ORIGINAL ARTICLE

Behaviour and distribution of suicide in the city of Medellín during the period 2015–2019 ☆

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Abstract

Objective: To identify the distribution and behaviour of suicide in the city of Medellin during the period 2015–2019.

Material and methods: Documentary study, retrospective approach, secondary sources of information on suicide cases reported by the National Institute of Legal Medicine and Forensic Sciences between 2015 and 2019 for the city of Medellin were used, the data was consolidated and transformed into relative frequencies and percentages.

Results: A total of 839 cases of suicide were reported, 81% of which were men, with a higher occurrence in ages between 29 and 59 years, reaching 48% of the total cases. Unmarried people were the marital status with the highest number of cases, 60% in the last 2 years; asphyxia with 60% is the most used method and temporality only revealed statistically significant results with respect to the day of highest occurrence, being Sunday and Monday the most frequent with 17% respectively.

Conclusions: It was possible to establish the sociodemographic characteristics with the highest incidence of suicide, it was shown that having lower educational level increases the prevalence of suicide, the lack of support network explained the tendency of singles to commit the act, the most used causal mechanism was asphyxia followed by injuries by projectile from a firearm and poisoning.

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Comportamiento y distribución del suicidio en la ciudad de Medellín durante el periodo 2015-2019

Resumen

Objetivo: Identificar la distribución y el comportamiento del suicidio en la ciudad de Medellín durante el periodo 2015-2019.

Material y métodos: Estudio documental, de carácter retrospectivo, se acudió a fuentes secundarias de información de los casos de suicidio reportados por el Instituto Nacional de Medicina Legal y Ciencias Forenses entre 2015-2019 para la ciudad de Medellín, se tomaron como variables sociodemográficas: el sexo, la escolaridad, el estado civil, el ciclo vital de la víctimas de suicidio; razones que pudieron llevar al evento, se consolidaron los datos y se transformaron a frecuencias relativas y porcentajes.

Resultados: Se reportaron un total de 839 casos de suicidio del cual el 81% eran hombres, se evidenció mayor ocurrencia en edades comprendidas entre los 29 a 59 años, alcanzando hasta el 48% de los casos totales. Los solteros fueron el estado conyugal con el mayor número de casos, un 60% en los últimos dos años; la asfixia con un 60% es el método más usado y la temporalidad sólo arrojó resultados estadísticamente significativos con respecto al día de mayor ocurrencia, siendo el domingo y el lunes los más frecuentes con el 17% respectivamente.

Conclusiones: Se pudieron establecer las características sociodemográficas con mayor incidencia de suicidio, se demostró que tener menor nivel educativo aumenta la prevalencia de suicidio, la carencia de red de apoyo explicó la tendencia de los solteros a cometer el acto, el mecanismo causal más usado fue la asfixia seguido de las lesiones por proyectil de arma de juego y el envenenamiento.

Introduction

Suicide is defined as the act in which an individual decides to end the life intentionally. It is considered to be a public health problem in 2019 according to the reports of the World Health Organization (WHO), and it is the third cause of death worldwide.[1] According to the Pan-American Health Organization (PHO) in the continent of America, the suicide rate in the year 2014 was 7.3 per 100,000 inhabitants, and sociodemographic factors such as age, sex and socioeconomic level have been shown to influence the development of the event.[2]

In Colombia, according to the National Institute of Legal Medicine and Forensic Science (INMLCF), suicide rates have gradually risen over the past 10 years, with a 2% increase from 2009 to 2018. A total of 20,832 suicides were recorded during this period in Colombia, representing up to 11% of deaths due to an external cause (violent deaths). The highest incidence occurred in the population aged from 15 to 30 years old, and the most widely used methods were a mechanism to cause asphyxia (hanging) and the consumption of medicines or pesticides.[3]

The INMLCF is a public body that makes it possible to analyse data using the platform of the Disappeared and Cadavers Network Information System (SIRDEC); the SIRDEC is a platform used in Colombia within the context of violent deaths (suicide, homicide and transport accidents). Information is obtained from the necropsy carried out together with the Judicial Police, who are in charge of the act of technically inspecting cadavers; and annual consolidated reports, which make it possible to know the cases of death due to an external cause in the country. In connection with suicide, it offers information with the total number of cases of suicide associated with sociodemographic factors, while also taking into account other variables which allow the said events to be characterised. The information offered by the INMLCF is public and also a tool for researchers, making it possible to analyse which population is the most affected, so that the magnitude of the problem can be determined.

