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Original

Suicide in Costa Rican Health Personnel: A Retrospective Look

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Abreviaturas:
INEC; National Institute of Statistics and Censuses (Costa Rica).
OIJ; Judicial Investigation Agency.
HCP; Healthcare personnel
CDR; General mortality rate or crude death rate.
SMR; Suicide mortality rate.
RW; Relative weight.

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Abstract

In the world, mortality by suicide in health personnel is higher than in the general population and it is even higher in physicians and nurses. Several risk factors are mentioned, among them long shifts, difficulties to fit family life with professional performance, burnout and others. Working conditions for health personnel are not the same in different parts of the world, thus not all the aspects of suicide in health personnel are comparable as is shown in several meta-analysis. In our country the subject of suicide has been researched, but not the details of suicide in health personnel.

Methods: A retrospective country-wide study was undertaken from 01/01/2012 to 12/31/2021 to determine the epidemiological characteristics of deaths by suicide in this population. From all autopsies performed at the Forensic Pathology Department of persons dead by suicide during the time of the study, those of the ones dully recognized as members of health personnel were chosen for this investigation. The epidemiological and demographic information was taken from the charts filed at the Department of Legal Medicine. Data was then analyzed with descriptive statistics and then compared with suicide rates in the general public as published by the INEC (National Statistics Office)

Results: Along the ten years of the study period, there was a 48,4% increase in general mortality rate for the country and the suicide rate grew 16,31%. The numbers for suicide in health personnel were very small and it was not possible to obtain a specific rate for comparison.

There were 44 suicides in health personnel, 26/44 were males, age average was in the 30-39 decade. Female health personnel showed a higher incidence of suicides than women of the general public. The main mechanisms of death were asphyxia (hanging) and poisoning. Half of all the suicides occurred in Nurses and Physicians.

Conclusions: It is necessary to implement steps to discover features in individuals that may warrant close professional follow up, mainly in those with psychiatric disorders.

In the other hand it is important to improve the way the information of suicides is obtained, particularly that of health personnel. Forensic technicians should be instructed and their questionnaires modified, in order to allow a deeper analysis to be able to develop efficient preventive strategies.

Keywords: suicide, health personnel, burnout

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Introduction

The Pan American Health Organization and the World Health Organization report that more than 700,000 people commit suicide in the world annually, about a quarter of them are people under 29 years of age (Pan American Health Organization. Living Life, Implementation Guide for Suicide Prevention in Countries. PAHO; 2021 (Accessed 27/01/2025). Available at: https://iris. paho.org/handle/106654.2/54718) and 80% of cases occur in low- and middle-income countries.[1]

In our country, several studies have been carried out on suicide in the general population, which, although not pretending to be exhaustive, are summarized below.

Ugalde and Castro reported on suicide behavior in patients admitted to national hospitals from 1980 to 1990.[2] Flores analyzed the suicides that occurred in the female population in the country from 1983 to 1993.[3] Chaves et al. published a demographic and statistical study of suicide during 2005 in the entire population, taking into account the types of injuries and causes of death, but the number of cases was too limited to demonstrate a trend.[4] Sáenz carried out an epidemiological and statistical investigation of suicide from 2000-2009, focused on psychology, without analyzing the legal medical part, or the injuries of those who died from this cause.[5] Vargas and Morales studied the ways in which suicidal deaths occurred in older adults from 2010 to 2014;[6] on the other hand, Mora et al. described the various types of injuries presented in suicides from 2010 to 2016.[7] Recently, Millán published an editorial in this same journal on the subject, with emphasis on the prevention of the phenomenon.[8]

However, specifically suicide in national Healthcare personnel (HCPs) has not been studied.

Analysing suicide in this group of civil servants is important, since their training requires years of dedication and discipline, and by the time they graduate, they have already reached a considerable age and maturity, thanks to a great physical and economic effort, both personal and family. In addition, they have committed their lives to the performance of professions from which society demands dedication and good results. Obviously, if these are negative, the professional will suffer frustration, a sense of failure and sadness.

Based on these reasons, a suicide investigation was conducted in the national HCP, with the aim of determining the epidemiological factors of this phenomenon in our environment.

Methods

A retrospective observational research was designed using national suicide data published by the National Institute of Statistics and Census (INEC) and the database of the Automated System of Forensic Pathology of the Department of Legal Medicine of the Judicial Investigation Agency (OIJ) of Costa Rica.

