



International Journal of Innovative Technologies in Social Science

e-ISSN: 2544-9435

Scholarly Publisher
RS Global Sp. z O.O.
ISNI: 0000 0004 8495 2390

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ARTICLE TITLE ARTIFICIAL INTELLIGENCE IN THE SUICIDE PREVENTION - A
SYSTEMATIC REVIEW

DOI [https://doi.org/10.31435/ijitss.4\(48\).2025.4447](https://doi.org/10.31435/ijitss.4(48).2025.4447)

RECEIVED 12 October 2025

ACCEPTED 12 December 2025

PUBLISHED 30 December 2025

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ARTIFICIAL INTELLIGENCE IN THE SUICIDE PREVENTION - A SYSTEMATIC REVIEW

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ABSTRACT

Objectives: Suicide remains a pressing global public health issue, claiming over 700,000 lives annually. Despite decades of research, predictive models for suicide risk have seen limited progress, emphasizing the need for innovative approaches. Artificial intelligence (AI) and machine learning (ML) are increasingly recognized for their potential to enhance early detection, risk assessment, and intervention strategies. The objective of this review is to provide a critical evaluation of the role of AI in the detection and prevention of suicide, with particular emphasis on its current implementations, potential benefits, and inherent limitations.

Methods: A literature review was conducted for the period spanning 2020 to 2025. Relevant publications were identified through a systematic search of the PubMed database using the keywords: artificial, intelligence, suicide, and prevention. The search retrieved 271 articles, of which 23 met the predefined inclusion criteria and were incorporated into the final analysis.

Key findings: Recent developments highlight how AI technologies can support suicide prevention through social media surveillance, clinical decision-making tools, and real-time crisis response systems. However, these advancements are not without challenges. Significant concerns persist around data privacy, algorithmic bias, transparency, and the erosion of human-centered care.

Conclusions: While AI-driven tools offer substantial opportunities for suicide prevention, their integration into mental health care must be approached with caution. Ethical safeguards, clinical oversight, and continued research are essential to ensure these technologies complement—rather than compromise—traditional human care. A balanced, multidisciplinary approach is vital to realize the full potential of AI while maintaining patient trust, safety, and dignity.

KEYWORDS

Suicide Prevention, Artificial Intelligence, AI, Machine Learning, ML, Mental Health, Digital Psychiatry

CITATION

Olga Jakubik, Katarzyna Torbacka, Katarzyna Rozkosz, Natalia Wróbel, Patrycja Podlejska, Maja Torbacka, Zuzanna Wróbel, Aleksandra Sosin, Joanna Kaczor, Wojciech Bednarz. (2025) Artificial Intelligence in the Suicide Prevention - A Systematic Review. *International Journal of Innovative Technologies in Social Science*. 4(48). doi: 10.31435/ijits.4(48).2025.4447

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Introduction

Suicide represents a significant global health crisis, claiming approximately 703,000 lives annually, with profound social and economic consequences. According to the World Health Organization, suicide ranks as the fourth leading cause of death among individuals aged 15 to 29 years, with youth being particularly vulnerable to this tragic outcome [1]. Additionally, for each completed suicide, it is estimated that there are 20 suicide attempts, underscoring the importance of understanding the complex risk factors and timely intervention strategies [2].

The underlying causes of suicide are multifactorial, encompassing a broad range of health-related, environmental, and personal history factors [3]. These include mental health disorders, substance abuse, chronic physical illness, a history of childhood abuse, and exposure to adverse life events such as bullying and domestic violence. Other risk factors include social isolation, stressful life circumstances, and a lack of access to mental health care [4]. Also previous suicidal behaviors are associated with suicidal ideation, suicide attempts and suicide death, respectively [5]. The COVID-19 pandemic has further heightened the risk of suicide worldwide, particularly due to the exacerbation of social isolation, unemployment, and heightened mental health distress during lockdowns [6]. Such findings highlight the importance of a comprehensive approach that incorporates environmental factors, individual mental health, and socio-economic conditions to identify at-risk individuals. Suicide can be classified into two primary groups: ideators and attempters. Suicidal ideation refers to a range of thoughts, from passive contemplation of death to active planning of suicide attempts [7]. Passive suicidal ideation involves a wish to be dead without an intention to act, while active ideation refers to an intent to commit suicide. Although passive ideation might appear less harmful, it remains a significant risk factor, as it can evolve into active suicide attempts, particularly when personal circumstances worsen or untreated mental health issues persist [8].

