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Spiral Spread of Contagious Covid19 in Southern Regions of India

Dr. Hemalatha Ramakrishnan
Professor Finance
School of Business and Management Christ *(Deemed to be)* University Bangalore, Karnataka.

This paper will be examining the demographic feature of bottom most labelled regions from South India. Four states are taken into consideration to analyse on the impact of Covid-19.Each state located on either borders are spread evenly in west and east, borders are analysed based on the pattern of demographic cases and recovery rate. It's observed that the four states displays a similar rate, however death rate there are variations in a marginal manner. Fact indicates that among these states there is a lag in growth of health care centres with growing population. Health care initiatives to match the growth of speedy population needs both specialized treatment and care centres. Each states with agglomerated districts concentrate to the core city for health concern issues, and the available health care centres shows a wide variation. Study focuses on evaluating whether there is arithmetic progression of health care centres with explosion of population.
Keywords: population, domestic product, fatality, health units,

Introduction: principles of population theory by Malthus is confirmed that growth of population is much faster than the growth rate of food subsistence. Malthusian theory indicates that there is exponential growth in population with not accompanying rise in food supply, when any uncertain situations like disease, famine, war, occur. However, in his model variable of contagious effect and impact on population sustenance has been an argument. When food supply grows arithmetically while that of population moves up geometrically, there seems to be a gap that was proved by Robert Malthus. He is of the view that higher technology application leads to higher production but non-availability of land for agricultural purpose has made food shortages. While population and food supply is of concern to mitigate poverty. Same as former similarly population and health care centres is a precautionary concern to caution and protect virus of serious spread. However, contagious disease and population sustenance is the argument to insulate health care precautions. Contagious incidence and exponential growth in health care centres is need of the hour. Are the expenditure pattern and allocation among
regions differ, if so role of private participation and effort to safeguard the population of all age is it affordable and are essential requirements if met? Based on this statement study has examined and analysed the relationship between population and combination of health care centres. Among the four southern regions exponential growth of population and number of health care centres of

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both public undertaking as well private shows a wide variation. However, regression equation reveals that there almost 68% of private health care are significantly grown in relation to population. Analysis based on Anova reveals that among the states there is 31% variation which is below moderate level in the plot of forecast. Emphasis need to be on Incidences of contagious impact during the past: Attempts made to reduce population during previous incidences from different occurrences has caused either injection nor poison gas nor a biological weapon which had unchecked human suffering. Several impact like plague, flu, and other kind of epidemics have invited for immediate policy guidelines and interventions. But when it comes to human beings impacted due to contagious disease there has been instinct reactions to safeguard oneself. Spread has been without contagious symptoms as well, this had a different impact on human living. In 1897, entirely villages in India were influenced that a British plot to reduce unwanted population was under way with thousands being killed through the deliberate poisoning of wells and injections. In the year 1918, it was publicized that a poison gas had escaped from the world war I front in France and reached Mumbai which was causing havoc and leading to the death of thousands. Gossip spread of information through social media 102years a biological weapon leakage of a medical lab in Wuhan China and infecting thousands of people at a time. This is the recent trend around the world that was waving every mouth as one of the top discussions through social media, TV channels and newspapers. In most of the events of such occurrences, public anxiety and economic damage on a recorded scale, it was disease. Plague a germs led pandemic (1896- 1939),caused 12million deaths, Spanish Flu, caused by a virus, claimed 12 million lives in India over a period of just three months in 1918. Either of the situations the British government intervened, advocated social isolation to sensitize the population. In all these situations antagonist were invisible, scenario becomes difficult to narrate on public or an immediate scientific solution was delayed.

Reliability and immediate effect of the disease measures enforcement was not immediate in India. Reason is policy makers were reluctant on compulsory measures on the public, due to counterproductive and perhaps believed that Ayurveda and Unani practitioners were preferred.