With data from INEC (http Sistemas de Consultas. https:// inec.cr/sistemas-de-consulta, accessed 12/2024), mortality rates in the general population, suicide mortality rates (SMR) and the relative weight (RW) of specific suicide mortality were determined. The calculation of the above-mentioned rates was made per 100 000 inhabitants. To standardize their interpretation and to be able to calculate the RW, in terms of the same units of measurement.

The formula used for the calculation of the general population mortality rate is presented below:

$$CDR = \frac{D}{N} \; x \; 100\,000 \; inhabitants$$

Where:

CDR: general mortality rate or crude death rate.

D: total deaths in the year.

N: national population at mid-year.

The suicide mortality rate (SMR) was calculated using this formula:

$$SMR = \frac{D(suicide)}{N} x \; 100\,000 \; inhabitants$$

Where:

SMR: suicide mortality rate in the general population.

D: total deaths by suicide in the year.

N: national population at mid-year.

Finally, the RW of the SMR in the CDR was calculated with the formula indicated below:

$$RW = \frac{SMR}{CDR} \quad x \; 100\,000 \; habitants$$

Where:

RW: relative weight.

SMR: suicide rate in the general population.

CDR: mortality rate in the general population.

From the database of the Automated Intelligence System of Forensic Pathology of the Department of Legal Medicine from the OIJ of Costa Rica, information was taken concerning the medico-legal autopsies performed in the Forensic Pathology Section during the period

under study and, finally, from the medico-legal files of the deceased filed in the Forensic Pathology Section of the Department of Legal Medicine, the epidemiological and clinical information available for each case was obtained.

For the purposes of the research, HCPs were defined as all health professionals (medicine, microbiology, pharmacy, nutrition, psychology, dentistry, nursing, and medical technologies) and also the assistants of these professionals.

All healthcare personnel whose death was secondary to self-inflicted mechanisms and whose autopsy was realized by the section of forensic pathology of the Forensic Pathology of the OIJ, in the period from 01/01/2012 to 31/12/2021 were included.

Data were collected in a specific form designed for the study. The variables in each case were age, sex, residence, marital status, method used for suicide, profession or occupation, previous attempt at self-elimination, history of suicidal ideation, history of depression, comorbidities, use of medications, and alcohol and drug use.

For the digitization and analysis of the information, Microsoft's Excel program (version 16.0, year 2016) was used.

The study complied with current international and national bioethical guidelines and was approved by the Scientific Ethics Committee of the Dr. Carlos Sáenz Herrera Hospital, in session 007-2022 of 07/27/2022. As it was a retrospective design, it was not necessary to obtain informed consent from the relatives of the deceased.

Results

From 2012 to 2021 there were 3481 cases of suicide throughout Costa Rica, of which 44 (1.26%) were members of the HCP. Figure 1 shows the respective percentage of suicides in HCP per year, which shows a slight upward trend in the number of suicides.