The early detection and assessment of suicidal ideation are crucial for preventing suicide, as timely intervention can significantly alter the trajectory of an individual's mental health. Despite this, several barriers to effective suicide prevention persist. These include societal stigma surrounding mental health, the lack of mental health professionals in many areas, and lack of financial resources [9]. Furthermore it has been established that despite decades of research, there has been little progress in improving the predictive accuracy of suicide risk over the past 50 years [10]. Improved tools for evaluating suicide risk are urgently needed.

Innovative approaches to suicide risk detection have emerged, particularly through the use of artificial intelligence (AI) and machine learning (ML). These technologies have been utilized to analyze large datasets of patient information, allowing for the identification of patterns and predictive models that can aid in suicide risk assessment [11]. AI has already proven effective in other medical disciplines such as dermatology and pathology, where algorithms are now able to match or even surpass the diagnostic accuracy of medical professionals. Although AI applications in psychiatry are still evolving, the potential for these technologies to support suicide prevention efforts is substantial [12]. By improving the precision of risk assessments, AI could possibly facilitate more timely and targeted interventions. Furthermore, the integration of social media data, smartphone sensors, and other real-time data sources into predictive models has the potential to revolutionize suicide prevention by detecting early warning signs and providing instant alerts to mental health professionals [13]. Given the rising incidence of suicide, more research is needed to refine predictive models and integrate them effectively into clinical practice. The development of AI-powered tools, in combination with professional expertise, holds promise for improving both the accuracy and efficiency of suicide prevention efforts. This multidisciplinary approach offers hope for a future where suicide can be detected and prevented with greater success, ultimately saving lives and reducing the burden on society [14].

This study aims to critically examine the potential of artificial intelligence (AI) in the detection and prevention of suicide, with a focus on its current applications, benefits, and limitations.

Methodology

A literature review was conducted for the period spanning 2020 to 2025. Relevant publications were identified through a systematic search of the PubMed database using the keywords: *artificial intelligence*, *suicide*, and *prevention*. The search retrieved 271 articles, of which 23 met the predefined inclusion criteria and were incorporated into the final analysis.

Results

Artificial intelligence (AI) encompasses computational systems designed to perform tasks typically requiring human intelligence, such as pattern recognition and decision-making [15]. A subset of AI, machine learning (ML), enables these systems to learn from data and improve over time without explicit programming [16]. In the realm of mental health, AI and ML are increasingly applied to identify individuals at risk of suicide by analyzing diverse data sources, including electronic health records, social media activity, and wearable device metrics [17]. These technologies can detect subtle patterns and risk factors that may elude traditional assessment methods, offering the potential for earlier and more accurate identification of at-risk individuals [18]. However, while promising, the integration of AI into suicide prevention strategies necessitates careful consideration of ethical implications, data privacy concerns, and the need for clinical validation to ensure these tools augment rather than replace human judgment [19]. Ongoing research is essential to establish standardized protocols and to evaluate the effectiveness of AI-driven interventions in real-world clinical settings [14].

Discussion

Application of AI in Suicide Prevention

Artificial intelligence (AI) has rapidly emerged as a powerful tool in the field of suicide prevention, offering new avenues for early detection, risk assessment, crisis intervention, and clinical support. By leveraging machine learning (ML), natural language processing (NLP), and multimodal data analytics, AI systems can interpret vast and complex datasets, ranging from social media behavior and electronic health records (EHRs) to linguistic cues in clinical interviews. This section reviews the AI-based methods currently applied or in development for suicide prevention, grouped into four primary domains: social media surveillance and digital behavior analysis, clinical decision support and risk stratification, crisis response and counseling enhancement, and educational and training applications.

