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BETWEEN CONNECTION AND ISOLATION EXCESSIVE TECHNOLOGY USE AND OLDER ADULTS' WELL-BEING POST-COVID-19

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ABSTRACT: *This narrative review synthesizes evidence from 2015 to 2024 on how excessive technology use affects older adults' physical health, mental well-being, and social adaptation in the post-pandemic context. The accelerated digitalization triggered by COVID-19 changed how older adults access information, maintain social connections, and use health services. While technology helped reduce isolation and enabled telemedicine, its excessive use has been linked to physical inactivity, sleep disturbances, techno-anxiety, and a shift toward online-only interaction.*
A comprehensive search in PubMed, Scopus, Web of Science, and Google Scholar yielded 742 records; after applying eligibility criteria, 64 empirical studies and 8 review articles were included.
Findings reveal a dual dynamic: moderate, purposeful use supports cognitive stimulation, access to care, and perceived social connection. In contrast, excessive use contributes to sedentarism, anxiety, fragmented sleep, information overload, and decreased offline community participation.
Digital inequality, in terms of access, affordability, and skills, remains a key structural barrier. The article proposes a practical framework of Digital Hygiene for Older Adults and outlines policy and service recommendations, including equitable digital infrastructure, age-friendly digital literacy programs, and integrated medico-social approaches to balance online and offline engagement.

Keywords: *older adults; excessive technology use; digital health; social adaptation; techno-anxiety; telemedicine; post-COVID-19.*

Introduction

Population aging and rapid digital transformation are twin hallmarks of contemporary societies. During the COVID-19 pandemic, digital tools became essential for information access, social contact, and care continuity. Studies highlight benefits ranging from reduced loneliness to sustained management of chronic conditions via telehealth (Xie et al., 2020; WHO, 2022). Yet, the same period revealed risks: prolonged screen time, reduced physical activity, sleep disruption, technostress, and patterns of online dependence persisting after restrictions were lifted (Czaja & Lee, 2021; Seifert et al., 2021; Zhang & Zhang, 2023).

This article focuses not on technology per se, but on the threshold at which use becomes excessive and begins to undermine physical, cognitive, and social well-being in later life. We adopt a whole-person and ecosystemic perspective, situating outcomes at the interface between the individual and the social environment. We also recognize structural inequalities, such as infrastructure gaps, affordability issues, and limited digital skills, which mediate both the benefits and risks of digital engagement among older adults (Chen & Schulz, 2019; Yu et al., 2021).

Aim. To synthesize 2015-2024 evidence regarding the health and social adaptation impacts of excessive technology use among older adults, and to propose practice/policy directions to enhance benefits while mitigating risks in the post-pandemic period.

Methods (Narrative Review)

Design

This article is based on a narrative literature review, supplemented by a comparative synthesis of empirical findings from studies published between 2015 and 2024. Although not conducted as a systematic review, the methodology incorporated key principles from the PRISMA framework to ensure transparency and reproducibility of the search and selection process. The narrative approach was selected due

to the multidimensional nature of the topic medical, psychological, and social and the need to contextualize findings within the specific post-COVID-19 environment.

Sources and Search Strategy

Literature searches were conducted across four major academic databases: PubMed, Scopus, Web of Science, and Google Scholar. Search terms included combinations of: "older adults," "elderly," "seniors," "technology use," "digital technology," "ICT," "COVID-19," "pandemic," "lockdown," "health impact," "social adaptation," and "mental health." Boolean operators (AND, OR) were used to refine queries.

Eligibility Criteria

Inclusion

- Published between January 2015 and March 2024.
- Focused on older adults and their use of digital technologies during or after the COVID-19 pandemic.
- Empirical (quantitative/qualitative) or systematic/narrative reviews that addressed physical, cognitive, or psychosocial health outcomes.

Exclusion

- Focused exclusively on younger populations.
- Were opinion pieces or lacked empirical evidence.
- Analyzed technology solely from a technical perspective.

Selection and Synthesis

Of 742 initial records, duplicates and non-eligible items were removed; 64 studies on older adults' technology use plus 8 reviews were included. We performed thematic synthesis organized into three domains: (a) physical health; (b) cognitive/mental health; (c) social adaptation and participation. Where reported, we note magnitudes (e.g., percentages) and study designs.

