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Artificial intelligence chatbots for supporting mental health in older adults: a mixed-methods systematic review protocol

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Author Affiliation:Flinders University, College of
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Adelaide, Australia.**ADMINISTRATIVE INFORMATION****Support** - None.**Review Stage at time of this submission** - Preliminary searches.**Conflicts of interest** - None declared.**INPLASY registration number:** INPLASY2025100110**Amendments** - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 27 October 2025 and was last updated on 27 October 2025.**INTRODUCTION**

Review question / Objective This mixed-methods systematic review will map and describe the extent, range and nature of research on AI chatbots both rule-based and LLM-enabled, that support mental health, including help-seeking, among older adults (≥ 60 years) across any setting (community, clinical, online, residential/long-term care). The review focuses on older adults (≥ 60 ; mixed-age studies eligible if $\geq 50\%$ are ≥ 60 or data are separable), AI chatbots/conversational agents delivering mental health support (e.g., help-seeking, psychoeducation, self-management, symptom monitoring, low-intensity interventions) via text, voice or multimodal interfaces, and any context (community, primary/specialist care, online, residential/long-term care). The study will also identify gaps to inform future research, practice and policy.

Background Population ageing is reshaping health systems worldwide, and mental health is central to

healthy ageing. In 2023 the WHO reported that around 14% of adults aged ≥ 60 live with a mental disorder, accounting for 10.6% of all Disability-adjusted life years (DALYs) in this age group; notably, approximately 27.2% of global suicide deaths occur among people aged ≥ 60 (World Health Organization, 2023). Against this background, older adults' mental health needs are substantial and heterogeneous.

Despite need, older adults engage less with formal mental health services than younger cohorts. Systematic reviews point to multilevel barriers, including stigma and ageism, low mental health literacy, beliefs about "normal" ageing, and access constraints, not only reduced physical mobility but also sensory losses (e.g., hearing impairment) and geographic isolation, alongside facilitators such as trusted providers and tailored information (Elshaikh et al., 2023; Alkholy et al., 2022). These patterns help explain persistent treatment gaps even in settings with service availability.

Digital mental health interventions, including conversational agents (chatbots), have been proposed to expand reach, reduce wait times, and offer low-threshold, round-the-clock support. Pre-LLM systems were commonly rule-based, showed feasibility and acceptability in general adult samples, and yielded short-term improvements in symptoms in some trials (Fitzpatrick et al., 2017; Abd-Alrazaq et al., 2019). Recent studies indicate that AI-based conversational agents can reduce depressive symptoms and psychological distress, with effects moderated by modality and design features (Li et al., 2023; Zhong et al., 2024).

For older adults specifically, the opportunity space includes companionship, psychoeducation, guided skills practice, and self-management prompts but usability, trust, privacy, and accessibility concerns are pronounced. Technology adoption among seniors has risen markedly over the last decade, yet age-related disparities persist (Pew Research Center, 2022). Qualitative evidence from older adults using digital mental health tools underscores the need for age-inclusive content, clear value propositions, simple interfaces (including voice and captions), and attention to privacy and data control (Yin et al., 2024).

Since late 2022, large language models (LLMs) have transformed conversational systems, enabling free-text, context-sensitive dialogue that may enhance engagement and perceived empathy. At the same time, health authorities caution that LLMs can generate inaccurate or biased outputs, raise privacy and cybersecurity risks, requiring robust governance, evaluation, and guardrails prior to health deployment (World Health Organization, 2024). These benefits and risks are salient for older users, who can face compounded harms from misinformation or inaccessible design.

For this review, we use "older adults" consistent with WHO's working definition (typically ≥ 60 years) (World Health Organization, 2023). We define an "AI chatbot" (also referred to as a conversational agent) as software that simulates dialogue with users for the purpose of information, guidance, or support. Chatbots may be (i) rules- or script-based, (ii) machine-learning-based, or (iii) powered by foundation models such as LLMs or large multimodal models (LMMs); they can be delivered via text, voice, or multimodal interfaces within standalone apps, web platforms, or messaging services (Abd-Alrazaq et al., 2019; Li et al., 2023; World Health Organization, 2024). "Mental health support" includes prevention, self-management, symptom monitoring, psychoeducation, and low-intensity interventions targeting common domains such as depression, anxiety, loneliness, and social

connectedness (World Health Organization, 2023; Yin et al., 2024).

Rationale A dedicated mixed-methods systematic review is needed to provide the first in-depth synthesis of AI chatbots for supporting mental health in older adults, as the current literature lacks this specific focus. While foundational reviews have recently emerged, they leave critical gaps in clinical scope, technological relevance and effectiveness, and intervention type. First, existing syntheses are too broad in their clinical focus. A key scoping review by Zhang et al. (2024), for instance, covered chatbots for all of healthcare in older adults; consequently, mental health was only one of nine health domains considered and could not be explored in the required depth. Other reviews are too broad demographically, focusing on the general adult population without addressing the unique needs of older users (Li et al., 2023; Zhong et al., 2024), or examine disparate technologies like social robots (Gasteiger et al., 2021). Second, the literature is fragmented by intervention type and outdated technologically. One valuable review focused narrowly on commercial voice assistants (e.g., Amazon Alexa) while deliberately excluding the vast field of purpose-built chatbots (Teo et al., 2025). Critically, the searches for both the Teo et al. (2025) and Zhang et al. (2024) reviews were completed before the research impact of large language models (LLMs) was published. The rapid emergence of LLMs since late 2022 represents a paradigm shift in chatbot capabilities, meaning earlier reviews focused on pre-LLM, rule-based systems are no longer current (Vaidyam et al., 2019). Finally, other syntheses are too narrow in their methodology, focusing only on specific outcomes like social connectedness or limiting their inclusion to randomized controlled trials (Oh et al., 2025). This approach excludes the rich qualitative and observational evidence essential for understanding real-world engagement and safety.