Novel coronavirus has impacted Indian population and among southern regions has been a buildup anxiety situation. General mass by then became aware that something is wrong, an infection that anybody could give anyone, a scary situation. A pandemic disease operating guidelines was introduced. Draft mentioned that mass sanitary measures, stopping fairs, festivals and pilgrimages, physically inspecting both male and female railway passengers, sending suspected cases to hospital, searching homes, application technology to know the infected individuals. This guideline was a major turning point as well data to update through
government standard website. Transport through airline the vital agent that spread widespread from all over regions from international movement. Every pandemic plays out its own role, life, its own cause, and nature. Any, epidemic has its own life span, in the year 1918, in India age group of 20-40, were highly impacted than elderly population with the spread. An outbreak of this characteristic reveals there is aren't an assured way to handle, But bitter lessons experienced with a sequence of learnings in human behaviour in the environment and spread of pandemic, has examined what appropriate measures has been effectively governed and directed. India with high density of population in many cities and the hardships that the population faced in each individual effort to remain socially isolated and the pandemic unfolded in the country. This has caused huge loss and mass poverty especially among the migrant labourers. Not only

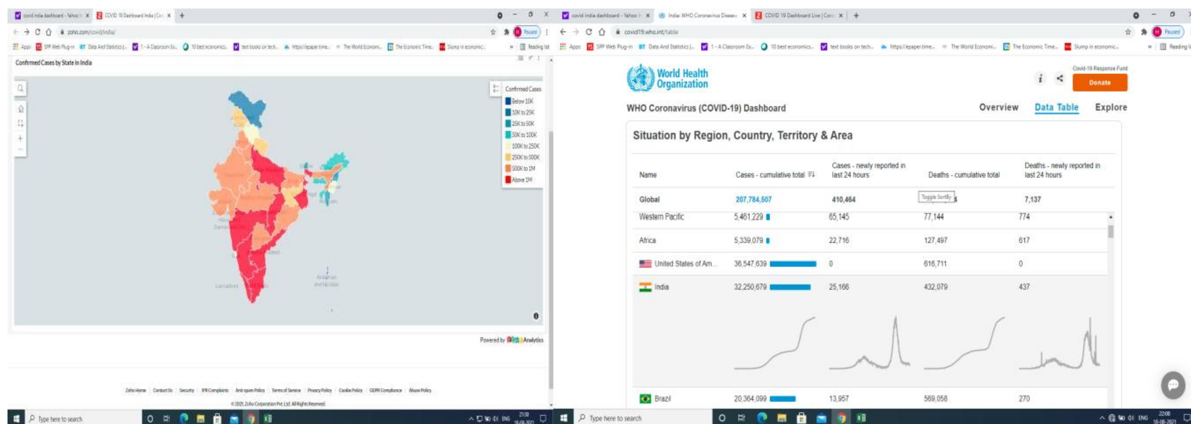
downtrodden has been impacted but incidences like plague, flu, and coronavirus did not have a confident dealing in terms of medical advancement. But rather with the spread been much faster, the world health organization and governments have been effective measures with standard operating procedures as well as enforcing restrictions adherence in day today well-being of the citizens.

Review of Literature: Sandeep Mangat, in the article has shared that covid-19 infections in the Indian states of Andhra Pradesh and Tamil Nadu are spread by a small number of infected individuals known as super spreaders. These super spreaders not documented, the evidence of the same has been led by a senior scientist Ramanan Laximinarayan at the Princeton Environmental Institute in the study entitled Patterns of enhanced transmission risk in similar age-pairs were strongest among children age between zero and fourteen years and among sixty five years adults and older. Has proposed that school closures and pharmaceutical interventions could have helped reduce transmission, however the highest proposition of test positive contacts in most age age groups stemmed from the index cases aged 20-44 years.

John Wennberg and Alan Gittelsohn, have discussed a small area variations in health care delivery, a population based health data system that there are wide variations in resource input, utilization of services and expenditure among neighboring communities. Their findings has revealed that the input of resources that are associated with income transfer from areas of lower expenditure to areas of higher expenditure. Populations based on the health information systems and regulatory agencies are an important step in the development of rational public policy for health. Starfield has discussed on the various concepts in population health and health care, in this process terms like fairness and impartial seem confront measurement.

Access to/of health services depends upon the ability of general mass to reach health care practitioner in terms of location, time and ease of approach.

