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ORIGINAL ARTICLE

Emergency Care for Suicidal Behavior Before and During the COVID-19 Pandemic in Two Hospitals in Bogotá: a Longitudinal Analysis

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ABSTRACT

Introduction: The impact of the COVID-19 pandemic and confinement measures on the pattern of admissions for suicidal behavior in emergency departments is unknown.

Methods: A retrospective longitudinal cohort study was conducted, collecting monthly data from January 2015 to June 2022 from the mental health program of two reference institutions in Bogotá. All patients were assessed by psychiatrists and psychologists in the emergency department and their demographic, clinical and specific attributes of suicidal behavior were characterized. An interrupted time series analysis was performed to evaluate the trend and impact on the pattern of care before and during the pandemic.

Results: A total of 884 individuals were admitted for suicidal behavior during the study period (67% women, 66% young adults, 55% students, and 1.6% LGBTQ+ population). There was an increase in the number of cases attended (mean of 5 additional cases per month) compared to the pre-pandemic period ($p < 0.000$). Suicidal ideation was the most documented typology during the pandemic ($p < 0.001$), and the prevalence of suicidal behavior among children and adolescents (≤18 years) increased from 29% to 33%.

Conclusions: Theresults suggest that the pandemic catalyzed the number of admissions for suicidal behavior in the general population after the implementation of containment measures or contagion prevention restrictions. The need to integrate emergency departments in the prevention, detection, management, and follow-up of suicidal behavior, especially in the current mental health epidemic, is underscored.

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Atenciones en urgencias por conducta suicida antes y durante la pandemia por COVID-19 en dos hospitales de Bogotá: un análisis longitudinal

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RESUMEN

Introducción: se desconoce el impacto de la pandemia por COVID-19 y las medidas de confinamiento en el patrón de admisiones por conducta suicida en los servicios de urgencias.

Métodos: estudio de cohorte retrospectivo longitudinal en el que se recogieron datos mensuales desde enero de 2015 hasta junio de 2022 del programa de salud mental de dos instituciones de referencia en Bogotá. Todos los pacientes fueron valorados por psiquiatría y psicología en urgencias y se caracterizaron sus atributos demográficos, clínicos y específicos de la conducta suicida. Se realizó un análisis de series de tiempo interrumpido para evaluar la tendencia y el impacto en el patrón de atenciones antes y durante la pandemia.

Resultados: 884 personas fueron admitidas por conducta suicida durante el periodo de estudio (67% mujeres, 66% adultos jóvenes, 55% estudiantes y 1,6% población LGBTIQ+). Se evidenció un incremento en el número de casos atendidos (media de cinco casos adicionales por mes) en comparación con el periodo prepandemia ($p < 0,000$). La ideación suicida fue la tipología más documentada durante la pandemia ($p < 0,001$) y la prevalencia de conducta suicida entre niños y adolescentes (≤18 años) aumentó del 29% al 33%.

Conclusiones: los resultados sugieren que la pandemia catalizó el número de atenciones por conducta suicida en la población general después de que se implementaron las restricciones anticontagio. Se subraya la necesidad de integrar los servicios de urgencias en las actividades de prevención, detección, manejo y seguimiento de la conducta suicida, especialmente en la actual epidemia de salud mental.

INTRODUCTION

The World Health Organization (WHO) (1) considers suicide to be a serious and growing public health problem worldwide. It represents the second leading cause of death in people aged 10 to 24 years and appears among the twenty leading causes of death throughout the world. Approximately one million people die by suicide each year, which is equivalent to one death every forty seconds; moreover, for every death by suicide there are twenty suicide attempts (1). The WHO (2) reports that suicide rates have increased by 60% in the last 50 years and that Colombia has the third highest number of cases in Latin America, after Cuba and Brazil.