Studying the behaviour and distribution of suicide in the city of Medellín makes it possible to determine the magnitude of this scourge, given that no studies of this subject have covered the city. It is important to supply information on this subject to the community in general as well as to the academic fields which have an interest in it, offering input that may enable the development of new research projects which have the purpose of generating strategies to prevent and reduce the incidence of suicide, not only in the city but also within the department.

Taking the panorama described above into account, the aim of this study is to identify the behaviour and distribution of suicide within Medellín city in the years 2015–2019. The decision was taken to analyse suicide during this period because the last study to offer information on this subject was published by the *Corporación Universitaria Remington* using departmental data up to the year 2014.[4]

Methodology

Type of study

A retrospective documental study was undertaken using secondary sources of information about the cases of suicide reported by the INMLCF, through the SIRDEC platform and the consolidated annual data reported by this institute. This information was in fact already partially analysed, reporting the absolute frequencies of cases based on previously set variables and categories.

Source of information and analysis

SIRDEC data reported for the city of Medellín in the years 2015−2019 were taken, during which it had an average population of approximately 2,549,537 inhabitants. The following sociodemographic variables were taken into account: sex, educational level, marital status, the life-stage of suicide victims (in age intervals set by the INMLCF); the reasons that may have motivated the event, such as bullying, conflicts within a relationship, lack of love, economic problems, diseases, problems in connection with education, abuse and the death of family members. The causal mechanism was also taken into account (a blow or a sharp object, hanging, firearm, poison or cutting), together with the setting of the event (an urban or rural area, or a town), and the time of the suicide within the study period.

The absolute frequencies supplied by the INMLCF were transformed into relative frequencies and percentages, taking the year in question as the unit of analysis; the aim of this was to analyse behaviour; the number of cases per category were taken respecting the total number of cases per year. The information was tabulated and transferred into graphic format for subsequent analysis. The relative data for each period of time were subjected to 2 factor variance analysis with a single sample per group, which was undertaken in Microsoft® Excel based on an F test, with an alpha value of 0.05%.

Results

Suicidal behaviour, Medellín

A total of 839 cases were reported in the period studied (2015−2019). 81% corresponded to males (681 cases), and an increase in the number of cases for both sexes was found in the last 2 years (Fig. 1).

Life-stage

When cases of suicide were analysed according to age, it was found that the highest incidence occurs in the age range from 29 to 59 years old, corresponding to 48% of the total number of cases in the study period, followed by the age range from 18 to 28 years old. The lowest incidence corresponded to the age range from 6 to 11 years old. The number of suicides in the age range from 18 to 28 years old fell in the last year of the study, although the number of cases in the age range from 29 to 59 years old increased.
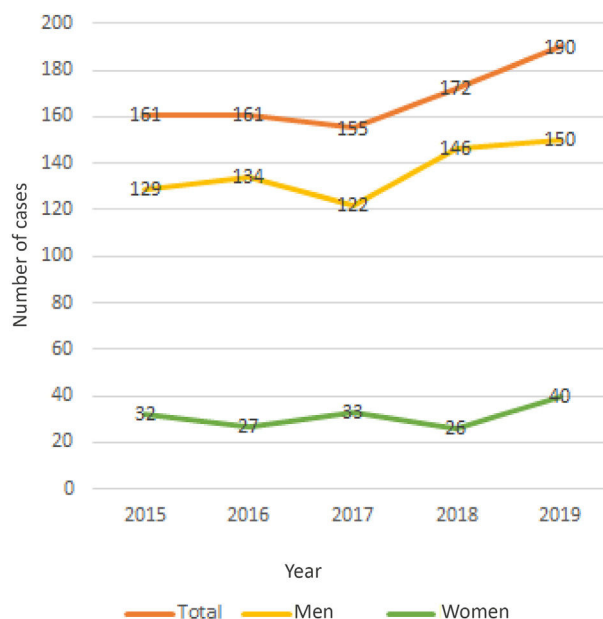

Fig. 1 Cases of suicide per sex in the years 2015−2019 in the city of Medellín, Colombia.