Social Media Surveillance and Digital Behavior Analysis

Social media platforms are rich with unfiltered expressions of emotion, distress, and behavioral patterns, making them valuable sources for identifying individuals at risk of suicide. Several projects have harnessed AI tools to monitor and assess user-generated content on platforms such as Facebook, Twitter, and Reddit.

Facebook developed a machine learning system based on the random forest algorithm to scan posts and live videos for signs of suicidal ideation or self-harm. The system alerts human reviewers to high-risk content, and according to Facebook, it outperforms traditional reporting by users [20]. Though early results suggested that it helped connect emergency responders with over 3500 individuals at immediate risk by late 2018, no peer-reviewed data has substantiated these claims [20].

Radar, an AI-driven app developed by the UK-based nonprofit Samaritans, analyzed Twitter activity to alert users when a contact exhibited suicide risk signals. Despite its innovative application of AI, Radar was met with controversy over ethical concerns and potential misuse for profiling, highlighting the delicate balance between innovation and privacy [21].

Similarly, the Canadian Government, through Public Health Canada, collaborated with AI company Advanced Symbolics to monitor suicide-related discussions across digital platforms. The initiative aimed to identify suicide “hotspots” by analyzing de-identified online behavior and thus optimize resource allocation [22]. This type of predictive modeling has demonstrated the potential of public social data for proactive public health strategies.

Reddit has also served as a focal point for suicidality detection. Given the anonymity of platforms like Reddit, users may feel more comfortable sharing their experiences and distress, reducing the barrier of social stigma that often limits face-to-face disclosures. Research suggests that nearly 80% of individuals who die by suicide in non-psychiatric settings did not reveal their suicidal intentions during prior clinical evaluations [23]. AI models analyzing Reddit posts can thus help capture signals that standard clinical screening often misses, aiding in both individual-level and population-level interventions.

Clinical Decision Support and Risk Stratification

Beyond public platforms, AI is increasingly being integrated into clinical settings to support mental health professionals in identifying and managing suicide risk. These applications rely on data from EHRs, clinical notes, and structured interviews.

A pivotal study by McCoy et al. used a combination of demographic data, billing codes, and narrative discharge summaries extracted from EHRs to predict suicide risk. The inclusion of additional data other than clinical notes enhanced predictive accuracy, underlining the importance of NLP tools in mining nuanced clinical information [24].

In a parallel study, Zhong et al. developed an algorithm to detect suicidal behavior among pregnant women using clinical notes extracted through NLP. Compared to manual chart reviews, this approach increased the detection of suicidal behaviors by 11-fold, emphasizing the scalability and effectiveness of NLP for underreported populations [25].

A study conducted in emergency departments across the southeastern United States demonstrated the practical utility of NLP and ML in real-time risk assessment. Short interviews with patients, processed through AI models, reliably predicted suicidal ideation using linguistic patterns, achieving strong performance metrics (AUC and Brier scores) [24]. These tools not only integrate seamlessly into clinical workflows but also alleviate the cognitive burden on clinicians, serving as decision-making co-pilots.

Another noteworthy model was developed by Roy et al., who combined neural network outputs with random forest classifiers to predict suicidal ideation before it was explicitly mentioned by patients. Their use of ordered word pattern screening revealed that AI could preemptively detect risk, offering crucial opportunities for early intervention [26].

Crisis Response and Counseling Enhancement

AI is also transforming how crisis support is delivered, enabling faster and more accurate triaging in high-stress scenarios. The Crisis Text Line functioning in the USA, Canada, South Africa and Ireland exemplifies this approach: using ML algorithms trained on over 54 million text messages, counselors can identify high-risk individuals within the first few interactions. Specific keywords like “ibuprofen” or “Advil” were found to be 14 times more predictive of imminent danger than even the word “suicide,”[20].

