Osong Public Health and Research Perspectives

Original Article

Impacts of Social Distancing During the COVID-19 Outbreaks in Korea: Level 1 Trauma Center Data of Domestic Incidents and Intentional Injury

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ABSTRACT

Article history:
Received: August 14, 2020
Revised: September 23, 2020
Accepted: October 6, 2020

Keywords:
COVID-19,
domestic violence, suicide,
trauma

Objectives: As a protective measure to slow down the transmission of coronavirus disease 2019 in Korea, social distancing was implemented from February 29th, 2020. This study aimed to evaluate the prevalence of domestic incidents and intentional injury during March 2020 when social distancing was in effect.
Methods: There were 12,638 patients who visited the Level 1 trauma center of Chungnam province with injuries from domestic incidents, familial discord, and intentional injury. The prevalence of injuries during March 2020 was compared with the average of the previous 5 years, and the average for every March between 2015 and 2019.
Results: The prevalence of domestic incidents in March 2020 was significantly higher than the 5-year average, and the average for every March from 2015 to 2019 ($p < 0.001$). Familial discord ($p = 0.002$) and intentional injury ($p = 0.031$) were more frequently observed in March 2020. Adolescents showed a markedly higher level of intentional injury in March 2020 than in both the 5-year average ($p = 0.031$), and average for every March over the previous 5 years ($p = 0.037$).
Conclusion: The prevalence of domestic incidents and intentional injury were significantly higher during the period of social distancing in Korea. There is a need for social consensus, better policies, and psychological support services, especially if faced with a second or third wave of coronavirus disease.

Introduction

While the coronavirus disease 2019 (COVID-19) continues to spread across the globe, Korea Centers for Disease Control and Prevention implemented a strict social distancing policy from February 29th, 2020 as a primary protective measure. Schools were closed and the public was advised to stay at home and avoid social gatherings as part of a social distancing policy to slow down transmission of disease.

There is increasing concern about the impact on people

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of official stay-at-home directives, quarantines, and social isolation [1]. In recent pandemics, isolation and quarantine have precipitated depression and anxiety [2,3], while social distancing measures have caused stress, depression, irritability, insomnia, fear, confusion, anger, frustration, and boredom in confined people with altered daily routines, and livelihoods [1].

Social distancing measures may also exacerbate domestic violence. In Hubei province, China, domestic violence more than tripled during the lockdown in February from 47 in 2019, to 162 in 2020 [4]. However, few studies have examined the effect of social distancing measures on intentional injury. The purpose of this study was to evaluate the effect of social distancing on the prevalence of domestic incidents and intentional injury, including self-harm or injury by violence.

Materials and Methods

The data of trauma patients who visited the Level 1 trauma center of Dankook University hospital from January 2015 to December 2019, and March 2020, were analyzed to evaluate changes in the prevalence of domestic incidents and intentional injury after social distancing measures were adopted in March 2020. The variables reviewed included basic demographics, the place of the incident, injury mechanism, injury severity score (ISS), familial discord, previous history of mental illness, and intention of the injury. Domestic incident was defined as an incident that took place at home or in its immediate surroundings. Intentional injury was categorized into self-harm and injury by violence. Suicidal behavior was included in the self-harm category, and injury by violence was defined as behavior with intention. Each domestic incident was reviewed by a psychiatrist and a psychologist to establish whether there was an intention to do harm. The prevalence of trauma injury in March 2020 was compared with the 5-year average and the averages for March from 2015 to 2019. Seasons were defined as spring (March-May), summer (June-August), autumn (September-November), and winter (December-February) to check for seasonal variations in self-harm. For the comparison, Chi-square tests or Fisher's exact test were used. $p < 0.05$ were considered statistically significant. All statistical analyses were performed using PASW Statistics 19 (IBM Corp., Armonk, NY, USA). This study was approved by the Institutional Review Board of Dankook University Hospital (approval no.: DKUH 202005003). Informed consent was waived.

