

MORTALITY PATTERN DURING COVID-19 LOCKDOWN. COMPARISON OF MEDICOLEGAL AUTOPSIES PERFORMED DURING AND BEFORE LOCKDOWN.

Forensic Medicine

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ABSTRACT

The present study aims to assess the impact of Covid-19 by analysing the pattern of autopsies conducted during and just before lockdown. The autopsy report and inquest papers were used for data collection. The number of autopsies conducted before and during lockdown was 101 and 67, respectively. A significant increase in the number of unemployed deceased and urban deaths during lockdown was evident. Suicides and natural deaths contributed 75% to overall urban deaths. Suicides in the rural population increased from 12% to 55%. Significant reduction noted in road accident deaths and an increase in the number of suicides during lockdown.

KEYWORDS

Covid-19; Lockdown; Medicolegal autopsies; Unemployment; Road traffic accidents; Suicides; Domestic violence

1. INTRODUCTION

The novel corona virus 2019 has infected almost every corner of the world. The count of affected individuals has crossed millions across the globe. Undoubtedly Covid-19 is now a economic, social, and psychological burden to the society. Countries are implementing various preventive measures to control the spread, such as mandatory mask-wearing, social distancing norms, restricted human activities, and complete lockdown. The Indian government announced complete lockdown from 25-Mar-2020 initially for 21 days [1], but because of rapidly increasing cases, the lockdown was further extended for the next three months in phases. Lockdown imposed a curfew like situation in the country, and human activities were strictly prohibited. Movements were not allowed except for emergency and essential services like trauma & critical care, and grocery needs.

Road traffic accident claim 147913 deaths every year in India, which equals to 405 deaths per day [2]. Total number of suicides, as reported by the National Crime Record Bureau of India (2018) is 134516, which represents 10.2 suicides per lac population and male to female ratio of 2.17 : 1 [3]. Restricted human activities imposed during lockdown must have modified the count of road accident deaths. Financial constraints during lockdown could have uncovered indoor disputes and its consequences. Unavailability of abusive drugs might have increased drug withdrawal crises [4]. Further, we noted increased number of suicidal cases being brought to our center for autopsy. Hence suicidal deaths have been emphasized in this study.

Several research studies have demonstrated the diverse impact of Covid-19 on society, but most were questionnaire based involving online surveys. A few studies attempted an analysis of the autopsy profile during initial period of lockdown [5] but the analysis of entire lockdown period is not yet available. The present study aims to assess the same by analyzing and comparing the pattern of medicolegal autopsies conducted during and just before lockdown, at the tertiary care center of Rishikesh, Uttarakhand.

2. MATERIALS AND METHODS

2.1. Study Design

Retrospective, analytical and cross-sectional study

2.2. Study period

In India, complete lockdown extended from 25-Mar-2020 until 31-

May-2020. The first phase of unlock was initially announced for 30 days (1-Jun-2020 to 30-Jun-2020), only for non-containment zones [6]. Containment zone is an area with Reverse Transcriptase-Polymerase Chain Reaction (RT-PCR) confirmed cases of Covid-19. Our jurisdiction area was unfortunately still a containment zone, thus the lockdown continued till 30-June-2020. Therefore, the study period included in our research was 25-Mar-2020 to 30-June-2020 which equals to 98 days. The comparison group also included an equal number of days just before lockdown (18-Dec-2019 to 24-Mar-2020).

2.3. Data collection

The study was conducted in the Department of Forensic Medicine & Toxicology, All India Institute of Medical Sciences (AIIMS) Rishikesh. The study included two groups; before-lockdown and during-lockdown. The autopsy reports and inquest papers containing short history by the relatives of deceased were used for data collection. All the autopsies conducted before and during lockdown period were included in the study irrespective of any exclusion criterion.

2.4. Parameters for evaluation

Parameters shortlisted for inclusion were age (years), gender, marital status, occupation, area of residence, place of death, manner of death, method of suicide, and occupation of suicide victims.

2.5. STATISTICAL ANALYSIS

Continuous variables were presented in mean $\pm$ standard deviation and compared using Student's t-test. Categorical variables were presented in frequency (%) and analysed using Chi-square test. P-value < 0.05 was considered significant. Statistical analysis was performed using Statistical Package for Social Sciences software, version-23 (SPSS-23, IBM, Chicago, USA).

3. RESULTS

The study included 168 autopsy cases, 101 in before-lockdown group, and 67 in during-lockdown group.

The 'mean age $\pm$ standard deviation' of the deceased before and during lockdown was 39.63 ± 17.95 and 39.01 ± 16.14 years, respectively. Before-lockdown group had 81% males (mean age: 39.01 years) and 19% females (mean age: 42.31 years) whereas during-lockdown group had 73% males (mean age: 41.06 years) and 27% females (mean age: 33.55 years) (Table 2).



