

Family Caregivers' Perspectives on AI-Assisted Mental Health Care in China: Acceptance, Concerns, and Implementation Conditions

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Abstract

Objective

This study aimed to explore family caregivers' attitudes toward the application of artificial intelligence (AI) in mental health care, investigate their acceptance intentions and influencing factors, and provide theoretical and practical evidence to support the effective implementation of AI in psychiatric nursing.

Methods

A qualitative study using semi-structured interviews was conducted between January and March 2026 at a mental health center in Henan Province, China. Eighteen caregivers with more than three months of caregiving experience were recruited. Interview data were coded and analyzed using thematic analysis with NVivo 12.0.

Results

Four core themes were identified: perceived clinical benefits; emotional concerns and human connection; trust and adoption drivers; and barriers to AI implementation. Each theme included several subthemes reflecting caregivers' multifaceted perceptions.

Conclusions

Primary caregivers of patients with mental disorders showed a cautiously accepting attitude toward the use of AI in psychiatric care. While acknowledging its potential benefits in risk monitoring, medication management, and healthcare support, they also expressed concerns regarding reduced emotional interaction, privacy risks, unclear accountability, and additional financial burden. Acceptance was influenced by physician recommendation, prior experience, and social perceptions.

1 Background

In recent years, the rapid development of artificial intelligence (AI), particularly generative AI and large language models (LLMs), has made psychiatry one of the most profoundly impacted specialties in medicine(1). Unlike other medical specialties that rely heavily on objective biomarkers or imaging technologies, psychiatric practice is fundamentally rooted in language-based communication, subjective experiences, and behavioral observation(2). This unique characteristic renders mental health care particularly compatible with AI systems capable of processing and generating natural language, while simultaneously raising critical concerns regarding empathy, ethical boundaries, and human interaction(3, 4).

Mental disorders represent a major global health challenge, with a lifetime prevalence of approximately 30% and contributing substantially to disability-adjusted life years worldwide(5). Systematic reviews have shown that since 2022, research on generative AI in the field of mental health has grown rapidly. Research topics include knowledge validation, psychoeducation, treatment recommendation generation, and clinical text processing. However, the field remains in an early exploratory stage, with limited methodological maturity and clinical translation(6). At the same time, existing studies suggest that the value of AI in psychiatry lies primarily in diagnostic support, risk prediction, personalized interventions, and improvements in service efficiency. Nevertheless, AI is currently positioned as an assistive tool rather than a substitute for clinical judgment(7).

At the level of clinical application, AI in mental health has gradually evolved from proof-of-concept studies to multi-scenario integration. Current applications are mainly concentrated in diagnostic assistance, risk prediction, symptom monitoring, and intervention support. Generative AI has been applied to psychiatric knowledge question answering, medication information explanation, psychological intervention design, and treatment planning(1, 8). Studies have demonstrated that AI models achieve relatively high accuracy in identifying conditions such as depression, schizophrenia, and suicide risk. Commonly used approaches include support vector machines, random forests, and deep learning algorithms, with data sources ranging from electronic health records (EHRs) and medical imaging to physiological signals(9, 10). In acute psychiatric wards, AI-enabled digital nighttime monitoring systems can enhance patient safety while reducing frequent awakenings, improving sleep quality, and lowering the incidence of adverse events(11). These practices suggest that AI holds practical potential for optimizing workflows and improving efficiency in mental health care. However, the application of AI in psychiatry also faces unique challenges. Compared with somatic medicine, the adoption of AI in mental health has been relatively slower, partly due to the highly subjective nature of psychiatric disorders and their complex psychosocial dimensions, which are difficult for AI systems to fully capture(8). In addition, issues related to algorithm validation, interoperability, safety, and patient privacy protection remain persistent concerns(12). Evidence suggests that while AI can improve efficiency in automating repetitive tasks, data analysis, and risk prediction, overreliance on algorithms may weaken the empathy- and interaction-centered nature of psychiatric care, thereby affecting the therapeutic alliance and patient experience(13). Furthermore, some studies indicate that AI-based interventions are often designed without explicit ethical considerations(14), and excessive dependence on AI may undermine the humanistic aspects of nursing care(15). Importantly, the clinical value of AI depends not only on algorithmic performance but also on users' trust in the technology, its usability, and perceptions of privacy and ethical safeguards(16). These factors make AI-driven tasks particularly challenging in psychiatric contexts.

However, the core of AI-driven transformation lies not only in the iteration of clinical diagnostic tools, but also in how these technologies can extend to family members of patients who often remain at the margins of the healthcare system. Family caregivers (FCGs) assume the majority of daily supervision and emotional support responsibilities throughout the recovery trajectory of individuals with mental disorders, yet they remain trapped in a dual burden of financial strain and psychological overload(17).

Evidence suggests that the level of psychological distress experienced by family members of individuals with mental disorders is comparable to, or even exceeds, that of the patients themselves(18). In the context of caring for individuals with severe mental illness (SMI), the presence of cognitive impairments, emotional blunting, and unpredictable mood fluctuations further intensifies caregiving demands. As a result, family caregivers are highly susceptible to burnout, social isolation, and pathological anxiety(19). Therefore, while family caregivers play a critical role in sustaining the functioning of the mental healthcare system, they simultaneously bear substantial physical and psychological costs.

