against covid 19 irrespective of virulence, infectivity of emerging covid variant.

Keywords: Covid 19 Deaths, Coronaviruses, Retrospective, Observational

Introduction
Coronaviruses (CoVs) refer to a family of enveloped, positive-sense, single-stranded, and highly diverse RNA viruses. There are four genera (alpha, beta, gamma, and delta), among which α-coronavirus and β-coronavirus attract more attention because of their ability to cross animal-human barriers and emerge to become major human pathogens. Till date, there are seven documented human coronaviruses (hCoVs), including the beta-genera CoVs, namely severe acute respiratory syndrome (SARS)-CoV (SARS-CoV)**,** Middle East Respiratory Syndrome (MERS)-CoV (MERS-Cove**),** SARS-CoV hCoV-HKU1**,** and hCoV-OC43 and the α-genera CoVs**,** which are hCoV-NL63 and hCoV-229E, respectively[1]. With nearly 31 million reported COVID-19 cases and 4,10, 000 deaths, India is one of the countries with the heaviest burden of COVID-19 cases and deaths. The majority of the morbidity and mortality in India are a consequence of the second wave, which started in March, 2021, and which is attributable largely to the delta SARS-CoV-2 variant[2]. The analysis of a study implies that during the second wave, among the covid 19 worst affected states in India Tamil Nadu was included[3]. Coimbatore, the Manchester of South India and one of the worst-affected districts during the second wave, has recorded 297 deaths in the month of May 2021[4].

Objectives
- To identify the possible causal factors that led to the decease among covid positive patients
- To analyse the impact of various modifiable host factors led to the decease among covid positive patients.

Methodology

A retrospective observational study included 59 Covid positive in-patient non survivors dated from 10.10.2020 till 21.06.2021in the Ganga Hospital, Coimbatore who are affected during the second wave of Covid 19 Pandemic. Demographic and clinical Data were retrieved from the internal electronic record system of the institution. The Results were discussed using the descriptive analysis. About 14 various scientific supportive literature were included in the study to identify the possible causal factors and the host related root cause among the in-patient non-Survivors due to Covid Positive