Discussion and analysis

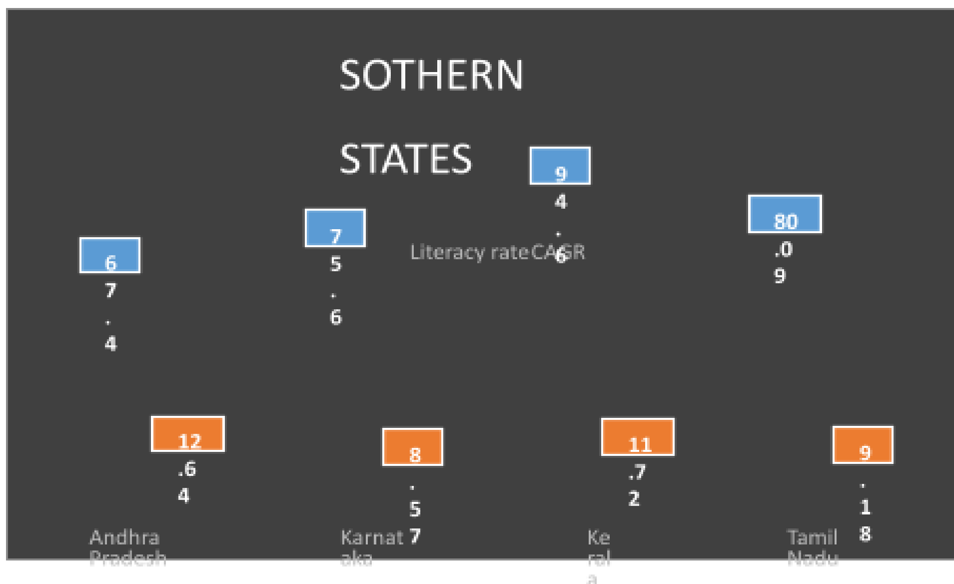


Physical features of the geographical image and locations of different states can be viewed. Maximum number of confirmed cases were mostly visible from red highlights of Southern regions with confirmed cases. Minimum of 250 thousands to above one million of population were contagious with the pandemic spread.

Chronic pandemic had a wider spread that among southern states, there has been variations in resources, ease of access, cultural features, health system, variations in equity in health as well variations in social, environmental, economic and health policy. Equity in health in vaccination were of little indifference, whereas among population groups among states there were disparities with high concentration of private health care with less number of districts.

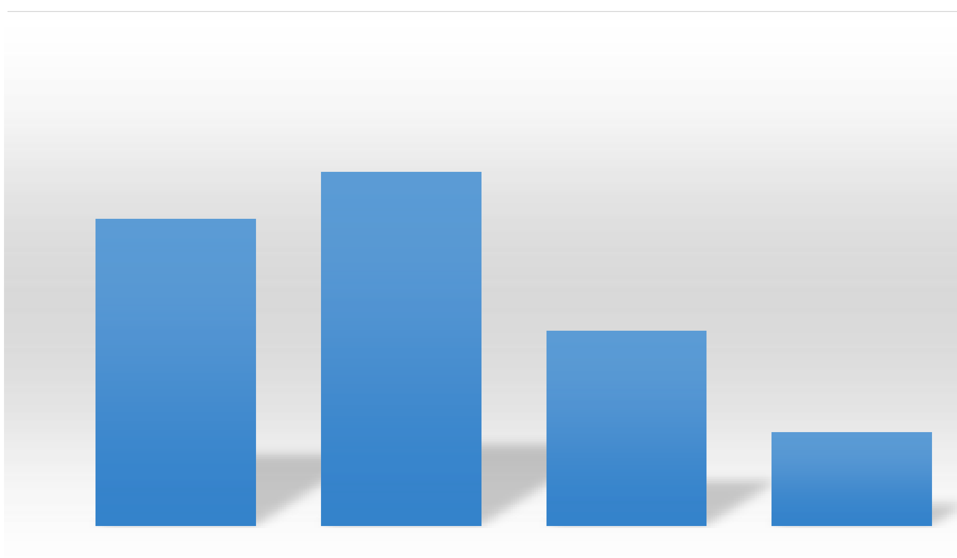
Inequity in access to health services for equal health and as well absence of enhanced access for socially, demographically as well geographically concentrated population needs grater health needs. Are health guidelines different from regulations, is somewhat facilitated based on the professional expectations rather than formal requirements. Laboratories standards, vary from clinical guidelines. This require interventions that are indicated in the diagnosis and management of specific pandemic and the environment. Does clinical guidelines goes with benefit of recommended procedures or the development of administrative guidelines is more often based on the practices of better quality, when certain elements of health systems when not adequately maintained. Is individual health more important than population health, depends on the nature and distribution of the population health. There was disability to adjust with age and as well with disability with life expectancies. Therefore, population health is merely sum of the health of individuals that may or may not entail concern. This requires health awareness and promotion activities that maximizes the development of resilience to a
threat to health. Health protection to reduce the likelihood of occurrence of situations that threats to health and organized on a population level by a societal action via legal system and regulation. Prevention of chain of causality at a point before psychological abnormality is recognized. Interruption through chain of causality which forms secondary prevention, there is a manifestation of sign noticed by the individual and intervention after confirmation of sign or symptom to mitigate the progression.

