

The Landscape of Ai-Driven Interactive Storytelling In Adolescent Mental Health: A Scoping Review On Nursing and Communication Perspectives

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Abstract.

Background: The post-pandemic surge in adolescent mental health disorders calls for innovative and decentralized digital intervention breakthroughs. Artificial Intelligence (AI) technology, through interactive storytelling models and generative chatbots, is now being integrated to provide a safe narrative space for adolescents. However, the computational-linguistic effectiveness and clinical-ethical boundaries of these interventions still require comprehensive mapping. *Objective:* This study aims to map the landscape, effectiveness, linguistic barriers, and ethical implications of using AI-driven interactive storytelling in adolescent mental health management by integrating psychiatric nursing and digital communication perspectives. *Methods:* This study used a scoping review design based on the PRISMA 2020 guidelines. Literature was systematically searched across three reputable electronic databases: Scopus, ScienceDirect, and CINAHL. The data selection process used the PCC (Population, Concept, Context) framework strategy. From a total of 146 articles identified in the initial search, 18 final original studies met the inclusion criteria and were extracted for narrative analysis. *Results:* Synthesis from a digital communication lens shows that adolescents use AI's anonymous venting features to freely express emotional distress. Nevertheless, Natural Language Processing (NLP) still has significant limitations in understanding the dynamics of cyber-slang and crisis metaphors (such as *algospeak*), which can trigger contextual failures in algorithmic responses. From a psychiatric nursing lens, interactive chatbots have proven effective as instruments for large-scale digital triage and Psychological First Aid. However, the application of this technology must comply with the principle of non-maleficence, in which AI systems must have strict operational limits to detect critical indicators of acute crisis (self-harm and suicidal ideation) and automatically redirect them to professional clinical mental health nurses. *Conclusion:* AI-driven interactive storytelling holds great potential as a complement to decentralized adolescent mental health services, but its optimization strongly depends on improving the AI's linguistic accuracy toward local adolescent language as well as strengthening automatic referral systems to clinical nursing staff to guarantee patient safety.

Keywords: Interactive Storytelling, Artificial Intelligence (AI), Adolescent Mental Health, Digital Communication and Psychiatric Nursing

I. INTRODUCTION

Adolescence is a critical period of neurobiological, psychological, and social transition, during which individuals reshape their identity and undergo rapid cognitive development. This development currently faces a serious threat: adolescent mental health has become one of the most urgent, complex, and multidimensional global public-health crises of the 21st century. Contemporary epidemiological evidence shows this crisis arising from a complex interaction between major shifts in social structure, rising academic pressure, shifting cultural values, and large-scale disruption from digital technology reshaping how young people interact with the world. The Lancet Psychiatry Commission report [1] confirms a consistent, systematic decline in young-adult mental health over the past two decades. OECD analysis [2] reinforces this, showing declining mental wellbeing among children and adolescents in many countries. This has triggered high-level policy responses, including the launch of the Second Lancet Commission on Adolescent Health and Wellbeing at the 2025 World Health Assembly, concluding that cross-sector investment in today's adolescents is highly decisive for humanity's future and planetary sustainability, demanding immediate action.

The global disease burden from psychiatric disorders among adolescents is severe. World Health Organization data [3] estimates that about one in seven adolescents aged 10–19 worldwide — around 14.3% of that population — experience clinically significant mental health disorders. Most cases, however, remain

undetected by health services, so many adolescents do not receive adequate treatment. Emotional disorders such as depression, anxiety, and behavioral disorders are the leading causes of the rising disease burden among adolescents globally. Anxiety disorders affect about 4.1% of adolescents aged 10–14, rising to 5.3% and even more than doubling to 3.4% among those aged 15–19. Anxiety and depressive symptoms often co-occur in adolescents, such as rapid, unstable mood swings. This can cause adolescents to withdraw from their social environment, increasing loneliness and isolation, disrupting peer relationships, and reducing school attendance and academic achievement.

