

Effects of Social Distancing on the Incidence of Traumatic Injuries

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ABSTRACT

Aim: To understand how social distancing orders impact the incidence of traumatic injuries.

Background: In an attempt to blunt the spread of the novel coronavirus SARS-CoV-2, social distancing and stay home orders have been enforced. Here we analyze the effect that these public health measures have had on the rate of traumatic injury presenting to a level 1 trauma center.

Materials and methods: This is a retrospective analysis of the number of trauma patients presenting to a level I trauma center from January 2019 through April 2020. Patients were identified using an institutional trauma registry and include trauma transfers, trauma activations, and admitted trauma patients. The independent samples *t*-test and the Mann–Whitney *U* test were used to assess differences between groups. Shapiro–Wilk and Levene’s tests were used to assess normality and variances, respectively.

Results: When comparing daily admissions in 2020 before and after social distancing orders, there was a significant reduction in the median daily number of trauma patients (12 vs 8.5; $p < 0.0001$) after the social distancing order was put into place. Additionally, there was a significant decrease in the mean number of weekly trauma patients presenting to our hospital in 2020 before and after social distancing orders (86.1 vs 60.3; $p < 0.0001$). When looking at weekly patient counts, there was a significant reduction in blunt trauma patients when comparing pre- and post-social distancing (56.6 vs 35.7; $p < 0.01$). However, there was no change in the number of weekly penetrating injuries (17.0 vs 17.1).

Conclusion: Social distancing orders have significantly reduced the number of blunt trauma patients presenting to our level 1 trauma center. Further studies will be needed to determine long-term effects of these measures.

Keywords: COVID-19, Public health, Retrospective, SARS-CoV-2, Social distancing, Trauma reduction

ABSTRACT

Objetivo: Para comprender cómo las órdenes de distanciamiento social impactan la frecuencia de lesiones traumáticas.

Introducción: Por mitigar la propagación del coronavirus SARS-CoV-2, se han aplicado las órdenes de distanciamiento social y quedarse en casa. Aquí analizamos el efecto que estas medidas de salud pública han tenido en la tasa de lesiones traumáticas que se presentan en un centro de trauma de nivel 1.

Materiales y métodos: Presentamos un análisis retrospectivo del número de pacientes con lesiones traumáticas que se presentaron en un centro de trauma de nivel I desde enero de 2019 a abril de 2020. Los pacientes fueron identificados mediante un registro de trauma institucional e incluyen transferencias de trauma, activaciones de trauma y pacientes de trauma admitidos. Se usaron muestras independientes de la prueba *t* y la prueba *U* de Mann–Whitney para evaluar las diferencias entre los grupos. Las pruebas de Shapiro–Wilk y Levene se utilizaron para evaluar la normalidad y las variaciones, respectivamente.

Resultados: Al comparar las admisiones diarias en 2020 antes y después de las órdenes de distanciamiento social, hubo una reducción significativa en el número medio diario de pacientes con trauma (12 vs 8.5; $p < 0.0001$) después de que se estableció la orden de distanciamiento social. Además, hubo una disminución significativa en el número medio de pacientes con trauma semanal que se presentaron en nuestro hospital en 2020 antes y después de las órdenes de distanciamiento social (86.1 vs 60.3; $p < 0.0001$). Al observar el número de pacientes semanales, hubo una reducción significativa en los pacientes con traumatismo cerrado al comparar el distanciamiento pre y post social (56.6 vs 35.7; $p < 0.01$). No hubo cambio en el número de lesiones penetrantes semanales (17.0 vs 17.1).

Conclusión: Las órdenes de distanciamiento social han reducido significativamente el número de pacientes con trauma cerrado que se presentan en nuestro centro de trauma de nivel 1. Se necesitarán más estudios para determinar los efectos a largo plazo de estas medidas.

Palabras clave: COVID-19, Distanciamiento social, Retrospectivo, Reducción de trauma, SARS-CoV-2, Salud pública.