Similarly, the Trevor Project, in partnership with Google, uses ML to support its counseling services for LGBTQ+ youth. Their system helps counselors assess the risk profile of users more quickly and efficiently, enabling more timely and targeted interventions [20].

These systems underscore the potential of AI to enhance responsiveness and reduce the risk of human error or delay in emotionally charged and time-sensitive situations.

Educational and Training Applications

AI is also being deployed to improve mental health literacy and crisis response training.

Generative AI-based simulators, for instance, are being tested as training tools for healthcare professionals. Engaging with these real-time role-play simulations can support the development of clinical competencies among crisis line operators, counselors, and suicide prevention gatekeepers, potentially improving both training efficacy and practitioner confidence in managing high-risk situations [27].

Meanwhile, Google has integrated screening tools into public-facing platforms. For example, Google provides private depression screening assessments upon search queries for clinical depression, offering users tailored mental health resources. Although the data is anonymized and the underlying algorithms are not publicly disclosed, such tools illustrate how educational AI can serve both individuals and research alike [20].

Challenges and Limitations of Artificial Intelligence in Suicide Prevention

Despite the promising applications of artificial intelligence (AI) in suicide prevention, several significant challenges and limitations must be acknowledged. These can be broadly categorized into ethical concerns, privacy and security issues, biases in data, limitations in data quality, transparency in decision-making processes, clinical integration difficulties and technical limitations.

Ethical Concerns and Responsibility

AI raises important ethical concerns regarding data use, the physician's role in care, and medico-legal responsibility [14]. While AI can optimize the analysis of clinical and sociodemographic data to better predict suicide risks, it is complementary to, not a replacement for, clinical judgment. The responsibility for patient care will continue to rest with the clinician, informed by an understanding of AI's capabilities and limitations [14]. Additionally, the ethical evaluation of risks and benefits during the development of AI and digital health tools has often been insufficient. There is concern that digital interventions might be adopted based on cost-effectiveness without thorough ethical scrutiny, particularly when replacing in-person services [28].

Bias and Fairness in AI Models

Bias in AI models remains a serious concern. Studies have found biases related to race, gender, religion, nationality, and age embedded in large language models (LLMs). Bias can enter at multiple stages: during data collection, annotation, model training, and interpretation. Such biases risk the creation of tools that systematically disadvantage marginalized groups [27]. Similarly, most studies fail to collect or appropriately categorize sociodemographic data, often using broad or imprecise labels that mask important disparities. This risks perpetuating inequities in mental health care access and outcomes [29].

Limitations of Data Quality and Quantity

Another significant challenge lies in the quality and quantity of data available for training AI models. To effectively train models for the detection of suicidal ideation, researchers require labeled datasets containing examples of posts classified as indicative of suicidality and those deemed non-suicidal. Manually labeling posts or medical notes is labor-intensive and subjected to human errors [23]. For example, in Reddit datasets focused on suicidality, only a tiny fraction of posts are annotated, leading to models that can suffer from poor generalization and a high rate of false negatives. Annotation bias, particularly when using non-expert crowdsourced workers, further compromises the reliability of datasets [23].

Transparency and Explainability

LLM and other advanced AI models operate as "black boxes," making their internal logic and decision-making processes difficult to interpret [27]. This lack of transparency undermines trust, especially when errors occur. Without clear insight into how decisions are made, clinicians and patients alike may hesitate to rely on AI recommendations. Moreover, models often fail to explain how they retrieve or validate information unless specifically prompted, and even then, responses can be vague or incorrect [27].

Clinical Integration and Human Factors

While digital tools such as internet-based cognitive behavioral therapy (iCBT) and suicide prevention apps are widely appreciated for their accessibility, they might not fully replace human interaction [30]. The therapeutic alliance is widely recognized as a crucial factor in determining the outcomes of psychotherapy. Numerous studies examining internet-based interventions have gathered data from patients regarding their perceptions of the therapeutic alliance with online therapists [30]. The human element in mental health care—empathy, trust, and the therapeutic alliance remains crucial.