The long-term impact of failing to recognize and treat adolescent mental health problems extends beyond youth into adulthood. Untreated mental disorders can affect physical health, reduce psychological wellbeing, and hinder individuals from living productive, quality lives later on. Adolescents with mental disorders are also more vulnerable to social exclusion, discrimination, and stigma, which often makes them afraid or reluctant to seek professional help. They also face higher risk of engaging in dangerous behavior, experiencing comorbid physical health problems, and becoming victims of human-rights violations. In more serious cases, untreated depression can increase the risk of suicidal ideation and attempts. Global data show suicide is currently one of the leading causes of death among young people, particularly adolescents and young adults aged 15–29.

This epidemiological emergency is no exception in Indonesia, where the 2021 Indonesia National Adolescent Mental Health Survey (I-NAMHS) found that one in three Indonesian adolescents experienced a mental health problem in the past year, with 5% specifically meeting clinical criteria for disorders such as anxiety and depression, according to Universitas Gadjah Mada data [4]. The massive gap between this surging prevalence and the limited capacity of conventional community mental-health services demands a revolutionary, decentralized, easily accessible care architecture for an age group deeply embedded in the digital world. As an effort to address the limitations of conventional mental-health service systems, AI technology is now being applied across various stages of clinical service, covering five main areas: initial screening, therapy support, post-treatment patient monitoring, nursing education, and community-level prevention [5].

One innovation in using AI for mental health is AI-driven interactive storytelling — an approach allowing adolescents to interact with an AI system through a dynamically and personally constructed narrative. Unlike conventional chatbots that focus on providing information or answering questions, interactive storytelling facilitates exploration of emotional experience through adaptive two-way conversation. This approach is considered capable of creating a safer space for adolescents to express thoughts and feelings, potentially supporting therapeutic communication, increasing engagement, and reducing help-seeking barriers caused by stigma toward mental disorders.

One application is GPT-based chatbots used in narrative therapy in the digital world. Through this approach, clients are guided to build a new narrative highlighting their competence, achievements, and independence. An AI-based assistant helps automatically construct the narrative and reframe the client's experience. AI can also analyze the client's language to design more adaptive coding exercises suited to individual needs, while providing a safe space for adolescents to express emotion without fear of social stigma. This process is supported by prompt engineering — computational instruction design that allows the algorithm to respond more flexibly to adolescents' shifting emotions compared to rigid intervention approaches [6]. Early studies show narrative-based chatbot interventions have fairly good clinical potential, helping reduce depression and anxiety symptoms and improving psychological wellbeing in short-term use [7].

Although using AI in mental-health services is considered capable of expanding access more equitably, this technology also raises ethical and operational issues, particularly in Psychiatric Nursing and Communication Science related to Human–Computer Interaction (HCI). From a nursing perspective, algorithm-based automated systems are feared to erode the core value of humanistic, person-centered care — an approach focused holistically on individual needs [8]. In Communication Science, several studies point to an "AI Empathy Gap" phenomenon — AI's limited, still-shallow, unnatural empathy — occurring because AI cannot yet understand non-verbal cues or consistently maintain emotional memory across sessions [9]. To

address this, the "Empathy by Design" concept was developed, using Retrieval Augmented Generation (RAG) technology so AI can build long-term emotional memory. However, this raises new challenges around patient data security and privacy, given the need to store emotional history on external cloud infrastructure [9]. In addition, experimental research on AI in mental health remains limited, fragmented, and has not extensively tested long-term therapeutic effectiveness [7]. A scoping review is therefore important to map multidisciplinary research gaps, develop ethical guidelines for nursing education, and evaluate digital storytelling so AI functions not merely as a technological tool but as a safe partner supporting young people's mental resilience.

Existing studies show research on AI in adolescent mental health is still developing partially within separate disciplines. Computer-science and digital-health studies generally focus on algorithm development, chatbot performance, or NLP accuracy; communication-science research discusses human–AI interaction patterns, anonymity, and adolescent digital-language dynamics; nursing studies focus on intervention effectiveness, patient safety, and service ethics. Scientific evidence on AI-driven interactive storytelling therefore remains fragmented, lacking a complete picture of the relationship between technology, therapeutic communication, and psychiatric nursing practice.