Regarding mean age, gender, marital status, place of death, and method of suicide, statistically insignificant results were obtained between the groups.

Assessment of 'occupation' sub-group demonstrated a significant decrease in the number of employed deceased ($p = 0.008$) and an increase in the number of unemployed deceased who lost their job recently ($p < 0.001$).

Analysis of sub-group 'area of residence' demonstrated a statistically significant increase in the number of urban deaths ($p = 0.013$). Decrease in rural deaths was not statistically significant ($p = 0.168$).

Regarding 'manner of death', study demonstrated decrease in road accident deaths ($p < 0.001$) and an increase in suicidal deaths ($p = 0.001$), both statistically significant. Natural ($p = 0.290$), homicidal ($p = 0.819$) and undetermined ($p = 0.922$) deaths showed insignificant changes.

Regarding 'method of suicide' (drowning, hanging, poisoning) employed by victims, analysis did not reveal statistically significant results. However, statistically significant rise was evident in the unemployed suicide victims ($p = 0.036$) who recently lost their jobs.

Detailed findings are listed in *Table 1*.

Table 1: Comparison of parameters before and during lockdown

S. No	Parameters	Sub-section	Before lockdown	During lockdown	p-value
1	Autopsies, (N)		101	67	
2	Age (mean/median) + SD years		(39.63 / 40.00) $\pm$ 17.95	(39.01 / 37) $\pm$ 16.14	0.828
3	Gender, N (%)	Male	82 (81.18%)	49 (73.13%)	0.297
		Female	19 (18.81%)	18 (26.86%)	0.297
4	Marital status, N (%)	Married	57 (56.44)	44 (65.67)	0.300
		Unmarried	26 (25.74)	16 (23.88)	0.928
		Not available	18 (17.82)	7 (10.44)	0.274
5	Occupation, N (%)	Employed	54 (53.47)	21 (31.34)	0.008*
		Unemployed	16 (15.84)	14 (20.89)	0.528
		Housewife	10 (9.90)	9 (13.43)	0.646
		Student	5 (4.95)	16 (33.88)	<0.001*
		Lost job recently	16 (15.84)	7 (10.44)	0.443
6	Area of residence, N (%)	Urban	47 (46.53)	45 (67.16)	0.013*
		Rural	42 (41.58)	20 (29.85)	0.168
		Not available	12 (11.88)	2 (2.98)	0.079
7	Place of death, N (%)	Out of hospital	81 (80.20)	49 (73.13)	0.377
		Hospital	20 (19.80)	18 (26.86)	0.377
8	Manner of death, N (%)	Accidental	52 (51.49)	14 (20.89)	<0.001*
		Homicidal	5 (4.95)	3 (4.47)	0.819
		Natural	23 (22.77)	21 (31.34)	0.290
		Suicidal	18 (17.82)	28 (41.79)	0.001*
		Undetermined	3 (2.97)	1 (1.49)	0.922
9	Method of Suicide, N (%)	Drowning	1 (5.55)	0 (0)	0.822
		Hanging	10 (55.55)	19 (67.85)	0.596
		Poisoning	7 (38.88)	9 (32.14)	0.879
10	Occupation of suicide victims, N (%)	Employed	11 (61.11)	11 (39.28)	0.253
		Unemployed	3 (16.66)	4 (14.28)	0.841
		Housewife	2 (11.11)	4 (14.28)	0.891
		Student	0 (0)	8 (28.57)	0.036*
		Lost job recently			

SD: Standard Deviation, *Significant

Table 2: Comparison of mean age before and during lockdown

	Gender	N	Mean Age (years)
Before lockdown (N = 101)	Male	82	39.01
	Female	19	42.31
During lockdown (N = 67)	Male	49	41.06
	Female	18	33.55

Table 3: Distribution of deaths in urban and rural population

Manner of Death	Urban		Rural	
	Before lockdown	During lockdown	Before lockdown	During lockdown
Accidental	19	10	27	4
Homicidal	2	1	3	2
Natural	14	17*	6	3
Suicidal	11	17*	5 (11.9%)	11 (55%)
Undetermined	1	0	1	0
Grand Total	47 (out of 101)	45 (out of 67)	42 (out of 101)	20 (out of 67)

Residential status was unknown for 12 (11.88%) and 2 (2.98%) cases before and during lockdown group respectively

1. DISCUSSION

Medicolegal cases (MLC) are those in which investigation by the law-enforcing agency is required to determine the cause and manner of infliction of injuries, whether in living or deceased [7]. All unnatural deaths or even natural deaths in unnatural circumstances are MLC and are mandatorily submitted to autopsy. Because of the strict lockdown policies imposed by the government, and fear of acquiring Covid-19 infection, surviving victims of MLC may hesitate to visit health care facilities. In such case, demonstrating the impact of the pandemic by comparing the characteristics of surviving MLC could prove to be inadequate due to under-reported cases. Hence, the present study aims to compare the profile of autopsied cases before and during lockdown to overcome the above limitation.