Results

1. Demographics

Data of 12,638 patients who visited a Level 1 trauma center in Chungnam province from 2015 to 2019, and March 2020 were analyzed. The mean age was 50.4 years, and most were male (69.0%). The percentage of patients with an ISS > 15 was 19.5%. There were 90.1% of patients injured by blunt trauma. Patients visiting the trauma center in March every year as a ratio of the whole year ranged between 6.5% and 8.3% (Table 1).

2. Domestic incidents

The prevalence of domestic incidents increased significantly in March 2020 compared with the 5-year average (31.0% vs. 16.1%, $p < 0.001$), and the average for every month of March

Table 1. Basic demographics of patients visiting a Level 1 trauma center in Chungnam province.

Parameter	n = 12,638
Age (y)	50.4 ± 22.1
Sex (male)	8,991 (69.0)
ISS	9.8 ± 8.7
ISS > 15	2,542 (19.5)
ISS ≥ 25	1,110 (8.5)
Injured sites	
Head and face	3,407 (26.1)
Chest	2,968 (22.8)
Abdomen	2,216 (17.0)
Pelvis and extremities	7,338 (56.3)
Injury mechanism	
Blunt	11,393 (90.1)
Penetrating	849 (6.7)
Others	396 (3.1)
No. patient's March/whole year	
2015	177/2,123 (8.3)
2016	185/2,378 (7.8)
2017	157/2,400 (6.5)
2018	221/2,792 (7.6)
2019	214/2,742 (7.8)
2020	203/NA

Data are presented as n (%) or mean ± SD.
ISS = injury severity score; NA = not applicable.

between 2015-2019 (18.0%, *p* < 0.001). The prevalence of major trauma including moderate (ISS 9-15) and serious trauma (ISS 16-24) increased significantly compared to the 5-year average, and average for every March between 2015-2019 (Table 2).

3. Familial discord and intentional injury

Familial discord was higher during the period of social distancing in March 2020 (2.2%) than the 5-year average (0.4%, *p* = 0.002), and average for every March between 2015-2019 (0.5%, *p* = 0.007). Due to the uncertainty over the intention to do harm and limited information, in 3 cases, these were omitted from the analysis. The prevalence of intentional injury in March 2020 was significantly higher than the 5-year average (4.4% vs. 2.2%, *p* = 0.031), but when compared to the average for every March between 2015-2019, there was no statistical

difference although the ratio was 4.4% to 2.7% (*p* = 0.197; Table 3). The prevalence of self-harm did not differ by season (*p* = 0.085) or month (*p* = 0.590; Table 4). Spring and summer (May-August, 79/4,386, 1.8%) showed no difference in the prevalence of self-harm compared to other seasons (115/8046, 1.4%, *p* = 0.110).

4. Adolescents

Among adolescents in March 2020, 3 patients had intentional domestic injury: a 19-year-old female was beaten by her boyfriend (ISS = 16), a 15-year-old male attempted suicide by jumping from a balcony (ISS = 12), and a 15-year-old male sustained injuries after being pushed off from a balcony during a fight with his brother (ISS = 9). The prevalence of intentional injury among adolescents in March 2020 (30.0%) was

Table 2. The incidences of domestic trauma.

Parameter	March 2020 (*n* = 203)	2015-2019 (*n* = 12,435)	*p*	March 2015-2019 (*n* = 954)	*p*
Domestic incident	63/203 (31.0)	1997/12,435 (16.1)	< 0.001	172/954 (18.0)	< 0.001
Minor trauma (ISS < 9)	24/95 (25.3)	979/6,534 (15.0)	0.006	95/534 (17.8)	0.087
Major trauma (ISS ≥ 9)	39/108 (36.1)	1018/5,899 (17.3)	< 0.001	77/420 (18.3)	< 0.001
Moderate (ISS 9-15)	28/63 (44.4)	777/3,402 (22.8)	< 0.001	60/230 (26.1)	0.005
Serious (ISS 16-24)	7/28 (25.0)	123/1,409 (8.7)	0.003	8/106 (7.5)	0.009
Severe (ISS ≥ 25)	4/17 (23.5)	118/1,088 (10.8)	0.108	9/84 (10.7)	0.225

Data are presented as *n* (%).
ISS = injury severity score.