In Colombia, the prevalence of suicide attempts is similar to that of other countries in the region, and the population at greatest risk is between 16 and 21 years of age (3). According to figures from the Colombian National Institute of Health (Instituto Nacional de Salud–INS) (4), deaths due to intentionally self-inflicted injuries have been increasing continuously since 2013 and were the third leading external cause of death in 2019, with 9.6%. Out of the total suicide deaths reported to the INS in 2019 (2,927), 79.9% occurred in men. Data from the 2015 National Mental Health Survey (5) showed that the prevalence of suicidal ideation in adolescents (aged 12 to 17 years) was 6.6%; the prevalence of attempted suicide in the same group was 2.5%, while 37.6% of adolescents who have thought about suicide would have attempted it.

Suicidal behavior (SB) constitutes a global mental health imperative, which is why it was included in Colombia's 2012–2021 Ten-Year Public Health Plan (6) and since 2014 it has been one of the events prioritized within routine surveillance and individual case notification, giving rise to the regulation of the National Mental Health Law (Law 1616 of 2013) (7). SB involves a series of complex events that can affect people of any age or social status and has devastating and lasting consequences for the individual, his or her family and the community (2).

The WHO (2) defines SB as a sequence of events called the *suicidal process,* which begins with thoughts and ideas that evolve into suicidal plans and culminate in one or multiple attempts with progressively increasing lethality but without leading to death, until finally the suicide is completed. This series of events includes suicide threats, gestures, and ideation, as well as attempted and completed suicide.

With the increase in the number of cases of Severe Acute Respiratory Syndrome-Coronavirus-2 (SARS-CoV-2) infection in the early stages of the pandemic, suicide became a concern for persons with mental disorders or risk behaviors. Situations such as fear of contagion, loneliness, and physical distancing, along with possible increases in domestic violence, alcohol consumption, sleep disturbances, and financial stressors during confinement measures, were factors associated with increased risk of SB (8-14). The aim of this study was to analyze the epidemiological behavior and variations in the pattern of emergency department admissions for suicidal behavior in the general population before and during the pandemic.

METHODS

We conducted a retrospective, longitudinal cohort study of patients who consulted the emergency department for SB in two private tertiary care institutions in the city of Bogotá D. C. before the COVID-19 pandemic (pre-pandemic period: January 1, 2015, until March 5, 2020) and from the appearance of the first confirmed case of SARS-CoV-2 infection in Colombia (pandemic period: March 6, 2020, until June 30, 2022). During the pandemic period, mandatory preventive confinement or isolation measures were implemented, which subsequently evolved into gradual social openness (post-confinement) with the start of the National COVID-19 Vaccination Plan in February 2021 (Figure 1). All patients in the study group were jointly assessed by a psychiatrist and a psychologist

in the emergency departments of the two participating institutions. The mental health team has provided 24/7 emergency care since 2015, when the mental health program was formalized, and it has been responsible for collecting demographic data, personal history, and characterization of suicidal behavior, if applicable. The unit of analysis of the present study was the daily number of patients assessed for SB in the emergency department; we worked with the program's census data.

