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Brief Policy

Registry System for Suicide Attempts: An Essential Step for Preventive Policy-Making

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Abstract
Suicide, as a serious public health challenge, not only imposes a heavy psychosocial burden on families and society, but also, given its upward trend in certain regions of the country, necessitates the development of precise registration and monitoring systems. A study focusing on the design and implementation of a qualitative registry system for suicide attempts in Hamadan Province, Iran, demonstrates that such a system can provide a clear picture of the demographic patterns, risk factors, prevalent methods, and outcomes of suicide. The findings of this research, based on continuous and prospective registration over one year, indicate the predominance of familial (e.g., conflicts with family members, marital problems) and interpersonal factors, a high prevalence of drug ingestion as the primary method, and a concentration of harm within younger age groups and the urban population. Complementary analyses utilizing machine learning methods have demonstrated that variables, such as age, gender, education level, marital status, and method of attempt, are the strongest predictors of suicide outcomes. This policy brief critiques the current national registration and reporting system, emphasizes the need to strengthen registration infrastructure, train human resources, and use registered data to design targeted interventions, and provides operational recommendations for health policymakers.

Keywords: Hamadan, Health Policy, Prevention, Registry System, Suicide

Background

Suicide is a multifactorial phenomenon rooted in the complex interaction of psychological, social, economic, and cultural factors. According to the World Health Organization, over 700,000 people die by suicide globally each year, with the number of suicide attempts estimated to be approximately 20 times this figure [1]. In recent decades, Iran has recorded the highest suicide rate in the Eastern Mediterranean region. However, the national suicide registry system in Iran faces serious challenges, including significant underreporting and deficiencies in demographic information [2].

Hamadan province has consistently been among the regions with high suicide rates, and this issue is considered the second leading cause of premature death in the province, following traffic accidents [3]. Population-based studies in this province have revealed significant gender and age differences in the pattern of suicide attempts, such that men, particularly in older age groups, have a higher probability of fatal outcomes, whereas women, though more likely to attempt suicide at younger ages, experience less lethal consequences [4]. Despite this, precise and systematic information on the various dimensions of suicide attempts remains unavailable, with most data being either fragmented or suffering from undercounts [2]. Establishing a qualitative registry system capable of continuously gathering demographic, clinical, and contextual data on suicide cases using validated standards is a prerequisite for any effective prevention planning. The present study, by aiming to design and implement such a system in Hamadan Province, Iran, has taken a fundamental step toward

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empowering policymakers to enact evidence-based interventions.

Registry Design Overview

The Hamadan Suicide Registry was designed as a prospective, continuous surveillance system operating across all public hospitals and private clinics in Hamadan, Iran. Case definition included all individuals presenting with a suicide attempt (fatal or non-fatal) based on ICD-10 criteria (X60–X84, Y87.0). Data collection was performed by trained clinical psychologists who were stationed at all participating centers to ensure standardized and accurate registration. To maximize data completeness and validity, structured interviews were conducted with both the individual and their family members, enabling a comprehensive understanding of the circumstances surrounding each attempt. Particularly in cases where individuals were suspected of suicide but were reluctant to disclose or explicitly denied the attempt, supplementary in-depth interviews were conducted with the individual and their relatives to ensure the most reliable and accurate data capture. The registry covered both governmental hospitals and private practices to maximize case capture. A comprehensive minimum dataset was used, covering demographic characteristics, socio-economic status, clinical and psychiatric history, and suicide-related circumstances. Quality control was ensured through monthly data audits, inter-rater reliability checks, and regular feedback sessions with reporting centers. Missing data were systematically monitored, and governance was overseen by a provincial steering committee comprising epidemiologists, psychiatrists, health policy experts, and a strong team of clinical psychologists. All procedures complied with ethical standards, and informed consent was obtained from all participants or their legal guardians. Data analysis, including descriptive statistics and machine learning predictive modeling, was performed on de-identified data.

Critique of the Current Conditions (Pathology of the Registration and Responsiveness System)

Despite scattered efforts at the national level to register suicide cases [2], the current system faces serious shortcomings that diminish its efficacy in guiding policy, which are outlined in the following.