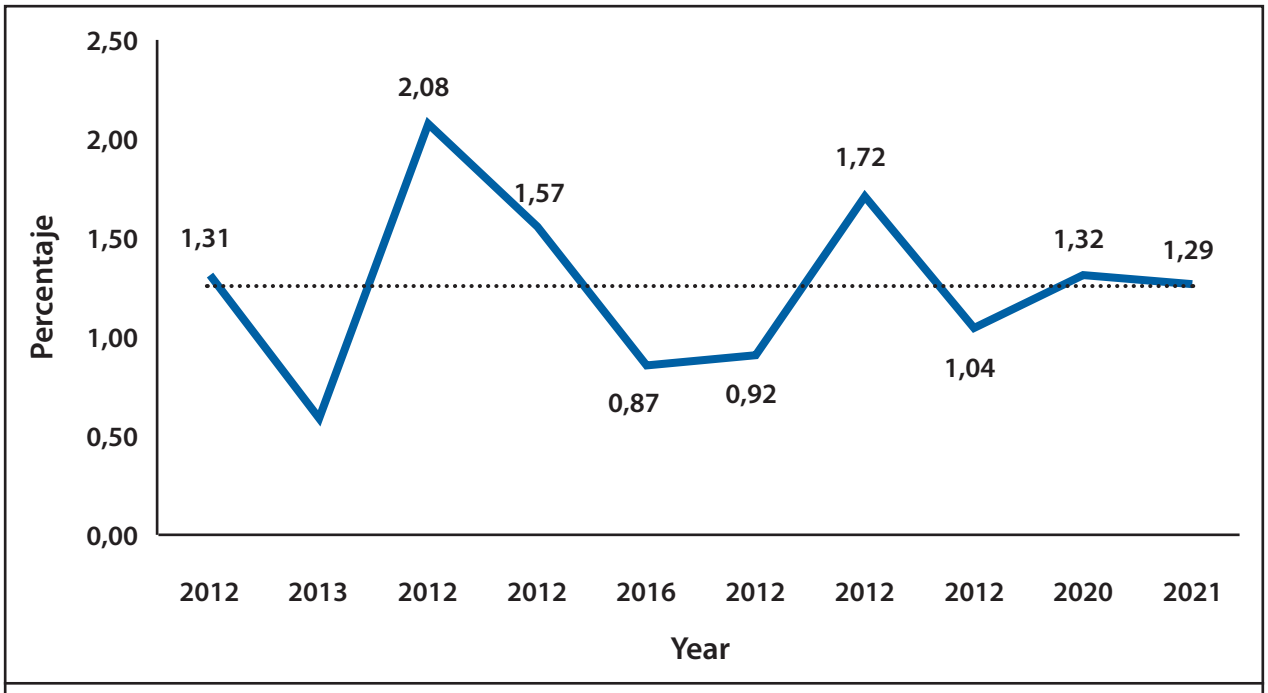


Figure 1: 1: Percentage of suicides in health personnel, Costa Rica, 2012-2021. Source: Records of the Judicial Investigation Agency (OIJ), 2023.

Rate Comparison

From 2012 to 2021 there was a 48.4% increase in the CDR in Costa Rica, while deaths by suicide increased by 16.31%. While it is true that there was an increase in both rates, suicide only represents 1.2% to 1.7% of total deaths in Costa Rica. In addition, as can be seen between 2012 and 2021, the RW of suicide mortality decreased by 21.6%.

Table 1 shows the RW of suicide-specific mortality within general mortality, 2012-2021.

Table 1. Relative weight of suicide-specific mortality within overall mortality, 2012-2021

Year	General Mortality Rate	Suicide death rate	Relative weight of the specific suicide mortality rate
2012	412,5	6,6	1,6
2013	416,8	7,3	1,7
2014	430,9	6,0	1,4
2015	435,7	6,6	1,5
2016	462,9	7,1	1,5
2017	471,2	6,6	1,4
2018	477,0	8,2	1,7
2019	483,8	7,6	1,6
2020	518,8	7,5	1,4
2021	612,3	7,6	1,2

Source: Records of the Judicial Investigation Agency (OIJ), 2023, National Institute of Statistics and Census (INEC), 2024.

Sociodemographic characteristics

During the years covered by the study, the average percentage distribution of suicides by sex in the general population was 83.4% in men, while in the HCP, the percentage distribution of suicides by sex was more balanced, with 54.5% for men. The highest frequency of suicides in the general population (23.8%) occurred in the age range of 20 to 29 years. However, in HCP the most frequent decade was 30 to 39 years (52.3%). Nursing and medical professionals accounted for 50% of all suicides in the HCP group. Figure 2 shows the percentage distribution according to the profession of the deceased.