In summary, the clinical application of AI theoretically provides a promising pathway to alleviate workforce shortages and enhance the effectiveness of family caregiving. Various theoretical frameworks have been proposed to understand technology acceptance. For instance, the Technology Acceptance Model (TAM) posits that users' attitudes toward a new technology are largely determined by their perceived usefulness and perceived ease of use(20). The willingness to adopt such technologies and the complex factors influencing their acceptance remain critical issues that need to be addressed in the field of digital mental health. Particularly in the Chinese healthcare context, where family members serve as the primary caregivers for individuals with mental disorders, their attitudes toward AI will directly affect the implementation and real-world effectiveness of these technologies in clinical practice. Despite this, qualitative research examining AI acceptance among family caregivers of individuals with mental disorders remains limited, with insufficient exploration of caregivers' inner experiences and perspectives. Therefore, this study adopts a qualitative approach using semi-structured interviews with family caregivers of patients with mental disorders, aiming to explore their attitudes toward AI applications—including their willingness to adopt such technologies and the influencing factors—in order to provide evidence to inform the future implementation and promotion of AI in psychiatric nursing.

2 Methods

2.1 Study design

This study employed a qualitative descriptive design and used semi-structured in-depth interviews to collect data on the attitudes of primary caregivers of patients with mental disorders toward the application of AI in clinical settings. This design was chosen to obtain rich and detailed information expressed in caregivers' own words, thereby capturing their subjective experiences and perspectives. The study adhered to the Consolidated Criteria for Reporting Qualitative Research (COREQ) guidelines to ensure comprehensive and rigorous reporting of the research methods and findings.

2.2 Setting

The study was conducted between January and March 2026 at the Henan Mental Health Center in China. This institution is a large national-level specialized psychiatric hospital, a regional center for mental health services, and the largest mental health facility in Henan Province. The center is equipped with relatively advanced mental health care resources and has begun to introduce several AI-based initiatives into clinical practice.

2.3 Participants

The study participants were the primary caregivers of hospitalized patients with mental disorders at the aforementioned hospital. The inclusion criteria were as follows: (1) aged between 18 and 60 years; (2) immediate family members of the patient who had provided care for more than three months; and (3) willing to participate and able to provide informed consent. The exclusion criteria were: (1) no prior exposure to or understanding of AI tools and related knowledge; and (2) presence of severe physical or mental illness. The determination of severe physical or mental illness was based on self-report by the participants and verification by the head nurse of the department, ensuring that participation would not pose any risk to their health. A total of 18 eligible caregivers were recruited, including 10 females and 8 males. The demographic characteristics and occupational profiles of the participants are presented in Table 1.

Table 1
Demographic characteristics of participants.

Participant	Gender	Age	Education Level	Occupation	Care Recipient	Diagnosis of the Patient
1	Female	37	High school	Self-employed	Daughter	Depression
2	Female	39	High school	Employee	Daughter	Anxiety disorder
3	Female	44	Bachelor's degree	State-owned enterprise	Son	Bipolar disorder
4	Male	54	College diploma	Retired	Son	Depression
5	Female	47	College diploma	Coal industry	Son	Depression
6	Female	43	Bachelor's degree	Kindergarten principal	Daughter	Depression
7	Male	38	Bachelor's degree	Finance	Daughter	Schizophrenia
8	Male	28	Bachelor's degree	Self-employed	Sister	Depression
9	Male	46	High school	Self-employed	Wife	Bipolar disorder
10	Female	22	Bachelor's degree	Student	Father	Alcohol dependence
11	Male	41	College diploma	Self-employed	Mother	Cognitive impairment
12	Female	36	Bachelor's degree	Accountant	Father	Schizophrenia
13	Female	44	College diploma	Self-employed	Husband	Schizophrenia
14	Male	35	College diploma	Driver	Father	Schizophrenia
15	Female	37	Bachelor's degree	Teacher	Son	Anxiety disorder
16	Male	52	High school	Self-employed	Son	Schizophrenia
17	Male	36	Bachelor's degree	State-owned enterprise	Mother	Anxiety disorder
18	Female	43	High school	Self-employed	Daughter	Schizophrenia

2.4 Sampling strategy

Purposive sampling was employed to recruit participants who could provide diverse perspectives relevant to the research objectives. Primary caregivers from different hospital departments were intentionally included to ensure variation in experiences and viewpoints. Ultimately, caregivers from five departments were represented, including Child and Adolescent Psychiatry, General Psychiatry, Addiction Psychiatry, Early Intervention Psychiatry, and Geriatric Psychiatry. The inclusion of caregivers across different departments helped capture diversity influenced by varying clinical contexts and departmental cultures. Participants were recruited with the assistance of the hospital's nursing administration department. Eligible caregivers from each department were invited to participate in the study. A total of 20 caregivers were approached, of whom 18 agreed to participate, yielding a response rate of 90%.

Data collection and sampling were conducted concurrently and continued until data saturation was achieved. In this study, data saturation was assessed through continuous comparison of codes, and no new themes or subthemes emerged in the final two interviews. Saturation was reached after the 18th interview.

2.5 Data Collection

After explaining the purpose of the study and obtaining written informed consent, face-to-face semi-structured interviews were conducted in quiet and private rooms within each department. All interviews were carried out by two experienced researchers. Each interview began with general, open-ended questions, followed by probing questions tailored to participants' responses. The duration of each interview was approximately 30–40 minutes. With participants' permission, all interviews were audio-recorded. In addition, interviewers documented non-verbal cues, including tone of voice, pauses, body language, and facial expressions.

All interviewers had received formal training in qualitative research methods. Trust was established with participants by emphasizing the principles of confidentiality and voluntariness. Importantly, the interviewers were not the participants' treating physicians or nurses, which helped create a more relaxed environment and facilitated the expression of authentic perspectives.

