Patient Portal Use Among Older Adults: A Systematic Review and Meta-Analysis

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Abstract—**Patient portals are digital tools for managing health information. As healthcare shifts toward digital-centered delivery, portals increasingly shape how older adults access information and participate in their care. Yet, it remains unclear how older adults use these systems and what factors shape sustained engagement. We conducted a systematic review and meta-analysis of studies published between 2005 and 2025 to examine portal use among older adults. From 1,487 unique records, 52 studies were included in the systematic review and 18 in the meta-analysis. While prevalence varied significantly across diverse study contexts ($I^2 \geq 97.6\%$), pooled estimates suggest that approximately 55% (95% CI: 0.28–0.79) of older adults had ever used a portal and 48% (95% CI: 0.31–0.67) were continuing users. Publication year significantly moderated ever use, indicating increasing uptake over time ($OR/year = 1.39$), but was not significantly associated with continued use.**

Index Terms—**Patient portals, older adults, systematic review, meta-analysis, human factors, usability, patient engagement.**

I. INTRODUCTION

Patient portals are typically tethered to a healthcare organization's electronic health record (EHR) system and offered to patients as web-based sites or mobile applications [1]. Major EHR vendors, such as athenahealth, Epic, and Cerner, commonly provide portal platforms that organizations configure and brand for patients. Although implementations vary, portals generally support three core functions: accessing parts of the medical record (e.g., lab results and visit summaries), managing logistics (e.g., appointments, prescription refills, and billing), and communicating with care teams via secure messaging [2]. Many portals also include notifications, health education content, questionnaires, and caregiver access through proxy or shared accounts, which can expand both the scope and complexity of "portal use."

In the U.S., patient portals are now widely available, driven in part by policy efforts to expand patient-authorized access to electronic health information (EHI). The 21st Century Cures Act emphasizes secure access to EHI, and most healthcare organizations offer portal-based services [3]. The COVID-19 pandemic further increased interest in and use of portals for services such as telehealth [1]. However, broad availability has not yet translated into universal engagement: in 2024, 77% of Americans reported being offered access to online medical records, but only 65% reported actually accessing them [2]. Portal use remains uneven, with lower uptake among people with low income, lower education or literacy, limited English proficiency, and older age [4]. When these groups cannot easily access or use portals, digital-first care workflows can exacerbate disparities and increase burdens for patients and health systems [5].

Compared to the general population, older adults have greater healthcare needs, including more frequent hospitalizations, a higher number of comorbidities, and multiple chronic conditions [6]. While encouraged, portal uptake among older adults has historically been low [7]. Recent initiatives have expanded access through mobile apps and dedicated support [8]. Yet, it remains unclear whether increased access and onboarding efforts translate into sustained portal use among older adults.

In this paper, we synthesize two decades of evidence on older adults' patient portal use through a systematic review and meta-analysis of studies published between 2005 and 2025. Models of older adults' technology acceptance and learning distinguish between trying a tool and integrating it into routine practice; initial trial does not necessarily lead to sustained use and may depend on perceived utility and access to technology support [9]–[11]. Because many portal studies report observed behavior rather than intention, we focus on two behavioral stages: *ever use* (using a patient portal at least once) and *continued use* (ongoing engagement over time). We systematically reviewed empirical studies and conducted random-effects meta-analyses to estimate the prevalence of both stages, using publication year as a moderator. To contextualize these patterns, we also conducted a reflexive thematic analysis to synthesize reported barriers and facilitators of portal use among older adults. Our findings highlight human factors implications that extend beyond onboarding to sustaining patient portal engagement for older adults.

II. METHODS

This systematic review of the English-language scholarly literature followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Figure 1). We included studies that empirically investigated patient portal use among older adults. Studies that reported extractable quan-

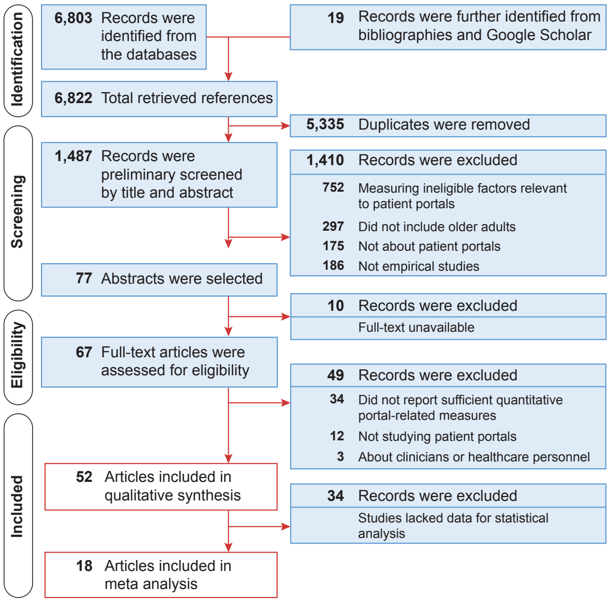

Fig. 1. Summary of literature search following PRISMA guidelines [12].

titative data sufficient to calculate the prevalence of patient portal engagement were included in the meta-analysis.