Technical and Infrastructural Challenges

Implementing AI-driven suicide prevention in low-resource settings presents unique challenges, including unreliable internet access, limited computational infrastructure, and high costs [31]. Open-source and low-cost solutions are critical for scaling AI innovations without exacerbating healthcare inequalities. Additionally, AI models must be culturally sensitive, recognizing that mental health behaviors and suicide risk factors vary significantly across regions [31].

Privacy and Data Protection

Protecting the privacy and security of sensitive mental health data is critical. Compliance with robust frameworks such as the General Data Protection Regulation (GDPR) and the Health Insurance Portability and Accountability Act (HIPAA) is necessary [31]. This includes encryption, anonymization, and secure storage of personal health information. Transparent consent processes and clear communication about data usage are fundamental to maintaining ethical standards [31].

Conclusions

Artificial intelligence holds significant promise in enhancing suicide prevention efforts by enabling earlier detection, more accurate risk assessment, and scalable intervention strategies. However, its integration into mental health care must be approached with caution, addressing key concerns such as data privacy, bias, ethical transparency, and the preservation of human elements like empathy and therapeutic alliance. While AI can augment clinical decision-making, it cannot replace the nuanced judgment and relational depth provided by trained professionals. Ongoing research, ethical scrutiny, and interdisciplinary collaboration will be essential to harness AI's potential responsibly and effectively in suicide prevention.

REFERENCES

1. World Health Organization. Suicide worldwide in 2019: global health estimates. Geneva: World Health Organization, 2021.
2. González-Ortega, I., Díaz-Marsa, M., López-Peña, P., Fernández-Sevillano, J., Andreo-Jover, J., Bobes, J., Bravo-Ortiz, M. F., Cebria, A. I., Crespo-Facorro, B., de la Torre-Luque, A., Elices, M., Fernández-Rodrigues, V., Garrido-Torres, N., Grande, I., Palao-Tarrero, Á., Pemau, A., Roberto, N., Ruiz-Veguilla, M., Seijo-Zazo, E., Alberich, S., ... SURVIVE Group (2025). Clinical predictors and psychosocial risk factors of suicide attempt severity. *Spanish journal of psychiatry and mental health*, 18(3), 182–190. <https://doi.org/10.1016/j.sjpmh.2023.07.002>O'Connor RC, Nock MK. *The psychology of suicidal behaviour*. *Lancet Psychiatry*. 2014 Jun;1(1):73-85. doi: 10.1016/S2215-0366(14)70222-6.
3. Moutier, C., & Mortali, M. G. (2021). Suicide Warning Signs and What to Do. *The Veterinary clinics of North America. Small animal practice*, 51(5), 1053–1060. <https://doi.org/10.1016/j.cvsm.2021.04.021>Li X, Mu F, Liu D, Zhu J, Yue S, Liu M, Liu Y, Wang J. *Predictors of suicidal ideation, suicide attempt and suicide death among people with major depressive disorder: A systematic review and meta-analysis of cohort studies*. *J Affect Disord*. 2022 Apr 1;302:332-351. doi: 10.1016/j.jad.2022.01.103.
4. Hossain, M. M., Tasnim, S., Sultana, A., Faizah, F., Mazumder, H., Zou, L., McKyer, E. L. J., Ahmed, H. U., & Ma, P. (2020). Epidemiology of mental health problems in COVID-19: a review. *F1000Research*, 9, 636. <https://doi.org/10.12688/f1000research.24457.1>
5. Harmer B, Lee S, Duong TVH, & Saadabadi A. (2022) *Suicidal ideation*. *StatPearls [Internet]*. StatPearls Publishing
6. Simon RI. (2014) Passive suicidal ideation: still a high-risk clinical scenario. *Current Psychiatry* 13(3):13-15
7. Kasal, A., Táborská, R., Juríková, L., Grabenhofer-Eggerth, A., Pichler, M., Gruber, B., Tomášková, H., & Niederkrotenthaler, T. (2023). Facilitators and barriers to implementation of suicide prevention interventions: Scoping review. *Global mental health (Cambridge, England)*, 10, e15. <https://doi.org/10.1017/gmh.2023.9>.
8. Franklin, J. C., Ribeiro, J. D., Fox, K. R., Bentley, K. H., Kleiman, E. M., Huang, X., Musacchio, K. M., Jaroszewski, A. C., Chang, B. P., & Nock, M. K. (2017). Risk factors for suicidal thoughts and behaviors: A meta-analysis of 50 years of research. *Psychological bulletin*, 143(2), 187–232. <https://doi.org/10.1037/bul0000084>.
9. Berrouguet, S., Billot, R., Larsen, M. E., Lopez-Castroman, J., Jaussent, I., Walter, M., Lenca, P., Baca-García, E., & Courtet, P. (2019). An Approach for Data Mining of Electronic Health Record Data for Suicide Risk Management: Database Analysis for Clinical Decision Support. *JMIR mental health*, 6(5), e9766. <https://doi.org/10.2196/mental.9766>Miller DD, Brown EW. Artificial Intelligence in Medical Practice: The Question to the Answer? *Am J Med*. 2018 Feb;131(2):129-133. doi: 10.1016/j.amjmed.2017.10.035.

