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Use of Health Technologies by Older Adults with Chronic Disease: An Umbrella Review of Evidence Synthesis

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I. INTRODUCTION

Population aging is increasing chronic disease burden and the need for long-term care, with adults aged ≥ 65 projected to rise from 10% in 2022 to 16% by 2050 [1] and multimorbidity already common [1][2]. Digital health technologies, including telemedicine, mHealth apps, wearables, and remote monitoring, may improve outcomes such as physical activity, psychological distress, and autonomy [3][4], yet adoption and sustained use among older adults remain inconsistent [5]. Barriers repeatedly cluster into five domains, socioeconomic, health-related, dispositional, technology-related, and social factors [1], with limited technical literacy (17%), low motivation (10%), cost (8%), and privacy/security concerns most frequently reported, alongside age-related functional limitations and limited clinician or family support [3][6][5]. Facilitators include perceived usefulness and ease of use (TAM/UTAUT), co-design, accessible design features, and ongoing training and technical support [2][6][7], but adoption also varies by socioeconomic status, gender, and rurality, risking widened disparities [5]. Because existing systematic reviews are fragmented and inconsistently report equity variables, an umbrella review is needed to consolidate the most consistent barriers, facilitators, and implementation strategies influencing adoption and sustained use in older adults with chronic diseases [1][5][3].

II. METHODS

This umbrella reviews synthesised evidence from systematic reviews and meta-analyses on **digital health technology adoption among older adults ($\geq 60/\geq 65$) with chronic diseases**, focusing on barriers, facilitators, equity factors, and implementation strategies, and was reported using **PRISMA 2020** with a prospectively registered protocol. Guided by a five-domain barrier framework and interpreted using **TAM/UTAUT**, **COM-B**, and **PROGRESS-Plus** [2][5][1], searches were conducted in **MEDLINE/PubMed**, Embase, CINAHL, Scopus, Web of Science, PsycINFO, and CDSR using terms for older adults, chronic disease, digital health (telehealth, mHealth, wearables, remote monitoring), and review filters. Two reviewers screened and extracted data, appraise review quality with **AMSTAR 2**, manage

overlap using a citation matrix and **CCA**, and synthesize findings primarily narratively, adding quantitative summaries only when comparable and without double counting; certainty was assessed with **GRADE** where feasible. Results of umbrella review

Adoption of digital health technologies (telehealth, mHealth, wearables, remote monitoring) among older adults with chronic diseases is constrained by intersecting barriers spanning socioeconomic, health-related, dispositional, technology-related, and social domains [1][5][3]. Cost and infrastructural access remain persistent constraints for seniors on fixed incomes, including device and data-plan affordability and limited broadband access, which reinforces the digital divide [1][3]. Health-related limitations such as impaired vision/hearing, reduced dexterity, and cognitive decline reduce usability and increase abandonment risk, especially when multimorbidity makes technology feel like an added burden [1][5][6]. Dispositional barriers include low perceived need, anxiety about making mistakes, fear of fraud, and concerns about stigma and loss of dignity [3][1][5]. Usability problems, difficult login procedures, unreliable connectivity, and false alarms amplify low digital literacy, which appears frequently in evidence syntheses as a dominant barrier theme [3][1].

Facilitators consistently align with perceived usefulness and ease of use, commonly framed through TAM and UTAUT, where sustained engagement increases when older adults see direct benefits to core health tasks and minimal complexity [2][6]. Social influence and clinical endorsement matter because trusted healthcare recommendations and family support increase confidence, initiation, and continued use, including in rural settings where community “digital champions” can reduce pressure on clinicians [1][5]. Evidence also links digital interventions to meaningful outcomes, including reduced psychological distress and improved autonomy, and meta-analytic evidence indicates small but significant improvements in moderate-to-vigorous physical activity among older adults living alone [3][4]. Across conditions, interventions frequently target heart failure and atrial fibrillation via telemonitoring and apps, diabetes via connected glucose monitoring and adherence tools, and neurological disorders via assistive devices and AI

agents, although cognitive and sensory impairments can still limit effective use [2][5].

Implementation is strongest when technologies are co-designed with older adults, caregivers, and clinicians to prevent age-mismatch in design assumptions and to ensure fit with clinical workflows [6][5]. Practical design choices, such as large buttons, high-contrast displays, and voice-enabled interaction, plus early adoption before functional decline, improve usability and learning [6][1]. Equity-sensitive deployment is required because adoption differs by gender, income, and rurality, so broadband access, culturally tailored training, and hybrid care models help ensure technology supplements rather than replaces human care [5]. Overall, the literature supports a taxonomy spanning self-management, assisted care, supervised care, and continuous monitoring, and it suggests that engagement improves when users receive repeated training and ongoing technical support that sustains confidence over time [6].

III. CONCLUSIONS

This umbrella review shows that digital health technologies, including telehealth, mobile applications, wearables, and remote monitoring, can support chronic disease management and independent living among older adults, but adoption and sustained use remain inconsistent. Across the included evidence syntheses, barriers repeatedly cluster around digital literacy, usability and reliability problems, affordability and access constraints, privacy concerns, and limited clinical or family support, while facilitators are linked to perceived usefulness and ease of use, age-friendly design, co-design, and ongoing training and technical support. The review also indicates that equity factors

such as socioeconomic status, rurality, and gender influence uptake, yet these variables are inconsistently reported across studies, limiting firm subgroup conclusions. Overall, the findings suggest that improving outcomes will require user-centred and equity-sensitive implementation that strengthens access, builds capability, and integrates digital tools into trusted care relationships.

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