A. *Search Strategy*

We searched nine multidisciplinary and computing-focused databases: ACM Digital Library, PubMed, Web of Science, Scopus, ERIC, Embase, PsycInfo, EBSCO CINAHL, and Cochrane. Searches targeted peer-reviewed, English-language publications from January 2005 through July 2025. We selected 2005 as the start date to align with the emergence of patient portals as a routine component of healthcare delivery.

Search queries combined database-specific controlled vocabulary (when available) with keywords spanning five domains: *Older Adults* (e.g., older adults, elderly, seniors), *Caregivers* (e.g., informal caregiver, family caregiver, spousal caregiver), *Alzheimer's Disease and Related Dementias (ADRD)* (e.g., diagnosed with MCI, PwD, people with dementia), *Patient Portals* (e.g., patient portal, eHealth), and *Method* (e.g., participatory design, user study, proxy access). We included the ADRD domain because some studies describe relevant populations primarily by diagnosis rather than by age group. The complete set of keywords is shown in Table I.

We included studies that empirically examined patient portal use among older adults and/or their informal caregivers. We included studies of informal caregivers when they examined patient portal use in relation to older adults, because these studies directly inform the barriers, supports, and workflows surrounding older adults' portal engagement. In addition, portal engagement may occur through shared or proxy access, and excluding caregiver-mediated use could underestimate how portals are accessed and used in practice. We did not impose a minimum age threshold; instead, we included studies that explicitly described the population as older adults (or in equivalent terms), regardless of health status. Eligible studies reported findings related to portal use, usability, or user experience and collected empirical data using methods such as experiments, interviews, or observations involving older adults or their informal caregivers.

TABLE I
KEYWORDS USED IN THE SYSTEMATIC LITERATURE SEARCH

Domain	**Keywords**
Older Adults	older adults, elderly, seniors, geriatric, aging population, older people, older persons
Caregivers	informal caregiver*, family caregiver*, carer*, unpaid caregiver*, care partner*, spousal caregiver*, adult children caregiver*, non-professional caregiver*, relative*, spouse*, adult child*, grandchild*, young carer*, younger family
ADRD	people with dementia, persons with dementia, patients with dementia, people living with dementia, diagnosed with dementia, people with mild cognitive impairment, diagnosed with MCI, PwD
Patient Portal	patient portal, patient portals, eHealth, e-health, health record
Method	user study, experiment*, observation*, interview*, focus group*, usability, case study, field study, participatory design, diary study, think aloud, cognitive walkthrough, survey*, questionnaire*, log analysis, user experience, interaction design, shared use, proxy use, healthcare proxy, proxy access

We excluded studies that (1) did not report empirical data, (2) focused exclusively on formal caregivers, or (3) examined informal caregivers of people who were not older adults. After deduplication, we screened records in two stages (title/abstract, then full text). The first author screened records, selected full texts, and extracted study characteristics using a standardized form. The first and second authors jointly determined final eligibility, resolving disagreements through discussion; when disagreements persisted, the second author made the final decision. Using these procedures, we included 52 articles from 1,487 unique records in the systematic review (Figure 1).

B. *Meta-analysis*

We conducted random-effects meta-analyses to synthesize study-level prevalence estimates of patient portal engagement, accounting for between-study heterogeneity. Studies were eligible for quantitative synthesis if they reported data that could be used to compute prevalence (i.e., the number of portal users and the total sample size). Using these criteria, 18 studies (18 articles) were included in the meta-analysis.

For each included study, we extracted study characteristics (e.g., study setting, measures, and the study's definition of older adults) and the quantitative data required to estimate prevalence. We categorized outcomes into two engagement stages: *ever use* (using a patient portal at least once) and *continued use* (ongoing engagement beyond initial onboarding, as defined by each study). Because these stages represent conceptually distinct behaviors and some articles reported multiple outcomes from overlapping samples, we analyzed ever use and continued use separately rather than producing a single pooled estimate across outcomes.

We computed effect sizes as logit-transformed proportions derived from user counts and total sample sizes, and fit models using restricted maximum likelihood (REML). We report pooled prevalence estimates with 95% confidence intervals and standard heterogeneity statistics (τ^2, I^2, and Q). To examine whether prevalence changed over time, we fit mixed-effects meta-regression models with publication year as a continuous moderator. We used publication year as a uniform temporal proxy because data-collection years were inconsistently reported. As a secondary analysis, we also fit a sample-size–weighted binomial logistic regression using aggregated counts and treat it as supportive, given potential influence from large studies. Risk of bias was assessed using the Joanna Briggs Institute (JBI) Critical Appraisal Checklist for Prevalence Studies. The first and second authors independently assessed each study and resolved disagreements through discussion. We retained all eligible studies and interpreted results in light of the overall risk profile.