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INTRODUCTION

The first case of SARS-CoV-2 in Louisiana was confirmed on March 9, 2020. By the end of April, confirmed cases state-wide rose to 27,286 with 6,365 in Orleans Parish, home to the city of New Orleans.¹ In response to the rising number of cases, mandatory state and city orders were put into effect on March 17, banning gatherings of more than 50 people and closing bars, casinos, theaters, and dine-in restaurants.

Social distancing is a nonpharmacological public health tool that can be used to slow the spread of infection diseases, especially

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when community transmission has already occurred and close contacts of infected patients are difficult or too numerous to trace. This technique is particularly effective in controlling pathogens that are spread via respiratory droplets, such as SARS-CoV-2, and thus require close contact for transmission.² Previous studies have demonstrated the efficacy of social distancing interventions in reducing the spread of infections during pandemics.³⁻⁵ The CDC has also suggested the implementation of social distancing strategies to slow the spread of SARS-CoV-2.⁶

These social distancing recommendations and stay home orders may have other unintended effects on community health beyond blunting the spread of SARS-CoV-2. Here, we analyze the effect of the March 17 social distancing order on the number of patients admitted with traumatic injuries to our level 1 trauma center in New Orleans to assess a possible impact on rates of traumatic injury.

MATERIALS AND METHODS

Research approval was granted by the Tulane University Institutional Review Board and approval was obtained from University Medical Center. This is a retrospective analysis of trauma patients admitted to a level 1 trauma center from January 2019 through April 2020. All adult patients who met trauma criteria were included in our counts including trauma activations, trauma transfers, and admitted trauma patients.

Trauma patient counts were obtained using daily snapshot reports received from the institutional trauma registrar, which included the daily number of trauma patients for 2019 and 2020. We further divided 2020 into pre- and post-social distancing measures, which went into effect in New Orleans on March 17. Patients were grouped by date of injury (before vs after social distancing) and further stratified by mechanism of injury (blunt, penetrating, other). "Other" injuries were composed of thermal injuries and those that did not meet registry criteria. We then compared median daily and mean weekly counts of trauma patients for each group. Patient demographics and mechanism of injury were gathered from our institutional trauma registry database.

Data was analyzed using Stata version 14.2 (College Station, TX). The numbers of trauma patients before and after social distancing were compared using the independent samples *t*-test or the Mann-Whitney *U* test. Shapiro-Wilk and Levene's tests were used to assess normality and variances, respectively. Nonparametric distributions are presented as median (IQR), normal distributions are presented as mean (standard deviation, median, [IQR]), unless otherwise noted. Differences were considered significant when a two-sided *p* value < 0.05.

RESULTS

Of the 1,309 adult trauma patients who presented to our hospital between January 1 and April 28 2020, approximately 64% suffered blunt trauma (*n* = 837) and 22% suffered penetrating injuries (*n* = 290). Subjects were primarily male (*n* = 907, 76.4%), with a median (IQR) age of 38 (26-55) (Table 1). There was no significant difference in age before social distancing (median = 38; IQR [26-55]) and after social distancing (36 [25-52]). There was no difference in the racial or ethnic composition when comparing pre- and post-social distancing groups.

There was no significant difference in the number of weekly penetrating injuries before and after social distancing guidelines

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Table 1: Patient demographics and mechanism of injury between January 1, 2020 and April 28, 2020

Date	January 1– March 17, 2020	March 18–April 28, 2020	Total
Demographics			
Age mean (median [IQR])	41 (38 [26–55])	40 (36 [25–52])	41 (38 [26–55])
Male	624 (73.7%)	283 (83.9%)	907 (76.6%)
Black	437 (51.6%)	182 (54.0%)	619 (52.2%)
White	336 (39.7%)	130 (38.5%)	466 (39.3%)
Other	75 (8.8%)	25 (7.4%)	100 (8.4%)
Latino/ Hispanic	65 (7.7%)	20 (5.9%)	85 (7.1%)
Mechanism of injury			
Blunt	623 (65.7%)	214 (59.1%)	837 (63.9%)
Penetrating	187 (19.7%)	103 (28.4%)	290 (22.2%)
Other	137 (14.4%)	45 (12.4%)	182 (13.9%)
Total patients	947	362	1309

were put into effect (17.0 vs 17.1). Prior to March 17, there was an average of 56.6 (standard deviation = 7.7) weekly blunt injuries compared to 35.7 (7.9) after social distancing, representing a significant decrease in blunt injuries (*p* < 0.01).