The number of autopsies performed during lockdown was reduced by approximately 34%, due to nationwide restricted human activities. Our statistically insignificant result regarding mean age, gender, marital status, and place of death was in accordance with the results of a similar study conducted in Greece [5]. Although mean age of deceased before (39.63 years) and during lockdown (39.01 years) was nearly similar, mean age of deceased females during lockdown ($n = 18$) was younger (33.55 years), compared to before lockdown period (42.31 years) (*Table 2*). During lockdown, 83% ($n = 15$) of deceased

females were married housewives, and 67% (n = 12) of them died due to unnatural cause, mainly suicide (n = 6). Covid-19 related anxiety, interpersonal distress, and loss of employment within the family (thus causing an increase of family disputes), may provide a possible explanation [8, 9].

As per the International Labour Organization, the world is expected to witness 25 million job losses [10] due to current pandemic and lockdown measures. Mass unemployment, economic instability, and limited earnings could be the inevitable challenges of this pandemic [11]. The statistically significant increase in the number of unemployed deceased ($p = <0.001$) post lockdown could be a reflection of the above worrisome situation.

The present study demonstrated a rise in urban deaths ($p = 0.013$) and a decline in fatalities among rural populations in the post lockdown period. Furthermore, suicide and natural deaths contributed 75%* to overall urban deaths in the post lockdown period. Though there was a drop in the number of deaths in rural populations during lockdown, suicides increased from 12% to 55% (Table 3).

Road traffic accident are the foremost cause of unnatural deaths encountered in any healthcare setting. A cross-sectional study conducted in the Calcutta region of India found the contribution of accidental, suicidal, undetermined, and homicidal deaths as 63%, 30%, 4.3%, and 2.8%, respectively, out of the total autopsies performed at that center [12]. A similar study revealed 58.5% contribution of road accident deaths out of 1470 autopsies conducted [13]. The present research demonstrated a statistically significant reduction in road accident deaths ($p = <0.001$) during lockdown similar to Sakelliadis EI et al [5]. Home isolation, restricted vehicle movements, closure of offices, educational institutes, marketplaces, and liquor stores could be the possible reason behind such an acute shift. Additionally, a rising trend of road accident deaths over 17 years before the pandemic, demonstrated in a multi-center study of India [14], confirms the fact that sudden fall in road traffic deaths was not by chance but as a consequence of this pandemic.

Many research evidence is available suggesting pandemic as a potential contributor behind rising suicide rates thus raising concerns regarding the increasing number of suicides with rising unemployment [8, 15–17]. Our study demonstrated a statistically significant rise in the number of suicides from about 18% to 42% ($p = 0.001$) during the lockdown period (n = 28). However, the method of suicide adopted by the victims was insignificant. During lockdown, most of the suicides occurred at the residence of victims and 76% (n = 22) of suicide victims were male. Comparing the occupation status of all victims, a statistically significant increase in the number of unemployed victims who lost their job recently was observable. The anxiety of isolation, fear of acquiring infection, depression of losing the job, the stress of new job search, and financial uncertainty might be the possible reasons behind this increase. The same explanation may also be attributed to increased urban death during the lockdown period.

The nationwide lockdown had both positive and negative impact on society. Reduced incidence of road traffic accident related death is surely a positive effect. On the other hand, the lockdown-related rise in unemployment was its negative part. People's income stopped, and livelihood became difficult. Family and marital disputes were on the rise. Due to the unavailability of alcohol, tobacco, and other psychoactive drugs, withdrawal emergencies were on the surge, making some individuals susceptible to commit suicide.

2. CONCLUSION

Results demonstrated a statistically significant increase in the number of unemployed deceased during lockdown. Deaths in the urban population were on the rise, and men contributed the most. Road traffic accidents decreased, whereas suicides increased during the lockdown period, the later mainly among unemployed males. Rising unemployment could be the main triggering factor behind increasing suicide rates during the pandemic. The government should enact policies to counter the current growing unemployment in the country. Employers must encourage 'work from home' for their employees to avoid lay-offs. Homicides, seemingly unaffected during the lockdown, are expected to rise soon due to unemployment and economic crisis [18]. Increasing domestic violence cases [19] is another emerging challenge to society during this pandemic, which might be overlooked.

Funding: No funding received

Conflict of interest: None

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