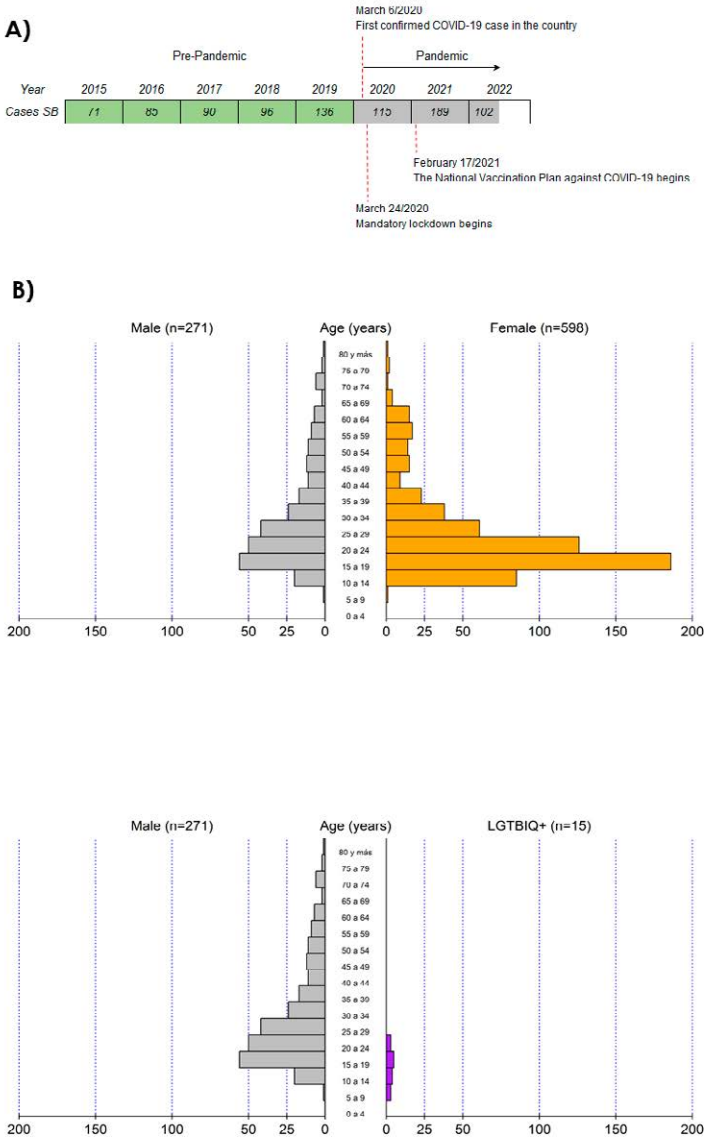

Figure 1. Incident cases of suicidal behavior and demographic distribution

A) Timeline with the number of people seen for SB during the COVID-19 pre-pandemic and pandemic periods in two hospitals in Bogotá D. C. B) Distribution and population structure of persons seen in emergency departments for SB between 2015 and 2022

Source: Own work

Statistical analysis

Quantitative variables were analyzed using measures of frequency, central tendency and dispersion. Categorical data were analyzed using proportions; and the assumptions of normal distribution in continuous variables were analyzed using the nonparametric Shapiro–Wilk test. In the bivariate analysis for group comparison, the Chi^2 statistic and Fisher's exact test were used. The coefficient of variation (CV) was applied to quantify the relative variability in the incidence of SB cases between the two periods: pre-pandemic and pandemic. In the hypothesis test, p values < 0.05 were considered statistically significant.

In the descriptive analysis of the time series, the autocorrelation function (ACF) and partial autocorrelation function (PACF) were evaluated. An Autoregressive Integrated Moving Average (ARIMA) model was developed to analyze the time series (TS). On the other hand, the Mann-Kendall test was performed to identify the trend in the TS, and the presence of autocorrelation in the residuals was assessed with the Durbin–Watson statistic. Likewise, the Ljung–Box test was implemented to test for general randomness as a function of the lags of the TS.

A nonparametric interrupted time series (ITS) analysis was performed to control for annual trends and seasonal variations (15,16). In the absence of intervention (i.e., the COVID-19 pandemic), this trend would remain unchanged; therefore, only the effect of the intervention was assessed and other structural determinants in patterns of care were not considered. A segmented regression impact model (factual vs. counterfactual model) was used to determine a level change in the ITS as follows:

$$Y_t = \beta_0 + \beta_1 * Time_t + \beta_2 * Intervention_t + \beta_3 * Post\ Intervention_t + \varepsilon_t$$

Where:

Y_t = Number of SB cases attended per month

β_0 = Number of baseline cases at time zero

β_1 = Change in trend prior to intervention, i.e., pre-pandemic period

β_2 = Change in the estimated number of SB cases immediately after the onset of the intervention (start of the COVID-19 pandemic period), i.e., since the end of the pre-pandemic period. Intervention is a dichotomous variable coded as 0 (before intervention) and 1 (after intervention).

β_1 y β_3 = Slope of the ITS after the intervention

ε_t =Random variability not explained by the model

The dataset was analyzed using the R 4.2.0 programming language.