Table 3. The incidences of familial discord and intentional injury.

Parameter	March 2020 (*n* = 203)	2015-2019 (*n* = 12,432)	*p*	March 2015-2019 (*n* = 954)	*p*
Familial discord	5/203 (2.2)	52/12,435 (0.4)	0.002	5/954 (0.5)	0.007
Intentional injury					
Total	9/203 (4.4)	272/12,432 (2.2)	0.031	26/954 (2.7)	0.197
Age (y) 10-19	3/10 (30.0)	43/798 (4.5)	0.016	3/58 (5.2)	0.037
Self-harm					
Total	6/203 (3.0)	194/12,432 (1.6)	0.114	19/954 (2.0)	0.391
Age (y) 10-19	1/10 (10.0)	27/798 (3.4)	0.299	1/58 (1.7)	0.274
Injury by violence					
Total	3/203 (1.5)	78/12,432 (0.6)	0.141	7/954 (0.7)	0.393
Age (y) 10-19	2/10 (20.0)	16/798 (2.0)	0.019	2/58 (3.4)	0.100

Data are presented as *n* (%).

Table 4. Seasonal and monthly incidences of self-harm (2015 to 2019).

Parameter	Spring			Summer			Autumn			Winter			p
	3	4	5	6	7	8	9	10	11	12	1	2	
Self-harm per season	59/3,187 (1.9)			54/3,189 (1.7)			53/3,392 (1.6)			28/2,664 (1.1)			0.085
Self-harm per month	19/954 (2.0)	15/1,036 (1.4)	25/1,197 (2.1)	17/981 (1.7)	19/1,050 (1.8)	18/1,158 (1.6)	18/1,129 (1.6)	21/1,237 (1.7)	14/1,026 (1.4)	9/965 (0.9)	9/922 (1.0)	10/777 (1.3)	0.590

Data are presented as n (%).

significantly higher than the 5-year average (4.5%, p = 0.031), and the average for every March between 2015-2019 (5.2%, p = 0.037). Injury due to acts of violence was also higher among adolescents during the period of social distancing in March 2020 (20.0% vs. 2.0%, p = 0.019; Table 3).

Discussion

Public health emergencies requiring confinement, the restriction of normal routines, and reduced social and physical contact with others can cause a range of emotional responses and unhealthy behaviors [1,5,6] There is mounting concern about the psychological distress caused by the COVID-19 pandemic related to isolation and social distancing [7,8].

There have been several reports regarding the effects of isolation and quarantine. During the outbreak of Severe Acute Respiratory Syndrome in Toronto in 2004, it was noted that 129 quarantined people responding to a web-based survey, exhibited a high prevalence of psychological distress such as post-traumatic stress disorder (28.9%) and depression (31.2%) [2]. During the Boston marathon bombings in 2013 resulting in the city-wide lockdown, there was a 3.4-fold increase in the symptoms of pediatric functional neurological symptom disorder [9]. During the outbreak of the Middle East Respiratory Syndrome coronavirus in Korea during 2015, indicators of psychophysical stress in plasma such as the levels of circulating cell-free genomic DNA and circulating cell-free mitochondria DNA were measured during hemodialysis in isolated patients and followed for 3 months, and showed a significant delay in normalization was observed, which implied that isolation caused high levels of stress [10]. A recent systematic review showed consistent evidence linking social isolation and loneliness to deteriorating cardiovascular and mental health outcomes [11].

