Health Scope. 2024 May; 13(2):e143251. https://doi.org/10.5812/healthscope-143251.

Published online 2024 April 23. **Letter**

Misclassification Bias of Poisoning-Related Mortality in Iran

Mehran Rostami [1] and Mohammad Jalilian [2,*]

[1]Deputy of Health, Kermanshah University of Medical Sciences, Kermanshah, Iran
[2]Department of Clinical Sciences, Faculty of Veterinary Medicine, Garmsar Branch of Islamic Azad University, Semnan, Iran

[*]*Corresponding author*: Department of Clinical Sciences, Faculty of Veterinary Medicine, Garmsar Branch of Islamic Azad University, Semnan, Iran. Email: drmjalilian@gmail.com

Received 2023 November 21; **Revised** 2024 February 21; **Accepted** 2024 March 02.

Keywords: Poisoning, Misclassification Bias, Self-harm

Dear Editor,

According to data from the Global Burden of Disease, suicide-related deaths in the Eastern Mediterranean Region (EMR) doubled between 1990 and 2015 (1). Iran, situated in the EMR comprising 22 countries, has been the focus of several studies on poisoning-related mortality. The challenge lies in accurately distinguishing between intentional and unintentional poisonings, a crucial factor for tailoring effective prevention strategies. The accurate diagnosis of intentional poisoning is essential for directing targeted prevention efforts, dispelling misconceptions about suicide rates, and guiding health policymakers toward nuanced initiatives. This distinction serves as a cornerstone for developing effective prevention strategies, addressing the multifaceted nature of self-harm, and striving for a society that prioritizes mental well-being and resilience. This letter addresses some challenges regarding the quality of data in poisoning-related studies, which will be explained in the following paragraphs.

As is known, the critical factor in evaluating any study is the quality of the data upon which the study is founded. For example, it seems that the Forensic Medicine Organization in the Fars province could serve as one of the data sources for the population-based Electronic Death Registry System (2). The mentioned study identifies the highest number of deaths resulting from unintentional poisoning among individuals aged 15 - 29 years old (2). The study reveals that 37.5% (550 cases) were aged 15 - 29 (2). It is essential to highlight that the main causes of mortality among children under five years are attributed to traffic accidents and unintentional injuries (3). However, the higher incidence of unintentional poisonings occurs in children. It is crucial to specify that suicide (intentional self-harm) is not categorized as a cause of death among those under the age of five. If a cause of death were recorded as suicide within this age group (age < 5), it would indicate a misclassification, commonly referred to as a garbage code in the death registry (4). However, death certificates issued by forensic physicians do not include the International Classification of Diseases tenth revision (ICD-10) codes. Instead, the cause of death is expressed in "Persian" in response to judicial considerations (4, 5).

In 2016, approximately 39% of suicide deaths in North Africa and the Middle East occurred before the age of 30 for both sexes (6). In Iran, a comprehensive study has indicated that the highest number of completed suicides occurs in individuals under 30 (7). The similarity may either indicate an emerging reality or result from misclassification bias. Misclassification bias occurs when cases of intentional poisoning are mistakenly classified as unintentional poisoning. One possible reason for this phenomenon could be that some family members of individuals who have intentionally poisoned themselves choose to conceal this reality due to social stigma (8).

Another investigative approach involves comparing past or current data. Previous studies have explored fluctuations in the occurrence of suicidal deaths during specific seasons or months. For instance, some studies have demonstrated that completed suicides follow a specific temporal pattern referred to as seasonality (9, 10). To validate this proposition, researchers could illustrate the occurrences of unintentional poisoning deaths every month and compare their frequency with intentional poisoning deaths at the exact location. If the highest number of deaths is observed in typical months in both groups of poisonings, it might once again suggest the potential occurrence of misclassification bias. In other

Copyright © 2024, Rostami and Jalilian. This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC BY 4.0) (https://creativecommons.org/licenses/by/4.0/) which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

words, the possibility of misclassification increases when graphs exhibit similar temporal patterns.

