REVIEW ARTICLE

CONTENTS

Exploring the potential and challenges of artificial intelligence (AI) for intervention and prevention of suicidality to achieve SDGs: A thematic review

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ABSTRACT

Aim: To explore the potential and challenges of Artificial Intelligence for the intervention and Prevention of Suicidality to achieve the Sustainable Development Goals (SDGs).

Materials and Methods: A thematic review was conducted whereby the databases included a) EBSCO *host,* b) Sociological Abstracts, c) Embase, and d) SCOPUS. A total of 10 papers (published since 2015-2026) were sampled and analysed by using Braun and Clark's reflexive thematic analysis.

Conclusions: AI can be used effectively to identify, intervene and prevent suicidality. Ethical considerations are important, and appropriate utilisation can help achieve SDGs relevant to mental health.

KEYWORDS: Suicidality, Suicide, Artificial Intelligence, Identification, Prevention, Sustainable Development Goals (SDGs)

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INTRODUCTION

Suicidality is a key health, social, and psychological phenomenon globally [1]. Younger populations are at increased risk of developing suicidality, leading to one of the leading causes of death among individuals aged between 16 and 30 years [2]. Suicidality has been widely researched across various contexts, including age-related differences, economic domains, cultural explanations, social factors, health-related domains, religious dimensions, and health indicators [3]. The dimensions are explored in the context of contributing to suicidality as risk factors, as well as in management and prevention.

Artificial Intelligence (AI) is a revolution of the current decade [4]. It is part of routine life, healthcare, education, and sports, and, in short, it impacts each sector of life. AI development and utilisation are expanding in daily life. The healthcare sector is a significant beneficiary of AI technology [5]. AI is revolutionising healthcare by assisting with diagnosis, treatment, and personalised recommendations to improve health indicators. Therefore, research shows that AI is significant for achieving health-related Sustainable Development Goals (SDGs) [6].

With the power of revolution in general and in healthcare, will AI be powerful enough to be utilised for identifying suicidality patterns, and will treatment and prevention remain key questions? Keeping this question in view, this work provides a prospective view of the utilisation of AI for the management of suicidality, with a focus on potential and challenges, which is the rationale for this study. To date, there are few studies on the theme of AI and suicidality. Stokel-Walker explored AI-driven suicidality. The study provides grounds for the importance of AI in relation to suicide and related behaviours [7]. On the other hand, AI has the potential to identify suicide-related behaviours. Parsapoor Mah Parsa and colleagues examined the importance and potential role of Machine Learning models and algorithms in analysing text to identify suicidal behaviours [8]. Social media content, including writing, posting, and interactions with other users, supports multimodal behavioural analysis, including mental status assessment. Mental status is important in connection with suicidal