2.6 Interview guide development

The semi-structured interview guide was developed based on a review of relevant literature and consultation with experts in psychiatric nursing. The research team sought input from five senior psychiatric nursing experts to ensure the appropriateness and comprehensiveness of the questions. A pilot study was conducted with 10 caregivers who were not included in the final sample to test and refine the clarity and relevance of the interview questions. The final interview guide consisted of open-ended questions covering multiple dimensions related to the application of AI in psychiatric care and caregivers' needs. The interview guide is shown in Supplementary File 1.

These questions were designed to explore caregivers' expectations, concerns, and suggestions regarding AI. Interviewers were encouraged to use follow-up probing questions based on participants' responses to obtain more in-depth information.

2.7 Data Analysis

All interviews were transcribed verbatim within 24 hours after completion. The transcripts were checked against the audio recordings to ensure accuracy, and identifiable information was replaced with codes to protect participants' privacy. Member checking was conducted by returning the transcripts to participants for verification of accuracy. Five participants provided feedback confirming that the transcripts and preliminary interpretations accurately reflected their views.

Data were analyzed using Braun and Clarke's thematic analysis approach. An inductive coding strategy was primarily adopted, with no predefined analytical framework, allowing themes to emerge naturally from the data. First, two researchers independently read each transcript line by line and coded the data using NVivo 12.0 software. The coding results were then compared, and discrepancies were discussed until consensus was reached. When disagreements in interpretation remained, a third researcher was consulted to resolve them and enhance the reliability of the analysis. Through repeated review, merging, and refinement of codes, meaningful themes and subthemes were ultimately generated. Throughout the analytic process, the research team also wrote analytic memos and conducted group discussions to reflect on potential biases and ensure that the themes remained grounded in participants' accounts. Final themes were reviewed and agreed upon by the research team to ensure that they accurately represented the data.

2.8 Researcher reflexivity

The research team was fully aware of the potential influence of researchers' backgrounds and positionality on the research process. Among the interviewers, one was a senior psychiatric nurse from the study hospital(not from the participants' respective departments), and the other was an academic nursing researcher. Throughout the study, both researchers continuously reflected on their own perspectives regarding AI. Prior to data collection, the research team engaged in in-depth discussions to bracket preconceived assumptions—such as optimism about the advantages of AI or concerns about its potential challenges—in order to minimize potential bias and avoid leading participants. During the interviews, neutrality was maintained, and participants were encouraged to express both positive and negative views openly. In the data analysis phase, the team conducted reflexive dialogues to critically examine how their own perspectives might have influenced theme development. By integrating researcher reflexivity, member checking, and consensus within the coding team, the study enhanced the credibility and authenticity of the findings.

3 Results

Based on thematic analysis of interviews with 18 participants, four major themes were identified in this study: (1) perceived clinical benefits; (2) emotional reliance and boundaries of autonomy; (3) trust structures and influencing factors; and (4) privacy sensitivity and implementation conditions. Each theme comprised several subthemes, which are reported in detail below. The identified themes were

returned to five participants for verification, and all confirmed that the findings accurately reflected their perspectives. Figure 1 shows the conceptual framework among the themes.

3.1 Perceived Clinical Benefits

In the long-term management of patients with mental disorders, family caregivers not only assume responsibility for patients' daily living activities but also play a crucial role in implementing treatment plans. Caregiver burden, as a core indicator of stress among non-professional caregivers, demonstrates significant complexity and persistence in the field of psychiatry. The interview findings revealed that caregivers held high expectations regarding the clinical functionality of AI. These expectations stem from their deep awareness of the limitations inherent in traditional caregiving models. From the timely monitoring of acute risks to the optimization of long-term management processes for chronic mental disorders, caregivers expressed a strong desire for more efficient approaches to compensate for the insufficiency of existing healthcare resources.

3.1.1 Monitoring, Early Warning and Safety

Monitoring and early warning systems were widely perceived by caregivers as the most practically valuable function of AI in psychiatric care. The pathological characteristics of mental disorders are often accompanied by sudden emotional outbursts or subtle behavioral deviations. This unpredictability constitutes a major source of long-term anxiety for caregivers. The interviews revealed three core expectations regarding AI-driven risk prevention: early detection of emotional fluctuations, prediction of extreme self-harm behaviors, and safety protection in the context of cognitive impairment.

With respect to early warning of emotional and behavioral changes, participants expressed a strong desire to shift from passive response to proactive intervention:

"My biggest need right now is to understand what triggers each of his emotional outbursts. There's no clear pattern, and every time it happens, we're caught off guard. If AI could analyze his behavior and tone of voice to identify triggers, it might help us prevent these episodes in advance." (Participant 13)

This reflects a demand for predictive systems based on multimodal data, perceived as potentially more precise than human experiential judgment. In terms of monitoring extreme risks, AI was often regarded as a "lifeline":

"Being able to predict suicide would be life-saving. I don't even dare let my sister stay alone. She has severe depression and social withdrawal. If AI could monitor her 24/7 and detect abnormal states in advance, that would be incredibly helpful." (Participant 8)

By capturing disruptions in daily rhythms or changes in linguistic patterns, AI may enhance the sensitivity of risk detection, particularly for patients who are unable or unwilling to express suicidal intent. For older adults with cognitive impairment, safety monitoring was primarily associated with location tracking and

environmental safety. Caregivers' narratives reflected typical challenges associated with conditions such as Alzheimer's disease:

"My mother has cognitive impairment. I'm always worried she might get lost when she goes out, and she doesn't sleep well at night—sometimes she gets out of bed and wanders around. If AI could provide location tracking and monitor her activities, it would ease a lot of my anxiety. At least we could find her quickly if she got lost." (Participant 11)

Nighttime monitoring was not only a technical tool for tracking but also a means of alleviating caregivers' psychological burden, allowing them to temporarily relax from a state of constant vigilance.