C. *Thematic Analysis*

Following the meta-analysis, we conducted a reflexive thematic analysis of all 52 included studies. The scope of this analysis was to synthesize reported *barriers and facilitators* of patient portal use in older adults and to contextualize the quantitative prevalence estimates. We extracted qualitative findings and relevant author interpretations from each study and developed an initial set of open codes capturing factors related to portal engagement (e.g., usability and design barriers, access to technology support, and caregiver involvement). We then iteratively refined the codes through axial coding, grouping related codes into higher-level categories and clarifying boundaries between concepts as new evidence was incorporated. Across multiple rounds of discussion, the research team reviewed coded excerpts, compared interpretations, and consolidated categories into candidate themes. Themes were iteratively revised to improve internal coherence and distinctiveness, and were finalized through group discussion and consensus, resulting in a thematic account of recurring barriers, facilitators, and usability challenges shaping older adults' portal use. This analytic process unfolded over approximately six months.

III. META-ANALYSIS RESULTS

Of the 18 studies included in the meta-analysis (Table II), nine reported the prevalence of older adults who had ever used a patient portal [13]–[21], and nine reported continued use [22]–[30]. Eleven studies defined older adults as age 65+ [13]–[15], [19], [20], [22], [23], [25], [26], [28], [29] while seven as 50+ [16]–[18], [21], [24], [27], [30]. Publication years ranged from 2014 to 2025. Studies were conducted in three countries—the U.S., the Netherlands, and Argentina—with most based in the U.S. (15/18) [13]–[15], [17]–[22], [24], [25], [27]–[30]. We identified two types of study settings: (1) health system–based that focused on a single institution's portal, and (2) community or population-based that sampled older adults across multiple health organizations (and therefore multiple portals) [18], [19], [21], [22], [24], [25], [27], [29].

TABLE II
STRATIFIED PREVALENCE RANGES AND STUDY COUNTS

Stratum	**Ever Use (k)**	**Continued Use (k)**
Overall	14% – 97% (9)	13% – 77% (9)
Age Definition		
$\geq$ 65 Years	32% – 97% (5)	13% – 77% (6)
Other (50+, 56+, etc.)	14% – 55% (4)	20% – 71% (3)
Study Setting		
Health System-based	20% – 92% (5)	27% – 70% (4)
Population-based	14% – 97% (4)	13% – 77% (5)
Data Source		
Log-based or Mixed	20% – 92% (4)	—
Self-reported	14% – 97% (5)	13% – 77% (9)
Data Timing		
Pre-COVID Era	14% – 77% (6)	13% – 77% (8)
Post-COVID Era	52% – 97% (3)	60% (1)
Country		
Argentina	—	60% (1)
Netherlands	20% (1)	27% (1)
USA	14% – 97% (8)	13% – 77% (7)

Health system–based studies generally focused on single-portal deployments within large health systems (e.g., Ochsner [17], Atrium [15], [30], AMC Amsterdam [16], Kaiser Permanente [13], [14], [28], HIBA [26]), most commonly Epic MyChart, with a few studies examining homegrown portals [23], [26]. Data collection also varied: studies used national [22] or statewide surveys [25], system-wide institutional surveys [13], [14], [16], [17], [20], [23], [26], [28], [30], and study-specific community instruments [18], [19], [21], [24], [27], [29]. Some institution-based studies paired survey data with portal usage logs [13], [14], [16], while one relied on logs alone [15]. All studies that used portal logs measured whether older adults had ever used a patient portal.

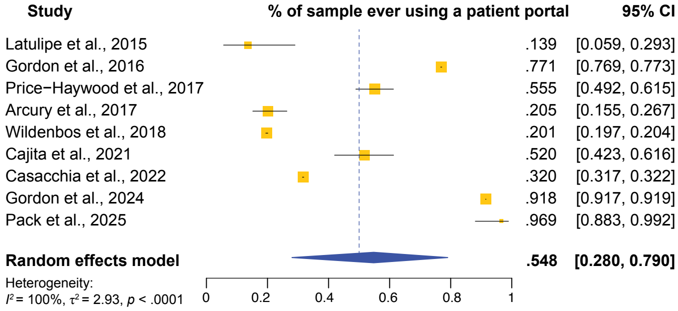

Fig. 2. Forest plot of study-level prevalence estimates for older adults who ever used a patient portal (at least once).

Across nine studies [13]–[21], the pooled prevalence of older adults who had *ever used* a patient portal was 0.55, 95% CI: 0.28–0.79 (Figure 2). Heterogeneity was very high, $\tau^2 = 2.93$, $I^2 = 100\%$, $Q(8) = 234{,}212.58$, $p < .0001$. Reflecting this extreme dispersion, the 95% prediction interval (PI) ranged from 0.02 to 0.99, indicating that while the average prevalence is 55%, the high heterogeneity makes it plausible for a study in a new context to find results across nearly the entire spectrum of engagement (Table II). Publication year was a significant moderator in mixed-effects meta-regression, $QM(1) = 7.27$, $p = 0.007$.

Across the other nine studies [22]–[30], the pooled prevalence of *continued* portal *use* was 0.48, 95% CI: 0.31–0.67 (Figure 3). Heterogeneity remained very high, $\tau^2 = 1.25$, $I^2 = 97.6\%$, $Q(8) = 550.55$, $p < .0001$. Reflecting this substantial dispersion, the 95% prediction interval (PI) ranged from 0.05 to 0.94. This indicates that while the average continued use rate is approximately 48%, engagement levels in any single future study or healthcare setting could plausibly fall anywhere across this vast range (Table II). Publication year was not a significant moderator, $QM(1) = 0.35$, $p = 0.55$.