Table 1. Sampled Papers

S. No	Authors	Title	Methodology	Major Findings
1	Liu et al. (2025)	Proactive suicide prevention online (PSPO): machine identification and crisis management for Chinese social media users with suicidal thoughts and behaviours	microblog group online; best performing model	The PSPO model is suitable for identifying populations that are at risk of suicide. When followed up with proactive crisis management, it may be a useful supplement to existing prevention programs because it has the potential to increase the accessibility of anti-suicide information to people with suicidal thoughts and behaviours, but a low motivation to seek help.
2	Lekkas et al. (2021)	Predicting acute suicidal ideation on Instagram using ensemble machine learning models	Ensemble machine learning model	Online Social Networking Data (SN) can provide insight into suicidal behaviour due to its rich data stream.
3	Ramírez-Cifuentes et al. (2020)	Detection of suicidal ideation on social media: multimodal, relational, and behavioral analysis	Experimental analysis with 2 control groups	Social media content, such as writing, posting, and interactions with other users, supports multimodal behavioural analysis, including mental status assessment.
4	Hopkins et al. (2024)	Technology in Suicide Prevention: Fears and Functionality for Crisis Supporters, Human Behaviour and Emerging Technologies	Thematic Survey design	AI technologies can be effective only if they are perceived as useful by the users.
5	Lejeune et al. (2022)	Artificial intelligence and suicide prevention: a systematic review	Systematic review	AI has significant potential for the identification of the risk of suicide among vulnerable individuals; however, ethical issues are also important to be considered.
6	Biscaia Fernández et al. (2026)	La inteligencia artificial en la prevención de conductas suicidas: aspectos técnicos y consideraciones ético-legales	Analysis of social networking environment	Social networking can be analysed as an important source for identifying suicidality using machine learning (AI).
7	Mondragón-Barrios et al. (2026)	Ethical challenges of using artificial intelligence in suicide prevention: a literature review	Literature Review (A non-systematic review)	The sensitive and confidential nature of data regarding suicide is posing a major threat to the extensive utilisation of AI for suicide prevention.
8	Stokel-Walker (2025)	AI-driven psychosis and suicide are on the rise, but what happens if we turn the chatbots off?	Investigative commentary with narrative case study	Chatbots seem to help individuals with mental health issues when they are alone; however, it is harmful in the long term, including developing suicidality.
9	Parsapoor et al. (2023)	Suicide risk detection using artificial intelligence: the promise of creating a benchmark dataset for research on the detection of suicide risk	Benchmark data set	A vocal and textual dataset can identify suicidal ideation. At this point in time, standard dataset based in logical AI are not available
10	Mokheleli et al. (2026)	Artificial intelligence in suicide risk assessment: a systematic literature review	Systematic Review	AI cannot replace traditional methods of intervening in suicidality; however, it can be a useful tool. Ethical considerations are very important when using AI for the identification and intervention of suicidality.

Source: compiled by the authors based on [7, 8, 9, 10, 17, 19, 21, 22, 28, 30]

ideation [9]. Hopkins and colleagues found that there are motivations for utilising Machine Learning tools (AI) for preventing suicides; however, attitudes towards AI can also be a barrier [10].

Considering the above arguments, this study extends the debate by situating it within theoretical explanations and the SDGs to improve mental health. Improving mental health is an important way to intervene and prevent suicidality. In this connection, this research aims to understand the link between existing theoretical explanations and AI utilisation for suicidality; the potential and challenges of utilising AI in the identification and management of suicidality; and the importance of AI utilisation in achieving the SDGs.

AIM

The aim of this study is to explore the potential and challenges of Artificial Intelligence for the intervention and Prevention of Suicidality to achieve the SDGs. The specific objectives are:

- To explore the potential of AI and challenges to utilisation in the identification and management of suicidality.
- To develop an understanding of AI utilisation as per available theoretical frameworks
- To align the effective utilisation of AI for identifying and managing suicidality for achieving SDGs regarding mental health and well-being
- To extract the findings regarding the status of AI and its utilisation regarding suicidality

MATERIALS AND METHODS

This study utilised the available body of knowledge regarding AI and its role in identifying and managing suicidality. For this purpose, a systematic review was conducted whereby the databases included a) EBSCO *host,* b) Sociological Abstracts, c) Embase, and d) SCOPUS. The keywords included

1) Suicide AND Artificial Intelligence
2) Artificial Intelligence AND Suicide Prevention
3) Artificial Intelligence AND Suicide Prevention AND Sustainable Development Goals
4) Artificial Intelligence AND Suicide Prevention AND Sustainable Development Goals AND Mental Well-being

The search strategy was limited to peer-reviewed literature only. In addition, the latest research was considered, i.e., research published since 2015. In the last decade, AI has brought about a revolution, which is a core dimension of this study. Further, a total of 10 research papers are sampled for this study. The sample size is justified according to Malterud and colleagues' recommendations for determining sample size in qualitative research [11]. This sample size technique is based on the philosophy that sampled papers must be best aligned with the objectives of the studies so that they provide an in-depth understanding for answering the research question. The details of the sampled papers are presented in Table 1.