However, such high-frequency monitoring may also introduce additional pressure. Some caregivers noted that frequent alerts—even if triggered by minor fluctuations or false positives—could lead to persistent anxiety and potentially contribute to psychological distress among caregivers themselves. This suggests that the design of AI-based early warning systems in clinical settings must prioritize high specificity, ensuring that patient monitoring does not inadvertently become a source of psychological burden for caregivers.

3.1.2 Treatment Management and Healthcare Support

Beyond managing acute risks, caregivers also expected AI to be integrated into the routine management of chronic mental disorders, particularly in addressing three key challenges: medication adherence, objective monitoring of illness progression, and access to healthcare resources.

"My wife has very poor medication adherence. She always says she's not ill and refuses to take her medication. AI could help remind her to take it, record whether she actually takes it, and regularly monitor her physical indicators. That way, I could know if something is wrong with her condition." (Participant 9)

"I feel that the treatment process is too subjective. The doctor just chats with my child, but when my child becomes anxious, they can't clearly explain anything. If AI could continuously record emotional changes and generate a trend over time, and then suggest treatments based on that, it would be much better." (Participant 15)

"It's really hard to get an appointment with specialists, and when you go to the hospital, you want the best doctor. Without connections, you don't even know who is good. If AI could integrate the expertise of top specialists, it would make seeking care much easier." (Participant 17)

Medication management was identified as one of the most conflict-prone aspects of psychiatric caregiving. Participants reported that covert non-adherence or refusal to take medication was a primary contributor to relapse. The involvement of AI was perceived as a form of depersonalized supervision, where automated reminders and adherence tracking could reduce confrontational dynamics between caregivers and patients. Objective recording of symptom changes was seen as a way to compensate for

information bias in clinical encounters. Traditional psychiatric assessment relies heavily on subjective reports from patients or caregivers, which may be limited by patients' impaired insight or communication difficulties. By generating longitudinal emotional trajectories and behavioral logs, AI could provide a more objective record, thereby supporting more precise treatment planning. At the level of healthcare access, long waiting times and difficulties in obtaining specialist appointments were commonly reported barriers. Caregivers expressed expectations that AI could alleviate these challenges through online consultations and preliminary screening. More importantly, from a sociological perspective, participants highlighted that AI should be able to integrate the diagnostic reasoning of top-tier specialists in major cities, enabling families in smaller cities or rural areas to access comparable levels of care through digital technologies.

3.2 Emotional Concerns and Human Connection

The clinical application of AI in mental health inevitably touches upon the emotional core of caregiving relationships and the boundaries of personal autonomy. The interview findings revealed that while caregivers actively seek the convenience and support offered by technology, they also experience deep-seated anxiety about the potential transformation of familial relationships.

3.2.1 The Irreplaceability of Human Warmth in Interaction

The treatment of mental disorders involves not only biological interventions but also the restoration of emotional connections between individuals. Most participants emphasized that the "warmth" inherent in human communication cannot be replaced by digital technologies.

"Long-term use of AI will definitely weaken emotional connections. Face-to-face communication between people is still better. AI is just a cold machine—it completely lacks the emotional variability of human beings." (Participant 1)

"I am a bit worried. The caregiving process is also a way for me to build a relationship with my child. If everything relies on AI, I'm afraid I'll become lazier, and our interactions will decrease. I don't want AI to replace me in chatting with him, comforting him, or giving him a warm hug—these emotional exchanges." (Participant 7)

Caregivers explicitly described AI as a "cold machine," suggesting that even if it can respond adaptively, it still lacks genuine emotional depth. This resistance reflects, at its core, a defense of the humanistic values embedded in psychiatric care. Furthermore, some caregivers raised concerns about potential social withdrawal among patients following AI integration. If interacting with AI is perceived as easier or less demanding than engaging with other people, patients may become increasingly socially withdrawn, develop a form of pathological reliance on AI, and further distance themselves from family members. This, in turn, may make the restoration of family relationships more difficult. These findings suggest that AI in psychiatric care should be positioned as a supportive tool rather than a replacement for human interaction.

3.2.2 Dependency, Functional Decline, and Care Burden

While AI has the potential to reduce caregiving burden, it may simultaneously contribute to functional decline in both caregivers and patients. This “decline” is reflected in reduced cognitive engagement and diminished autonomy in decision-making. From the caregivers’ perspective, excessive reliance on AI-based monitoring systems may also introduce a new form of psychological burden.

“Relying on AI will definitely have an impact. What’s worrying is that children are already using AI software to do their homework. They stop thinking about problems themselves and become lazy. That’s really concerning.” (Participant 5)

“If I receive these alerts every day, I would feel very anxious—maybe I’d develop anxiety myself. And what if the prediction is wrong?” (Participant 16)

Caregivers’ observations of adolescents using AI tools for learning suggest broader concerns that long-term reliance on AI-generated recommendations may erode patients’ independent thinking and problem-solving abilities. In the context of mental health recovery, self-efficacy is a critical factor for reintegration into society. If decision-making is consistently guided by AI, patients may develop a form of digitally mediated learned helplessness. In addition, the high-frequency alert systems described by caregivers may shift the nature of caregiving from physically demanding tasks to sustained psychological strain. If AI systems produce false alarms or malfunction, caregivers who have become accustomed to relying on technology may lose their basic observational and crisis-response abilities. Under such circumstances, AI may paradoxically become an additional burden rather than a source of support.

3.3 Trust and Adoption Drivers

Caregivers’ willingness to accept AI is not determined solely by the technical validity of the technology itself, but rather reflects a process of trust negotiation between professional medical advice and their own caregiving experience. The formation of this trust exhibits a clear hierarchical structure: it is initially grounded in endorsement by healthcare professionals, subsequently shaped by social discourse and the opinions of others, and ultimately stabilized through caregivers’ own hands-on use and repeated experiences with the technology.

