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Original Research Article

Study to estimate impact of sudden lockdown due to COVID-19 pandemic at the household level: findings of cross-sectional study in Tamil Nadu

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ABSTRACT

Background: In response to contain the spread of coronavirus disease 2019 (COVID-19) in India, the entire country was declared to be under lockdown from the midnight of 24 March 2020. In this study, we determined the economic impact and availability of health services during sudden lockdown.
Methods: A cross sectional study was done in rural and urban health and training centres attached to rural medical college of Chengalpattu district of Tamil Nadu. Sample size was 424. Study participants were out patients, seeking health care services. Data was collected by trained medical social workers (MSW), using field tested semi-structured questionnaire. Percentages were calculated and for assessing difference between proportions, Pearson's chi-square test was used as a test of significance.
Results: Out of 424 study participants, 223 (52.6%) were male and mean age of participants was 44 years. Socio economically, majority of them belonged to lower and lower middle-class families. 297 (70%) of households reported to have financial loss and 71.2% reported difference due to lockdown. In univariant analysis, the significant risk factors for difference in income were found to be type of house (0.029), loss of job (0.0001), loss of wages (0.0001), having bank loan (0.019) and issues in managing household expenses (0.0001), per capita income (0.008), farming business (0.018) and household with members having non-communicable diseases (0.013).
Conclusions: Lockdown has huge economic cost. Underprivileged households were economically impacted. Most of the essential health services were available and accessible to the household even during the strict lockdown.

Keywords: COVID-19, Economy, Household level, Impact, India, Lockdown

INTRODUCTION

On 30 January 2020, World Health Organization (WHO) had declared the outbreak of pneumonia of unknown etiology (unknown cause) detected in Wuhan City, Hubei Province of China to be a public health emergency of international concern.[1] The same day, the first COVID-19 case of India was reported from Trissur district of Kerala.[2]

After the first report of SARS-CoV-2 from Wuhan, China, the Government of India reviewed and initiated multisectoral measures for the mitigation of this emerging public health crisis. These included point-of-entry surveillance at 21 international airports, enhanced State-level surveillance programmes and preparedness for handling clinical cases in designated hospitals.[3]

The influenza outbreak of 1918 has proved that non-pharmaceutical measures such as social distancing are as

important as drugs and vaccines in controlling a pandemic. The lockdown in Wuhan to contain the COVID-19 outbreak in China showed a positive impact with significantly decreased growth rates and increased doubling time of cases.[4]

Evidence from United Kingdom and other European countries showed that intermittent periods of more intensive lockdown-type measures are predicted to be effective for preventing the health-care system from being overwhelmed.[5]

With growing number of cases in India, sudden lockdown was imposed to mitigate the pandemic. What started as one day Janta curfew on 22nd March 2020 by the Prime Minister of India and lockdowns by some of the state governments, the entire country was declared to be under lockdown from the midnight of 24 March 2020, (lockdown, phase-1).[6] Large gatherings were prohibited, most schools and nonessential businesses were closed, and people were asked to stay at home or shelter in place. However, union government issued orders to ensure the supply of the essential goods during the lockdown.[7]

Considering lockdown measures in place since March 24, 2020 that had helped in containing the spread of COVID-19. The government decided to further extend the lockdown till May 31, 2020 (phase 4).

However, social distancing, lockdown had impacted the workforce and job cuts. Asian Development Bank ADB (2020) have predicted that there will be a drop in employment in Asia of an amount of 109 million-167 million jobs. It will adversely impact the vulnerable section of the community.[8]

The first case of the COVID-19 pandemic in Tamil Nadu was reported on 7th March 2020. All 37 districts of the state were affected by the pandemic, along with capital district Chennai being the worst affected.[9] Tamil Nadu had the fifth highest number of active cases in India.[10] Chengalpattu district was a red district and it was a second worst affected district in Tamil Nadu. Due to lockdown, institutes, manufacturing industries and transport were closed in many parts of Tamil Nadu and other parts of the country.

The primary objective of this study was to estimate the impact of sudden lockdown on individual's household economy. The secondary objective was to assess the availability and accessibility of health services in the field practising areas of the rural medical college during lockdown.

