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Digital loneliness and men's mental well-being: broadening the scope of men's health (Systematic review)

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Digital loneliness among men emerges in the context of rapid digital transformation and cannot be reduced to either social isolation or digital deprivation. The article demonstrates that digital loneliness is an independent psychosocio-technological phenomenon affecting men's mental and somatic health and arises through the interaction of sociocultural and technological factors of digital environment.
The article proposes a systematization of interdisciplinary approaches to digital loneliness as a determinant of men's health, its distinction from related constructs, and a working definition and research framework for diagnostic, preventive, and intervention strategies.
A systematic selection and thematic synthesis of 66 sources was conducted (Scopus, Web of Science, PubMed, etc., 2015–2025). Comparative analysis addressed related constructs, including digital deprivation, digital/media isolation, cyber-loneliness, and digital solitude.
Digital loneliness among men is identified as a multidimensional socio-psychological state marked by reduced quality of social ties and diminished emotional attunement in digitally mediated communication. A distinction is clarified between digital solitude (voluntary restorative solitude) and digital loneliness (undesired emotional impoverishment despite high online engagement). The study proposes a theoretical matrix and an "intervention pyramid" ranging from structural policy and platform design to hybrid offline–online practices. The phenomenon varies across cultural, age, and professional contexts. The main mechanisms are compensatory use of social media, digital burnout, and substitution of deep support with superficial ties.
This article establishes a conceptual framework for examining digital loneliness among men as a distinct research domain, systematizes the relevant terminology, and outlines an architecture of potential interventions.
Keywords: *digital loneliness, men's mental health, social isolation, digital alienation, digital deprivation, cyber loneliness, digital literacy, online environment, media isolation, digital burnout, social networks, neurobiology of loneliness, AI companions, digital well-being.*

Цифрова самотність і психічне благополуччя чоловіків: розширення меж чоловічого здоров'я (Систематичний огляд)

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Феномен цифрової самотності чоловіків формується в умовах інтенсивної цифрової трансформації суспільства і не є тотожним ні соціальній ізоляції, ні цифровій депривації. У статті показано, що цифрова самотність є самостійним психосоціотехнологічним явищем, яке впливає на психічне й соматичне здоров'я чоловіків і формується внаслідок взаємодії соціокультурних чинників та технологічних параметрів цифрового середовища.
У статті запропоновано систематизацію міждисциплінарних підходів до розуміння цифрової самотності як детермінанти чоловічого здоров'я, відмежування її від суміжних понять, а також робоче визначення й дослідницьку рамку для розроблення діагностичних, профілактичних та інтервенційних стратегій.
Проведено систематичний відбір і тематичний синтез 66 літературних джерел (SCOPUS, Web of Science, PubMed та ін., 2015–2025 рр.). Використано порівняльний аналіз споріднених категорій: цифрова депривація, цифрова/медійна ізоляція, кіберсамотність, цифрова солітюдність.
Продемонстровано, що цифрова самотність чоловіків є самостійним багатовимірним соціально-психологічним станом, який характеризується зниженням якості соціальних зв'язків і емоційної налаштованості в умовах цифрової комунікації. Уточнено відмінність між digital solitude (добровільна відновлювальна усамітненість) та digital loneliness (небажане емоційне збіднення при підвищеній онлайн-активності). Запропоновано теоретичну матрицю та «піраміду інтервенцій»: від структурної політики й дизайн-рішень до гібридних офлайн/онлайн-практик. Показано, що феномен варіює залежно від культурних, вікових і професійних чинників. Основними механізмами є компенсаторне використання соціальних мереж, цифрове вигорання та заміщення глибоких соціальних зв'язків поверхневими.
У статті обґрунтовано концептуальну рамку вивчення цифрової самотності чоловіків як самостійного об'єкта наукового аналізу, систематизовано понятійний апарат та окреслено архітектуру можливих інтервенцій.
Ключові слова: *цифрова самотність, психічне здоров'я чоловіків, соціальна ізоляція, цифрове відчуження, цифрова депривація, кіберсамотність, цифрова грамотність, онлайн-середовище, медійна ізоляція, цифрове вигорання, соціальні мережі, нейробіологія самотності, AI-компаньйони, цифрове благополуччя.*

In the modern digital world, where technology permeates all aspects of life, the phenomenon of digital loneliness is becoming increasingly relevant, particularly among men. Despite the vast opportunities for online interaction, many men experience emotional isolation and a lack of deep social connections. Social media often creates an illusion of communication; however, superficial interactions fail to meet profound emotional needs. Constant self-comparison with idealized images of other users can lead to decreased self-esteem and heightened feelings of loneliness. Moreover, excessive use of digital platforms may replace real social contacts, further deepening isolation. Online toxicity, including cyberbullying and negative comments, can negatively impact men's mental health, reducing their self-confidence and willingness to interact with others. This underscores the importance of developing digital literacy and emotional regulation skills to maintain psychological well-being in the online environment.