Underreporting and Incomplete Data: Many instances of suicide attempts, particularly those of lower severity or those presenting to private centers, are not captured in official statistics. The national suicide registry system in Iran, implemented in 2009, has been confronted with serious challenges, including underreporting, incomplete demographic data, and inconsistent data quality across various levels [2]. Furthermore, key information, such as history of psychiatric disorders, prior suicide attempts, and primary motives, is often incomplete or lacks standardization.

Institutional Dispersion and Lack of Coordination: Responsibility for registration and reporting is fragmented among hospitals, health centers, forensic medicine organizations, and private practices, with no defined mechanism for data aggregation and exchange. This fragmentation precludes comprehensive, multi-dimensional analyses. Suicide data are recorded across disparate organizations, and this lack of integration complicates the accurate evaluation of trends and intervention outcomes [5].

Neglect of Data Application in Policy-Making: The available data are primarily utilized for statistical purposes and are rarely employed to identify local risk factors, design community-based interventions, or allocate resources to high-risk areas and populations. Although numerous studies have identified specific risk factors [4, 6], these findings are seldom translated into operational programs. Notably, machine learning-based research has shown that variables such as age, gender, method of attempt, education level, and marital status can predict suicide outcomes with high accuracy [7]. However, these analytical capacities remain untapped within the current registration and reporting system.

Weakness in Identifying and Monitoring High-Risk Groups: Although research findings indicate that certain groups, including middle-aged and older men, individuals with lower educational attainment, unmarried individuals, and residents of densely populated urban areas, are at greater risk for adverse suicide outcomes [4, 6], preventive programs do not systematically target these populations. Furthermore, the role of family conflicts and psychiatric disorders as primary triggers is insufficiently addressed in social and health interventions. Studies have demonstrated that the risk of suicide mortality increases significantly with age, particularly among men who employ more violent methods [4].

Policy Recommendations

Based on the experience of establishing the qualitative registry system in Hamadan, drawing on its lessons learned, and considering international experiences, such as the National Suicide Registry System of Malaysia (NSRM) [8] and multi-center suicide registration programs in Iran [5], the following recommendations are offered to

policymakers to enhance the efficiency of this system and transform it into an effective tool for suicide prevention:

Mandating Standardized and Integrated Registration in All Service-Providing Centers

- **Operational Action:** Approve a directive mandating that all hospitals (public and private), emergency medical centers, health facilities, and psychiatric clinics complete a standardized qualitative registration form for every case of suicide attempt. This form must include key variables, such as demographic characteristics, method, cause, motive, psychiatric history, and outcome.
- **Evidence Base:** Shafiee et al. (2022) developed a minimum dataset for Iran's suicide registry system, comprising 84 data elements across four categories: patient demographics, socio-economic status, clinical and psychological status, and suicide-related circumstances [9]. Furthermore, Yazdi-Ravandi et al. (2023) reported significant gender and age differences in the pattern of suicide attempts, underscoring the necessity of accurately recording these variables [4].
- **Implementing Body:** Ministry of Health and Medical Education, in collaboration with the Medical Council Organization and medical sciences universities.

Deployment of Comprehensive Data Registration and Analysis Software Utilizing Advanced Analytical Methods

- **Operational Action:** Design and implement an integrated software platform that enables real-time data entry, continuous data quality monitoring, and the generation of analytical reports at various levels (county, province, national). This platform should be interoperable with existing systems (e.g., the mortality registry) and leverage machine learning algorithms to identify complex patterns and predict factors influencing suicide outcomes.
- **Evidence Base:** The experience of Iran's multi-center suicide registration program (2019–2022) demonstrated that designing a registry system across five phases literature review, infrastructure development, database design, training, and data analysis can create a robust foundation for effective interventions [5]. Matinnia et al. (2024), using machine learning algorithms, found that variables such as age, gender, education, marital status, and method of attempt had the highest predictive power for suicide outcomes, suggesting that these methods can enhance the accuracy of early warning systems [8].
- **Implementing Body:** Ministry of Health, in collaboration with the Information Technology Deputy and affiliated research centers.