METHODS

Study setting

This study in was done in rural health and training centre (RHTC), Venmalagaram Village in Sirumayilur panchayat, Cheyyur Taluk, and Madurantakam, urban health and training centre (UHTC) attached to the department of Community Medicine, in rural medical college of Chengulpettu district.

Study period

Data was collected between November 2020 to February 2021. The lockdown period considered for data collected was between 24th March to 31 May 2020.

Study design

A cross sectional study at household level.

Study participants

Adult patients (18 years and above), attending the RHTC and UHTC, for preventive or curative services were the potential participants of this study. Those willing to participate in the study and willing to give written informed consent were included in study. Adult patients who were permanent resident of UHTC and RHTC area were included.

Sample size

The WHO non-serial publication 'sample size determination 1993' was relied upon. The following assumption have been used to calculate the sample size.

An anticipated population prevalence of 50% (i.e. 50% of population may have impact of lockdown, as we don't know the prevalence) and relative precision of results to be 0.10 (10%) with 95% confidence interval (CI), sample size worked out to be 384.[11]

Assuming 10% non-response rate, the actual sample size was 424. To get good representation of rural and urban area half 212 participants each from urban health training centre and rural health training centre respectively were enrolled in this study.

Sampling

Every alternate patient attending the out-patient services was approached for enrolling in this study. Five to ten patients were approached for data collection per day.

Data collection and analysis

Medical social workers were trained in administering the questionnaire. By interview technique data was collected from the participants. Semi-structured field-tested questionnaire (epicollect5 database- smartphone based) was used to collect and enter the data. Information regarding the socio-economic status, financial loss during lockdown, economic aid received from government and availability and accessibility of health services during lockdown was collected from each study participant.

Wealth index

Households were given scores based on the number and kinds of consumer goods they own, ranging from ownership of house, housing characteristics including availability of electricity, owing bike or car, type of socio- economic card issued by government, employment status and income. Wealth quintiles are compiled by assigning the household score to each variable and total score was summed up, and then divided the distribution into five equal score categories.[12]

Data collection and entry was done on the daily basis and analysis was done by using Microsoft Excel windows version 10 and SPSS version 17. Proportions (percentages) were calculated on excel sheet. For assessing difference between proportions, Pearson's chi-square test was used as a test of significance. P value <0.05 was considered statistically significant.

Ethical consideration

This study has been approved by research committee and institutional ethics committee of the medical college. Written informed consent was taken from each participant. Strict confidentiality was maintained for the collected data.

RESULTS

Out of 424 study participants, majority (63%) of participants were in less than 50 years age. Mean age of participants was 44 years. The age range was 18 to 85 years. Male (52.6%) participants were more than female (47.4%). Most of them belonged to Hindu religion (92%) and other backward community (56.0%). The majority of participants had completed schooling (72.6%), however very few 13.7% were graduate.

Majority of participants (31.8%) were working as daily wages workers, followed by female participants who were home maker and one fourth were working in the organized sector. More than 50% of participants belonged to lower and lower middle socioeconomic class followed by 42% were in lower middle and upper middle class, only 4.2% were in upper c lass category. Majority of the participants were in wealth index category-2, 62.9% and none of them in category 4 and 5.

Table 2 depicts the economic impact of lockdown on households. Approximately 282 (66%) of household members could not go for work during the lockdown and 297 (70%) of households reported to have financial loss and 71.2% reported difference in income before and after lockdown. The major reason quoted for loss of income was non availability of transport (26.9%) and institution and company closed (37.7%) during the lockdown. Small proportion 33, (7%) reported shortage of food at household level. The short fall was for food grains (Figure 1). Very few families 10 (2.4%) had to postpone the social events like marriage. In our study, 41.3% of responded had received assistance/aid (financial or food grains) from the government and other organization.

Table 1: Socio demographic characteristics of study participants.