Contagious Impact on Southern Regions: are analysed based on strength and progress of each states based on geographical distribution, population growth, literacy progress and cumulative average productivity growth rate Its observed that all states are competent and potential in performance. State growth has been significant in terms of productive growth date.



State	Geographical area (sq Km)	Literacy rate	CAGR
Andhra Pradesh	1,60,205	67.4	12.64
Karnataka	1,92,000	75.6	8.57
Kerala	38,863	94.6	11.72
Tamil Nadu	1,30,058	80.09	9.18

Illustration reveals the growth rate of population among the four states. Decade wise change show that percentage of population is high in Tamil Nadu followed by Karnataka. While Kerala and Andhra Pradesh are percentage growth is low between 3.73 and 7.77. Fall in birth rate in latter states reveals advancement of health, mortality rate.



Corona Cases of Southern States

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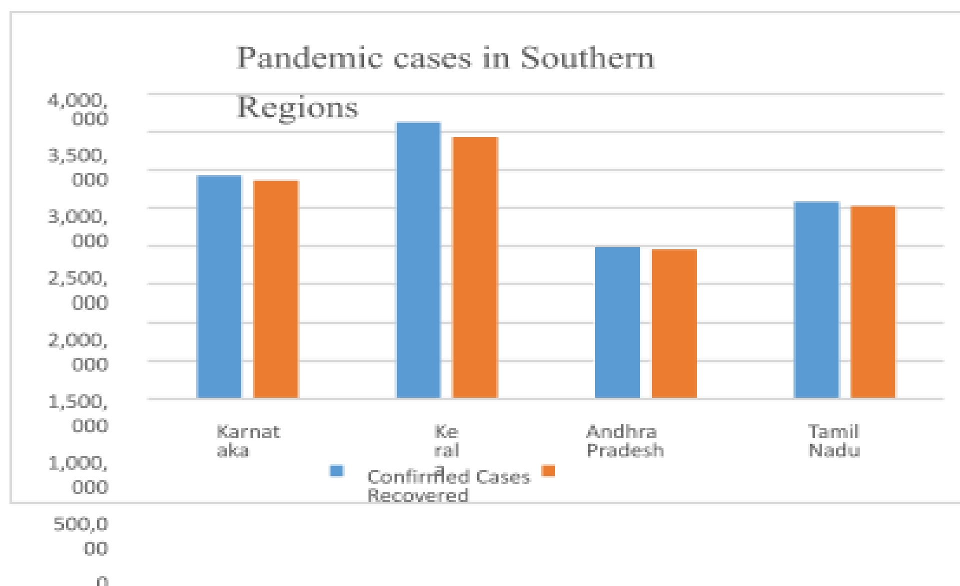
State	Confirmed Cases	Active Cases	Deaths	Recovered	Death Rate	Recovery Rate
Karnataka	29,24,732	22,728	36,911	28,65,067	1.26%	98.00%
Kerala	36,31,638	1,76,520	18,280	34,36,318	0.50%	94.60%
Andhra Pradesh	19,88,910	18,688	13,595	19,56,627	0.68%	98.40%
Tamil Nadu	25,83,036	20,399	34,428	25,28,209	1.33%	97.90%



Pandemic cases among four states exhibits variations from total population those have been impacted. In southern regions highly impacted was Kerala Karnataka, Tamil Nadu and Andhra Pradesh. Spread of the contagious that eroded via airways migration to Karnataka, similarly to Kerala as well. Impact in Tamil Nadu was also due to migration via airways as well through interstate migration. Less of compliance of SMS standard protocol took time for states to adhere and this had accelerated the spread of contagious effect. General awareness and panic scenario were high that had caused widespread infection. Out of the total population and infected confirmed cases state wise reveals highly impacted cases in the state of Kerala, Karnataka, Tamil Nadu and Andhra Pradesh. However, standard operating guidelines were announced, compliance and adoption there was a gap. General panic had caused a high wave of contagious effect. Non-availability of protective measures and highly relying on e-commerce based for supply of sanitized products. And everyone might not afford to purchase the quality product and sanitizers. This is due to limited supply along with high priced and directly done to door delivery.