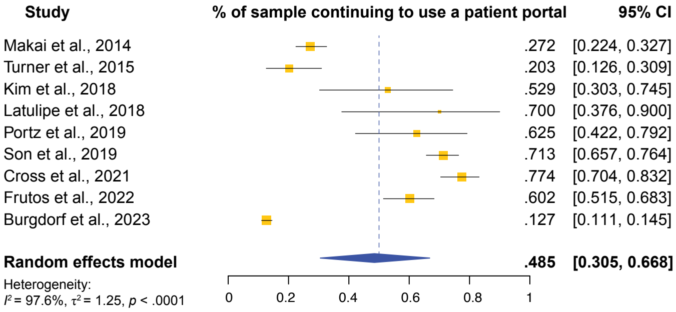

Fig. 3. Forest plot of study-level prevalence estimates for older adults who are continuing users of a patient portal.

To assess whether portal engagement has changed over time, we modeled publication year as a continuous moderator in mixed-effects meta-regression analyses. Publication year was a significant moderator for *ever use* (OR/year = 1.39, 95% CI 1.06–1.83, $p = 0.018$), such that more recently published studies reported higher odds that older adults had used a patient portal at least once (Figure 4). As a secondary check, we fit a sample-size–weighted logistic regression using aggregated counts; this analysis likewise suggested increasing ever use over time (OR/year = 1.11). In the same count-based model, *continued use* showed a decreasing trend (OR/year = 0.89). So the odds of older adults ever using a patient portal were about 11% higher for each more recent year, whereas the odds of continued use were about 11% lower for each more recent year. Because analyses based on aggregated counts may be disproportionately influenced by large studies, we treat these results as supportive context rather than primary evidence relative to the meta-regression findings.

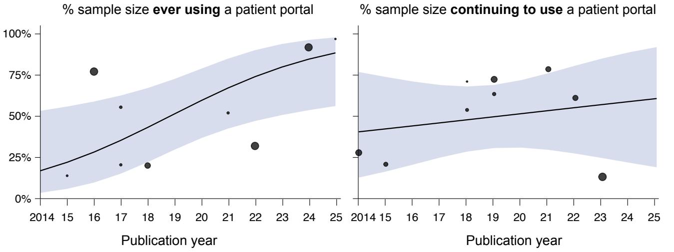

Fig. 4. Meta-regression of patient portal engagement by publication year.

Overall, study-level risk of bias, using the JBI Critical Appraisal Checklist for Prevalence Studies [31], was high (Table III). Of the 18 studies, 12 were rated High risk, five Moderate, and one Low. High risk ratings were more common among continued-use studies (7/9) than ever-use studies (5/9), largely due to non-representative samples, reliance on self-reports, and limited reporting of response rates. As a sensitivity check, excluding studies that used log data did not materially change the pooled ever-use estimate, suggesting that measurement mode alone does not explain the observed heterogeneity.

TABLE III
RISK-OF-BIAS RATINGS.

Risk of Bias	**All (*n*=18)**	**Ever use (*n*=9)**	**Continued use (*n*=9)**
Low	1	1 [16]	0
Moderate	5	3 [13]–[15]	2 [22], [24]
High	12	5 [17]–[21]	7 [23], [25]–[30]

IV. QUALITATIVE SYSTEMATIC REVIEW RESULTS

Next, we conducted a qualitative systematic review to synthesize how prior work explains older adults' patient portal engagement beyond prevalence estimates (Table IV). We first summarize general barriers and facilitators of patient portal use among older adults. We then examine three recurring themes in greater depth: usability challenges, caregiver involvement, and the role of technology support.

Several studies interpreted older adults' portal engagement through established technology adoption and health behavior frameworks. Across Technology Acceptance Model (TAM)–based work, perceived usefulness and ease of use were consistently linked to intention and use, while usability frictions—such as login difficulty and system complexity—were associated with lower engagement [28], [32]. Extensions combining TAM with UTAUT constructs emphasized facilitating conditions, social influence, and technology self-efficacy, highlighting the importance of support and digital confidence beyond intention alone [17], [21]. Other approaches similarly broadened the drivers of engagement: motivation-integrated models emphasized autonomy, competence, and relatedness [33], and the Health Belief Model foregrounded self-efficacy, cues to action, and perceived barriers [34]. UTAUT studies also underscored performance and effort expectancy, facilitating conditions, and caregiver involvement, particularly for frail older adults [23]. Moving beyond individual attitudes, Normalization Process Theory framed continued use as an evolving fit with daily routines and ongoing appraisal of value [35], while senior technology acceptance and domestication frameworks described portal use as a staged process shaped by aging-related barriers and the availability of tailored training and support [36], [37]. Finally, models emphasizing social context and resources highlighted caregiver presence, patient activation, and enabling factors (e.g., internet access) as key determinants of use [19], [38].