3.3.1 Physician Recommendation and Authority

In psychiatry, a field that relies heavily on the trust-based relationship between clinicians and patients, the opinions of treating physicians carry substantial authority. The interview findings indicated that when AI systems were strongly recommended by treating physicians—or integrated into hospital management systems—caregivers’ willingness to adopt such technologies increased significantly.

“The treating doctor has always been very responsible. If they recommend something, it must have been validated and helpful to us. If it’s integrated into the hospital system, it means it’s under government

regulation. Compared to apps developed by private companies, I trust hospital-based systems with a public and regulated background more.” (Participant 11)

“If it’s recommended by a doctor, I would trust the system’s accuracy more. After all, doctors are professionals and wouldn’t recommend something unreliable. Also, if something goes wrong, we know who to turn to.” (Participant 9)

This form of trust reflects, in essence, a psychological mechanism of responsibility delegation. Caregivers perceive physician-endorsed technologies as having undergone clinical validation in terms of both professionalism and safety, while also providing a clear line of accountability in case of adverse outcomes. Furthermore, when discrepancies arose between AI-generated recommendations and physicians’ clinical judgments, nearly all participants stated that they would unhesitatingly defer to the treating physician. Caregivers believed that AI lacks the holistic and experiential understanding of patients that clinicians develop over time, whereas physicians’ experiential knowledge carries greater persuasive power. These findings suggest that AI systems in psychiatric care should align with clinicians’ diagnostic reasoning and provide evidence-based justifications for their outputs. Such professional transparency may serve as a critical foundation for establishing long-term trust.

3.3.2 Social Discourse and Prior Experience

The broader social environment—particularly public discourse and generational differences—emerged as key external factors influencing caregivers’ acceptance of AI. Interview findings indicated that negative media coverage, especially on social media, exerted a disproportionately strong influence on decision-making, often functioning as a near “veto” against AI adoption. At the same time, generational differences were evident: younger caregivers were generally more willing to incorporate AI into daily life and viewed it as a natural extension of modern living, whereas older caregivers, constrained by technological barriers, tended to exhibit resistance toward emerging intelligent tools and were less inclined to adopt them.

“Negative reports would have a big impact on me. I’m not very good with smart devices to begin with. If I see reports about inaccurate AI tracking leading to elderly people getting lost, or data leaks, I would stop using it altogether. I’d rather go back to the traditional way of caring for my father—although it’s more tiring, it feels safer.” (Participant 11)

“If there are negative reports, I would make my own judgment—whether it’s an isolated operational issue or a systematic algorithmic bias. But it’s undeniable that such news raises my psychological guard significantly.” (Participant 15)

Caregivers noted that reports of data breaches, inaccurate positioning, or misdiagnosis by AI could immediately trigger resistance and even lead to the abandonment of AI tools. This heightened sensitivity to public discourse reflects the still-fragile social consensus surrounding digital health technologies. Although some participants emphasized rational evaluation, negative media narratives nonetheless

substantially elevated their psychological threshold for acceptance. In addition, caregivers' prior experiences with AI played a crucial role in shaping trust toward intelligent technologies.

"When my child first became ill, we were too embarrassed to tell others. I relied entirely on AI tools on my phone to look up symptoms, find recommended hospitals, plan routes, and get contact numbers. I actually called the hospital based on that information and came here." (Participant 2)

"I think current AI tools are still at a basic search-engine level. The information they provide is too generic. When it comes to individualized medication responses, they lack depth and may even be misleading." (Participant 17)

Positive experiences—such as obtaining useful guidance for seeking medical care through generative AI tools—helped caregivers form favorable expectations and increased their willingness to continue using such technologies. Conversely, negative experiences, including cumbersome interfaces or misleading outputs, directly led to disappointment and reduced acceptance. These findings underscore that initial user experience and usability testing prior to large-scale implementation are critical determinants of long-term adoption and sustained engagement with AI technologies.

3.4 Barriers to AI Implementation

When addressing highly sensitive issues such as psychiatric privacy, legal responsibility, and financial costs, caregivers' attitudes demonstrated a strong tendency toward risk avoidance and self-protection. Most participants' decisions were guided by minimizing potential risks and safeguarding their own interests. The interview findings highlight some of the most practical and challenging barriers to the real-world implementation of AI, including both application-level obstacles and existing systemic and regulatory constraints.

3.4.1 Privacy and Data Governance

During the in-depth interviews, caregivers expressed considerable caution and resistance toward data collection processes in AI-based applications, particularly those involving video recording and audio uploads that directly capture patients' behaviors and conditions. Participants consistently emphasized strict vigilance regarding privacy protection.

"I would not accept video recording and uploading because I'm afraid that if privacy is leaked, it could affect my child's future employment. Once information is exposed, it's very dangerous." (Participant 2)

"I understand that these data are needed for analysis, but I'm still concerned about privacy. Conversations and behaviors related to schizophrenia are very sensitive. If they were leaked, others might look down on him, which would be harmful to his recovery. If the hospital could provide a clear confidentiality agreement ensuring that data will not be leaked or misused, I might accept it." (Participant 13)

Notably, caregivers' attitudes toward privacy protection were not entirely fixed but could become more flexible under utility-driven considerations. When concerns about privacy were outweighed by critical needs such as patient safety and well-being, some caregivers demonstrated a willingness to compromise and showed greater acceptance.