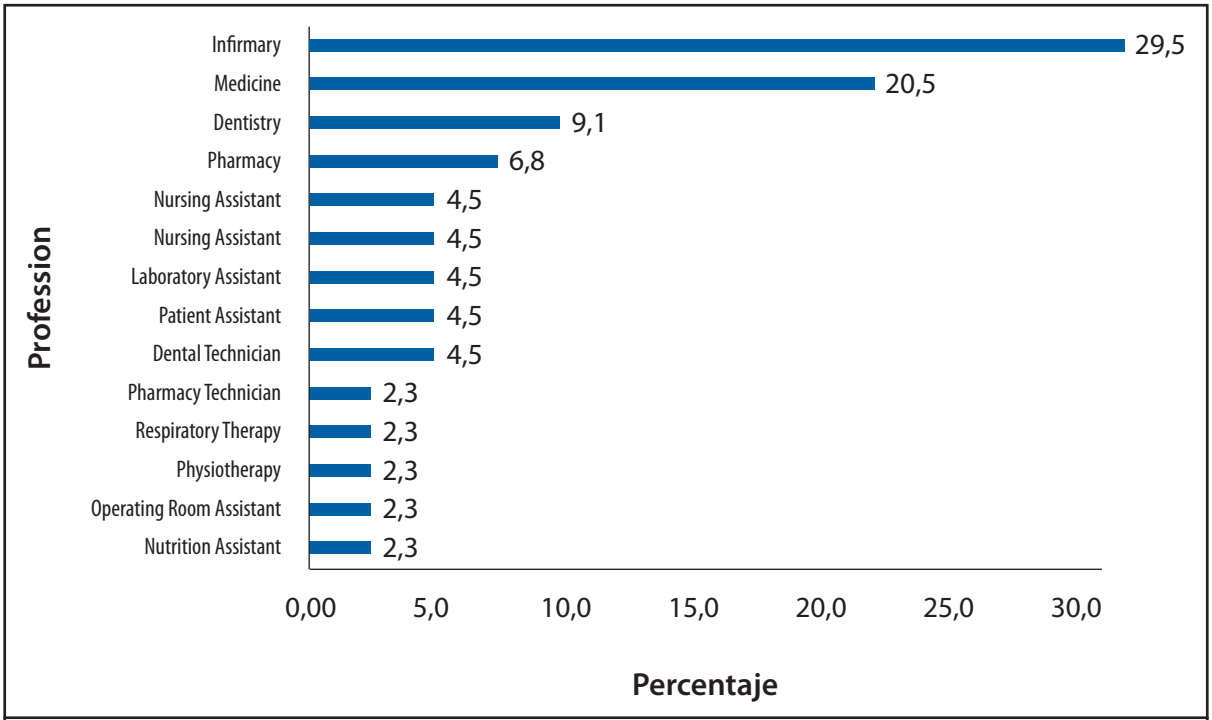


Figure 2. Percentage distribution according to the professional branch of health care of those who committed suicide, Costa Rica, 2012-2021. Source: Records of the Judicial Investigation Agency (OIJ), 2023.

Self-harm methods and comorbidities

The most commonly used mechanisms of death by HCP members were asphyxiation and intoxication by ingestion of harmful substances, with 45.5% and 31.8% respectively. This is followed by gunshot wounds, exsanguination due to stab wounds, and precipitation, with 9.1%, 9.1% and 4.5% respectively.

In terms of comorbidities, 36.4% of the deceased suffered from psychiatric conditions such as depression, personality disorders or schizophrenia. 11.4% were also alcoholics, 4.5% were alcoholics only, and 9.1% suffered from other diseases. However, in 38.6% of the deceased there was no record of any pathology.

Discussion

Suicide is a painful and fatal event that can only be avoided by creating prevention mechanisms and identifying potential suicides early. Although epidemiological and genetic studies of suicide suggest the existence of a hereditary component[9-10] exposure to biological and psychosocial adversities during critical periods of development also contributes to altering biological responses to threat and pleasure. O'Connor et al. insist on the association of childhood trauma and suicidal behavior[11], in addition to mentioning stressful situations in early stages of life such as neglect, abandonment, physical or sexual abuse, among others. Most models proposed to understand suicide risk recognize that it results from the interaction between the predisposition (diathesis) and a precipitant, trigger, or cause.[10]

The relationship between suicide and work activity has been recognized for decades. In Japan in 1987 the Minister of Health began to collect cases of "death in workers due to overwork" or "karoshi".[12] In France, from 2005 to 2015, there was a veritable epidemic of suicides of officials of several companies such as the telecommunications giant Télécom/Orange, car manufacturers, the postal service, electricity and gas suppliers, banks, supermarkets, the police force and research centers. The phenomenon was attributed to the deterioration in working conditions.[13] The incidence of suicide has increased in some groups, especially in health professionals.[14-15] The reasons include high stress and responsibility load, long shifts, sleep deprivation, difficulty in reconciling family life with work, fear of making mistakes, being the right one to convey bad news, etc.[14-15]