Although various studies report the use of AI-based chatbots, NLP, and generative AI in supporting adolescent mental health, most focus on evaluating technology effectiveness or algorithm performance in isolation. To date, no scoping review has comprehensively mapped AI-driven interactive storytelling by integrating psychiatric-nursing and digital-communication perspectives into one analytical framework. Yet the effectiveness of interactive storytelling depends not only on AI's ability to generate adaptive responses, but also on the quality of therapeutic communication, the ability to understand adolescents' distinctive language, and implications for safe, empathetic, patient-centered nursing practice. This gap shows the need for an evidence synthesis that evaluates not only technology effectiveness but also communication characteristics, linguistic challenges, and the ethical and clinical implications of implementing AI-driven interactive storytelling. This study was therefore conducted to fill that gap through a scoping review presenting the current landscape of scientific evidence on AI-driven interactive storytelling supporting adolescent mental health from nursing and communication perspectives.

II. METHODS

Research Design

This study used a Scoping Review design to map the scientific landscape of AI-driven interactive storytelling in adolescent mental health interventions. The review protocol followed the five-stage methodological framework developed by Arksey and O'Malley (2005), together with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR).

Search Strategy and Data Sources

Literature searches were conducted comprehensively across three internationally reputable electronic databases: Scopus, ScienceDirect, and CINAHL Complete. Search terms used Boolean operators (AND, OR) with the following keyword combination: ("AI chatbot" OR "generative AI" OR "NLP" OR "large language models") AND ("interactive storytelling" OR "chat counselling" OR "slang" OR "algospeak") AND ("adolescent" OR "youth" OR "mental health" OR "psychological distress").

Inclusion and Exclusion Criteria

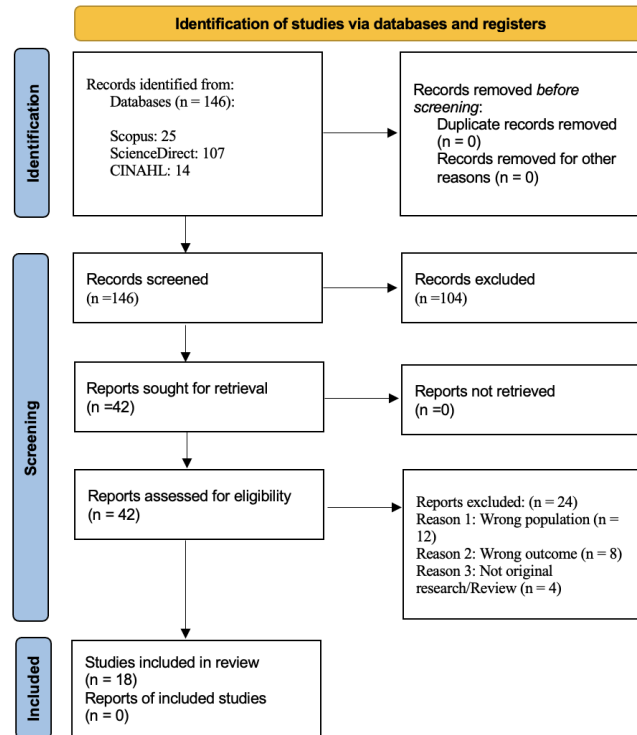
Data from eligible articles were extracted into a standard table covering: author name, publication year, country, study design, type of AI technology used, and key findings. A thematic analysis then grouped findings into two main pillars: the Communication Science Perspective (language analysis, anonymous space, digital narrative construction) and the Nursing Science Perspective (crisis detection, psychological first aid, clinical intervention effectiveness).

III. RESULT AND DISCUSSION

Study Selection Flow

Searching across three databases yielded 146 documents at initial identification (Scopus = 25, ScienceDirect = 107, CINAHL = 14). After title/abstract screening, 104 records were excluded, leaving 42 reports assessed for eligibility. Of these, 24 were excluded: inappropriate population (n=12), inappropriate outcomes (n=8), and not original research/being a review (n=4) — leaving 18 final studies meeting the inclusion criteria for further analysis.