Empowering Human Resources and Promoting a Reporting Culture

- **Operational Action:** Conduct continuous training programs for physicians, nurses, psychologists, and health experts on the importance of accurate registration and the proper procedures for interviewing and completing registry forms. Additionally, public awareness campaigns aimed at reducing the social stigma associated with suicide are essential to fostering patient cooperation in providing accurate information.
- **Evidence Base:** Hajebi et al. (2013) identified cultural barriers, including the taboo surrounding suicide and legal concerns, as primary reasons for reluctance to report suicide cases in Iran [2].
- **Implementing Body:** Medical sciences universities, in conjunction with the provincial Departments of Education and the Ministries of Culture and Islamic Guidance.

Active Application of Data in Designing Preventive Interventions Targeting High-Risk Groups

- **Operational Action:** Establish provincial task forces dedicated to analyzing registered data to identify high-risk geographic areas, age groups, occupational categories, and genders within each period. According to these analyses, tailored intervention programs, such as family counseling, social support initiatives, and mental health screening for specific groups, should be developed and implemented. Specifically, given that elderly and middle-aged men are at the highest risk of suicide mortality [4], screening and psychosocial support programs should be prioritized for these groups.
- **Evidence Base:** Karami et al. (2018), utilizing data from the Hamadan qualitative registry, identified two high-risk geographic clusters in the counties of Asadabad and Razan, Iran, indicating that clusters are not uniformly distributed among the cities of Hamadan province [3]. Moreover, Yazdi-Ravandi et al. (2021) reported that men are 83.2 times more likely to experience severe outcomes, and that

individuals with lower education, older age, and a history of suicidal ideation have an elevated risk of fatal outcomes [6]. Yazdi-Ravandi et al. (2023) further emphasized that gender and age differences must be considered when designing interventions [4].

- **Implementing Body:** Deputy of Health at medical sciences universities, in collaboration with the State Welfare Organization and the Imam Khomeini Relief Committee.

Facilitating Access to Psychiatric and Counseling Services with Priority on At-Risk Groups

- **Operational Action:** Given that a significant proportion of attempters have a history of psychiatric illness and that many attempts are impulsive and unplanned, it is imperative to expand access to telephone helplines, crisis centers, and psychological services during non-working hours and on holidays. Additionally, training in conflict resolution and anger management skills is recommended in schools and workplaces. Specifically, since young women and unmarried individuals are high-risk groups for suicide attempts [4], supportive and counseling programs for these populations must be strengthened.
- **Evidence Base:** Iran's National Suicide Prevention Program, integrated into the primary health care system since 2010 [5], requires further reinforcement at provincial and county levels.
- **Implementing Body:** Ministry of Health, State Welfare Organization, and Ministry of Education.

Conclusion

The design and implementation of a qualitative suicide registry system in Hamadan, as a pioneering initiative, has demonstrated that, despite executive challenges, it is feasible to gather rich and valuable data in this domain. Deeper analyses of these data, including the application of machine learning methods, have revealed that factors such as age, gender, marital status, and method of attempt can predict suicide outcomes with high accuracy [4, 6, 7]. However, the sustainability and effectiveness of this system require organizational commitment, sustained resource allocation, and a paradigm shift from mere data registration to the active utilization of findings in policy-making. The experiences of countries like Malaysia in establishing national suicide registries [8], alongside Iran's multi-center registration programs [5], indicate that standardized registry systems can provide a platform for meaningful evaluations, reporting, and measurement of suicidal behaviors across regions and nations. Suicide is not an individual failure, but rather a failure within the social support network. A qualitative registry system can serve as a clear mirror reflecting these deficits, thereby paving the way for their remediation. It is anticipated that the implementation of the above recommendations will result in effective strides toward reducing new cases of suicide and improving associated outcomes in Hamadan province and across the country.

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Conflict of Interest

The authors declared no conflict of interest.

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