Perspective

Essential Skills for Suicide Prevention Data Analysts

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Abstract

Suicide prevention policies increasingly emphasize the integration of high-risk and population-based approaches. Despite the legal foundation provided by Japan's 2006 Basic Act on Suicide Countermeasures, the General Principles of Suicide Prevention Policy (2022) neglect the need for specialized training for data analysts. This study highlights three key areas for effective suicide prevention data analysis: data, analytical, and domain knowledge.

Keywords: suicide, mental health, exploratory data analysis

Introduction

The World Health Organization (WHO) promotes a tiered suicide prevention model comprising three components: (1) advocacy and policy frameworks, (2) strategies targeting high-risk groups, and (3) enhanced screening efforts [1]. These tiers form a comprehensive model integrating population-based and high-risk approaches. Furthermore, the implementation of population-based and data-driven approaches to suicide prevention is closely linked.

In Japan, the 2006 Basic Act on Suicide Countermeasures established a legal foundation for comprehensive suicide prevention efforts. The Act mandates that "Suicide countermeasures must be implemented on a comprehensive basis through the organic coordination of measures and policies related to health, medicine, welfare, education, labor, and other relevant issues (Article 2, Paragraph 5)" [2]. This approach highlights the necessity of incorporating high-risk and population-based perspectives into suicide prevention measures. As stated in the WHO report [1], increasing the effectiveness of these measures requires developing appropriate human resources, including establishing many suicide research units and graduate and postgraduate courses.

The General Principles of Suicide Countermeasures Policy (2007, revised 2022) [3] focuses on training human resources for mental health and medical welfare services and supporting human resource development in private entities; however, the policy is ambiguous about the role of suicide researchers and data analysts who have employed population-based methodology.

As shown in Figure 1, this article outlines the core competencies required for suicide prevention data analysts focusing on three essential elements.

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Data Knowledge

In Japan, representative suicide surveillance systems include vital and police statistics, which differ significantly, particularly in terms of accessibility. Although vital statistics are available for research and enhance the effectiveness of the analysis, access to police microdata is highly restricted. To overcome such limitations, analysts must incorporate supplementary data, such as information on suicide attempts, suicidal ideation, and mental health issues [4]. Public statistical microdata, termed "official microdata," encompass diverse suicide-related resources, including the Survey on Time Use and Leisure Activities [5] and surveys on loneliness and isolation [6]. Furthermore, official microdata addresses various issues related to mental health problems and socioeconomic factors preceding suicide. For example, in case regional economic disparities influence suicide rates, combining microdata related to economic issues with vital statistics clarifies the pathways leading to suicide. This integration supports effective local government monitoring and developing targeted suicide prevention strategies. Researchers can examine multifaceted underlying risk factors by leveraging these detailed datasets. Notable, initiatives such as the Innovative Research Program on Suicide Countermeasures under the Japan Suicide Countermeasures Promotion Center (JSCP) have utilized these data to produce impactful outcomes in suicide prevention [7]. Consistent efforts to analyze such microdata are essential for advancing population-based suicide prevention strategies.

Analytical Knowledge

Proficiency in statistics and computer science is fundamental for data analysis, and advances in generative artificial intelligence (AI) have further enhanced analytic efficiency. Generative AI offers support across multiple research stages, including hypothesis formulation, study design, data preprocessing, implementation, and discussion.

Hypothesis testing, which tests specific hypotheses, is highly compatible with generative AI capabilities. However, in the exploratory approach, which generates new hypotheses through careful data observation without any preconceived notions and links them to practical issues, the ideas produced by generative AI may appear unoriginal. While the hypothesis-testing approach represents "day science," emphasizing the application of rigorous statistical methods, the exploratory approach can be seen as the 'night science' of freely experimenting with data without constraints [8]. Suicide is a complex process, involving multiple intertwined factors, such as family, school, work, relationships, health, and finances. At first glance, the hypothesis-testing approach appears to be the most suitable to analyze suicide data. However, an exploratory approach may uncover significant issues that have not been clarified or remain overlooked, and therefore have not been integrated into suicide prevention strategies.

For this reason, analysts must balance the gravity of suicide with the playfulness of exploration, ensuring that innovative insights are not overlooked when addressing this multifaceted problem.

Recognizing that not all aspects of suicide prevention can be addressed solely by data-driven methods is also crucial. Although suicide monitoring can yield valuable insights, analytic systems must ultimately inform tangible prevention strategies. Otherwise, such efforts may become self-contained exercises that fail to achieve their end goal.