Variables	Frequency n=424, (%)
Age group	
18 to 50 years	269 (63.5)
51 years and above	155 (36.5)
Gender	
Male	223 (52.6)
Female	201 (47.4)
Head of the family	
Yes	200 (47.2)
No	224 (52.8)
Religion	
Hindu	390 (92.0)
Muslim	22 (5.2)
Christian and others	12 (2.8)
Caste	
SC/ST	157 (37)
OBC	241 (56.8)
Open/unreserved/others	26 (6.2)
Education status	
Illiterate	58 (13.7)
Primary to higher secondary school	308 (72.6)
Graduate	58 (13.7)
Family members	
Up to 4 members	259 (61.1)
More than 4 members	165 (38.9)
Employment status	
Unemployed	34 (8)
Home maker	116 (27.4)
Employed (government, private, own business)	103 (24.3)
Retired	11 (2.6)
Daily wage laborer	135 (31.8)
Student	25 (5.9)
BG Prasad-socioeconomic class based on per-capita income (Rs. /month)	
Upper class (7000 and above)	18 (4.2)
Upper middle class (3504 to 7007)	64 (15.1)
Lower middle (2102 to 3503)	115 (27.1)
Upper lower (1051-2101)	118 (27.8)
Lower (0 to 1050)	109 (25.8)
Wealth index category	
Category-1 (score 1-4)	7 (1.6)
Category 2 (score 5-8)	267 (62.9)
Category 3 (score 9-12)	150 (35.3)
Category 4 (score 13-16) and 5 (score 17-20)	0

Table 2: Economic impact of lockdown on households.

Members having loss in job/lost job/ unable to go for work during lockdown	Frequency (N=424), (%)
Yes	282 (66.5)
No	142 (33.5)
Households with financial loss	
Yes	297 (70)
No	127 (30)
Reported differences in income after lock down	
Yes	302 (71.2)
No	122 (28.8)
Reason for loss of income	
No transport	114 (26.9)
Institution/company closed	160 (37.7)
No job opportunity	44 (10.4)
Households with bank loan	
Yes	78 (18.4)
No	346 (81.6)
Household paying back the loans	
Yes	60 (76.9)
No	18 (23.0)
Issues in managing the monthly expenses	
Yes	125 (29.5)
No	299 (70.5)
Families receiving assistance/relief package	
Yes	175 (41.3)
No	249 (58.7)
Household reporting shortage of food	
Yes	33 (7.5)
No	392 (92.5)
Social events like marriage postponed	
Yes	10 (2.4)
No	414 (97.6)

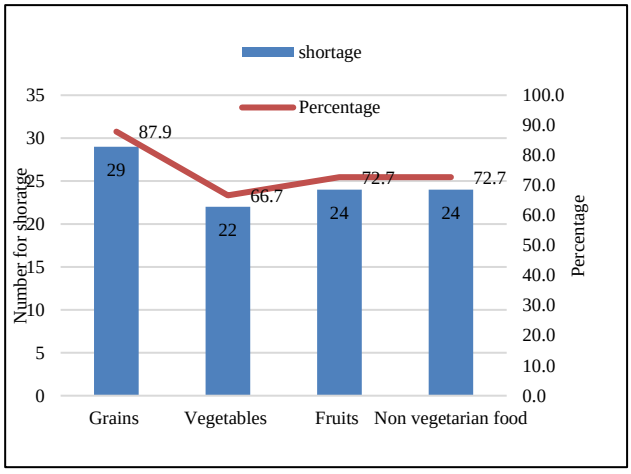

Figure 1: Impact on household food security, n=33.

Sixty-nine participants (16.3%), reported farming as main occupation business. Out of these 69 (16.3%) participants, 56 (81.1%), could harvest the produce, 75.3% could sell the produce and 72% could sell the produce at regular rate. However, 19 farmers (27%) could not sell the produce at regular rate (Figure 2).

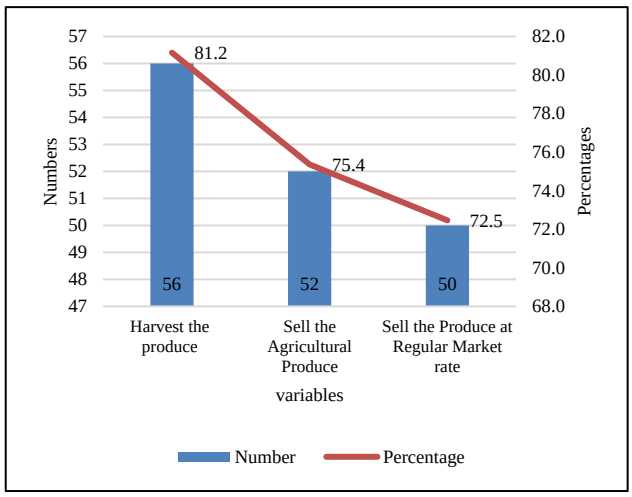

Figure 2: Impact of sudden lockdown on agriculture (n=69).