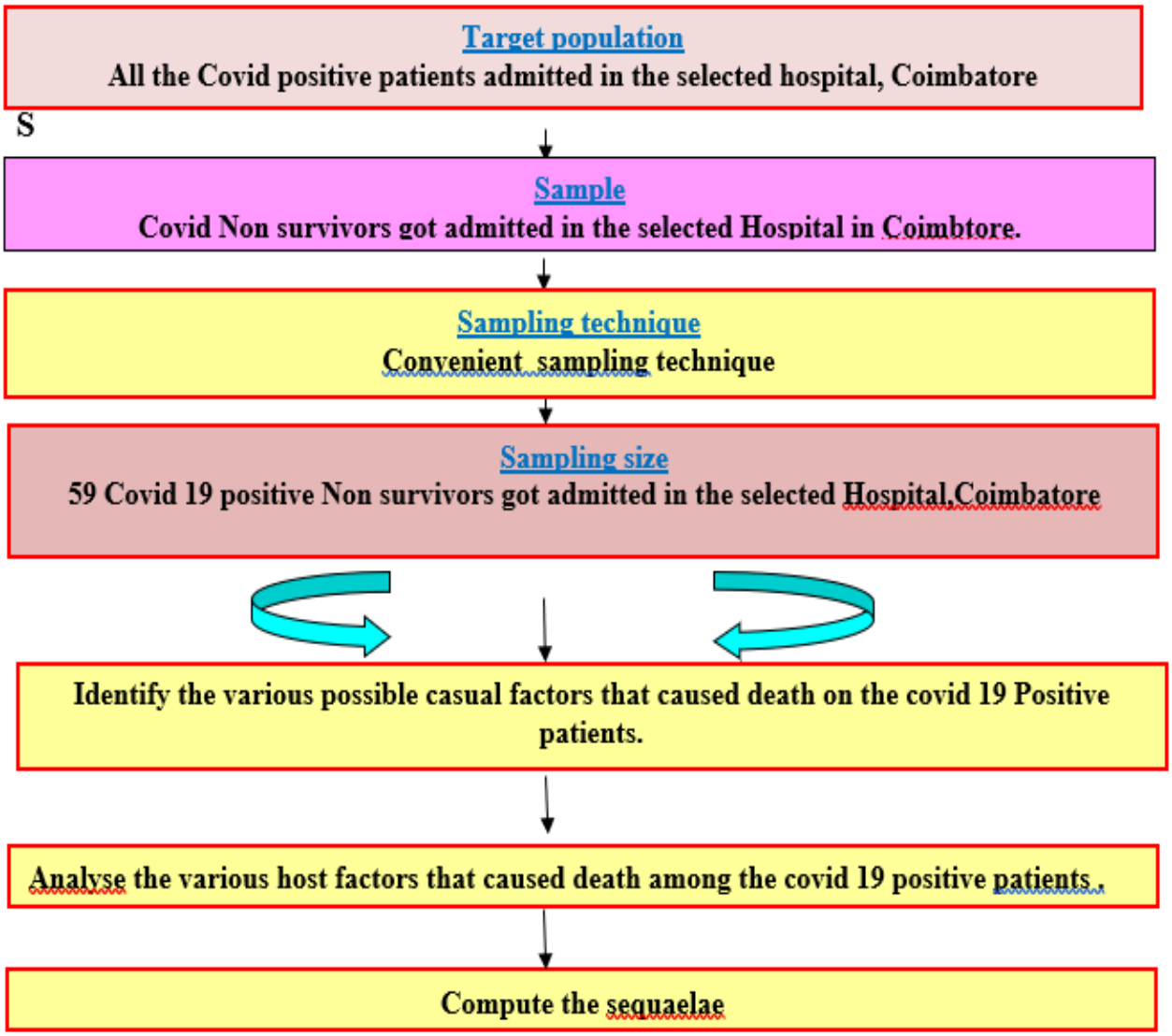
Inclusion Criteria

1. Deceased covid positive patients
2. Covid positive patients admitted between 10.10.2020 till 21.06.2021and deceased
3. who got admitted in the selected Hospitals?

Exclusion Criteria

1. Covid positive patients who were brought dead.
2. Covid positiv e patients who got referred / discharged

Schematic Representation of The Study Methodology



Sources of sample data: Institutional Internal Electronic Record

Data Analysis

Table 1: Frequency Distribution of Demographic Variables.

SL. NO.	Demographic Variables	N=59	
		No.	%
1	**Age In Years**		
	< 10	1	1.69
	10-19	-	
	20-45	6	10.16
	46-64	24	40.67
	Above 65	**28**	**47.45**
2	**GENDER**		
	Male	**40**	**67.79**

	Female	19	32.20
3	**Vaccinated Status (Against Covid 19)**		
	Vaccinated	5	8.47
	a) First Dose completed	3	5.08
	b) Second dose completed	2	3.38
	Not Vaccinated	**54**	**91.52**
4	**Co Morbidity**		
	DM	**22**	**37.28**
	HTN	17	28.81
	CAD	19	32.20
	Stroke	2	3.38
	Chronic Respiratory Disease	2	3.38
	Renal Failure	2	3.38
	Carcinoma	1	1.69
5.	**Outcome Of the Diseases**		
	Cardiac Arrest	5	8.47
	SOF	1	1.69
	COVID pneumonia	**43**	**72.88**
	Respiratory failure	4	6.77
	Cardio Pulmonary arrest	3	5.08
	Sepsis	2	3.38
	Massive Pulmonary Embolism	1	1.69

Table 1:1

The above table 1.1. shows that the most were under the age group of above 65 years and males. Majority were non vaccinated against Covid 19 and were with Diabetes Mellitus as co morbidity and major were deceased with the outcome of Covid Pneumonia.