Allocation of medical expenditure among three states: Cumulative growth on planned expenditure pattern for health care shows a variation among the states. Between 2015-16 and 2017-18, Andhra Pradesh shows a rise of 13.13% to 17.16% while that of Karnataka has declined from 14.94% to 2.18%.Tamil Nadu has received a marginal rise in allocation expenditure to the level of 5.71% to 9.37%. A minor variation and fall in expenditure pattern has come down for Kerala State from 19.10% to 14.30%. All this are integrated to sub centres, community health

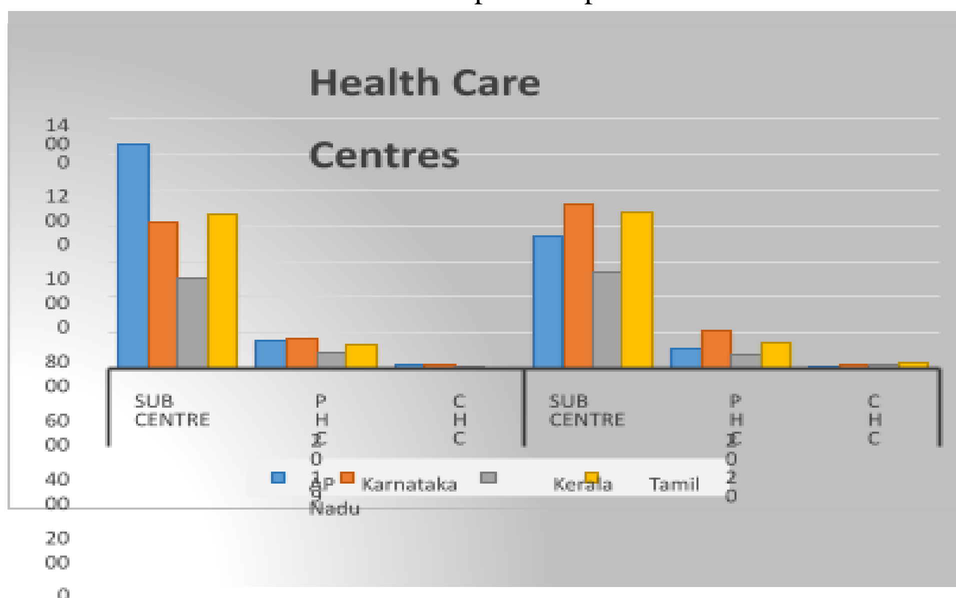
care centres, and Primary health care centres as well. Each of these centres have been assigned with their own roles and responsibilities. However,readiness and precautions taken to safeguard took a span of delay to rural mass and sub urban population.

This illustration explains about the three tier infrastructure based on population norms. The average population covered by a Sub Centre, PHC and CHCs are 5616, 35567 and 165702 respectively as on 31st March, 2019. The Sub Centre is the most peripheral and first contact point between the primary health care system and the community. There should be 1 CHC per 80,000 populations in tribal areas, and per 120000 populations in normal areas. At the all India level, there are 9 PHCs for every CHC on an average. Community Health Centre (CHC) : A 30 bedded Hospital/Referral Unit for 4 PHCs with Specialized services The three tier infrastructure is based on the following population norms: The average population covered by a Sub Centre, PHC and CHCs are 5616, 35567 and 165702 respectively as on 31st March, 2019.

States/Year	2019			2020		
	Sub centre	PHC	CHC	Sub centre	PHC	CHC
AP	12522	1570	164	7437	1142	141
Karnataka	8143	1681	254	9188	2176	189
Kerala	5094	911	106	5410	784	211
Tamil Nadu	8682	1380	35	8713	1420	385

These norms absolutely conveys the rigidity and to open up for the cause of contagious protection took its own span of time. General reluctance from public to take counsel and to make necessary steps went with its lag of execution. Media was the only way through awareness were created. Although, local population in sub-urbs and rural have been less impacted, but followed their own conservative procedures and adhered to norms of age old practices. This way untouched or not reachable population were able to safeguard in their own way.

Illustration reveals the number of dependent public health care centres for the 2017-18 and 2018-



19 as per health report of 2020 reveals active primary health care centres and community health care centres.in Karnataka and Tamil Nadu there is a rise in number of units, whereas in Kerala and Andhra Pradesh indicates that a minor fall in health care units.