ETHICAL ASPECTS

According to Resolution 8430 by the Colombian Ministry of Health and Social Protection (*MSPS* in Spanish), this is a risk-free research study. Therefore, it was not necessary to sign an informed consent form. The coordination of the study was the responsibility of the Mental Health Department of each of the participating institutions. Likewise, the research protocol was approved by the Ethics Committee of each institution (CEIFUS-1942-22).

RESULTS

A total of 884 persons were admitted for SB to the mental health unit of the emergency department of the participating institutions, which represented a total mean of 110 cases/year during the study period. The mean age of the patients was 26.4 years (SD = 14.3); the majority were female (67.6%), young adults (66.4%), single (62.44%) and students (55.6%) (Table 1 and Figure 1).

Table 1. Demographic characteristics

Variable	Frequency	(%)
Gender		
Female	598	67.65
Male	271	30.66
LGTBIQ+	15	1.69
Age group in years		
<18	278	31.45
18 a 64	587	66.4
65+	19	2.15
Marital status		
Single	552	62.44
Data not available	168	19.01
Married	71	8.03
Separated/Divorced	57	6.45
Domestic partnership	29	3.28
Widow(er)	7	0.79
Occupation		
Student	492	55.66
Employee	181	20.48
Unemployed	65	7.35
Independent worker	62	7.01
Homemaker	40	4.52
Pensioned/Retired	26	2.94
Not available	15	1.7
Out-of-school person	3	0.34

Source: Own work

A total of 59.6% of the patients had already had a previous episode of SB; a very high indicator in the LGBTIQ+ population group (86.6%). Out of the patients with a previous episode of SB, 65.1% were under outpatient clinical management by a psychiatrist or psychologist, and, out of these, 47.3% had a prescription for outpatient pharmacological therapy. Suicide attempt was the most frequent type of event in the entire cohort (63.9%), the most commonly reported method was intoxication or poisoning (59.1%), and the home or usual residence was the physical space where most of the behaviors materialized (85.8%) (Table 2).

Table 2. Behavior of emergency department admissions for suicidal behavior before and during the COVID-19 pandemic

Variable	Pre-pandemic period (1/01/2015 to 5/03/2020)		Pandemic period (6/03/2020 to 30/06/2022)		p-value	Total
	n = 478	(%)	n = 406	(%)		N = 884
Gender						
Female	320	66.95	278	68.47	0.065	598
Male	154	32.22	117	28.82		271
LGTBIQ+	4	0.83	11	2.71		15
Age group in years						
<18	143	29.92	135	33.25	0.443	278
18 a 64	326	68.2	261	64.29		587
65+	9	1.88	10	2.46		19
Type of event						
Attempt	315	65.9	250	61.58	<0.001	565
Ideation	102	21.34	129	31.77		231
Self-injurious behavior	33	6.9	10	2.46		43
Threat	19	3.97	16	3.94		35
Completed	8	1.67	1	0.25		9
Data not available	1	0.22	0	0		1
Method						
Intoxication/Poisoning	282	59	241	59.36	0.192	523
Sharp object	59	12.34	47	11.58		106
Data not available	64	13.38	38	9.35		102
Jumping from a height	29	6.07	31	7.64		60
Other	30	6.28	27	6.65		57
Hanging	7	1.46	13	3.2		20
Firearm	2	0.42	6	1.48		8
Jumping in front of a moving vehicle	5	1.05	3	0.74		8
Place of occurrence						
Home	411	85.98	348	85.71	0.117	759
Other	31	6.49	32	7.88		63
Road/Public site	21	4.39	8	1.97		29
Educational Institution	12	2.51	10	2.46		22
Work site	2	0.42	5	1.23		7
Data not available	0	0	2	0.49		2
Private institution	0	0	1	0.25		1
Public transportation	1	0.21	0	0		1

Source: Own work

In general, the highest peak in emergency department admissions was recorded in the months of September (mean = 12.5 cases/month), while the lowest numbers occurred during the months of January (mean = 7.5 cases/month). During the five years of the pre-pandemic period, the average annual number of admissions for SB was 95.6 cases, while in the pandemic period it was 135.3 (p <

0.001). During the 2020 confinement measures, the number of patients admitted decreased (n = 115) compared to the immediately preceding year, 2019 (n = 136); however, with the measures put in place during post-confinement, cases increased again in 2021 (n = 189) (Figures 1 and 2).