In 2019, the number of daily trauma patients followed a nonparametric distribution with a median of 12 (IQR = 9-15), and the weekly number of trauma patients was normally distributed with a mean of 84.2 (standard deviation = 12.7, median = 83.5, IQR = [72.5-93]). Similarly, in 2020 prior to March 17, there was a daily median of 12 (9-15) trauma patients and a weekly median of 86.1 trauma patients (10.2, 84, [77-96]). In the 6 weeks after the March 17 social distancing order, there was a daily median of 8.5 (5-11) trauma patients and a weekly mean of 60.3 trauma patients (9.3, 63, [54-67]) (Figs 1 and 2).

There was no significant difference between the median daily or mean weekly number of trauma patients when comparing 2019 to 2020 prior to March 17 (12 vs 12; 84.2 vs 86.1, respectively) (Fig. 3). When comparing daily admissions in 2020 before and after March 17, there was a significant reduction in the median daily number of trauma patients (12 vs 8.5; *p* < 0.0001) after the social distancing order was put into place (Fig. 4). Additionally, there was a significant decrease in the mean number of weekly trauma patients before and after March 17 (86.1 vs 60.3; *p* < 0.0001). When comparing the weeks following the social distancing orders to 2019, the daily median number of trauma patients was significantly lower (8.5 vs 12; *p* < 0.0001). Similarly, the mean number of weekly patients significantly differed when comparing social distancing 2020 to 2019 (60.3 vs 84.2; *p* < 0.0001).

DISCUSSION

There was no significant difference between the number of daily and weekly trauma patients between 2019 and 2020 prior to social



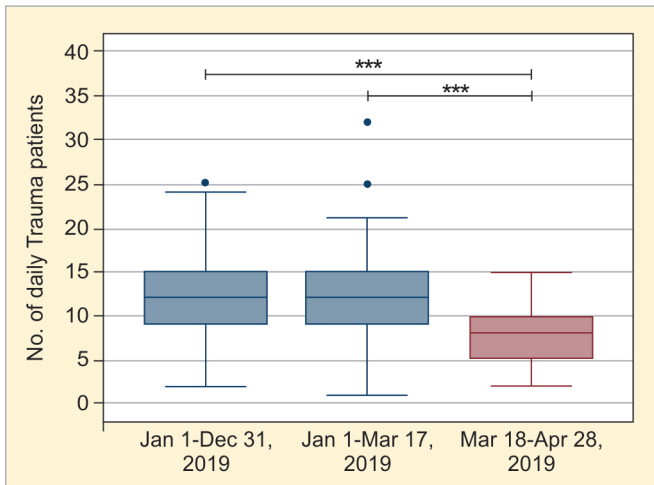


Fig. 1: Distribution of daily number of trauma patients. 2019 (median = 12; IQR = [9-15]), 2020 before March 17 (12; [9-15]), 2020 after March 17 (8.5; [5-11]). *** $p < 0.0001$