This systematic review will address these cumulative gaps. It will be the first to: (1) provide a deep and focused synthesis specifically on mental health applications; (2) comprehensively map all forms of AI chatbots, including commercial, researcher-developed, and LLM-enabled systems; and (3) capture the current state of the field by including evidence from the generative AI era.

METHODS

Strategy of data synthesis We will use six databases to perform the literature search: MEDLINE (Ovid), Embase, PsycINFO, CINAHL,

Scopus, Web of Science. Appendix A provides the complete search strategy for MEDLINE (Ovid). Searches combine controlled vocabulary and keywords for older adults, mental health, and chatbots/LLMs; MEDLINE strategy provided in the protocol. Strategies will be translated for Embase, PsycINFO, CINAHL, Scopus, and Web of Science using controlled vocabulary and keywords. The search strategy was developed and refined with a research librarian.

Search keywords: older adults, mental health, AI chatbots

Timeframe: 2014–present; English language. Synthesis will follow JBI guidance for mixed-methods reviews using a convergent integrated/narrative approach; quantitative and qualitative findings will be combined in evidence tables and visual summaries.

Eligibility criteria We will include original, peer-reviewed empirical studies published in English from 1 January 2014 to the present that report primary data on older adults (aged ≥ 60 years; mixed-age studies are eligible when $\geq 50\%$ of participants are ≥ 60 or data for older adults are separable) interacting with artificial-intelligence chatbots/conversational agents that provide mental health support. Eligible interventions comprise rule-/script-based, machine-learning and large-language-model (LLM)-enabled systems delivered via text, voice or multimodal interfaces; embodied conversational agents or general voice assistants are included only when they are used explicitly as mental health chatbots that offer two-way conversational support. Any context is eligible, including community settings, primary or specialist care, online programmes and residential/long-term care. Eligible study designs encompass qualitative, quantitative and mixed-methods investigations (e.g., feasibility/pilot studies, observational designs, quasi-experimental evaluations and trials/RCTs). Studies must report at least one of the following outcome domains: help-seeking (intentions, behaviours, pathways or referrals); mental health symptoms or wellbeing (e.g., depression, anxiety, stress, loneliness, quality of life); or user experience and safety (e.g., usability, acceptability, trust, engagement/adherence, adverse events or harms). The 2014 start date captures the modern era of conversational AI associated with the maturation of smartphone app ecosystems and encompasses foundational pre-LLM chatbots through to contemporary LLM-enabled systems, allowing synthesis of the field's evolution. We will exclude opinion pieces, editorials, letters and narrative viewpoints without primary data; study protocols

(used only to identify subsequent studies); purely technical or simulation papers with no human participants; social/companion robots or general voice assistants that lack explicit, two-way mental health conversational support; non-English publications, non-peer-reviewed items and abstracts without accessible full text; studies unrelated to mental health support (e.g., general health information only, device control or appointment reminders without a mental health component); and grey literature (preprints, theses and reports).

Source of evidence screening and selection

Records will be managed and screened in Nested Knowledge. Two reviewers will independently screen titles/abstracts and full texts against predefined criteria; disagreements resolved by discussion or third-reviewer arbitration. A pilot (about 50 titles/abstracts) will calibrate decisions prior to full screening. Reasons for exclusion at full text will be recorded; PRISMA flow diagram will document selection.

Data management Search results will be imported into Nested Knowledge for deduplication and workflow. Data extraction will use a predefined Excel sheet (one row per study) with fields for study characteristics, intervention/technology, outcomes, and key findings; one extractor with independent verification by a second reviewer.

Reporting results / Analysis of the evidence

A convergent integrated synthesis will combine quantitative summaries (ranges/central tendencies where instruments are comparable) with qualitative thematic findings. Results will be stratified by chatbot technology (rule-based vs LLM-enabled), modality (text/voice), delivery channel, setting, and outcome domain. Quality appraisals (MMAT supplemented by JBI tools) will contextualise interpretation; studies will not be excluded on quality alone.

Presentation of the results Planned outputs include: PRISMA flow diagram; evidence tables of study characteristics and outcomes; a heat map (e.g., outcome domain $\times$ chatbot type/modality); and stratified summaries by population/setting and technology. A draft chart is outlined in the protocol's data-extraction table and mapping plan.

Language restriction English only.

Country(ies) involved Australia.

Other relevant information This review contributes toward a PhD for the lead author (SS).

Librarian support acknowledged; ethics approval not applicable.

Keywords Older adults; mental health; chatbots; conversational agents; artificial intelligence; large language models; help-seeking; mixed-methods; systematic review.

Dissemination plans Planned: Register protocol (INPLASY); submit results to a peer-reviewed journal and present at ageing/mental health conferences.

Contributions of each author

Author 1 - Sharmin Sultana - Drafted the protocol, developed the search strategy, led data extraction and synthesis, and prepared the manuscript for submission.

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Author 2 - Sharif Rasel - Provided methodological and analytical guidance, assisted with data synthesis, and reviewed the final protocol.

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