Furthermore, the number of cases in individuals over the age of 60 years rose in the last 3 years of the study (Fig. 2).

Educational level of suicide victims

When cases of suicide during the period studied were analysed according to educational level, the highest number of cases was found to exist among victims who had studied to primary, secondary and technical levels. The fewest cases were found in individual who had studied to professional level and those who were uneducated (Fig. 3).

Marital status

This aspect was divided into the following categories: single, married, in a relationship, separated and widowed. During all of the years studied, a higher incidence was detected among single individuals, reaching the highest levels in the years
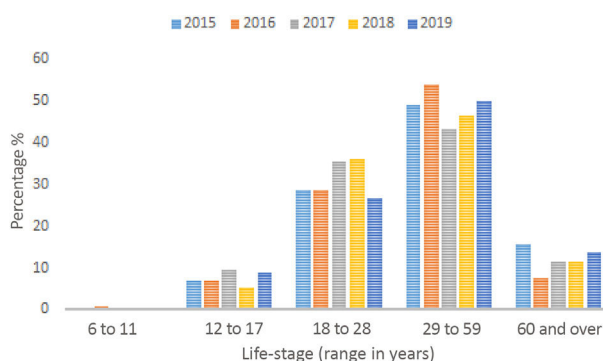

Fig. 2 Percentage of suicides according to age range, in the city of Medellín, Colombia during 2015−2019.
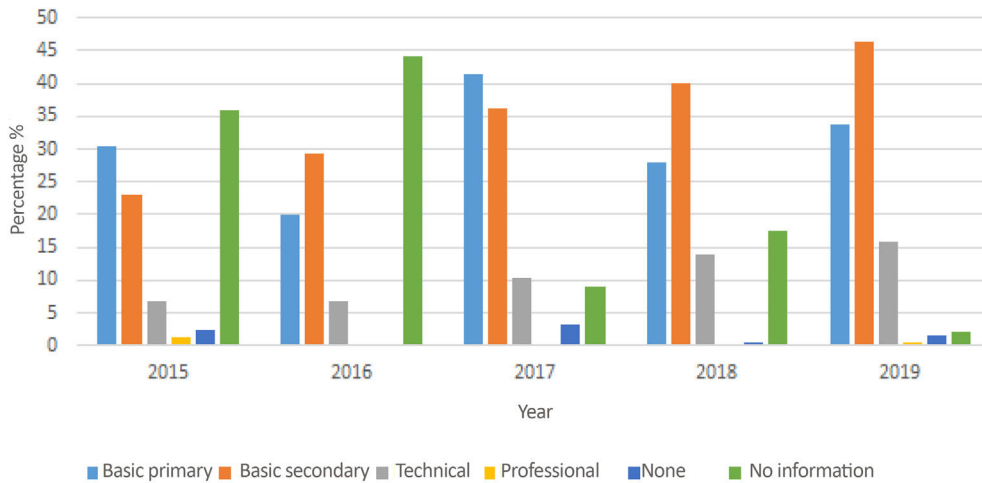
Fig. 3 Percentages of suicides reported per educational level during 2015−2019 in the city of Medellín, Colombia.

2018 and 2019, with 60% of cases. The rates among married individuals and those in a relationship were found to be similar, although it was higher in the second group. On the other hand, the population where the incidence was found to be the lowest were individuals who had been widowed.

Suicide triggers

The possible reasons for suicide were analysed using the judicial investigations, and the category with the highest number of cases in all of the years was found to be physical and mental illnesses, followed by relationship problems with their partner or ex-partner and economic problems. The categories with the fewest number of cases were found to be bullying and the death or suicide of a family member or friend.