Note on scope. We integrate parallel biomedical insights (e.g., cardiovascular risk amplification through sedentarism) to contextualize digital-behavioral risks for older adults, maintaining interpretive caution when extrapolating (Kacso et al., 2015; Ghigolea et al., 2017).

Methodological limitations

Most studies were cross-sectional, with self-reported data, and there is a lack of long-term longitudinal research, which limits the establishment of causal relationships (Zhang & Zhang, 2023). Reliance on self-reports raises the risk of subjective errors and memory bias. The lack of long-term longitudinal studies makes it difficult to understand the impact of technology after the COVID-19 period. Uneven geographical distribution of research: most studies came from the US, Western Europe, and East Asia, while data from Eastern Europe or Africa is insufficient.

Results

Physical Health: Sedentarism, Sleep, and Somatic Complaints

Across multicountry surveys, daily online time increased by ~2-3 hours during lockdown among older adults, correlating with reduced physical activity and increased musculoskeletal discomfort (Seifert et al., 2021). Between 48% and 67% reported decreased daily movement; 35-40% reported insomnia or fragmented sleep, often linked to evening screen exposure and blue light (Zhang & Zhang, 2023). While telemedicine uptake ranged from ~50% to 74% for chronic disease management (WHO, 2022), older adults commonly emphasized that remote visits did not fully substitute in-person examinations.

Interpretation. Excessive screen time contributes to sedentary routines that may exacerbate cardiometabolic risk, echoing clinical evidence that vascular fragility predicts poor outcomes in chronically ill populations (Kacso et al., 2015; Ghigolea et al., 2017). For older adults, digital-sedentary coupling is thus a plausible pathway from convenience to deconditioning.

Cognitive and Mental Health: Stimulation vs. Techno-Anxiety

Moderate, purpose-driven technology use, such as cognitive games and learning apps has been associated with better MMSE/MoCA performance and subjective cognitive engagement (Kuerbis et al., 2020; Vaportzis et al., 2019). Conversely, 17 studies reported techno-anxiety in ~28-46% of older users, tied to fear of errors, scams, and technical difficulties (Yu et al., 2021). Qualitative research described "digital oversaturation": >5 hours/day online linked to anxiety, restlessness, and reduced motivation for offline interactions (Zubala & MacIntyre, 2021).

Interpretation. Cognitive stimulation is dose- and content-dependent. When use becomes

excessive, information overload and continuous partial attention may worsen anxiety and sleep, undermining perceived control.

Social Adaptation: Connection, Substitution, and Digital Inequality

During COVID-19, ~70% of older adults perceived technology as essential for maintaining family contact (Xie et al., 2020; Seifert et al., 2021). Post-pandemic, however, 22-30% continued to prefer virtual over face-to-face contact, with some reporting shrinking offline support networks and reduced participation in community activities (Seifert et al., 2021). Persistent digital inequalities, access, affordability, and skills left about a quarter of older adults excluded, with higher loneliness and depressive symptoms (Chen & Schulz, 2019; WHO, 2022).

Interpretation. Technology both bridges and widens sociality. The substitution effect (online replacing in-person ties) becomes problematic when virtual contact does not translate back into offline participation, particularly among those with mobility or anxiety constraints.

Discussion

A Dual Dynamic

Evidence supports a dual dynamic: moderate, meaningful technology use can protect against isolation, enhance cognitive engagement, and maintain continuity of care; excessive use is associated with sedentarism, sleep problems, techno-anxiety, and attenuated offline participation. This aligns with dose-response patterns seen in other behavioral exposures (screen time, sedentary behavior), where intensity and timing (e.g., evening use) are pivotal.