Suicide/suicidal ideation has been associated with burnout. In fact, Shanafelt et al. demonstrated a statistically significant association between suicidal ideation and the three domains of psychological exhaustion.[16] This syndrome has also been identified in HCPs in our country, Millán and Fainardi reported its occurrence in 70% of a sample of resident physicians from different specialties[17] and Castillo et al. reported the presence of exhaustion in half of a sample of almost 350 volunteer physicians surveyed during the 2019 National Medical Congress.[18]

Before analyzing the findings of this research, it should be remembered that the members of the HCP are also human beings and therefore vulnerable to the same vicissitudes of their own patients and although the vocation is of service, they all come from different backgrounds. The different cultural and labor fields, then the realities of individuals and their countries are not totally comparable. However, it is clear that HCP has a higher risk of suicide compared to the general population and other professions.[4-15] The most relevant risk factors in this study of suicide in HCP were male sex, being a nursing or medical professional, and having a psychiatric history.

Studies in other countries have shown that doctors are at increased risk, particularly general practitioners and specialists in anesthesiology, psychiatry, and general surgery.[4-15] In this research, it was not possible to differentiate in detail between the specialties, since the national forensic registry did not have this information.

The highest suicide rates in this study occurred in medical and nursing personnel, a fact previously reported in the aforementioned meta-analyses, health professions with a higher degree of responsibility and that exhibit a tendency to depression and psychological exhaustion syndrome.[14-15] Long working hours, fear of making mistakes, work overload, and direct contact with patients and their families are characteristic of medical practice and are likely to contribute directly to mental stress and burnout.[19] Although the methods of self-elimination chosen by the suicides were the same as those used in other latitudes, the preferences were different. For example, Cano et al. described in their meta-analysis that 90 % of suicide doctors in Australia died from drug overdoses (anesthetics, barbiturates, and opiates), while 48% of suicide doctors in 16 states in the United States of America used firearms and 41% of Canadian doctors hanged themselves.[14] This last group is similar to the 45% observed in the present series. These differences could be explained by cultural idiosyncrasies, affordability of a means of self-harm, or preferences of the time when the research was conducted and published.

Another important aspect is personal history, mainly psychiatric antecedents and within them, depression.[15] The same authors reported that it is more

frequent in HCP than in teachers and in the general population. Bailey et al. report a prevalence of up to 60% of depression in Australian doctors.[20] In this series, one-third of the individuals had some mental disorder.

Finally, with regard to the strengths and weaknesses of this research, it should be mentioned that the Forensic Pathology Section of the OIJ performs all autopsies for suicide in the national territory, so the results of this study are reliable and there was no bias due to omission in any case.

However, only the information from the Forensic Medical Organism's file was used, so the lack of complete pre-mortem clinical data in some subjects constitutes a major limitation, as well as the absence of potentially accessible information by third parties and the impossibility of contacting family members or co-workers of the deceased, according to the design of the study.

Another drawback was that the information in the files was obtained by administrative or technical assistants from the Department of Forensic Medicine and not by medical personnel, so in some cases potentially relevant clinical or therapeutic aspects were not noted. Some data was not obtained, for example, whether or not the individual was employed when he or she committed suicide or if he or she was incapacitated. The only information on previous psychiatric illness was obtained from the post-mortem interview with people related to the deceased and was not verified in other digital health records of national coverage (e.g., digital file). There is also no way to investigate the degree of depression that a person could have been in before the event, the psychiatric medications they were taking, or their addictions, since so far in the country there is no connection with the medical file of the institution where they were being monitored.

Recommendations

It is necessary to do more research on suicide, analyze the causes and delve into socioeconomic, legal, cultural and family aspects of those involved, information of this nature could not be obtained because there was no access to other source documents in relation to the deceased and their families. It is also important to identify other variables that could affect and study risky personality characteristics in HCP, such as intolerance to frustration, all in order to create strategies to promote mental health and eventually propose contingency and prevention strategies.

Burnout may play a preponderant role in HCP suicidal behavior and more research is needed on the role of this factor in HCP at the national level, information that will be useful for employers and human resource managers.

In the face of a person with suicidal ideation or self-injurious behaviors, the intervention of mental health professionals is necessary. The participation of people close to them who work is also important as a support network. This can help implement measures that help reduce suicide risk and monitor the person at risk more closely. Assertive listening is essential. Once diagnosed with depression, the person should be given appropriate follow-up and therapy.

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