Causal mechanism

When the causal mechanism of suicide was analysed, it was found that the highest percentage corresponded to hanging,

with 60% of cases during the period studied, followed by toxicological causes at 13%, a blow with 12% and injuries caused by a firearm with 7%. The fewest cases corresponded to the causal categories of sharp instruments, thermal causes and cutting, with less than 1% of the total cases (Fig. 4).

Setting

This variable covered the evaluation of three categories respecting the place where the event occurred: an urban area (towns with 2,500 inhabitants or more), a population centre (towns with from 1,000 to 2,499 inhabitants) or a rural area (population centres with fewer than 1,000 inhabitants or sparsely populated areas). The majority of event were found to have taken place in an urban area, with an average of 92% of the total number of cases in the years studied (2015−2019), followed by population centres with 4% of cases, and lastly rural areas with approximately 3% of cases.
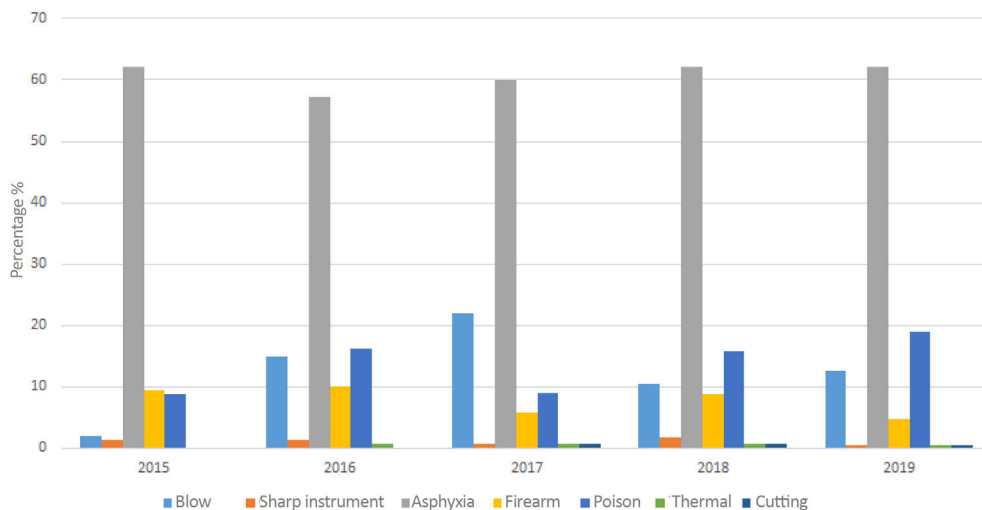

Fig. 4 Distribution in percentages of the causal mechanisms of suicide 2015−2019 in the city of Medellín, Colombia.

Timing

The variance in the timing of when suicides occurred was analysed according to the month, day and time. It was only possible to establish a statistically significant difference between the days, as more suicides occurred on Sunday and Monday (at 17.84% and 17.09%, respectively) than was the case during the rest of the week. No significant difference could be found in the data corresponding to the month and time, although higher averages were detected for the month of August (9.86%) and the interval from 21:00 to 23:59 hr (13.04%). No statistically significant difference was found between the years for any of the temporal variables, as very similar behaviour was found in all of them.

Discussion

A very large difference between the male and female sexes was found in the data that were presented. Within the time period studied, the number of events in which men took part surpassed the corresponding number of events for women by a ratio of 5:1. This makes it possible to hypothesise about this behaviour: the WHO and the PHO associate this with the greater lethality of the methods used by men in comparison with those used by women.[1,2] Nevertheless, it should be underlined that according to the report issued in 2015 by the Ministry for Social Protection, women make more repeated attempts at suicide, although they use less lethal mechanisms.[5] Another aspect that may be involved in this ratio is the social factor, in which due to cultural questions men refuse to seek help, to prevent feeling that they look weak or wounded to others.[12]

The most affected age range ran from 29 to 59 years old. This is when the population is most active economically, when individuals are exposed to social pressures that may have a negative influence in terms of suicide.[1] A similarity was also detected with worldwide findings by the WHO,[1] and more specifically in the continent of America by the PHO,[2] where the highest number of suicides were found in this age range.[6]