Bias was reduced when sampling research papers by reviewing them alongside 2 social science experts from academia. After cross-checking the abstract and a pool of selected papers, 11 papers were sampled. The 2 experts were provided with purposeful criteria, including a) the paper must be relevant to suicidality, b) AI-based intervention for mental health and suicide, and c) papers on AI with a specific focus on mental health and SDGs. The exclusion criteria included a) papers regarding the general context of mental health and AI; b) papers explaining AI in a general context. Finally, Braun and Clark's reflexive thematic analysis has been used to analyze the information from the sampled paper. A six-step mechanism was used to analyse the data [12].

REVIEW AND DISCUSSION

THEME ONE: THE POWER OF AI IN THE IDENTIFICATION OF HEALTH-RELATED INDICATORS

There is a substantial body of research on the role of AI in health assessment. In this context, AI is used to assess patterns of physical activity, such as steps, SP2 levels, and heart rate. Currently, advanced AI gadgets can even assess heart rhythms [13]. There is a need to expand AI technology for assessing suicidality. The proposed innovation in this regard is to integrate AI technologies that can correlate stress with agitation, changes in activity, concentration patterns, and even speech. For example, a Samsung watch noting higher stress levels, leading to sudden changes in activity and speech tone, can be assessed as a warning sign. However, how to integrate it remains a key question for AI developers. The work by Al Abdi and colleagues is relevant, as it illustrates AI's capability in assessing stress levels [14]. Further, digital phenotyping is a useful way to understand time-to-time variation in human behaviour. Wearables have the capability to understand the patterns of variation in human behavior, where sleep disorders linked with suicidal ideation among marines have been detected through digital phenotyping [15] (Table 2).

THEME TWO: CORRELATION OF ACTIONS AS PRECURSORS OF SUICIDALITY

Research shows that suicidality results from multifaceted factors. There are certain variables which are directly correlated with suicidality, including depression, impulsivity and stressful life events [1]. In addition, there are certain factors which play mediating and moderating roles, such as familial negation, moderating the role between depression and suicidality. Loneliness can mediate the relationship between depression and suicidality. AI can be utilized to understand patterns of social interaction (for example, within a family), as well as stress and loneliness. Improved AI integration can assist mental health services in identifying precursors to suicidality [16]. Another example in this regard is noticing incidents of impulsive behavior, such as several aggressive statements. These incidents can be analyzed

Table 2. Braun and Clark (2019) Thematic Table

First Order Codes	Second Degree Concepts	Overreaching Themes
• Advanced AI gadgets can even assess heart rhythms[13] • digital phenotyping is a useful way to understand time-to-time variation in human behaviou [15]	Assessment Variation Identification gadgets Stress level	Theme One: The Power of AI in the Identification of Health-Related Indicators
• AI can be utilised to understand the patterns of social interaction[16] • AI have the capability to predict suicidality among individuals with mental health issues [18] • noticing incidents of impulsive behaviour, such as several aggressive statements[17]	Patterns Capability Physiological Mental Predict	Theme Two: Correlation of Actions as Precursors of Suicidality
• AI models can analyse phone text and social media activity to predict suicidal behaviours [19] • help-seeking agencies remain the most important stakeholder [20] • AI has the capacity to be used for personalised care for individuals with suicidal ideation and increased risk of suicide attempts [21]	Text Social media communication Risk Agencies Care	Theme Three: The Link between Source and Healthcare Services Sub-theme One: Help Seeking Agencies, AI detection and Suicidality Sub-theme Two: Personalised care
• Taking records from routine activities of individuals poses a significant challenge [22] • AI-based assessments are not error-free [24] • Individuals with suicidal ideation can be targeted for medical business purposes [23]	Records Errors Business purpose Ethics Targeted	Theme Four: Ethical Considerations Sub-theme One: Biases and Errors
• Targets such as 3.4, 3.5 and 3.8 are explicitly about mental health. • AI can be effectively utilised for sustainable mental well-being [25] • AI is used for personalised programmes for physical and mental health and plays a crucial role in diagnosis and treatment [26] • The developing world is lagging far behind the developed world in terms of technological advancement [27] • AI cannot replace the traditional methods of intervening suicidality [28] • AI technologies are gaining momentum to be used as assistance tools for mental health professionals [29]	Personalized	Theme Five: AI, SGDs and Mental Well-being Sub-theme One: Intersectionality, AI and Suicidality Sub-theme Two: prioritizing using AI as tool in assistance instead of thinking it as replacement