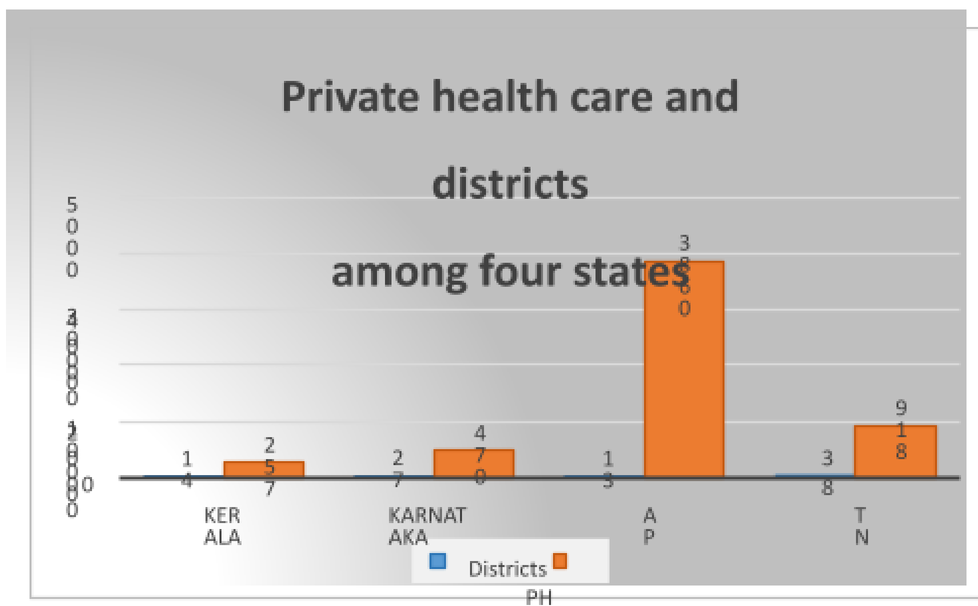


Illustration indicates number of districts and private health care centers. There is a positive rise among the four states. There are two observations with less districts and number of private affordable health care centres are high in Kerala and Andhra Pradesh. Whereas in Tamil Nadu and Karnataka with more number of districts available and affordable private health care centres are above moderate level. This is due to demand from affordable population with initiatives of private physician and support from financial institution lending. Open policy has encouraged many private health care centres in collaboration with insurance firms have been on positive rise. Andhra Pradesh, with less districts number of private health care centres are high

SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0.687199
R Square	0.472243
Adjusted R Square	0.208364

Standard Error	22464759				
Observations	4				
ANOVA					
	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	9.03E+14	9.03E+14	1.789622	0.312801
Residual	2	1.01E+15	5.05E+14		
Total	3	1.91E+15			

Above analysis reveals that among the four states relationship is significant with private health care centres and current dynamic population. Regression table explains the significant relationship between current population and number of private hospitals. This indicates that there is 68% outer growth between the two variables. While relationship while R^2 value shows 47%. that is below fifty percentage.Although state wise there are cumulative rise in the number of Health care centers, comparatively units of public health care among the southern states reveals a rise but at a diminishing level. This is due to primitive treatment although cost of treatment is affordable and free, but compared to private there is a high influence of medical equipment's that are available in urban location. However, during pandemic there has been stringent policy change that has caused the practitioners presence in the clinic with less resource and experts. This has been a real challenging for established hospitals with limited resources like oxygen, beds and space available due to larger number of patients demand for treatment. There was a moderate progress and affordability to access the expensive Covid treatment became very acute shortage, due to non-availability space/beds/oxygen/ for immediate needs. Health care centers of private although initiated the treatment with scarce and non-availability of medical equipment's but with government intervention could continue to protect and safeguard the patients those who could afford treatment with health insurance protection. Claims and insurance protection firms although had collaborated with health care centres, but the treatment were very expensive and the billing rate rose to more than three times than the regular billing amount. F value shows that there is 31% variation among states population and available health care centres, exclusively private.

Findings and Conclusion: to summarize based on the caption Spiral Spread of Contagious Covid19 in Southern Regions of India had impacted in various ways. Scenario with small geographical location there has been a series of spread with non-affordable treatment and
non-availability of medical equipment's With speed of migration widespread of the disease as well accelerated at a high level. General productivity of all the four states was affected, Standard guidelines although similar among four states, but varied in time and
implementation. However, speed of widespread disease manifold, subsequent adherence and anxiety among the population cautioned to stay alert and become precarious about the consequences. During the scenario manifold rise in the medical charges has revealed non preparedness to meet such contingency situations.co-existence of public and private health care centres have been existing, functioning and taken precautionary measures to mitigate the risk of the spread.

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