Respecting suicide and educational level, the highest incidence was found among individuals who had received primary, secondary and technical education. A rise in the number of cases among people with basic secondary education was detected during the years studied. Another important aspect that was observed over the years was that more information was obtained on the educational level of the victims, with a reduction in the number of cases where information was lacking. A similarity could be established with the situation reported in the 2015 Forensis, where it was suggested that more of the Colombian population educated to primary or secondary level were affected;[3] the PHO indicates that the risk of suicide increases with lower educational levels of individuals.[2,6]

When marital status is analysed in connection with cases of suicide, the population that is affected the most by this event is found to consist of single individuals. Durkheim's theory suggests that weak social ties or the lack of a supporting network play a role here, and it even suggests that mental illness hinders the development of emotional relationships.[7] Data identified in this study is able to supply information for the proposal by the Centre for Disease Control and Prevention (CDC), reinforcing Durkheim theory[8] and also showing similarity with what was reported in Colombia by the Forensis.[3]

Physical or mental illness was identified as the most common reason for suicide. A study published by the *Universidad Pontificia Bolivariana* and undertaken in the east of the Department of Antioquia, reported that up to 73% of attempted suicide cases were by patients with underlying psychiatric illnesses.[9] Other important reasons were the relationship with a partner or ex-partner and economic problems,[10] and these findings agree with those reported in Colombia by the 2019 Forensis.[3] The interpersonal theory for suicidal behaviour proposed by Joiner suggests that there are three factors which may increase the desire for death in individuals. These are based on emotional conditions, such as believing that one does not give sufficiently to society, the social burden one is subjected to and the capacity to adapt to situations or events.[13]

As the PHO and the Forensis report, the mechanism used the most in the city of Medellín was asphyxia (hanging).[2,3] This raises the possibility that this may be due to ease of access and the belief that this system causes less suffering;[11] blows, wounds caused by firearms and poisons were also widely used, which is similar to the situation reported by the WHO. Nevertheless, wounds caused by firearms are in first place at world level, followed by hanging and poisoning.[1]

The highest percentage of suicides occurred in urban areas, and this is in concordance with the report contained in the paper published in 2017 by the *Corporación Universitaria Remington*[4] and the Forensis in Colombia.[3]

The aim of this study was to describe when suicides occurred, and a higher percentage were found to take place on Sunday and Monday, with statistically significant differences. Although averages were high in the month of August and the time span from 21:00 to 23:59, these differences were not significant. This is similar to the report by the Forensis in Colombia respecting the days when more suicides take place, as it too found that more cases occurred on Sunday and Monday.[3]

The results of the study show the size of a problem that is growing, without seeming to be subject to control by the health system of Medellín city, which is in second place in the ranking of the number of suicides in Colombia according to the 2019 Forensis. This is why it is necessary to generate strategies which have a greater impact on the incidence of suicide in the city: as dynamics in the city change, new reasons for suicide emerge and the number of such events may increase over time. It is important not to forget that the most common reasons for suicide were physical or mental illnesses and relationship problems; this indicates the need to centre attention on these fields and implement public policies for prevention. One limit of this study is admitted to be the lack of information about many of the variables of interest as well as many others which would be able to greatly enrich the discussion, such as the occupation of the victims and the use or otherwise of psychoactive substances, amongst others.

Conclusions

It was possible to establish the sociodemographic characteristics associated with the highest incidence of suicide in the city of Medellín, including male sex and an age within the

range from 29 to 59 years. It also showed that the risk of suicide increases with low educational levels, and that the lack of a support network explained the tendency for single people to commit suicide. Finally, the causal mechanism that was used the most often was asphyxia, followed by wounds caused by firearms and poisoning.

Ethical considerations

This study was approved ethically by the *Corporación Universitaria Remington* and the Deputy Scientific Research Committee of the National Institute of Legal Medicine and Forensic Science, which classified it as risk-free research.

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Conflict of interests

The authors have no conflict of interests to declare.

Acknowledgements

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