Source: compiled by the authors based on [13, 15-17, 19-29]

in a broader context in routine life to assess the risk of suicidality [17]. Further, AI have the capability to predict suicidality among individuals with physiological mental health issues, i.e., degenerative disorders. Wearables can detect variations in heart rate and muscle movement, as well as variations in the pattern of speech [18].

THEME THREE: THE LINK BETWEEN SOURCE AND HEALTHCARE SERVICES

It is important to understand that if an AI-based source detects a risk of suicidality, what possible pathways for help exist? The most important intervention will be the link between AI-based programs on phones, smart-watches, or other devices and help-seeking services. AI models can analyse phone text and social media activity to predict suicidal behaviours, and machine learning models are particularly useful in this context [19]. Instagram has been already tested for mechanism to identify acute suicidal ideation among users [30].

SUB-THEME ONE: HELP SEEKING AGENCIES, AI DETECTION AND SUICIDALITY

One of the key questions is the reporting mechanism of AI-based detection of precursors of suicidality. Should it

be conveyed to family members, or should it warn the individual? However, considering the broader literature, help-seeking agencies remain the most important stakeholders in this regard. In England, Samaritans is an important agency to intervene and prevent the act of suicide [20]. There is a need to link AI-based facilities to help agencies identify and prevent suicidality.

SUB-THEME TWO: PERSONALISED CARE

Biscaia and colleagues explored the role of AI in personalised care. AI has the capacity to be used for personalised care for individuals with suicidal ideation and increased risk of suicide attempts. AI can reduce costs for such individuals by offering breathing exercises to help relax when devices detect stress. In addition, AI devices can help mental health professionals by providing real-time data when a vulnerable user consents [21].

THEME FOUR: ETHICAL CONSIDERATIONS

In the context of suicidality and integration of AI to tools, ethical concerns pose a major challenge. Collecting records of individuals' routine activities poses a significant challenge. Consent and voluntary participation of high-risk individuals can provide solutions. For example, individuals with diagnosed minor and major depression, impulsivity, family history of suicidality, experience of active stressful life events (i.e., death of a sibling, partner or parent, divorce, unemployment, etc.) can be sampled. This technique also shows that high-risk individuals can be assessed effectively to prevent the act of suicide, and at the same time, with minimal records of precursors and routine life. Probably the most important aspect is storage and appropriate use of information [22]. It is a fact that AI is used for advertising purposes as well, i.e., targeted advertising by assessing users' social media activity. In such a case, individuals with suicidal ideation can be targeted for medical business purposes by suggesting antidepressants or counselling services. This may interfere with personal life and may even lead to further harm. The argument about targeted advertisement leading to further harm for individuals with suicidal ideation [23].

SUB-THEME ONE: BIASES AND ERRORS

AI-based assessments are not error-free. AI can misinterpret normal behaviours, leading to misdiagnosis or wrong diagnosis. In addition, AI-related biases and errors can impose economic costs on individuals and burden the healthcare system [24].