A. Barriers and Facilitators of Portal Use

Studies consistently linked portal engagement to socioeconomic and demographic factors, as well as to health circumstances that shaped both the need for and the opportunity to use the portal. Portal use was lower among "older-old" adults, including those over age 70 [14], [17], [39] and over age 75 [13], [16], [28], [40]. This pattern was often discussed alongside age-related declines in physical and cognitive abilities that can make portal interactions more difficult [36]–[38], [41]. Likewise, physical and cognitive impairments beyond chronological age were also reported as limiting meaningful portal use among older adults [14], [27], [42]–[44].

Differences in portal use were also reported across racial and ethnic groups. Several studies found significantly lower use among Hispanic/Latinx [14], [39], African American [14], [39], [45], Filipino [14], and other groups categorized as "Other" [18], [19], [39], [45]. The literature did not consistently disentangle whether these differences reflected socioeconomic status, language barriers, or cultural factors. However, socioeconomic conditions were examined directly, and lower financial stability or exposure to socioeconomic disadvantage was negatively associated with portal use [17], [18], [21], [22], [25], [26], [39]. Lower use was also linked to limited literacy across multiple domains, including digital literacy [34], [39], [46], [47] and numeracy [43], [48].

In contrast, studies reported higher portal uptake among older adults with higher educational attainment [14], [17], [49], those who were married [15], [19], and those with prior internet experience or regular internet use [13], [17], [18], [21]. Greater health literacy and eHealth literacy were also positively associated with portal use [16], [17], [19], [39].

Health-related circumstances further shaped engagement. Portal use was higher among older adults with multiple chronic conditions or multimorbidity [24], [39], and some studies reported increased use following acute health events requiring hospitalization, intensive care, or periods of quarantine or rest [23], [46]. Older adults who were more engaged with healthcare services—such as those with multiple recent visits or routine checkups—were also more likely to use portals [15], [25]. Finally, one study found that openness to patient-portal–delivered AI-driven health advice varied across groups: individuals identifying as Black or African American, those reporting better overall health, and those who expressed higher technology confidence were more receptive, whereas those with higher health literacy were more skeptical and preferred clinician-led guidance [47].

System-level factors shaped portal engagement through both limitations that created friction and features that supported use. Even after onboarding, shortcomings in portal content and functionality could undermine ongoing engagement. For example, some studies reported that laboratory values were flagged as abnormal despite being age- or condition-appropriate [29], and medication lists sometimes included discontinued medications or incorrect dosages due to inconsistencies with providers' databases [45]. In addition to these system limitations, provider-side use of portals also mattered: limited provider uptake and follow-through were associated with lower portal use among older adults [24], [50], and delayed or minimal responses to patient messages discouraged continued engagement [29], [30].

At the same time, studies highlighted portal features that older adults found valuable and that supported engagement. Older adults were more likely to use portals when they could readily review medical record information [16], [46], [51], communicate directly with care teams [27], [29], manage appointments with minimal effort [27], and support medication management [29]. Features that increased users' sense of autonomy and control over their medical information and decisions were also described as advantageous [52].

Attitudes, perceived risks, and capabilities shaped portal engagement alongside the availability of support. Concerns about privacy and data security were a salient barrier, with older adults expressing worry about sharing personal health information through patient portals [16], [27]. Anxiety about portals also emerged repeatedly, with apprehension occurring both before use and during interactions with the system [18], [34], [41], [42]. Other barriers reflected limited perceived value: some older adults reported low interest in portals [16], [21], [27], did not view portals as beneficial to their health or daily lives, or preferred traditional, face-to-face healthcare interactions over digital tools [17], [33], [36].

In contrast, attitudes that supported engagement were consistently tied to perceived usability and value. Perceived ease of use [33], [38], [46], perceived usefulness [16], [33], [34], [36], [53], confidence in using the portal [19], [34], [45], and perceived empowerment [16], [27], [38], [54] were all associated with greater portal use. Studies also emphasized that these beliefs and capabilities were shaped by access to support: multimodal training and ongoing, up-to-date digital assistance facilitated both onboarding and continued use [14], [42], [45]. Social support further increased engagement; encouragement from family members and broader social networks supported willingness to use portals [19], [42], and caregiver involvement in the portal-use process was reported as an additional facilitator of older adults' engagement [22].