Fig 1. PRISMA-ScR Checklist



General Characteristics of Selected Articles

Most selected articles were published in recent scientific literature, reflecting the rapid development of Generative AI and NLP in the digital-health ecosystem. Methods varied widely — from messaging-app-based Randomized Controlled Trials (RCTs), to computational language-modeling (machine learning) studies, to qualitative content analysis of adolescent digital micro-communities.

Synthesis of Findings by Discipline

Table 1. Cluster Mapping by Discipline

Thematic Cluster	Selected Articles	Digital Communication Focus (Communication Perspective)	Therapy & Mental Health Intervention Implications (Nursing Perspective)
Cluster 1 — Language Dynamics, Algospeak, and Anonymous Space	[20], [24], [25], [27], [13], [11], [16], [10]	Analysis of adolescent slang evolution (Gen Alpha/Gen Z) and the algospeak phenomenon. Exploration of digital-forum anonymity driving self-disclosure. Cross-country European qualitative study identifying benefits of anonymous space in online counseling, alongside limitations such as unclear communication and low service visibility [20]. Longitudinal NLP-based analysis of an LGBTQ+ adolescent digital micro-community confirms shifting topics and crisis-emotion trends during the pandemic	AI's failure to detect dangerous crisis code (e.g., "kys") due to lack of slang understanding. Use of popular (TikTok) slang to reduce stigma. Qualitative study of clinical acceptance of automated NLP-based digital monitoring for detecting suicide risk from subtle linguistic units (negatively charged words, emoticons) in post-crisis adolescents.

Thematic Cluster	Selected Articles	Digital Communication Focus (Communication Perspective)	Therapy & Mental Health Intervention Implications (Nursing Perspective)
		[27]. A trust survey of adolescents (n=224) on free-conversation vs. menu-driven chatbots for online safety. Evaluation of adolescent (13–18) perceptions of language style and experience with a depression-education chatbot.	AI-chatbot effectiveness comparable to a Nurse Hotline. Applying NLP for real-time psychiatric-emergency detection. Meta-analysis of 31 RCTs (n=29,637) on AI-chatbot
Cluster 2 — Counseling Chatbots, PFA, and Crisis- Risk Detection	[23], [14], [19], [21], [22], [12], [18], [15], [26], [17]	Evaluation of interactive storytelling effectiveness in reducing distress effectiveness via instant text (WhatsApp, among adolescents/young adults. A live crisis chat). Analysis of active simulation study showing 10 communication techniques therapy/companion chatbots overall (empathizing/affirming vs. giving failed to reject 32% of harmful advice).	requests from fictional at-risk adolescents. Narrative review of conversational AI's role in pediatric mental health. Practical clinician recommendations for AI-chatbot use with adolescents.

The Human–AI Relationship Landscape from a Communication Science Perspective

The review findings show that the main strength of AI-driven interactive storytelling lies in meeting adolescents' psychological need for an anonymous space free from social judgment. Adolescents tend to develop emotional attachment to generative chatbots with anthropomorphic traits (mimicking human empathy).

However, digital-communication studies also reveal a major challenge: adolescent language moves far faster than AI database updates. The emergence of algospeak and specific slang (such as veiled words expressing distress) often creates computational bias, where AI fails to capture emotional-crisis messages conveyed non-literally by adolescents.

Intervention Effectiveness and Crisis Management from a Nursing Perspective

From a clinical nursing standpoint, AI-based interactive storytelling models have proven effective as instruments for large-scale Precision Prevention and Psychological First Aid (PFA). WhatsApp-based chatbot interventions (such as PsyBot in Indonesia) significantly reduced loneliness and anxiety scores among student populations.

Furthermore, clinical trials show interactive AI-chatbot technology has efficiency and satisfaction levels comparable to conventional Nurse Hotline services in handling short-term psychological distress. AI acts as a digital triage that can simultaneously analyze hundreds of thousands of messages to detect critical indicators of self-harm and suicidal ideation, which can then be escalated directly to professional mental-health nurses for intensive treatment.