Regarding the type of event, the results showed a significant increase in the prevalence of suicidal ideation during the pandemic period compared to its pre-pandemic counterpart (31.77% vs. 21.34%, respectively; $p < 0.001$), while no differences were observed in method and place of occurrence, neither by age group nor by gender (Table 2). The TS analysis showed a positive trend in emergency department care for SB that increased with the onset of the pandemic (Mann-Kendall test; $p < 0.000$) and remained so until the end of the study period (Figure 2).

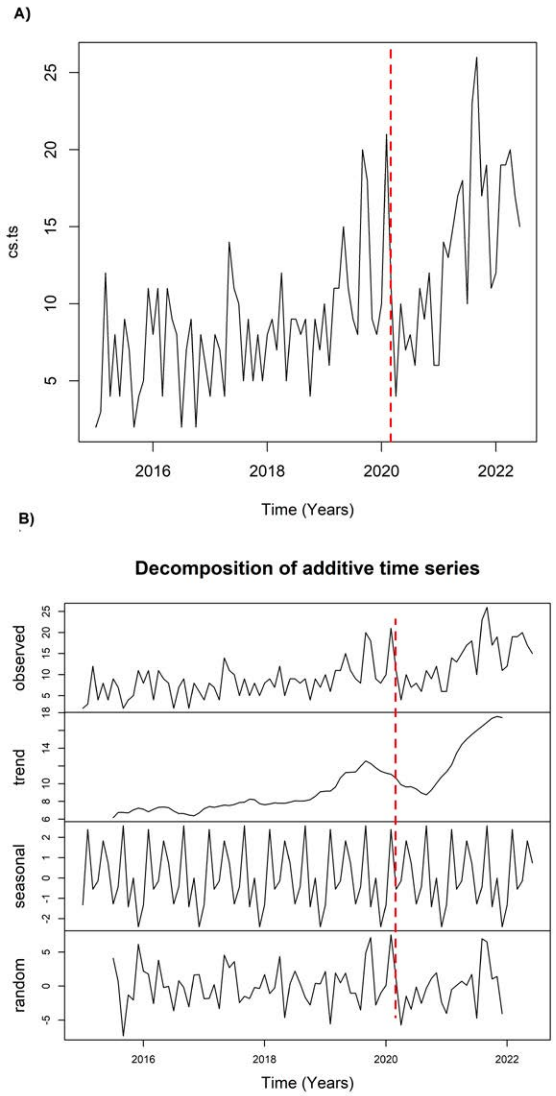

Figure 2. Time series data (number of people with suicidal behavior)

A) Behavior of the time series before and during the COVID-19 pandemic **B)** Additive decomposition of the time series of people with suicidal behavior attended in the emergency department in two hospitals in Bogotá D. C. between 2015 and 2022.

Source: Own work

For the time before and after the onset of the pandemic, we used additive generalized models (ARIMA) that include smoothed terms. These models were used to determine whether changes in trend and magnitude were attributable to the effect of the pandemic. The results of the Ljung–Box test ($p = 0.2349$) for the ARIMA models [0, 1, 1] met the criterion that model residuals are normally distributed, suggesting a good model fit. The ITS data for the two periods revealed that the COVID-19 emergency declaration was statistically significantly associated with an average increase of 5 cases/month in the pandemic period (Figure 3).