B. Usability Challenges

Several studies reported usability challenges that increased interaction burden and made portals difficult for older adults to adopt and use. Authentication was a frequent barrier: older adults described cumbersome login flows, difficulty remembering passwords, and challenges with multi-step authentication, such as two-factor methods [16], [17], [21], [23], [24], [27], [28], [30], [36], [42], [49], [51], [55], [56]. After logging in, participants often struggled with unfamiliar navigation patterns and weak "information scent," making it hard to discover where features or information were located and requiring repeated clicking through multiple pages and irrelevant content to locate meaningful results [14], [16], [24], [27], [33], [36], [37], [42]–[45], [51], [64], [65]. Visual design issues further compounded these problems, including small font sizes,

TABLE IV

Summary of 52 included studies on older adults' patient portal use. CG: Family caregiver

Study	**Year**	**Key construct**	**Sample (n; age)**	**Method**	**Framework/Theory**
Torkman et al. [34]	2025	Intention to use	121; $\geq$60	Survey	Health Belief Model
Pack et al. [20]	2025	Ever use	64; $\geq$66	Mixed methods	Medication self-management model
Jeong et al. [36]	2025	Use frequency	31; $\geq$60	Interviews	STAM
Gleason et al. [55]	2025	Use frequency	1664; $\geq$65	Mixed methods	Human-centered design
Dukhanin et al. [56]	2025	Proxy / Caregiver use	1626; $\geq$65	Survey	CFIR
Yoon et al. [39]	2024	Ownership / Access status	528; $\geq$60	Mixed methods	—
Vordenberg et al. [47]	2024	Intention to use	1245; $\geq$65	Survey	modified 5-item TAM
Trinh et al. [33]	2024	Use frequency	26; $\geq$60	Mixed methods	TAMIMI (SDT & UTAUT)
Oh et al. [49]	2024	Use frequency (low vs non-use)	304 CG	Survey	—
Gordon et al. [13]	2024	Ever use	471152; $\geq$65	Mixed methods	—
Gleason et al. [57]	2024	Use frequency (specifically messaging)	1973; $\geq$65	Mixed methods	4Ms Age-Friendly Health System framework
Gordon et al. [40]	2024	Intention to use	4105; $\geq$65	Mixed methods	—
Zoorob et al. [42]	2023	Use frequency (portal and telehealth use)	215; $\geq$64	Mixed methods	—
Metting et al. [37]	2023	Intention to use	11; $\geq$55	Mixed methods	STAM
Judson et al. [58]	2023	Ever use	20; $\geq$65	Interviews	—
Gabbard et al. [59]	2023	Intention to use	20; $\geq$65	Interviews	Tourangeau model
Burgdorf et al. [22]	2023	Use frequency	1417; $\geq$65	Survey	—
Son et al. [46]	2022	Use frequency (past 12 months)	446; $\geq$50	Survey	—
Luo et al. [60]	2022	Use frequency ($\geq$1 use)	207; $\geq$65	Survey	Andersen Behavioral Model
Frutos et al. [26]	2022	Use frequency	128; $\geq$69	Survey	—
Casacchia et al. [15]	2022	Ever use	178720; $\geq$65	Logs	—
Steele-Gray et al. [35]	2021	Use frequency ($\geq$monthly)	45; $\geq$60	Mixed methods	Normalization Process Theory
Cajita et al. [19]	2021	Ever use	100; $\geq$65	Survey	IOM, CREATE core battery
Luo et al. [38]	2021	Use frequency ($\geq$1 use)	610; $\geq$55	Survey	Human–technology interaction
Cross et al. [25]	2021	Use frequency	164; $\geq$65	Survey	TAM & UTAUT & ECT
Peterson et al. [50]	2020	Use frequency	34 CG; mean 65.4	Mixed methods	—
Nahm et al. [51]	2020	Ownership / Access status	272; $\geq$50	Mixed methods	—
Nahm et al. [45]	2020	Perceptions / Use patterns	56; $\geq$50	Content analysis	—
Son et al. [24]	2019	Use frequency	272; $\geq$50	Survey	—
Portz et al. [28]	2019	Use frequency	24; $\geq$65	Mixed methods	Technology Acceptance Model
Wildenbos et al. [16]	2018	Ever use	53215; $\geq$56	Mixed methods	—
Latulipe et al. [30]	2018	Use frequency	10; $\geq$55	Interviews	—
Kim et al. [29]	2018	Use frequency	17; $\geq$65	Mixed methods	—
Price-Haywood et al. [17]	2017	Ever use	247; $\geq$50	Survey	TAM & UTAUT
Arcury et al. [18]	2017	Ever use	200; $\geq$55	Survey	TAM & P-E Interaction model
Schaller et al. [61]	2016	Use frequency (weekly)	25 CG; 29–80	Mixed methods	—
Gordon et al. [14]	2016	Ever use	231082; $\geq$65	Mixed methods	—
Turner et al. [27]	2015	Use frequency	74; $\geq$60	Mixed methods	Ecological framework
Schaller et al. [62]	2015	Perceptions (demo only)	31 CG; 25–83	Interviews	—
Latulipe et al. [21]	2015	Ever use	36; $\geq$55	Interviews	—
Czaja et al. [43]	2015	Use patterns (prototype)	17; $\geq$50	Experimental	—
Crotty et al. [63]	2015	Information sharing	30; $\geq$75	Focus groups	CPM theory
Taha et al. [48]	2014	Ability to use a portal	51; $\geq$60	Usability testing	—
Makai et al. [23]	2014	Use frequency	290; $\geq$74	Mixed methods	—
Kerai et al. [54]	2014	Intention to use	80; $\geq$60	Survey	—
Price et al. [32]	2013	Intention to use	36; $\geq$61	Mixed methods	TAM
Barron et al. [64]	2013	Use patterns (prototype)	7; $\geq$66	Mixed methods	—
Hourcade et al. [44]	2011	Use patterns (prototype)	16; $\geq$65	Usability testing	—
Siek et al. [65]	2011	Use patterns (prototype)	22; $\geq$61	Participatory	Participatory design
Haverhals et al. [52]	2011	Use frequency	32; $\geq$73	Mixed methods	User-centered design
Sack et al. [53]	2011	Intention to use	26; $\geq$63	Focus groups	Cost–benefit analysis
Kim et al. [41]	2009	Use frequency	44; $\geq$60	Mixed methods	Digital divide model