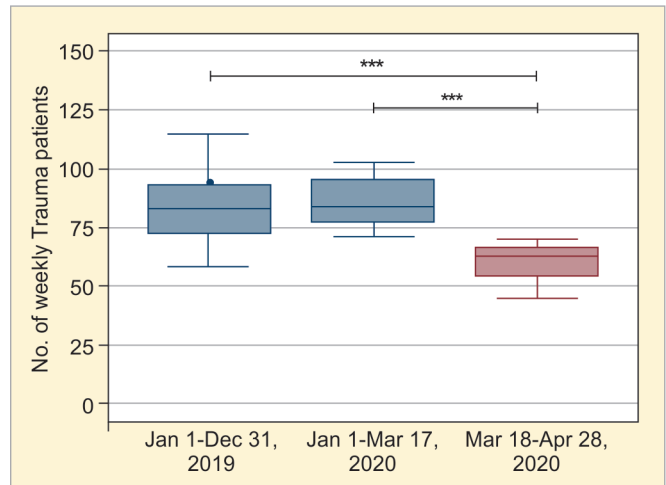


Fig. 2: Distribution of total weekly number of trauma patients. 2019 (mean = 84.2, standard deviation 12.7), 2020 before March 17 (86.1; 10.2), 2020 after March 17 (60.3; 9.3). *** $p < 0.0001$

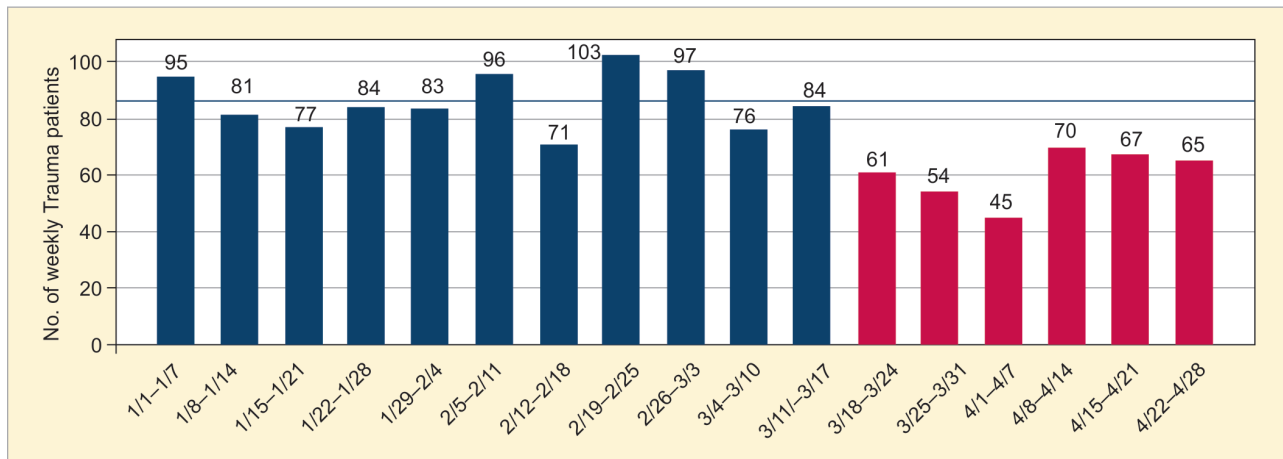


Fig. 3: Number of trauma patients by week from January 1 to April 28, 2020. The horizontal solid line represents the mean weekly number of trauma patients (86.1) prior to March 17. Blue bars indicate weekly counts prior to March 17. Red bars indicate weekly counts after the March 17 social distancing orders