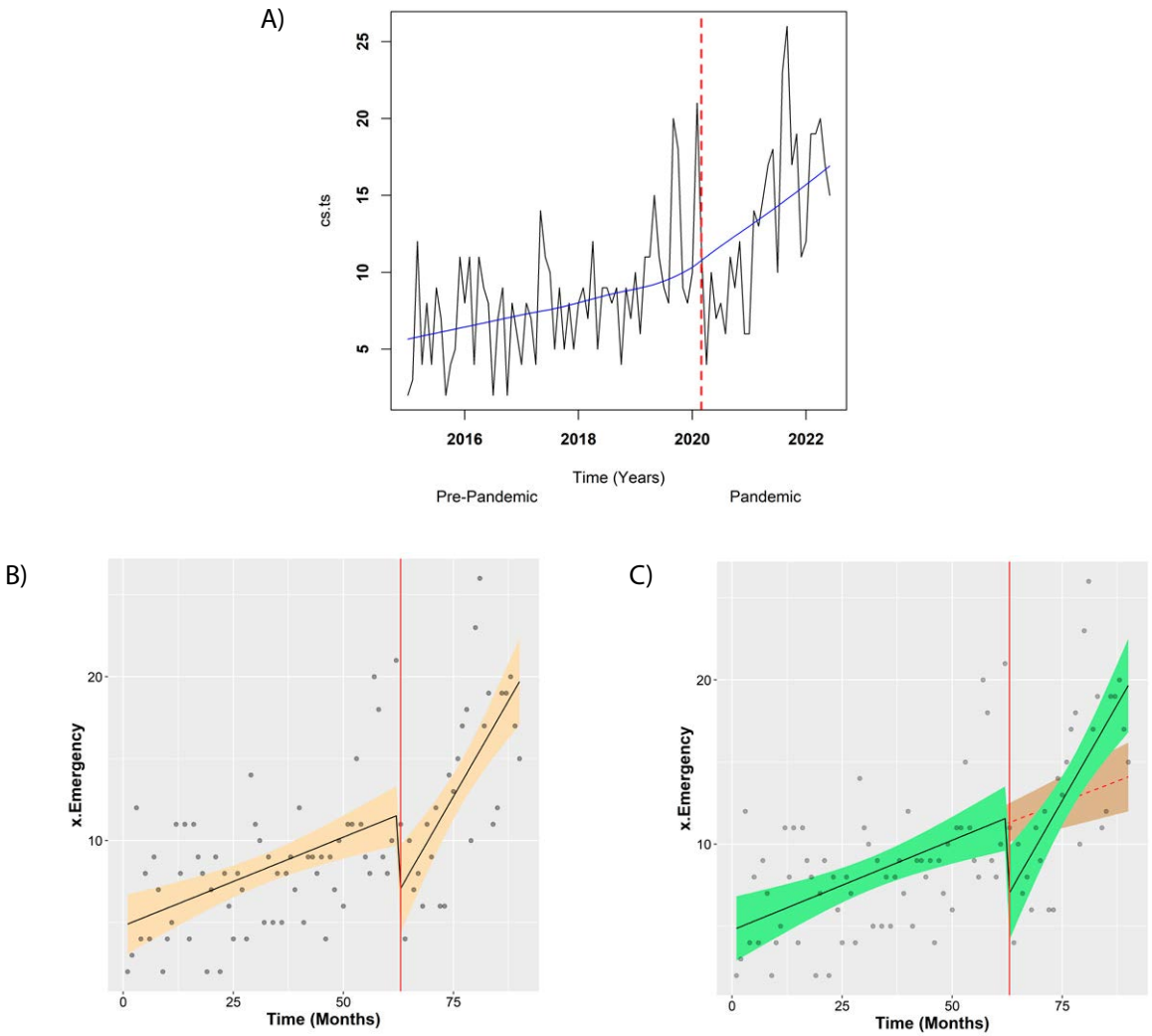

Figure 3. Impact of the COVID-19 pandemic on the temporal patterns of care for suicidal behavior in two hospitals in Bogotá

A) ARIMA model (0, 1, 1) with positive trend in the series (Mann-Kendall; $p < 0.000$) and normality in the residuals (Ljung–Box, $p = 0.2349$). **B)** Interrupted time series with delta, in which the average effect of the increase in cases during the pandemic (5 cases/month) is determined. **C)** Segmented regression: Factual model (β_1=0.108; β_3= 0.358; $p < 0.000$) vs. Counterfactual Model; $p < 0.000$)