Considering the above, it is clear that data misclassification may occur when statistics related to deaths caused by intentional poisoning are erroneously categorized as unintentional. Such misclassification can result in notable inaccuracies in the data. These inaccuracies can lead to the underestimation of intentional poisonings and the overestimation of unintentional poisonings. Additional research is warranted to clarify the reasons behind these statistical errors, aiming to provide more accurate estimates for the planning of suicide prevention strategies.

Footnotes

Authors' Contribution: Conceptualization: M.R.; writing original & revised draft: M.R., M.J.

Conflict of Interests: The authors declare that they have no conflicts of interest.

Funding/Support: This paper received no specific grant from any public, commercial, or not-for-profit sector funding agency.

References

1. Rezaeian M, Khan MM. Suicide Prevention in the Eastern Mediterranean Region. *Crisis*. 2020;**41**(Suppl 1):S72–9. [PubMed ID: 32208764]. https://doi.org/10.1027/0227-5910/a000669.
2. Azarbakhsh H, Jafari F, Dehghani SP, Karami H, Hassanzadeh J, Mirahmadizadeh A. Trend Analysis of Deaths With Unintentional Poisoning and Years of Life Lost in the South of Iran: 2004-2019. *J Res Health Sci*. 2023;**23**(3):e00588. [PubMed ID: 38315903]. [PubMed Central ID: PMC10660503]. https://doi.org/10.34172/jrhs.2023.123.
3. Ezzati F, Shabani M, Mohammadhoseini T, Karimi F, Khodayari-Zarnaq R. Factors Affecting Children's Mortality Due to Traffic Accidents Using Haddon Model and Statistical Process Control in Ardabil Province, Iran. *Health Scope*. 2022;**11**(3):e120953. https://doi.org/10.5812/jhealthscope-120953.
4. Rostami M, Jalilian A, Jalilian M, Mahdavi SA. Years of Life Lost Due to Complete Suicide in Iran: A National Registry-Based Study. *J Res Health Sci*. 2024;**24**(1):e00605. https://doi.org/10.34172/jrhs.2024.140.
5. Rostami M, Jalilian A, Mahdavi SA, Bagheri N. Spatial heterogeneity in gender and age of fatal suicide in Iran. *J Res Health Sci*. 2021;**22**(1):e00541. [PubMed ID: 36511251]. [PubMed Central ID: PMC9315463]. https://doi.org/10.34172/jrhs.2022.76.
6. Naghavi M, Global Burden of Disease Self-Harm C. Global, regional, and national burden of suicide mortality 1990 to 2016: systematic analysis for the Global Burden of Disease Study 2016. *BMJ*. 2019;**364**:l94. [PubMed ID: 31339847]. [PubMed Central ID: PMC6598639]. https://doi.org/10.1136/bmj.l94.
7. Sharif Nia H, Heidari M, Naghavi N, Lehto RH, Haghdoost AA, Jafari-Koulaee A, et al. Age Changes and Suicidal Activity in Iran Over the Past Decade: A Systematic Review and Meta-Analysis. *Omega (Westport)*. 2022;**86**(1):312–37. [PubMed ID: 33106088]. https://doi.org/10.1177/0030222820966934.
8. Karamouzian M, Rostami M. Suicide Statistics in Iran: Let's Get Specific. *Am J Mens Health*. 2019;**13**(1):1557988318807080. [PubMed ID: 30339039]. [PubMed Central ID: PMC6771129]. https://doi.org/10.1177/1557988318807079.
9. Rostami M, Jalilian A, Poorolajal J, Mahaki B. Time Series Analysis of Monthly Suicide Rates in West of Iran, 2006-2013. *Int J Prev Med*. 2019;**10**:78. [PubMed ID: 31198513]. [PubMed Central ID: PMC6547801]. https://doi.org/10.4103/ijpvm.IJPVM_197_17.
10. Shojaei A, Moradi S, Alaeddini F, Khodadoost M, Ghadirzadeh MR, Khademi A. The association between completed suicides and season of the year in an Iranian population. *Iran J Public Health*. 2013;**42**(3):293.