Result

The data in this study revealed that the majority were above 65 yrs among the deceased. Thus, it was supported by the other study were Amber in his article of impact journal of ageing has discussed with scientific evidence that older age was an independent risk factor plays a major role in negative progression among covid affected patients. They elaborated that molecular difference causing changes in immune response found to be more with older age leading to which results in changes in physiologic function, reduction of lung reserve, airway clearance defense barrier function**5**.

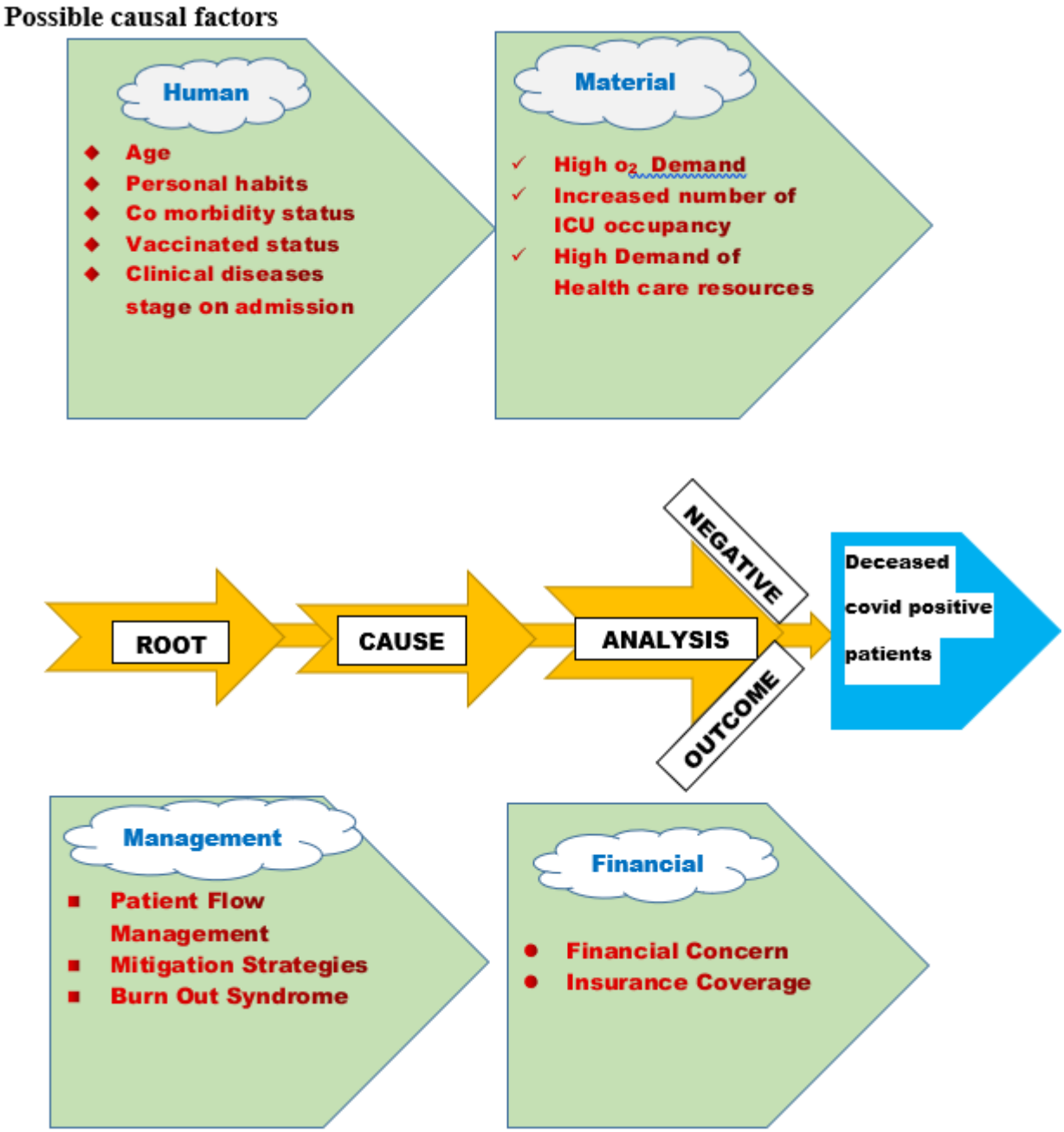
The study result revealed that males were large in number among the deceased added with evidence by the other study were Jinet et al., with the extracted public data concluded that men and women have the same prevalence but men with COVID-19 are more at risk for worse outcomes and death, independent of their age.**6.**