inadequate color contrast, small icons and click/tap targets, cluttered pages, and vague or inconsistent labeling across screens [17], [28], [33], [36], [37], [42]–[44], [51], [61], [64], [65]. Navigation difficulties were especially salient for time-sensitive tasks: older adults reported that finding and scheduling appointments—and even locating upcoming appointment information—often required too many steps or was harder than expected compared to phone-based alternatives [28], [29], [36], [43], [50], [59], [62]. Interaction was also impeded by slow system response times and high input demands that required extensive data entry [14], [42], [44], [58], [64], [65]. Finally, older adults often encountered unfamiliar medical or technical terms in portals, and some studies reported that portals displayed content that was not well tailored to older users—making information feel irrelevant or harder to interpret [16], [18], [21], [30], [37], [43], [44], [48], [59], [64].

C. *Caregiver Involvement and Proxy Access*

Older adults frequently relied on family caregivers or other proxies to interact with patient portals. Across studies, multiple formal and informal proxy arrangements were described, including password sharing [30], [55], [57], use of official proxy or shared-access accounts [22], [55], [57], logging in together when co-located [56], and access granted through power-of-attorney arrangements [30], [36], [56]. Caregivers were often positioned as digital intermediaries—interpreting information, completing tasks, or messaging clinicians on behalf of older adults [14], [42], [57]. When caregiver-supported use functioned well, portals were described as saving time and reducing burden by facilitating coordination and support [62]; however, caregivers also reported emotional and physical burden associated with managing portal-related work [50], [61]. Added burden and access barriers sometimes prompted workarounds, most commonly password sharing [30].

At the same time, studies highlighted barriers and tensions that complicate shared use. Many older adults lacked awareness of available proxy features [30], [55], [63]. Proxy access was reported to be more common among older adults who had, or were at risk for, ADRD [22]. Across studies, proxy access raised persistent concerns about privacy, control, and autonomy: older adults often wanted to retain decision-making authority over what information was shared and with whom [56], [63], and comfort varied by relationship type [30], [63]. Specific concerns included loss of confidentiality [30], [63], disclosure of sensitive or stigmatized conditions [30], and unintended consequences of sharing (e.g., burdening caregivers with stressful information or losing control over decisions) [63]. Consistent with these preferences, older adults frequently preferred to restrict caregiver access to particular categories of information (e.g., financial details, past history, or sensitive lifestyle information) [22], [63].

To address these tensions, multiple studies called for proxy access models that better reflect changing needs and caregiving contexts. Older adults expressed strong preferences for granular and dynamic access controls [30], [55], [63], including emergency or "break-glass" mechanisms that could temporarily broaden access when needed [30], [56], [63]. Recommendations also emphasized designing portals with caregivers in mind [27], providing training and ongoing technology support [21], and reducing reliance on workarounds by improving proxy access processes (e.g., making proxy access easier to enable) [56]. Overall, the literature suggests that no single proxy access model is likely to fit all older adults, given variation in preferences, relationships, and caregiving arrangements [30], [55], [63].

D. *Technology Support*

Technology support played distinct roles at each stage of patient portal adoption. Multiple studies identified a lack of initial training and hands-on digital assistance as a key barrier to portal uptake among non-users [21], [45]. Consistent with this, passive organizational supports during onboarding (e.g., brochures or implementation toolkits) showed limited effectiveness; one multisite study found no increase in new shared-access registrations after their deployment [55]. However, although these support interventions did not increase onboarding rates, they were associated with higher use intensity (e.g., more logins and information viewing) among users who were already registered [55].

Sustained portal use was consistently linked to active, ongoing support. One study found that 77% of portal activities occurred when in-person assistance was available, and nearly half of users disengaged after a single day without it [41]. Another study similarly found that help desks and reminders were associated with lower disengagement after initial use [61]. Overall, these findings suggest that while support may not be sufficient to initiate adoption, ongoing assistance is closely associated with sustained engagement once access is established [19], [26].

E. *Practice and Policy Considerations*

Across the reviewed literature, authors emphasized that improving patient portal engagement among older adults requires coordinated changes that span policy, clinical practice, and design. Policy-oriented discussions called for frameworks that support meaningful portal use and appropriate health information sharing while accounting for heterogeneity in older adults' capabilities and caregiving contexts [14], [17], [51], [55]. Several studies also highlighted the importance of healthcare organizations and clinicians actively promoting portal use—for example, by encouraging enrollment, explaining benefits, and integrating portal use into routine care [14], [16], [42]. Design recommendations focused on better aligning portal information organization and task structure with older adults' expectations [14], [16], including simplifying navigation (e.g., shallower menu structures and hyperlinks) [14], using fonts and visual formats optimized for older adults [14], and improving sharing and caregiver access controls to better match older adults' preferences and care arrangements [30]. Finally, multiple studies emphasized that these changes are unlikely to be sufficient without accessible training and ongoing, up-to-date technology support delivered through multiple media formats and available beyond one-time onboarding sessions [14], [17], [39], [42].