Post-pandemic Trends and Digital Habits

While some older adults gradually returned to offline routines, a significant proportion retained online-heavy behavior even after COVID-19 restrictions were lifted. For many, this shift reflects practical adaptation telehealth and online errands remain convenient. However, when daily discretionary screen time exceeds 4-5 hours, studies suggest a higher risk of physical inactivity, sleep problems, and reduced offline engagement (Zubala & MacIntyre, 2021; Zhang & Zhang, 2023). These patterns may signal avoidance behavior or loss of community integration rather than genuine digital empowerment. Service providers should thus move beyond the emergency-use logic of the pandemic and adopt hybrid models that encourage safe re-engagement with in-person activities.

Equity Lens: The Second Digital Divide

The first divide (access) and second divide (skills and meaningful use) intersect with age, income, education, and rurality (Yu et al., 2021). Without targeted literacy and infrastructure, digitalization may magnify rather than reduce disparities, leaving the most vulnerable older adults further isolated (Chen & Schulz, 2019; WHO, 2022).

A Practical Frame: "Digital Hygiene for Older Adults"

We propose a pragmatic framework to translate evidence into daily routines:

- Time boundaries: aim for ≤2-3 h/day of discretionary screen time; avoid blue-light exposure ≥2 hours before bedtime.
- Movement coupling: pair online sessions with light activity breaks every 30-45 minutes (standing, stretching).
- Purposeful use: prioritize goal-oriented activities (telehealth, learning, family contact) over passive scrolling.
- Safety & confidence: regular fraud-awareness refreshers; simple checklists for verifying links/messages.
- Social translation: set a rule that online contact triggers an offline action (walk, club meeting, call + visit).
- Care integration: involve primary care and social workers in personalized plans (sleep hygiene, physical activity, community connectors).

This blends health promotion, behavioral nudges, and social prescribing within a person environment perspective.

Implications for Practice and Policy

- Service design. Develop hybrid care models combining telemedicine and in-person consultations. These should include routine screening for techno-anxiety, digital fatigue, and sleep disturbances, particularly in chronically ill or socially isolated older adults.
- Community-based digital literacy. Invest in age-adapted training programs focused on practical use (e.g., health portals, video calls),

digital safety (fraud prevention), and confidence building. Programs should be delivered via senior centers, libraries, and local NGOs.

- Equity & infrastructure. Provide subsidized internet access and user-friendly devices to older adults with low income or limited education. Rural connectivity remains a major barrier in Eastern Europe and must be addressed through public private partnerships.
- Monitoring and evaluation. Include digital behavior metrics (screen time, tech-related stress, social media dependence) as part of health and social care assessments for older adults.
- Medical-social partnerships (Romania/Eastern Europe). Priority should be given to collaborations between family doctors and community nurses (as frontline actors), social workers within the DGASPC (General Directorates for Social Assistance and Child Protection), Public libraries and rural cultural centers (as digital access points, local NGOs and church groups, which often act as informal support structures in small communities.

These partnerships should co-create personalized digital hygiene plans, coordinate outreach, and support older adults in maintaining both online functionality and offline community engagement.

Limitations and Future Research

This review, being narrative rather than systematic, is subject to potential selection bias. Most included studies were cross-sectional and relied on self-reported data, which may introduce recall and social desirability biases. Additionally, most research was conducted in North America, Western Europe, or East Asia, with limited representation from Eastern Europe and low-resource settings.

Future studies should prioritize:

Longitudinal and mixed methods design that can capture long-term behavioral and health outcomes related to technology use.

Objective measurement tools for tracking screen time, physical activity, and sleep (e.g., wearables, mobile app logs).

Culturally adapted intervention trials evaluating the Digital Hygiene framework among older adults in diverse geographic and socio-economic contexts.

Pilot programs implemented through local health and social services (e.g., family doctors, community nurses, social workers), aimed at balancing online engagement with real-world participation.

Collaborative research that includes partnerships with social service agencies and local NGOs to co-design, test, and evaluate community-based digital wellness interventions for older populations.

Such initiatives would enhance the evidence base and ensure that digital aging strategies are both inclusive and context sensitive.

Conclusions

For older adults, technology is both lifeline and liability. The post-pandemic challenge is not to abandon digital tools, but to moderate and re-purpose them supporting autonomy, health, and real-world participation. A Digital Hygiene approach, embedded in equitable services and community infrastructures, can preserve the connection gains of digitalization while preventing the isolation risks of excess.

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