"I can accept it, but only if the data are absolutely secure and won't be leaked. After all, it's for better analysis and helping his recovery. As long as privacy is guaranteed, recording and uploading wouldn't be a problem—I just want clear safeguards." (Participant 7)

"I can accept it. My mother's cognitive impairment is quite severe, and recording conversations and behavior could help better analyze her condition—like whether there are new abnormal behaviors or emotional changes. But the data should only be used for clinical purposes, not for anything else." (Participant 11)

Compared with general clinical data, mental health–related information is particularly sensitive and carries unique implications. Such data are closely tied not only to patients' personal dignity but also to social stigma, societal labeling, and levels of social acceptance. In some cases, data breaches or misuse may even affect patients' educational opportunities, employment prospects, and social integration. The consequences of such violations are often more profound and less reversible than those associated with physical health data. Therefore, AI data governance in mental health must ensure a high degree of transparency throughout the entire data lifecycle. This includes clearly specifying data collection scope, storage methods, usage purposes, and deletion procedures, all of which should be openly accessible and verifiable to alleviate caregivers' concerns.

3.4.2 Cost, Support and Accountability

Given the chronic course, high relapse rates, and need for continuous intervention in mental disorders, caregivers often face substantial and long-term financial burdens. As a result, most families prioritize essential expenses such as basic living needs, medication, and daily caregiving, leaving little room in their budgets for additional expenditures on intelligent devices.

"Our financial situation doesn't allow us to afford these kinds of devices. Ideally, they should be covered by medical insurance. If we have to pay out of pocket, it would be unacceptable, because this is a long-term chronic condition, not something that can be resolved in a few days like surgery." (Participant 2)

"I wouldn't support long-term use. My schooling and my father's treatment already cost a lot, and we're financially struggling. I hope hospitals and the government can cover these costs. Also, technical training and instructions should be organized by hospitals." (Participant 10)

Beyond financial constraints, caregivers expressed a strong need for supportive infrastructures. What they require is not only financial subsidies but also practical assistance, including training and ongoing technical support—key factors determining whether AI technologies can be effectively utilized.

“Our budget is tight. I hope the government can provide subsidies to reduce the cost of devices and services. Hospitals should offer free training and have dedicated support staff available to answer questions.” (Participant 7)

“I hope hospitals can establish a 24-hour AI emergency service, so that when the system issues an alert, timely intervention can be provided to prevent accidents. Also, training and operational guidance should be organized by hospitals.” (Participant 10)

Compared with economic costs and policy support, ambiguity in legal accountability emerged as the most concerning issue for caregivers and a key institutional barrier to AI adoption. In real-world applications, AI systems may inevitably produce misdiagnoses, data inaccuracies, or technical failures. However, when such issues result in harm to patients or caregiving errors, there is currently no clear legal framework defining responsibility, leading to divergent views among participants.

“The manufacturer should definitely bear responsibility, and the distributor should also share part of it. Just like when we buy products—if they’re defective, the seller is also responsible. Of course, if it’s due to user error, then the operator should also bear some responsibility. It depends on the situation.” (Participant 1)

“I think the hospital should bear the primary responsibility. We use these systems because we trust doctors and hospitals, and if the system is integrated into hospital management, then the hospital has a duty to supervise its operation. Of course, the developer should also bear secondary responsibility as the technology provider.” (Participant 13)

Economic burden, policy support, and accountability frameworks together constitute critical determinants of whether AI can be implemented in mental health care. These challenges are more difficult to address than issues related to technical performance or user experience. Compared with general healthcare contexts, AI applications in psychiatric care must serve populations characterized by chronic illness and significant financial strain. Therefore, successful implementation of medical AI requires not only technological advancement but also the parallel development of robust institutional frameworks. This includes establishing clear regulations governing algorithmic operation and data use, reducing the opacity of “black-box” decision-making, and developing well-defined accountability mechanisms. Such institutional design is essential to alleviating caregivers’ concerns about uncertain liability and ensuring that AI serves as a supportive tool rather than an additional source of risk.

4 Discussion

This study explored the acceptance of AI among family caregivers of patients with mental disorders in China and identified the key factors influencing their attitudes through in-depth qualitative interviews. Four major themes emerged: perceived clinical benefits, emotional concerns and human connection, trust and adoption drivers, and barriers to AI implementation. The findings highlight the complex and nuanced perspectives of caregivers, revealing both cautious optimism and apprehension regarding the

integration of AI into psychiatric care. Notably, this study represents one of the first qualitative investigations focusing on Chinese family caregivers of individuals with mental disorders, providing context-specific insights into AI acceptance in this population.

Consistent with the TAM, perceived usefulness emerged as a primary determinant of caregivers' willingness to adopt AI(20). The chronic and unpredictable nature of mental disorders places caregivers in a state of sustained vigilance, which not only compromises their physical and psychological well-being but also affects patients' recovery outcomes(21). Previous studies have shown that the psychological distress experienced by caregivers may equal or even exceed that of patients themselves, with up to 57% of caregivers of individuals with severe mental illness reporting significant caregiving burden(22). The interview findings indicated a strong functionalist orientation among caregivers, whereby the value of AI is primarily judged by its ability to address practical challenges in risk monitoring, disease management, and healthcare access. In terms of risk monitoring, traditional approaches rely heavily on caregivers' continuous observation, and prolonged states of heightened alertness often lead to caregiving fatigue(11). The integration of AI technologies, particularly those based on multimodal digital phenotyping, offers a novel pathway to address this challenge. By continuously monitoring patients' daily routines, speech patterns, and physiological signals, AI systems can detect prodromal symptoms embedded within everyday behaviors, enabling a shift from reactive crisis management to proactive early intervention(23, 24). However, the realization of these technological benefits requires a careful balance between predictive accuracy and alert frequency. Excessive false alarms may induce secondary anxiety among caregivers, thereby exacerbating their psychological burden rather than alleviating it.