Domain Knowledge

Suicide is an inherently interdisciplinary issue spanning medical, psychological, and sociological domains. Therefore, a deep understanding of suicide prevention, combined with strict adherence to ethical standards—especially in handling sensitive personal information—is critical.

Public health systems promote suicide prevention through a population-based approach. However, as it is often framed within medical schools and graduate programs in medicine, this approach is biased toward education from medical perspectives and hypothesis-testing approaches. Evaluating educational programs in academic fields such as health services research and data science is essential, as curricula increasingly incorporate exploratory approaches and sociological and humanistic knowledge that go beyond traditional public health approaches.

Developing standardized educational materials on data surveillance, access, and management—combined with certification programs—is a crucial first step toward building capacity in this emerging field. However, developing such materials may be challenging owing to the field's interdisciplinary nature. Therefore, to fully develop human resources for suicide prevention data analysts, more resources should be allocated to fields that offer cross-disciplinary educational services, such as health services research and data science.

Analysts must integrate data from diverse sources, including surveillance systems, official microdata, healthcare records, hotline logs, and online platforms. This multidisciplinary approach generates novel insights and informs the development of effective policies. Suicide prevention strategies, as emphasized by the iceberg model, must account for both visible and invisible factors contributing to suicide. The model suggests that while visible indicators represent the tip of the iceberg, the underlying causes, which include social, psychological, and environmental factors, often remain hidden.

Mastering these competencies is complex and requires advanced training. However, most Japanese research institutions and universities lack structured development programs, largely leaving skill acquisition to individual initiative. In contrast, JSCP functions as a specialized organization that fosters interdisciplinary collaboration among media professionals, municipal officials, bereaved families, psychologists, legal scholars, and public administrators. This unique synergy enables JSCP to address suicide prevention from multiple perspectives. Notably, JSCP is one of the few institutions with access to police data, allowing it to develop more robust, data-driven suicide prevention strategies. Therefore, JSCP can serve as an incubator for these critical skills in Japan.
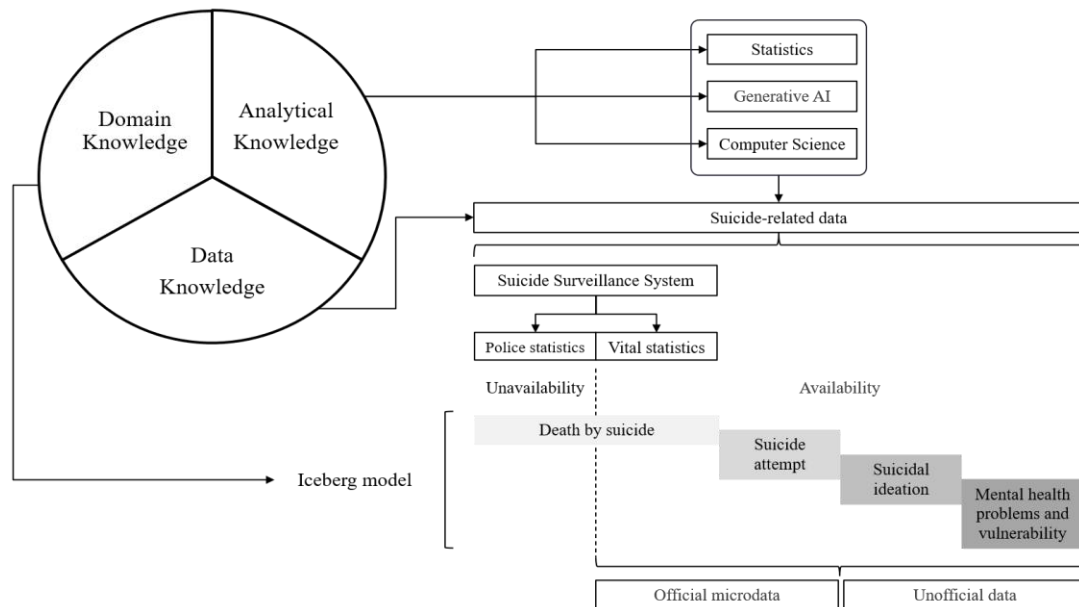

Fig. 1 The three types of knowledge and skills required of suicide prevention data analyst.

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Conflicts of Interest

None declared.

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