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ORIGINAL ARTICLE

Profile of medico-legal autopsy cases performed during COVID-19 pandemic lockdown at mortuary of Civil Hospital and B. J. Medical College in Ahmedabad, Gujarat.

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Abstract
On 24th March 2020, the Government of India ordered a nationwide lockdown for 21 days, starting from 25th March, limiting the movement of India's entire 1.3 billion population as a preventive measure against the COVID-19 pandemic in India. The Lockdown eventually extended in 4 phases, spanning entire 68 days till 31st May 2020. The first of its kind lockdown impacted the lives of all the countrymen in different aspects, viz. personal, social, psychological and economic aspects. The different studies carried out in the past had proven that the profile of Medico-legal autopsy cases in particular geographical regions reflects the crime prevailing in the society. It helps to assess the social and economic profile of the deceased. It is necessary for understanding the nature of crime in a particular area. It helps identify the demographic needs and take necessary preventive measures to stop the crime or unnatural deaths using spreading awareness and psychological counselling if needed. This study was carried out retrospectively on death cases brought for medico-legal autopsies at the mortuary of Civil Hospital and B. J. Medical College, Ahmedabad between the Covid-19 pandemic lockdown period of 25th March 2020 to 31st May 2020.

Keywords
COVID-19 pandemic; Lockdown; Autopsy; Natural deaths; Unnatural deaths; Road traffic accidents.

Introduction

Around December 2019, Chinese authorities reported acute respiratory syndrome cases in Wuhan City, Hubei province, China. This disease was called coronavirus disease 2019 (COVID-19) and was identified to be caused by SARS-CoV-2.[1] As per statistics from 31st December 2019 to 24th March 2020, the day before India went for Lockdown, Total 5, 13, 128 cases of COVID-19 had been reported worldwide, of which 19,193 resulted in death. At that time, India had reported around 500 cases of COVID-19 with no casualties.[2] The novel disease was characterized by asymptomatic transmission, sometimes intense severity and even risk of death (especially in case co-morbidities exist), lack of control options (no vaccine or effective antiviral therapy was available) and finally, lack of widespread diagnostic testing.[3] To reduce transmission of COVID-19, the Government of India announced a strict nationwide lockdown, the first of its kind in the history of independent India, from 25th March 2020. This Lockdown restricted people from stepping out of their homes. All transport services–road, air and rail–were suspended, except for transportation of essential goods, fire, police and emergency services. Educational institutions, industrial establishments and hospitality services were also suspended. Services such as food shops, banks and ATMs, petrol pumps, other essentials, and manufacturing were exempted. The Home Ministry stated that anyone who fails to follow the restrictions could face a year in jail.[4] Initially, Lockdown was announced for 21 days. But, due to the large population of our country and the number of cases rising every day, Government extended the Lockdown in 3 more phases for a total of 68 days till 31st May 2020. From 1st June onwards, the Unlock process started in a phased manner. This 68 days lockdown created a tremendous impact on the economic, social, psychological and personal life of all citizens in one or another way. Reports from various State Crime Records Bureau suggests a significant drop in deaths and crimes in general but, The National Commission for Women (NCW) registered an increase of at least 2.5 times in domestic violence complaints since the nationwide Lockdown, according to official data.[5] Studying the profile of medico-legal autopsy cases in mortuary helps to understand the nature of various crimes, the manner and mode of death during a particular time in a particular region.[6,7,8] Our study aims to identify and compare the characteristics of cases referred for autopsy during the lockdown period for the COVID-19 pandemic versus the cases referred during the same period in 2019.

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Material and Methods

The present study is a retrospective study of medico-legal autopsies performed at the mortuary of Civil Hospital and B. J. Medical College, Ahmedabad between the Covid-19 pandemic lockdown period of 25th March 2020 to 31st May 2020. The cases were distributed based on different age groups, sex, and cause of death. The age-wise distribution consisted of age less

than 1 year up to 100 years. Causes of death are divided into assault/murder, RTA (road traffic accidents), railway accidents, injury, burns, drowning, poison, snake bite, hanging, electrocution, natural (disease) and into others (unspecified) and compared with the date of the previous year, i.e., 2019 for the same period. Injuries were further classified into head injury (RTA and railway), multiple injury (RTA and railway), spinal cord injury and stab injury depending upon the cases reported. Violent asphyxial deaths were further divided into hanging, strangulation, drowning, and smothering, depending on the reported cases. Natural (Disease) causes of death were further elaborated into Cerebral System, respiratory system, cardiovascular system, git system, circulatory (blood) system, septicaemia (multi-organ failure) and into non-specific causes.