Though the medical oxygen production was good in hand in India during second wave, the rapid increase in cases beyond predictable and major cases found with the symptoms of shortness of breath sky rocketed the demand of beds with oxygen supply in India which was reported to the India Today article dated on 21st April 2021 **7.**

A review through a National Pulse Survey Conducted by the National Policy Makers of United States regarding Hospital Experiences Responding to the COVID-19 Pandemic, highlighted that they felt as a specific challenges to devise mitigation strategies, and needs for assistance related to personal protective equipment (PPE), testing, staffing, supplies and durable equipment like maintaining or expanding facility capacity; and financial concerns to handle this sudden public health crisis created out of Covid Pandemic**8**.

Sanyaolu, et.al., did a systematic electronic literature review on Comorbidity and its Impact on Patients with COVID-19. They have concluded with their review evidence that patients with comorbidity have more deteriorating outcomes compared with patients without. Added that COVID-19 patients with history of hypertension, obesity, chronic lung disease, diabetes, and cardiovascular disease have the worst prognosis with negative progression to ARDS and pneumonia. Also, elderly patients in long-term care facilities, chronic kidney disease patients, and cancer patients are at risk not only for contracting the virus, but there is a significantly increased risk of death among these groups of patients **9**

The CDC has declared that COVID 19-vaccines are effective which keep us away getting and spreading the virus that causes COVID-19. It also protects us getting seriously ill even if we do get COVID-19**10**. Kenneth Grace et.al., conducted a community based cross sectional study among 564 persons in urban and rural communities who had not been vaccinated yet using the Vaccine Attitude Scale. The study result concluded that Vaccine hesitancy was high in urban and rural Tamil Nadu**11**. Out of seven-crore population the state has inoculated only nine per cent of its with the first dose of the vaccine. Thus, during the initial period of second wave, state was put right at the bottom of the list of states with low vaccination percentage**12**



Discussion

All the above said material, management and financial factors can be a possible causal factor developed sudden out of the situation have led to negative outcome during the first and second wave of covid 19 whereas the vaccination status is a human factor (called as the causal risk factor) against covid 19 can be intervened at the primordial level of Prevention that can alter the risk of outcome**13**. Unfortunately, the study result depicts 91.52% were not vaccinated. Added Munish Moudgil, Head of Karnataka State COVID War Room has declared that the non-vaccinated was 30 times more likely required ICU or HDU that reflects the negative progress of the disease in non-vaccinated. Moreover, as per the Chennai Municipal Corporation report, the share of number of covid positive deaths in Non vaccinated was about 85% between the month of Aug- Sep 2021 and it was reduced to 69% during Dec 2021**14** during which the vaccine drive was implemented vigorously.

Conclusion

The possible causal factors for deaths out of covid 19 was listed above like material, finance and management factors with the supportive evidence, but when considering the Human factor, apart from the fixed non modifiable variable like age, variable markers such as co morbidity status and clinical diseases stage on admission are at and above the level of secondary prevention 13. Unfortunately, the study result depicts 91.52% were not vaccinated. To compare on the other hand, the specific death rate due to Covid 19 different emerged variants after second wave was in a down surge throughout the country during which the governments has implemented a vigorous vaccine drive against Covid 19 has helped to breathe without battle during the remerging covid pandemic. The above which can help us to derive a conclusion that the root cause for decease among the covid 19 in patient may be their Non vaccination status against covid 19 irrespective of virulence, infectivity of emerging covid variant.

Abbreviations

CDC: Centre for Disease control and Prevention
COVID: Corona Virus Disease of 2019
HDU: High Dependence Unit
ICU: Intensive Care Unit

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