At the level of chronic disease management, AI primarily functions as a form of technological support. Poor medication adherence is a leading factor contributing to relapse in the management of mental disorders(25). Interview findings indicated that AI-assisted strategies—such as voice reminders and video-based medication confirmation—may help reduce intra-family conflict surrounding treatment compliance. In addition, caregivers' expectations regarding AI-generated objective trajectories of symptom changes reflect a desire to improve the efficiency of clinician–patient communication, thereby enhancing the scientific basis of clinical decision-making(26). However, despite the appeal of technological efficiency, the humanistic core of psychiatric care—namely, the therapeutic alliance and emotional connection—faces significant challenges in the context of AI integration. Recovery from mental disorders is highly dependent on social support and emotional resonance(27). Yet, caregivers consistently described AI as a “cold machine,” emphasizing its inability to replicate the adaptive and nuanced emotional responsiveness inherent in human interaction. Existing research supports this perception: although large language models are capable of generating empathetic and compassionate text, such responses are fundamentally based on probabilistic language modeling rather than genuine subjective experience(28). Excessive reliance on AI-based monitoring and prediction may inadvertently reduce meaningful interactions between caregivers and patients, potentially weakening family bonds and undermining the goals of psychiatric rehabilitation. Furthermore, the application of AI in mental health care raises critical concerns regarding patient autonomy. For adolescent patients in particular,

overdependence on AI for emotional regulation or problem-solving may impair the development of independent coping abilities(29). Therefore, the implementation of AI in psychiatric settings should adhere to a principle of augmentation rather than replacement. AI should be positioned as a supportive tool for clinicians and caregivers, rather than as an agent that constrains human agency or replaces essential interpersonal functions(30–32).

The construction of trust represents a critical socio-psychological process that determines whether AI can be meaningfully integrated into both clinical practice and family caregiving contexts. Within the current healthcare system in China, physicians' decisions carry substantial authority and influence(33), and strong recommendations from treating clinicians can alleviate most concerns associated with unfamiliar technologies. Caregivers generally perceive AI systems integrated into hospital infrastructures as being supported by professional expertise and associated with clearer lines of accountability. However, when discrepancies arise between AI-generated recommendations and clinicians' judgments, caregivers tend to prioritize physicians' opinions. This preference indicates that in complex decision-making contexts, trust ultimately remains anchored in clinical experience rather than algorithmic output(34).

In addition, privacy, accountability, and cost emerged as critical real-world barriers to the implementation of AI. The highly sensitive nature of mental health data necessitates a distinct and rigorous approach to data governance(35). Caregivers' resistance to uploading audio and video recordings reflects deep concerns about the potential consequences of data breaches. Given the persistent stigma surrounding mental illness, unauthorized disclosure of sensitive information may adversely affect patients' educational opportunities, employment prospects, and social integration(36, 37). However, when privacy protection conflicts with patient safety—such as in the context of suicide risk monitoring—caregivers tend to prioritize safety considerations over strict privacy concerns. Economic burden is another significant constraint. Families of individuals with mental disorders often face substantial financial strain, and additional expenditures on AI-based devices are typically beyond their budget(38). To enhance accessibility, governments should consider policy measures such as public procurement, targeted subsidies, or inclusion of AI-based services within health insurance schemes, thereby ensuring that economically disadvantaged populations can also benefit from these technologies. Furthermore, ambiguity in accountability remains a major challenge. When failures in AI systems—such as inaccurate predictions or system malfunctions—result in harm to patients, responsibility is often difficult to assign, as no unified legal framework currently exists(39). Existing literature generally conceptualizes AI as a clinical decision-support tool, with liability distributed between healthcare institutions (for clinical application) and developers (for product-related issues) depending on the specific context(40, 41). However, the inherently dynamic and complex nature of mental health care complicates such distinctions, as responsibility may involve multiple stakeholders, including developers, healthcare providers, and family caregivers. Participants in this study tended to attribute primary responsibility to technology providers, reflecting public expectations regarding risk accountability and rights protection. In practice, however, a single-actor liability model is insufficient. Future efforts should explore multi-

stakeholder accountability frameworks that clearly delineate responsibilities while safeguarding patient rights.

This study represents one of the first qualitative investigations in China to explore the attitudes of caregivers of patients with mental disorders toward the application of AI. The findings reveal the complex and ambivalent perspectives of this population: while caregivers expect AI to alleviate caregiving burden and address key challenges such as symptom monitoring and medication management, they also express concerns regarding the erosion of humanistic care, privacy risks, ambiguous accountability, and financial costs. The implementation of AI in psychiatric caregiving must therefore balance technological effectiveness with the preservation of medical humanism, while simultaneously advancing ethical frameworks and policy support. Developing a context-sensitive, human–AI collaborative care model tailored to local healthcare systems is essential for facilitating the practical integration of AI and providing empirical guidance for future applications.

4.1 Limitations

This study has several limitations. Participants were recruited from a single psychiatric hospital in Henan Province, limiting generalizability. Exclusion of caregivers without prior exposure to AI may have led to an overestimation of acceptance levels. Additionally, as a qualitative study, the findings are exploratory and require validation through quantitative or mixed-method research. Future studies should examine longitudinal adoption patterns, cross-regional differences, and the effectiveness of human–AI collaborative interventions, potentially integrating experimental or implementation science designs.