THEME FIVE: AI, SDGs AND MENTAL WELL-BEING

SDG 3 is about health and well-being, where mental health is a significant focus. A multifaceted approach is considered a pathway to ensure better mental health. Targets such as 3.4, 3.5 and 3.8 are explicitly about mental health. AI can be effectively utilised for sustainable mental well-being [25]. AI is pivotal to the adoption of personalised mental health programs, where individualised considerations are crucial. AI is used for personalised programmes for physical and mental health and plays a crucial role in diagnosis and treatment. Similarly, AI's utilisation for the diagnosis of mental health problems is increasingly evident; however, it is still lagging when its utilisation regarding physical health is considered [26].

SUB-THEME ONE: INTERSECTIONALITY, AI AND SUICIDALITY

The notion of intersectionality is applicable globally in the use of AI for mental health and well-being. The developing world is far behind the developed world in technological advancement, including AI. Discrimination and distress predict suicidality. In the context of intersectionality, a wide range of demographic factors contribute to suicidality, including age, gender, race, and ethnicity. These indicators affect life in unique ways in the developing world; for example, gendered norms in traditional societies and the gendered status of women in poor societies have distinct patterns. These indicators affect the use of AI in the developing world differently, with intersectional indicators intensified [27].

SUB-THEME TWO: PRIORITISING THE USE OF AI AS AN ASSISTIVE TOOL RATHER THAN AS A REPLACEMENT

Careful consideration is needed when utilising AI for suicidality. For example, it should be used as a tool for suicide risk assessment. AI cannot replace traditional methods of intervening in suicidality; however, it can be a useful tool [28]. Current evidence shows that if AI is used as a tool to help medical and psychological professionals understand patterns of suicidal behaviours, it would be more beneficial than replacing them. AI technologies are gaining momentum for integration to assist professionals in managing mental health issues [29].

There are two major domains of AI and suicidality: first, AI-driven suicidality; and second, the utilisation of AI for suicidality. This work focuses on the utilisation of AI for intervention and prevention of suicidality. AI has the potential to identify suicide-related behaviours [8]. Advanced AI devices can even assess heart rhythms [13], underscoring

the usefulness of AI. Most importantly, digital phenotyping is a useful way to understand time-to-time variation in human behaviour [15]. AI can be utilised to understand patterns of social interaction. Patterns of social interaction can provide hints for identifying suicidality, such as chat patterns, Google searches, and even physical interactions [16].

Recent research shows that AI can predict suicidality in individuals, for example, physiological and mental health issues can be identified using AI tools [18]. AI can detect incidents of impulsive behaviour, such as aggressive statements [17]. Another example is searching for methods on Google, where AI integration with phone technology can play a pivotal role in detecting suicidal behaviours. In addition, AI models can analyse phone text and social media activity to predict suicidal behaviours [19]. This is useful for reporting behaviours to help-seeking organisations and even family and friends, enabling effective intervention.

AI has the capacity to support personalised care for individuals with suicidal ideation and an increased risk of suicide attempts [21]. AI cannot replace traditional methods of intervening in suicidality; however, it is a tool that can assist professionals in the better management and care of individuals with suicidal ideation [28].

Ethical dilemmas are a pivotal consideration when it comes to the use of AI tools for suicide risk assessment, intervention and prevention. Collecting records from individuals' routine activities poses a significant challenge [22]. In addition, AI-based assessments are not error-free [24]. For example, AI tools can detect aggression and impulsivity, which are associated with suicidality, but they are not always leading factors.

The Sustainable Development Goals (SDGs) include health as an important element. Targets such as 3.4, 3.5 and 3.8 are explicitly about mental health. AI can be effectively utilised for sustainable mental well-being [25]. AI is used to deliver personalised programmes for physical and mental health and plays a crucial role in diagnosis and treatment [26]. However, inequalities are barriers to the effective use of AI in the diagnosis and treatment of suicidality when an intersectional perspective is applied. The developing world is far behind the developed world in technological advancement [27, 31]. Finally, it is concluded that AI cannot replace traditional methods of intervening in suicidality; however, it can be used as a useful tool [28]. Therefore, AI and human collaboration are suggested to achieve the SDGs, specifically 3.4, 3.5, and 3.8.