Out of 424, responded 31 (7.3%) reported that household members had history of health emergencies, of which 29 (93.5%) had reached the hospital. Household had used mainly governments (51.7%) and private hospitals during lockdown. Majority used own vehicles (65.5%) or private vehicle (24.1%) to reach hospital. Only 10% had called the government ambulances. Only 2 (6.4%) did not seek the medical advice. Reason quoted for not going to hospital was fear of contracting corona and transport not available.

The responded also informed about the 4 (0.9%) members had COVID-19, all of them received medical advice and recovered (data not shown).

Out of 157 pregnant women in household, only 45% could go for regular antenatal check-up. Out of 80 children below 15 years of age, 64 (80%) got routine vaccination. The prevalence of non- communicable diseases, (diabetes, hypertension, cerebro-vascular diseases and cardiovascular diseases and cancer) was 129 (30.4%) and most of them 92.2% had regular check-up and medications during the lockdown. Other patients, other than NCD (3.1%) also reported accessing the health services during lockdown.

Univariant analysis was done to find association of various independent factors with outcome factor "difference in income" before and after lockdown. In univariant analysis, the significant risk factors for difference in income were found to be type of house, loss of job, loss of wages, having bank loan and issues in managing household expenses, low per capita income, farming business and household with members having non-communicable diseases.

Table 3: Impact on availability and accessibility of health services during lockdown.

Variables	Frequency (%)
Households with history of health emergencies	
Yes	31 (7.3)
No	393 (92.7)
Reached hospital for health emergency	
Yes	29 (93.5)
No	2 (6.4)
Type of health facility	
Government	15 (51.7)
Private	11 (37.9)
Government and private	3 (10.3)
Mode of transport	
Own transport	19 (65.5)
Private-self paid/taxi	7 (24.1)
Called government ambulance	3 (10.3)
Maternal and child health services	
Regular antenatal checkup	
Yes	72 (45.9)
No	85 (54.1)
Vaccination of children below 15 years of age	
Yes	64 (80)
No	16 (20)
History of non-communicable disease (NCD)	
Yes	129 (30.4)
No	295 (69.6)
NCD patients had regular medical check-up and regular medication	
Yes	119 (92.2)
No	8 (6.2)
Any other health symptoms (other than NCD)	
Yes	13 (3.1)
No	411 (96.9)
Visited hospital for health care needs	
Yes	12 (92.3)
No	1 (7.7)

Table 4: Association between the socio-economic factors and difference in income reported by study participants.

Variables (independent)	Difference in income		Total	P value
Type of house	**Yes (N= 302)**	**No (N=122)**		
Pucca	125 (74.9)	42 (25.1)	167	0.029
Kaccha	125 (73.5)	45 (26.5)	170	
Mixed	52 (59.8)	35 (40.2)	87	
Type of ration card				
APL card	3 (100)	0	3	0.292
BPL card	296 (70.8)	122 (29.2)	418	
No ration card	3 (100)	0	3	
Loss of job				
Yes	262 (92.9)	20 (7.1)	282	0.0001
No	40 (28.2)	102 (71.8)	142	
Wage loss				
Yes	277(93.3)	20 (6.7)	297	0.0001
No	25(19.7)	102 (80.3)	127	
Bank loan				
Yes	64 (82.1)	14 (17.9)	78	0.019

Continued.

Variables (independent)	Difference in income		Total	P value
No	238 (68.8)	108 (31.2)	346	
Issues in managing monthly expenses				
Yes	115(92.0)	10 (8)	125	0.0001
No	187(62.5)	112 (37.5)	299	
Per capita income per month				
Up to Rs 2101	174 (76.7)	53 (23.3)	227	0.008
Above Rs 2101	128(65.0)	69 (35)	197	
Number of family members				
Up to 4 members	176(68.0)	83 (32)	259	0.062
More than 4 members	126(76.4)	39 (23.6)	165	
Received assistance/relief aid				
Yes	143 (81.7)	32 (18.3)	175	0.0001
No	159(63.9)	90 (36.1)	249	
Farming business				
Yes	41(59.4)	28 (40.6)	69	0.018
No	261(73.5)	94 (26.5)	355	
Food shortage				
Yes	24 (75)	8 (25)	32	0.624
No	278 (70.9)	114 (29.1)	392	
Non-communicable disease				
Yes	102 (79.7)	26 (20.3)	128	0.013
No	200 (67.8)	95 (32.2)	295	