Results

Table 1 shows the age and sex distribution of cases which shows that out of total reported death cases, i.e., 418, 77.9% were males and 22.1% were females. The male-female ratio was nearly 3:1 in reported deaths. Among the male cases, maximum cases were reported from the age group 41-50 years followed by 31-40 years, while among the female cases, maximum cases reported from the age group of 41-50 years followed by 21-30 years. Overall maximum, i.e., 24.9%, cases belonged to 41-50 years of age group. Nearly 2/3rd cases were reported from the age group of 21-60 yeas (76%), followed by 14.4% from more than 60 years and 9.6% from less than 20 years. Table 2 shows the cause of death wise distribution of cases. In the lockdown period of 2020, cause of death in 36.4% case was natural disease followed by 19.1% RTA, 12% injury, 11.5% hanging, 5.5% burns, 4.5% assault/murder, 4.1% poison, 3.3% burning, 2.4% others, 0.7% Electrocution and 0.5% railway accidents.

Table 1: Age and sex-wise distribution of cases

Lockdown Period (From 25th March 2020 to 31st May 2020)				
Age (years)	**Male**	**Female**	**Total**	**%**
0-10	10	6	16	3.8
11-20	13	11	24	5.7
21-30	55	18	73	17.5
31-40	68	12	80	19.1
41-50	84	20	104	24.9
51-60	53	8	61	14.6
61-70	27	12	39	9.3
71-80	13	3	16	3.8
81-90	3	2	5	1.2
91-100	0	0	0	0.0
Total	326	92	418	100

Table 2: Distribution of Cases according to cause of death

	Lockdown period (From 25th March 2020 to 31st May 2020)		**Lockdown period of 2019 (From 25th March 2019 to 31st May 2019)**	
Cause of death	**Total Cases**	**Percentage**	**Total Cases**	**Percentage**
Assault/Murder	19	4.5	20	2.9
RTA	80	19.1	221	31.5
Railway	2	0.5	19	2.7
Injury	50	12.0	80	11.4
Burns	23	5.5	40	5.7
Drowning	14	3.3	29	4.1
Poison	17	4.1	41	5.8
Snake Bite	0	0	3	0.4
Hanging	48	11.5	65	9.3
Electrocution	3	0.7	5	0.7
Natural (Disease)	152	36.4	169	24.1
Others	10	2.4	9	1.3
Total	418	100	701	100.0

Table 3: Distribution of case according to various types of injury

Lockdown Period (From 25th March 2020 to 31st May 2020)		
Type of Mechanical Injury	**Number of Cases**	**Percentage (%)**
Head Injury	82	56.9
Multiple Injury	50	34.7
Spinal Cord Injury	4	2.8
Stab Injury	8	5.6
Total	144	100.0

In 2019 for the same period cause of death of reported cases was maximum of RTA (31.5%) followed by Natural (Disease) cases (24.1%). Still, in 2020, during Lockdown, cases of Natural (Disease), i.e., 36.4%, were more than cases of RTA (19.1). Table 3 shows the distribution of cases according to various types of injury, which shows that 56.9% head injury cases followed by 34.7% multiple injuries, 5.6% stab injury and 2.8 % Spinal cord Injury, which was the least among all cases related to the injury. Table 4 shows that out of 64 violent asphyxia deaths, 75% were due to hanging, followed by 21.9% due to drowning. Deaths due to strangulation and Smothering among violent asphyxia deaths was equal that is 1.6%. Table 5 shows that out of 169 natural cause of death cases, 43.2% cases were of Respiratory system followed by 31.4% were of cardio-vascular system, 13.6% of septicaemia (multi-organ failure), 5.9% of GIT system, 3% of the cerebral system, 1.8% of circulatory system/blood system and 1.2% of non-specific.

Table 4: Distribution of cases according to violent asphyxial deaths

Lockdown Period (From 25th March 2020 to 31st May 2020)		
Violent Asphyxial Death	**Number of cases**	**Percentage (%)**
Hanging	48	75.0
Strangulation	1	1.6
Drowning	14	21.9
Smothering	1	1.6
Total	64	100.0

Table 5: Distribution of Cases according to Natural Cause of deaths

Lockdown Period (From 25th March 2020 to 31st May 2020)		
Disease Type	**Number of Case**	**Percentage**
Cerebral System	5	3.0
Respiratory System	73	43.2
Cardiovascular System	53	31.4
GIT system	10	5.9
Circulatory (Blood) System	3	1.8
Septicaemia (Multi-organ Failure)	23	13.6
Non-specific	2	1.2
Total	169	100.0

Discussion

Babu et al. studied the comparison of the pattern of death during the Pre-lockdown period and COVID-9 lockdown period in Central Kerala.[9] They found 424 cases in the pre-lockdown period in the year 2019, whereas in the lockdown period in 2020, the number of cases declined to 270. Among the manner of deaths, accidents accounted for most of the deaths in 2019, i.e., 44.6% deaths due to accidents, whereas in the year 2020, deaths due to natural diseases topped the list, i.e., 46.3%. They concluded that differences in the manner of deaths were found statistically significant.