10. Torous, J., Larsen, M. E., Depp, C., Cosco, T. D., Barnett, I., Nock, M. K., & Firth, J. (2018). Smartphones, Sensors, and Machine Learning to Advance Real-Time Prediction and Interventions for Suicide Prevention: a Review of Current Progress and Next Steps. *Current psychiatry reports*, 20(7), 51. <https://doi.org/10.1007/s11920-018-0914-y>
11. Lejeune, A., Le Glaz, A., Perron, P. A., Sebti, J., Baca-Garcia, E., Walter, M., Lemey, C., & Berrouiguet, S. (2022). Artificial intelligence and suicide prevention: a systematic review. *European psychiatry : the journal of the Association of European Psychiatrists*, 65(1), 1–22. Advance online publication. <https://doi.org/10.1192/j.eurpsy.2022.8>
12. Amisha, Malik, P., Pathania, M., & Rathaur, V. K. (2019). Overview of artificial intelligence in medicine. *Journal of family medicine and primary care*, 8(7), 2328–2331. https://doi.org/10.4103/jfmpe.jfmpe_440_19
13. Boudreaux, E. D., Rundensteiner, E., Liu, F., Wang, B., Larkin, C., Agu, E., Ghosh, S., Semeter, J., Simon, G., & Davis-Martin, R. E. (2021). Applying Machine Learning Approaches to Suicide Prediction Using Healthcare Data: Overview and Future Directions. *Frontiers in psychiatry*, 12, 707916. <https://doi.org/10.3389/fpsy.2021.707916>
14. Ji, S., Pan, S., Li, X., Cambria, E., Long, G., & Huang, Z. (2021). Suicidal ideation detection: A review of machine learning methods and applications. *IEEE Transactions on Computational Social Systems*, 8(2), 214–226.
15. Atmakuru, A., Shahini, A., Chakraborty, S., Seoni, S., Salvi, M., Hafeez-Baig, A., Rashid, S., Tan, R.-S., Barua, P., Molinari, F., & Acharya, U. R. (2024). Artificial intelligence-based suicide prevention and prediction: A systematic review (2019–2023). *Information Fusion*, 114 102673.
16. Ehtemam, H., Sadeghi Esfahlani, S., Sanaei, A., Ghaemi, M. M., Hajesmaeel-Gohari, S., Rahimisadegh, R., Bahaadinbeigy, K., Ghasemian, F., & Shirvani, H. (2024). Role of machine learning algorithms in suicide risk prediction: a systematic review-meta analysis of clinical studies. *BMC medical informatics and decision making*, 24(1), 138. <https://doi.org/10.1186/s12911-024-02524-0>
17. D'Hotman, D., & Loh, E. (2020). AI enabled suicide prediction tools: a qualitative narrative review. *BMJ health & care informatics*, 27(3), e100175. <https://doi.org/10.1136/bmjhci-2020-100175>
18. Gomes de Andrade, N., Pawson, D., Muriello, D., Donahue L., & Guadagno J. (2018) Ethics and Artificial Intelligence: Suicide Prevention on Facebook. *Philosophy & Technology* 31, 669–684. <https://doi.org/10.1007/s13347-018-0336-0>
19. Vogel L. (2018). AI opens new frontier for suicide prevention. *CMAJ : Canadian Medical Association journal = journal de l'Association medicale canadienne*, 190(4), E119. <https://doi.org/10.1503/cmaj.109-5549>