5 Conclusions

Family caregivers of patients with mental disorders demonstrate cautious but generally positive attitudes toward AI applications in psychiatric care. Their acceptance is influenced by perceived utility, emotional considerations, trust, privacy, accountability, and economic factors. Designing AI interventions that respect humanistic values, provide institutional support, and ensure data security is critical for facilitating adoption. This study contributes novel context-specific insights and underscores the importance of caregiver-centered approaches in the implementation of AI in mental health care.

Abbreviations

Artificial intelligence

AI

Large Language Models

LLMs

Electronic Health Records

EHRs

Family Caregivers

FCGs
Severe Mental Illness
SMI
Technology Acceptance Model
TAM
Consolidated Criteria for Reporting Qualitative Research
COREQ

Declarations

7.1 Ethics approval and consent to participate

This study strictly adhered to the principles of the Declaration of Helsinki (World Medical Association, 2013 revision) for medical research involving human subjects, and complied with the National Ethical Guidelines for Biomedical Research Involving Human Subjects of China. The study protocol was reviewed and approved by the Ethics Committee of Henan Medical University(Reg.No.HYYLL-20260402).

Prior to data collection, all participating caregivers were provided with detailed information regarding the study objectives, procedures, potential risks, and participants' rights. Written informed consent was obtained from each participant, and all interview recordings and transcripts were anonymized—identifying information (e.g., names, workplace details) was replaced with pseudonyms to protect privacy. The storage and analysis of sensitive data strictly followed institutional data security protocols to prevent leakage.

7.2 Clinical trial number

Clinical trial number: not applicable.

7.3 Consent for publication

Not applicable.

7.4 Availability of data and materials

The datasets generated and analysed during the current study are not publicly available due to confidentiality and privacy considerations, as they contain sensitive qualitative interview data.

7.5 Competing interests

The authors declare that they have no competing interests.

7.6 Funding

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7.7 Authors' contributions

J.T. Dong and D.J. Zhang contributed to the conception and design of the study, and were major contributors in writing the manuscript. F. Yan and X. Chen were responsible for data collection. J.Y. Mu, M.Y. Wu, C.F. Ruan and W. Cui made substantial revisions to the manuscript. All authors read and approved the final manuscript.

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Figures

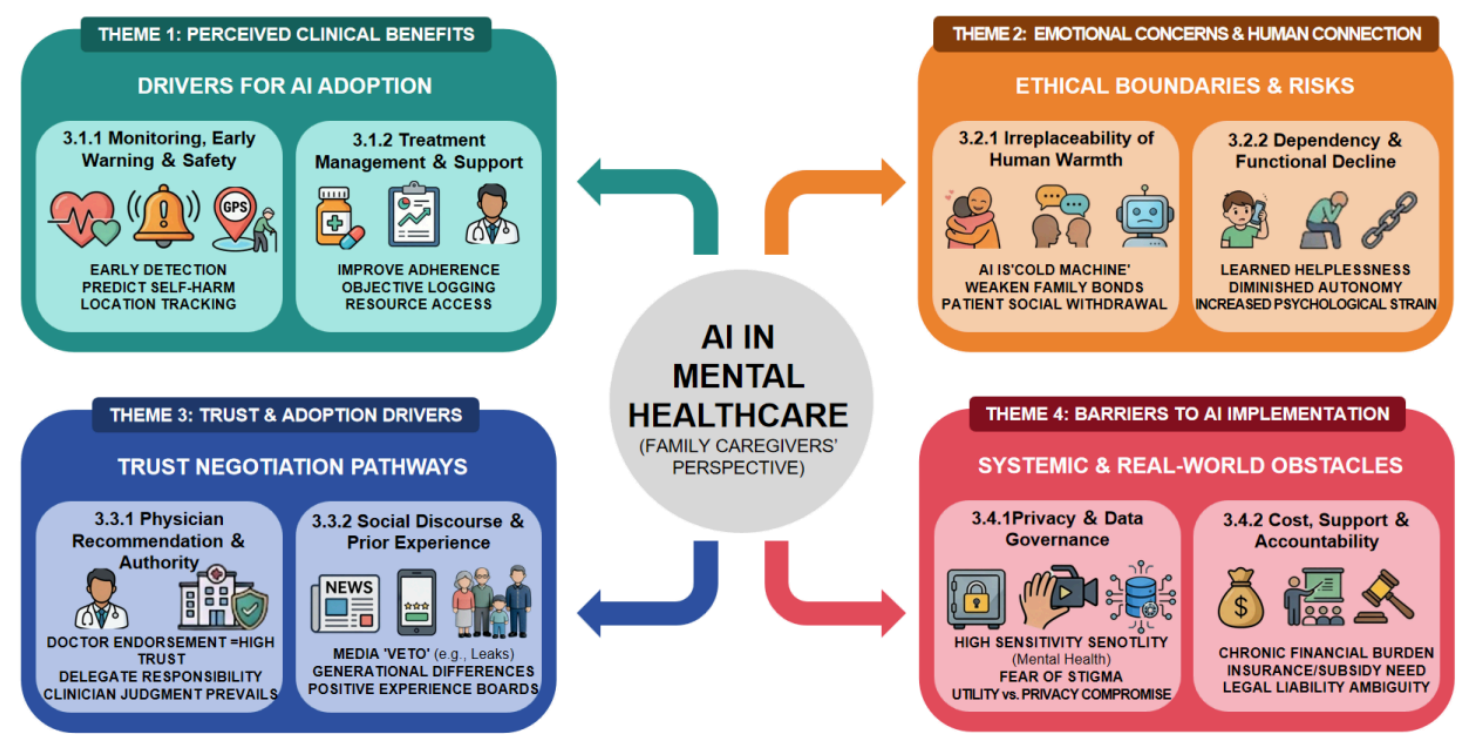


Figure 1

Conceptual framework.

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