TABLE V
MAPPING QUANTITATIVE AND QUALITATIVE FINDINGS

Quantitative Pattern	**Qualitative Themes**
Increase in ever use	Post-COVID onboarding support, device and Internet access, ease of reviewing lab results and managing appointments, caregiver involvement
No increase in continued use	Lack of ongoing support, usability issues, caregiver burden, authentication issues, age-related physical and cognitive changes, limited provider engagement with portals
High between-study heterogeneity ($I^2 \geq 97.6\%$)	High variability between samples (education, digital literacy, age, socioeconomic condition), instruments. Logs vs. Self-report, and timeline (pre- vs. post-COVID)

V. DISCUSSION

This review updates findings from nearly a decade ago [7], [66] by distinguishing between how older adults start and sustain patient portal use. A major challenge identified is the lack of standardized outcome measures (Table IV). Currently, researchers define "use" in widely different ways—ranging from one-time login to multiple uses—which makes it difficult to compare results across studies. Furthermore, studies do not account for the substantial variability among older adults. These factors, combined with the use of disparate measurement instruments and study settings largely account for the extreme heterogeneity ($I^2 \geq 97.6\%$) observed in our meta-analysis (Table II). To improve the evidence base, researchers should move away from treating a one-time login as successful engagement. Instead, future work should adopt stage-specific metrics that track task success, user confidence, and caregiver involvement. These standardized definitions are a necessary step for health systems to accurately identify where older adults struggle and to design more effective support. Measures should capture not only access, but also whether older adults can complete meaningful tasks and recover from breakdowns.

While the 39% annual increase in ever-use suggests that onboarding efforts like helplines and provider encouragement are working, the lack of growth in continued use highlights a major retention gap (Figure 4). This gap may be even wider than our results suggest, as all nine continued-use studies relied on self-reports, which can overestimate actual engagement compared to system logs. To move beyond initial trial, health systems should reallocate resources to balance initial onboarding with sustained technology support. Portal designers must prioritize reducing recurring friction, such as authentication hurdles, and ensuring features like secure messaging provide immediate, visible value to the user. For researchers, the next step is conducting longitudinal studies using complementary measures to identify the exact points where older adults stop using portals. This shift from measuring simple access to tracking sustained engagement is necessary to ensure portals become a routine part of geriatric care.

The persistent gaps in portal use among the oldest users and marginalized groups show that simply providing access is not enough to ensure digital health adoption [18], [19], [39], [45]. To address this, health systems should invest in digital navigators who provide personalized, one-on-one support for those with lower digital literacy. Designers must also move away from generic layouts and simplify login steps—for example, by using biometrics to reduce authentication friction. Portal interfaces should be redesigned to use labels and categories that match how older adults think, making it easier to find clinical information. Since caregivers are often older adults themselves, proxy features must be made more discoverable and easier to manage. Instead of "all or nothing" account access, designers should offer graded permissions that allow caregivers to help with specific tasks, like scheduling or refills, without seeing the entire record. Future research should include intervention studies to test whether these specific design changes and support models actually help close the digital divide for high-risk populations.

While evidence on whether onboarding assistance increases first-time portal use is mixed [21], [45], [55], technology support emerged as a prominent facilitator of both initial access and continued use. Many navigation problems likely reflect that portals are feature-rich systems optimized for breadth rather than older adults' age-related needs [67], [68], and these usability costs often intensify when interfaces change [69]. To prevent the disruption of established mental models, designers should prioritize interface stability and implement automated, "just-in-time" assistance—such as layered accessibility tools—that provide support during active task performance [70]. Furthermore, because system updates can erase user familiarity, health systems must establish a continuous support infrastructure. This should include providing reliable human assistance within community-based settings that older adults already frequent, such as public libraries and senior centers [11]. For researchers, longitudinal work is needed to evaluate how specific interface modifications impact retention rates over time.

VI. CONCLUSION

As healthcare digitizes, it can add new barriers to care for older adults. Patient portals are a central tool for supporting autonomy, but only if older adults can adopt them and keep using them. In this systematic review, we show that initial trial (ever use) and sustained engagement (continued use) are distinct milestones shaped by different barriers and facilitators. Although more older adults are trying portals over time, continued use has not kept pace, indicating a persistent drop-off after first access. Strengthening equitable portal engagement will require stage-specific, standardized measures and investments in usable designs and durable support that enable older adults to complete meaningful care tasks over time.

ACKNOWLEDGMENTS

Research reported in this publication was supported in part by the National Institute on Aging of the National Institutes of Health under Award No. P30AG083255.

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