The synthesis of the 18 studies analyzed in this scoping review confirms that AI-driven interactive storytelling occupies an ambivalent position in the adolescent mental-health ecosystem: on one hand offering revolutionary accessibility solutions, while on the other creating new linguistic, ethical, and clinical

vulnerabilities simultaneously. These findings reinforce the argument that digital-health technology evaluation cannot rely solely on an algorithm-engineering standpoint but requires an interdisciplinary lens combining digital communication science and psychiatric nursing, as undertaken here.

Linguistic Gaps as a Critical Point for Patient Safety

Cluster 1 reveals a fundamental issue that has received little attention in digital-nursing literature: the rate of change in adolescent language far outpaces language-model update capacity. Algospeak, which originally developed as a strategy for adolescents to avoid social-media algorithmic censorship, carries unexpected consequences for NLP-based crisis-detection systems. Biernesser et al.'s findings [11] reinforce this concern: although automated NLP-based digital monitoring can theoretically capture subtle linguistic units marking suicide risk, clinical acceptance depends on how well the system can adapt to the language preferences of adolescents, parents, and clinicians simultaneously. This is further complicated by Charles et al.'s finding [13] that adolescents themselves have differing preferences for chatbot interaction style — free-conversation or menu-driven — meaning a uniform linguistic solution risks failing to reach the full diversity of adolescent crisis-communication styles.

From a psychiatric-nursing perspective, this is not merely a technical limitation but a direct threat to the principle of non-maleficence, since detection failure can delay crisis intervention at the most critical moment. This finding is consistent with concerns raised by Milasan and Scott-Purdy [8] regarding the risk of humanistic care shifting toward care relying solely on statistical language patterns, without the contextual sensitivity of human clinical staff.

Empirical Evidence of Effectiveness and Its Safety Limits

Cluster 2 gives a more measured picture of AI chatbots' true clinical effectiveness. Feng et al.'s meta-analysis [18], synthesizing 31 RCTs with over 29,000 adolescent and young-adult participants, shows AI chatbots provide small-to-moderate effects in reducing psychological distress. This large-scale finding reinforces earlier individual studies [23], [14] reporting short-term effectiveness of interactive chatbots, while placing that effect size in a more realistic context — a moderate-scale complementary instrument, not a full substitute for conventional clinical services.

However, this effectiveness evidence must be read alongside critical findings from Clark's [15] simulation study, which revealed that ten tested therapy/companion chatbots approved nearly a third of all harmful requests posed by fictional adolescents in crisis scenarios, including failing to recognize euphemisms for suicidal ideation. This is an important reminder that average effectiveness in a large population does not guarantee safety in individual high-risk cases — a nuance highly relevant to psychiatric nursing practice, which is oriented toward per-individual risk assessment rather than aggregate data alone.

AI Empathy Gap and Empathy-by-Design Efforts

Relatedly, adolescents' emotional attachment to interactive chatbots, as documented in Mansoor et al.'s narrative review [26] on conversational AI in pediatric mental health, actually amplifies risks arising from the AI Empathy Gap. AI can simulate empathic responses linguistically but cannot yet maintain continuity of emotional memory across sessions or capture non-verbal cues that are typically central to conventional psychiatric nursing assessment. The Empathy-by-Design approach, using RAG technology, is a promising technical response to this limitation, but shifts risk from the clinical domain to the data-privacy domain, given the need to store patients' emotional history on external cloud infrastructure [9].

Implications for Nursing Practice and Digital Triage

The practical recommendations formulated by Dvir et al. [17] for child and adolescent clinicians confirm the same direction: AI is most appropriately positioned not as a replacement for mental-health nursing staff but as a front-line digital-triage layer requiring strict human oversight. AI's capacity to process massive message volumes enables early detection of self-harm and suicidal-ideation risk indicators at a scale practically impossible for human staff alone. However, Clark's [15] findings above show that without a firm automatic-escalation mechanism to professional clinical mental-health nurses once critical indicators are detected, the potential benefits of digital triage risk turning into systemic failure.