Sakelliadis et al. studied a total of 231 cases; 125 in 2019 and 106 in 2020.[10] Regarding gender, age and nationality, no significant differences were detected between the two time periods. Age subgroup analysis demonstrated an increased number of cases within the age group 70–79 years, in 2020. Regarding the type of death (violent, sudden/unexpected), the drop of violent deaths in the 2020 examined period was not confirmed as statistically significant. However, further subgroup analysis showed a significant drop in fatal injuries resulting from road traffic accidents in the 2020 period. They could not detect significant differences in the two time periods examined.

Nadeem et al. studied 62 cases of unnatural deaths, out of which 23 Cases in 2019 and 39 cases in 2020 were recorded.[11] In total 62 cases, in 2019, there were 15 males and 8 females, and in 2020, there were 27 males and 12 females. Maximum death reported from the age group of 30-59 years. In 2019, 65.2% were died due to homicide during the lockdown period, only 30.8% of victims lost their lives due to homicides. In 11 cases (47.8%) in 2019 and 8 cases (20.5%) in 2020, the cause of death was Firearm injuries. In 2019, only 1 death (4.3%) was caused by an accident, while a majority (36%) of deaths during the lockdown period amidst the COVID pandemic were attributed to roadside accidents.

Khurshid et al. conducted a study in Pakistan; 246 autopsies were studied in 2019 and 2020 in which the cause of death was road traffic accidents. The results showed that road traffic accidents during the lockdown period were significantly reduced, which may be explained by reduced traffic burden.[12] Calderon-Anyosa and Kaufman in Peru studied an interrupted time series analysis to assess the immediate impact and change in the trend of COVID-19 Lockdown on external causes of death, including homicide, suicide, and traffic accidents. A maximum decline in deaths related to traffic accidents was observed, that is, a reduction of 12.22 deaths per million per month in males and 3.55 deaths per million per month in women, while with a Homicide and suicide presented similar level drop in women.[13]

Tam et al. found large delays in patients with myocardial infarction seeking medical care during the lockdown. People were reluctant to go to a hospital during the COVID-19 outbreak, which explains the potential delays in seeking care and increase in natural mortality cause of death.[14] In our study, hanging/suicide increased from 9.3% (2019) to 11.5% in 2020. Gunnell et al. mentioned in the study that deaths by suicide increased in USA 1918-19 influenza pandemic and among older people in Hong Kong in 2003 SARS epidemic.[15] The general population's mental health might be exacerbated by fear, self-isolation, and physical distancing. Suicide risk might be increased because of stigma towards individuals with COVID-19 and their families, loss of employment and financial stressors, which will cause distress and leave many people vulnerable to suicidal behaviour.[15] In recent pandemics, studies conducted in Canada and Korea conclude that depression and anxiety were precipitated due to isolation and quarantine measures.[16,17] Brooks et al. had done an evidence-based rapid review of the 24 papers, which concluded that some of the stressors were longer quarantine duration, infection fears, frustration, boredom, inadequate supplies, inadequate information, financial loss, and stigma.[18] Fear of contagion, inadequate clarity around social distancing guidelines, often made worse by less reliable media sources, heightened confusion and fearmongering.[18] This reduced access to helpful

but "non-essential" psychiatric services and ultimately increased suicide cases.[19]

Venter et al. has conducted an observational retrospective audit of the patient register and studied 4 300 trauma presentations secondary to interpersonal violence and Road traffic collisions (RTC) between February - June 2019 and 2020 vs 3 239 presentations in February - June 2020. Significant reduction (40% decline) was observed in the number of RTCs, while declines in the volume of trauma cases secondary to interpersonal violence and of overall trauma cases in 2020, was not statistically significant.[20] Zsilavecz et al had studied trauma pattern in during COVID-19 Lockdown in South Africa, which also concluded that as a significant decrease in Motor vehicle accidents, pedestrian-vehicle accidents and interpersonal violence.[21] Yasin et al. conducted a narrative review on the effects of the COVID-19 pandemic and reported the reduction in overall absolute numbers of RTCs and their deaths and injuries globally.[22]

Conclusion

The present study was conducted at mortuary of Civil Hospital and B. J. Medical College, Ahmedabad to know the profile of medico-legal autopsy cases performed during covid-19 pandemic lockdown i.e., from 25th March 2020 to 31st May 2020 on total cases comprising 418 medico-legal autopsies. A maximum number of cases were recorded in the age group of 21-50 years. Male cases are more in number as compared to female. Death due to Natural causes (Disease) cases are more in number. On comparing our study data with the previous year 2019 data of the same period, we found that RTA and Railway accidents deaths are drastically reduced as all road and rail services were suspended. Unnatural deaths due to injury, burns, drowning, poisoning and snake bites are reduced to more than half in number in Lockdown compared to previous year. In Injury cases, head Injuries were more in number. Hanging cases were more common amongst violent asphyxial deaths.

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Conflict of interest: None to declare

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