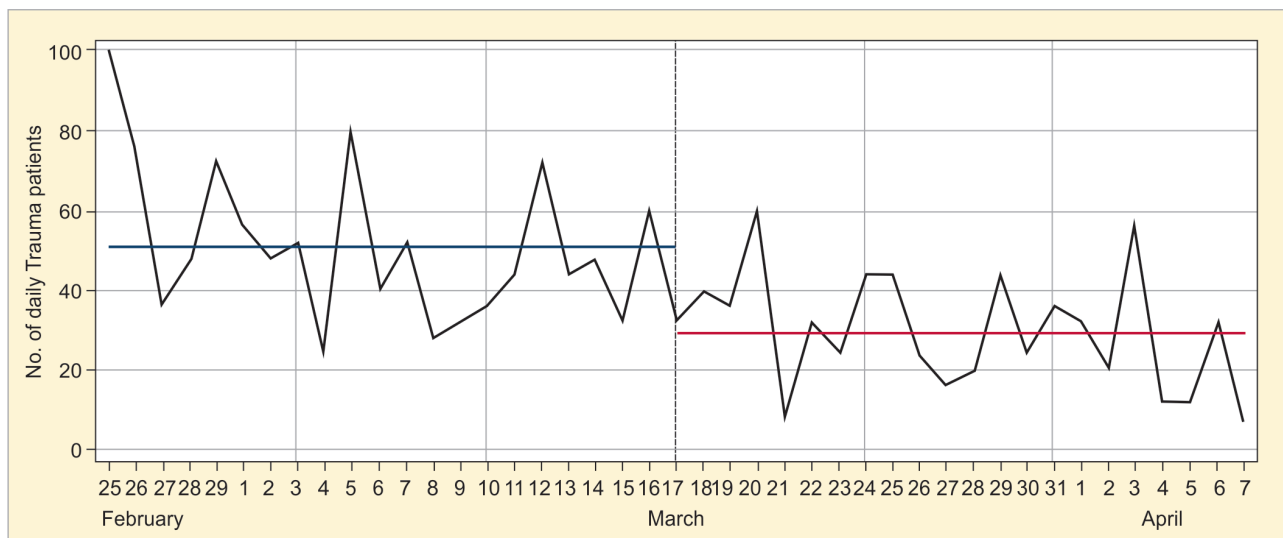


Fig. 4: Number of total trauma patients per day from February 25 to April 7, 2020. The horizontal blue line represents the mean daily number of trauma patients (12.6) in the 3 weeks prior to March 17. The horizontal red line represents the mean daily number of trauma patients (7.4) in the 3 weeks following March 17. The vertical dashed line represents the implementation of the March 17 social distancing mandate

distancing. The introduction of social distancing orders on March 17, 2020, resulted in a significant decline in the number of both daily and weekly trauma patients compared to the early months of 2020. There was a significant decline in the total number of blunt trauma patients; however, the total number of penetrating trauma patients remained unchanged.

The observed reduction in patients after March 17 might be a result of high-risk patients avoiding the hospital due to fear of contact with SARS-CoV-2; however, the nature of traumatic injuries represented in this study requires emergent evaluation and treatment. Thus, we believe that the count data reflect a true decrease in traumatic injury and not a reduction in reporting.

Social distancing and stay home orders may reduce injuries due to mechanisms that typically occur outside of one's home, while injuries that occur at home may be less affected by these orders. Interestingly, there was no reduction in the mean number of weekly penetrating injuries before and after social distancing. Most of the reduction of traumatic injuries can be attributed to a decrease in the weekly incidence of blunt trauma. It is unclear if the reduction of blunt injuries is a direct result of fewer motor vehicle accidents and minor assaults, or if there are other intermediate consequences of social distancing that ultimately caused the observed reduction. Future analysis comparing specific mechanisms of injury will further elucidate this effect.

While our data show that there has been a reduction in traumatic injuries, it is unclear how criminal activity has played a role in this reduction. A previous study has demonstrated an increase in violent crime during economic hardship.⁷ Interestingly, however, despite the severe economic impacts of social distancing, national data have actually shown a decrease in crime across major cities including Chicago, Detroit, Los Angeles, and New York.^{8,9} Similar studies to ours, performed in these larger cities, would help determine if there is a correlation between crime and traumatic injury in the setting of social distancing.

CONCLUSION

The March 17 social distancing mandate had a significant effect of lowering the number of blunt trauma patients at our level 1 trauma center. This observed decrease could be caused by multiple factors, including decreases in accidents related to social gatherings or violent crimes in the area. Additional data will be helpful to determine the full effect of social distancing recommendations and

stay home orders on traumatic injuries. Given the short amount of time since the implementation of these measures, further study of the ongoing situation will be vital to fully understanding the impact on our communities' overall health. Further investigation will be needed to understand the entire implications of these findings and determine if the reduction in traumatic injury is a temporary or sustained effect of social distancing.

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