DISCUSSION

This study concludes that 71% of families had differences in income after the lockdown and 297 (70%) of households reported to have financial loss including 7.5% had shortage of food grains at the household level. During lockdown, 7.3% of the household had medical emergencies and most of them reached the hospital for health care. The family members of the participants with non-communicable diseases and other diseases had access to the routine check-up and received the regular medicines. However, pregnant women had not been to hospital for regular antenatal check-up, but child health services, i.e. immunization services was utilized by the communities.

Thus, findings of our study, are concurrent with other reports on job cuts, as 66% of participants reported loss in job or unable to work. Thus, during lockdown, crucial parameters like manufacturing, construction, trade, hotel industry saw a decline and slid into negative gross domestic product (GDP) growth rate.[13]

The pandemic was expected to plunge most countries into recession in 2020, with per capita income contracting in the largest fraction of countries globally since 1870. The crisis highlighted the need for urgent action to cushion the pandemic's health and economic consequences, to protect vulnerable populations, and set the stage for a lasting recovery (World Bank news).[14]

Thus, in anticipation of economic impact of covid -19 on vulnerable populations, the Union Finance and Corporate Affairs Minister, government of India, announced Rs 1.70 lakh crore relief package under Pradhan Mantri Garib Kalyan Yojana on 26th March 2020.[15] In our study we found that 41% of the household had received the relief assistance from the government and other sources to cope up with the financial losses. However, 7.3% still had shortage of food, as food grain aid was inadequate to feed, the large family size.

Findings of our study, are discordant with the other reports on agricultural produce. As three fourth of the participants in the farming business in our study could harvest and sell the produce at the regular rate. However, in others reported that during lockdowns majority of farmers did find it difficult to take their produce for sale to the markets.[16]

In our study we found that, during lockdown, all emergency services and non-communicable disease services were available. The findings of our study are in contrast to World Health Organization (WHO), study between May and July 2020, as 105 countries reported disruptions of essential health services and more so in lower-income than higher-income countries, except for maternal health services. The great majority of service disruptions were partial. Emergency services were the least disrupted, although 16 countries reported disruptions across all emergency services. The most severely affected service delivery platforms were mobile services, often suspended by government, and campaigns, for example as used for malaria prevention or immunization.[17]

In our study, we found only 45% of the pregnant women went for regular antenatal check-up. This finding was similar to the findings of study, done by Goyal et al reporting one-third of women had inadequate antenatal visits, 45.1% reduction of in institutional deliveries, increase of 7.2% in high-risk pregnancy, and 2.5-fold rise in admission to the intensive care unit of pregnant women during the pandemic. The main reason for delayed health-seeking was lockdown and fear of contracting infection, resulting in 44.7% of pregnancies with complications.[18]

Inspite of the Anganwadi workers and auxiliary midwifes workers were deployed mainly in contact tracing and testing of COVID-cases due to closure of other outreach programmes that they used to perform.[19] In our study 80% of under 15 children received immunization during lockdown this, finding is discorded to the other studies in India. This may be because of the good public health system in Tamil Nadu and adhering to the government of India guidelines to continue the immunization services during lockdown.[20]

In the month on May 2020, epidemiological data was used to reopen the economy in India.[21] Restrictions were imposed in red, zones and other zones opened up in phase wise manner. This approach of localized lockdown was better to minimize economic impact.[22]

Limitations were that this was a cross sectional study. The information regarding households were collected from the patients attending the health centres attached to medical college. Due to Covid-19 pandemic, the community-based study was changed to institutional based study. Thus, information on type of house and other information on wealth of the family could not be assessed directly by the data collectors.

CONCLUSION

Lockdown as non-pharmacological intervention to mitigate the pandemic is essential, but has huge economic cost. Underprivileged households were economically impacted. In Tamil Nadu, all essential health services were available and accessible to the household even during the strict lockdown period due to effective public health system and private service providers.

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