Source: Own work

DISCUSSION

The effects of the new coronavirus (COVID-19) disease pandemic are still being elucidated, and the associated containment and mitigation measures are likely to have impacts well beyond the pandemic period (17-22). Overall, SB cases did not increase during the first pandemic year (2020); on the contrary, the trend in the data shows a relative decrease compared with the broader pre-pandemic period (23). Several studies have labeled this period as atypical, as it was characterized by severe mobility constraints and reorganization of health care services, which led to delays in diagnostic procedures, cancellations of elective surgeries, lower rates of emergency department admissions and hospitalizations for illnesses other than COVID-19, as well as missed treatments and changes in the severity of baseline illnesses in many patients (24-26). However, during the year 2021, emergency department attendances doubled, including all those related to mental health (27-29).

SB is a complex problem for global public health and is a key indicator of the mental health status of a society, yet it is also often ignored and surrounded by stigma, myths, discrimination and taboos. In Latin America, multiple initiatives have been aimed at mitigating risk factors and enhancing protective factors at the individual, community and social level; nevertheless, the advent of the pandemic catalyzed, in a heterogeneous manner, the different mental health problems in the region, including SB (1,2,9,11,12).

Some studies in Asia and Europe show an increase in suicide attempts in the first year of the pandemic (30,31). However, the findings of these studies, together with those of other research in the United States and Denmark, coincide with the report of a lower incidence of cases during this period (27,29). These differences are related to multiple contextual situations that determine or catalyze their occurrence in other cases.

The reported findings show a significant increase in suicidal ideation during the entire pandemic period compared to the other manifestations that are part of the suicidal process; this is similar to the results published in Spain by Jerónimo *et al.* (32). The positive history of the illness and the specialized outpatient management in psychiatry and psychology in more than 50% of the patients evaluated in the emergency departments are striking, suggesting relapses, fragility in the family support and care networks and failures in the implementation of prevention measures, such as environmental surveillance; this catapults the home as a place where SB is most frequently materialized. The difficulties of access to medical follow-up or mental health programs or the loss of self-regulation in many of the patients admitted to the emergency department cannot be underestimated either (33,34).

The results also suggest the presence of a population group with a higher apparent risk of SB (detected in emergency departments throughout the period analyzed): women, young people, and students. Despite this finding, concerns persist about the effects of the pandemic on the mental health of children and adolescents. Our data indicate no significant differences for this population group, but it is too early to assess the true impact of the pandemic on this very young population (35).

From the perspective of emergency departments, it is necessary to understand that children and adolescents may be at greater risk due to factors that occurred during confinement, such as social distancing, loneliness, lack of physical exercise and collective family stress. This could contribute to alterations in their mental health and should be suspected during any routine medical evaluation in the emergency department, given that the youngest children may experience somatic or atypical symptoms, depression and anxiety, which implies greater sensitivity in the diagnostic process on the part of the medical care teams (33).

The long observation period (seven years) and the standardized systematic registration of all cases in the emergency departments are considered strengths of this research, as well as the specialized assessment of patients by the multidisciplinary mental health team (psychiatrist, psychologist and social worker) at the two institutions involved in the study, which allowed the evaluation of patients of all age groups.

Among the limitations of this study we recognize the nature of the observational design, the conditioning to work with retrospective data recorded in the electronic medical records of the program and the non-inclusion of hospitals of the public network of the city of Bogota D. C. Although the scope is focused on recognizing the profile of patients with SB before and during the pandemic, as well as variations in the rates of care, it is recommended that future research could incorporate the measurement of clinical outcomes once they leave the emergency department.

CONCLUSIONS

The results confirm the increase in emergency department patient care for SB during the pandemic. The rate of suicidal ideation was higher than reported in pre-pandemic studies and this could result in higher suicide rates in the near future. Screening and timely intervention strategies for SB should be an integral part of clinical care pathways and outpatient mental health prevention and care programs, including educational institutions.

CONFLICT OF INTEREST

None stated by the authors.

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