20. Yeskuatov, E., Chua, S. L., & Foo, L. K. (2022). Leveraging Reddit for Suicidal Ideation Detection: A Review of Machine Learning and Natural Language Processing Techniques. *International journal of environmental research and public health*, 19(16), 10347. <https://doi.org/10.3390/ijerph191610347>
21. Arowosegbe, A., & Oyelade, T. (2023). Application of Natural Language Processing (NLP) in Detecting and Preventing Suicide Ideation: A Systematic Review. *International journal of environmental research and public health*, 20(2), 1514. <https://doi.org/10.3390/ijerph20021514>
22. Zhong, Q. Y., Mittal, L. P., Nathan, M. D., Brown, K. M., Knudson González, D., Cai, T., Finan, S., Gelaye, B., Avillach, P., Smoller, J. W., Karlson, E. W., Cai, T., & Williams, M. A. (2019). Use of natural language processing in electronic medical records to identify pregnant women with suicidal behavior: towards a solution to the complex classification problem. *European journal of epidemiology*, 34(2), 153–162. <https://doi.org/10.1007/s10654-018-0470-0>
23. Sweeney, C., Ennis, E., Mulvenna, M. D., Bond, R., & O'Neill, S. (2024). Insights Derived From Text-Based Digital Media, in Relation to Mental Health and Suicide Prevention, Using Data Analysis and Machine Learning: Systematic Review. *JMIR mental health*, 11, e55747. <https://doi.org/10.2196/55747>
24. Holmes, G., Tang, B., Gupta, S., Venkatesh, S., Christensen, H., & Whitton, A. (2025). Applications of Large Language Models in the Field of Suicide Prevention: Scoping Review. *Journal of medical Internet research*, 27, e63126. <https://doi.org/10.2196/63126>
25. Rassy, J., Bardon, C., Dargis, L., Côté, L. P., Corthésy-Blondin, L., Mörch, C. M., & Labelle, R. (2021). Information and Communication Technology Use in Suicide Prevention: Scoping Review. *Journal of medical Internet research*, 23(5), e25288. <https://doi.org/10.2196/25288>
26. Bennett-Poynter, L., Kundurthi, S., Besa, R., Joyce, D. W., Kormilitzin, A., Shen, N., Sunwoo, J., Szkudlarek, P., Sequiera, L., & Sikstrom, L. (2025). Harnessing digital health data for suicide prevention and care: A rapid review. *Digital health*, 11, 20552076241308615. <https://doi.org/10.1177/20552076241308615>
27. Andersson, G., & Titov, N. (2014). Advantages and limitations of Internet-based interventions for common mental disorders. *World psychiatry: official journal of the World Psychiatric Association (WPA)*, 13(1), 4–11. <https://doi.org/10.1002/wps.20083>
28. Al-Remawi, M., Ali Agha, A. S. A., Al-Akayleh, F., Aburub, F., & Abdel-Rahem, R. A. (2024). Artificial intelligence and machine learning techniques for suicide prediction: Integrating dietary patterns and environmental contaminants. *Heliyon*, 10(24), e40925. <https://doi.org/10.1016/j.heliyon.2024.e40925>