The findings from this study showed that the prevalence of

domestic incidents and intentional injury was significantly higher in March 2020 than in the past 5 years. During the 1918–19 influenza pandemic in the United States, and the 2003 Severe Acute Respiratory Syndrome outbreak in Hong Kong, deaths by suicide increased [12-14]. Although the etiology for the increase in suicides during an epidemic is unknown, the psychological distress induced by an economic downturn, social discrimination, and barriers to mental health treatment are suggested as possible predictors [15,16].

Previous studies have reported higher suicide rates in late spring and summer in the Northern hemisphere [15,17]. In this current study, no seasonal variation or monthly variation was observed however, the prevalence of intentional injury and self-harm in March 2020 was not higher than the average for March over the past 5 years. However, the cohort was too small to power this study. Since there have been several reports that the seasonality of suicide in late spring and summer tends to diminish [17,18], the coincidence of COVID-19 and the seasonal effects needs further investigation.

The increase in violence, especially domestic violence, is an important concern associated with the effects of social distancing [19-22]. The psychological stress associated with the lockdown due to factors such as closure of schools, more interaction within the family, and isolation from social support may leave families vulnerable to intra-familial conflict and domestic violence [19,21,22]. Globally there has been a substantial increase in domestic violence in the wake of the COVID-19 pandemic and enforced confinement. Domestic violence increased in Brazil by 40–50%, 1 region of Spain recorded 20%, and Cyprus reported a 30% increase [21]. An Australian article also reported that domestic violence increased by 5% during the lockdown and a 40% drop in overall crime rate [21]. Reports of domestic violence in France have increased 30% since they initiated lockdown. Helpline calls increased 33% in Singapore and 25% in Argentina [23]. Alarming trends in US domestic violence have also been reported [23].

In this study, a marked increase in the prevalence of intentional injury and injury by domestic violence in adolescents was observed after social distancing measures were implemented in March 2020. Although scientific debate on the effectiveness of school closures on virus transmission is ongoing [24], school closure for a long period of time could have detrimental consequences [25]. For adolescents with mental health issues school routines are important coping mechanisms [4], and school closures mean a lack of access to the resources that schools usually provide [26]. Evidence shows that violence and vulnerability increase in adolescents during long periods of school closures [22] including summer holidays [27]. An increased rate of child abuse, neglect, and exploitation have been reported during previous public health emergencies, such as the Ebola outbreak in West Africa in 2014 to 2016 [4]. During the COIVD-19 pandemic, stressors such as fear of infection, frustration, boredom, lack of in-person contact with classmates, friends, and teachers, lack of personal space at home, and financial issues in the family become problematic [6] as observed in this current study with increases in intentional injuries.

Social distancing requires physical space between people but ideally it should include social solidarity. To mitigate the consequences of home confinement, the potential unintended adverse outcomes on mental health-related issues should be addressed and the government, community, teachers, parents, and healthcare professionals need to be aware of this [4,5]. Adolescents who are more vulnerable may benefit from technology-enabled modalities such as open-access online resources [22] or online services to cope with mental health issues caused by domestic conflicts or tension with parents [4].

There are several limitations in this study. Firstly, the number of subjects was too small to statistically compare the average incidents of trauma for March over the past 5 years. Secondly, the patients who visited the Level 1 trauma center were not representative of the whole province or countrywide figures and therefore generalizations cannot be made. Since patients are referred after an initial examination and according to the severity of their trauma, those with minor injuries may not visit a Level 1 trauma center. In 2019, only 26% of severely injured patients were transferred to the Level 1 trauma center in Chungnam province. Thirdly, psychological abuse without physical assault was not included in this cohort. In addition, patients who provide incorrect histories regarding injury mechanisms may have also been excluded.

Conclusion

In conclusion, the prevalence of domestic incidents and intentional injury increased significantly during March 2020 in the implemented period of social distancing in South Korea. Our findings warrant further study regarding the psychological impact of the COVID-19 pandemic and social distancing measures. The development of social consensus, policies, and psychological support services needs to be considered, especially if there is a second or third wave of infections.

Conflicts of Interest

The authors have no conflicts of interest to declare.

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