Integration of Communication and Nursing Perspectives

One of this scoping review's main contributions is showing that two largely separately developing fields — digital communication science and psychiatric nursing — actually complement each other in fully understanding this phenomenon. Communication analysis provides deep understanding of why and how adolescents communicate with AI, including the psychological need for anonymous space and diverse interaction-style preferences, while nursing analysis provides the clinical-safety framework ensuring that space does not become a risk gap. The absence of such integration in most reviewed studies reinforces the urgency of developing a psychiatric-nursing education curriculum that includes digital literacy and understanding of contemporary adolescent language dynamics.

Study Limitations

This scoping review has several limitations. First, most included studies come from English-language, developed-country contexts (United States, Australia), so generalizing findings to Indonesian adolescents' language and cultural context requires caution, given that algospeak and slang are highly linguistically and culturally context-dependent. Second, some reviewed studies are editorial or non-empirical narrative reviews, so their strength of evidence differs from RCTs or observational studies. Third, the scoping-review's landscape-mapping orientation means this study did not conduct an in-depth methodological quality assessment as is typical in systematic reviews, so the strength of reported clinical-effectiveness evidence needs further confirmation through studies with stricter risk-of-bias assessment.

Recommendations for Future Research and Practice

Future research should be directed toward three main agendas. First, developing NLP models specifically trained on local adolescent-language corpora, including slang and algospeak typical of Indonesian adolescents, to improve crisis-detection sensitivity. Second, formulating explicit clinical ethical guidelines governing AI automation thresholds and mandatory escalation mechanisms to professional mental-health nursing staff, given evidence that chatbots can fail to reject dangerous requests at critical moments. Third, integrating human–AI interaction topics into psychiatric-nursing and health-communication education curricula, so future professionals have dual competence in both the technical-linguistic and clinical-ethical dimensions of this technology.

IV. CONCLUSION

This scoping review of 18 studies shows that AI-driven interactive storytelling has great potential as a complement to decentralized, accessible, stigma-free adolescent mental-health services. From a psychiatric-nursing perspective, this technology has proven effective as an instrument for large-scale digital triage and Psychological First Aid, with efficacy comparable to conventional Nurse Hotlines in handling short-term distress. However, this effectiveness is conditional and non-uniform: simulation evidence shows some chatbots can still approve dangerous requests from adolescents in crisis scenarios, so clinical safety cannot yet be fully guaranteed without human oversight.

From a communication-science perspective, this technology's main strength lies in its ability to create an anonymous space encouraging adolescent self-disclosure. However, the pace of adolescent-language change — particularly algospeak and slang — consistently outpaces NLP algorithms' adaptive capacity, creating a critical gap in emotional crisis-signal detection. The AI Empathy Gap further limits the depth of therapeutic relationships AI can build, due to its limitations in maintaining emotional memory across sessions and reading non-verbal cues.

It can therefore be concluded that AI-driven interactive storytelling is most appropriately positioned as a complementary partner — not a replacement — for professional mental-health nursing staff, and its optimization strongly depends on strengthening linguistic accuracy toward local adolescent language and strengthening automatic referral systems to clinical staff to guarantee patient safety.

For technology developers: continuous retraining of NLP models is needed using local adolescent slang and algospeak corpora, given that adolescent language is dynamic and differs across cultural contexts. Developers should also design mandatory (not optional) automatic-escalation mechanisms triggered as soon as acute crisis indicators are detected, rather than relying solely on standard keyword-based responses.

For institutions and mental-health nursing staff: explicit clinical ethical guidelines should be developed governing AI-automation limits in adolescent mental-health services, including human-supervision protocols for chatbot outputs before application to high-risk populations. Integrating digital-literacy and human–AI-interaction material into the psychiatric-nursing education curriculum should also be considered, so future professionals are ready for the increasingly digitally decentralized shift in mental-health services.

For policymakers, particularly in Indonesia: regulations should be formulated governing minimum safety standards for mental-health chatbots targeting adolescents, including mandatory transparency about system limitations and guaranteed protection of patients' emotional data.

For future research: empirical RCT studies are recommended specifically within Indonesian adolescent language and cultural contexts, given that most evidence in this review still comes from English-speaking developed-country contexts. In-depth research on long-term (not only short-term) effectiveness, along with studies on methodological bias risk in existing research, are also important agendas for strengthening the evidence base in this field.

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