THEORETICAL FRAMEWORK

There are many potential theories and perspectives that can serve as a guiding framework for AI utilisation to prevent, identify, and manage suicidality. The Technology Acceptance Model (TAM) is the most important. Hopkins and colleagues explored the importance of attitude towards Machine Learning (ML) technology in preventing suicides. Beliefs about technology play a pivotal role in help-seeking behaviours supported by ML technologies [10]. So far, evidence shows mixed opinions about the effectiveness of ML technologies in preventing suicides. The belief that AI can assist humans in improving mental health, thereby indirectly reducing suicidality, is important. Extending human-AI collaboration to achieve the SDGs, specifically 3.4, 3.5, and 3.8, can be guided by the Technology Acceptance Model (TAM).

Further, the identification of suicidal ideation with the Integrated Motivational-Volitional Model (IMV), 3-Step Theory, and Fluid Vulnerability Theory (FVT). This is a very useful juxtaposition of AI-based identification, particularly in terms of its effectiveness. For example, AI and ML models can detect hopelessness and the capability to attempt suicide from text (i.e., chat) and voice notes. Ethical integration of AI into devices can help identify suicidality by analysing web searches, chat, and social media content [8].

CONCLUSIONS

This study aimed to explore the potential and challenges of Artificial Intelligence for the intervention and prevention of suicidality to achieve the SDGs. Methodologically, this study is a thematic review based on Braun and Clark's reflexive thematic analysis. A total of 11 studies were sampled using Malterud and colleagues' information power mechanism [11]. A total of five major themes were extracted, namely, the Power of AI in identification of health-related indicators, Correlation of Actions as Precursors of Suicidality, the Link between Source and Healthcare Services, Ethical Considerations and AI, and SDGs and Mental Well-being. It is concluded that there are two major domains of AI and suicidality: first, AI-driven suicidality; and second, utilisation of AI for suicidality. AI has the potential to identify suicide-related behaviours. For example, AI-enabled devices and AI integration into phone technology are useful tools. Digital phenotyping is a useful way to understand time-to-time variation in human behaviour, which can help in the identification of suicidal behaviours. In addition, physiological and mental health issues (e.g., impulsive behaviours) can be identified using AI tools. AI models can analyse phone text and social media activity to predict suicidal behaviours. Most importantly, AI has the capacity to be used for personalised care for individuals with suicidal ideation and increased risk of suicide attempts.

However, ethical dilemmas are always present when using AI for the intervention and prevention of suicidality. Two key areas of concern are the use of records from individuals' routine activities and potential errors in assessment. A useful approach to tackling these dilemmas is to view AI as an assisting tool rather than a replacement for traditional methods of intervening in suicidality. AI technologies are increasingly being used as assistive tools for mental health professionals. It is also concluded that AI can contribute to achieving the SDGs relevant to health and well-being by assisting in suicide-related intervention and prevention. However, intersectionality and inequalities are relevant, as the developing world is lagging in the application of technology in the healthcare sector.

SUGGESTIONS FOR FUTURE RESEARCH

Phenomenological studies, specifically those with an experimental basis, are required to understand the experiences of those who allow AI devices to record their tendencies towards suicidal behaviour. This will enable researchers to better equip AI tools and integrate the technology to assist in managing suicidality. Further, it is suggested that large-scale surveys can provide a comparative analysis of AI integration and use by professionals in the developing and developed worlds, which is important for achieving SDGs. There is a need to research the ethical aspects of AI and human collaboration to understand, identify, and prevent suicidality. There is also a need for theoretical debate, supported by empirical research, regarding suicidality and AI utilisation.

STUDY LIMITATIONS

This research is a review-based paper and does not provide firsthand insight into the experiences of individuals with suicidality undergoing AI-based interventions, nor into the experiences of professionals involved in assessing suicidality with assistance from AI tools.

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CONFLICT OF INTEREST

The Authors declare no conflict of interest

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