At the same time, the digital space provides opportunities for self-development and emotional resilience. Participation in thematic online communities can facilitate finding like-minded individuals and forming supportive connections. However, it is crucial to use digital technologies consciously, balancing virtual and real-world interactions to prevent feelings of isolation. Therefore, understanding and recognizing the impact of the digital environment on health and emotional well-being is essential for overcoming digital loneliness among men. This requires the development of critical thinking skills, emotional literacy, and active pursuit of authentic social interactions both online and offline.

The objective of this review is to establish the issue of men's digital loneliness as a scientific and practical problem through a systematic interdisciplinary literature review on the impact of digital loneliness on men's mental and physical health.

Methodology. Databases: Scopus, Web of Science, PubMed, IEEE Xplore, PsycINFO, Google Scholar. Types of sources and time frame: meta-analyses, empirical studies, review articles in Ukrainian and English (2015–2025). Inclusion criteria: peer-reviewed empirical and conceptual studies addressing digital loneliness, digital well-being, or technology-mediated social isolation, with a focus on men or containing data applicable to male populations. The review also included interdisciplinary research exploring the impact of digital technologies on mental, social, or physical health outcomes relevant to men's well-being. Exclusion criteria: publications unrelated to digital communication or social connectivity (e.g., studies on general internet use without psychosocial context), as well as duplicate reports and non-academic sources (news articles, blogs). Analytical methods: thematic content analysis and comparative synthesis across biological sex, age, and cross-cultural dimensions to identify patterns and conceptual frameworks shaping digital loneliness and men's health.

The historical origins of the term "digital loneliness"

The emergence of the internet and social media has given rise to a new body of research on loneliness in the digital era. As early as the late 1990s and 2000s, scholars began to observe what became known as the "Internet paradox": despite increased online communication, users often reported fewer offline contacts and a heightened sense of loneliness [1]. A classical expression of this paradox was coined by Sherry Turkle as "alone together" – describing individuals who are constantly connected but emotionally distanced, which undermines the depth of real-life attachments [2].

Nevertheless, other studies have emphasized the positive aspects of digital technologies, highlighting their capacity to expand social capital – for example, through online communities, social media friendship networks, and virtual support groups. Early academic discourse thus revealed 2 competing perspectives: one attributing the loneliness epidemic to the digital environment, the other underscoring its potential to foster novel forms of connection [1].

The term *digital loneliness* emerged in this scholarly context, capturing a new form of isolation specific to an era of ubiquitous digital communication. Today, digital loneliness is recognized as a growing social concern, particularly as online interactions increasingly substitute – but do not fully satisfy – the human need for emotionally meaningful connection [2].

Theoretical and methodological frameworks

The concept of digital loneliness is addressed across multiple academic disciplines. In psychology, loneliness is primarily conceptualized as a subjective perception of insufficiently satisfying relationships, in contrast to objective social isolation [1]. Foundational psychological models include the cognitive discrepancy model (Peplau & Perlman) and Cacioppo's evolutionary theory of loneliness, both of which emphasize the adverse effects of unmet social needs despite the presence of nominal contacts [3–5].

Sociological approaches emerged later, viewing loneliness as a consequence of changing social structures and norms [1]. Contemporary sociology increasingly regards loneliness not merely as a personal affliction, but as an indicator of broader social disintegration – from weakened community ties to the cultural dominance of individualism. At the intersection of sociology and media linguistics, digital loneliness is examined in the context of social media's impact on social integration.

Key communication theories applied to this field include the displacement hypothesis, which posits that digital interactions displace in-person relationships, and the opposing stimulation hypothesis, suggesting that the internet can enhance social life. Critical theory has also contributed to this discourse. For instance, K. Jacobs analyzes digital loneliness through the lens of recognition theory, framing it as a symptom of disrupted social acknowledgment in the digital age [6]. Her critique warns that technological attempts to *solve* loneliness – such as artificial intelligence (AI) companions – may merely *digitize* the problem, without addressing its structural roots.

Methodologically, research on digital loneliness ranges from large-scale surveys and psychometric assessments to neurobiological investigations (e.g., hormonal assays, neuroimaging) and digital behavioral analytics (e.g., tracking online engagement). This interdisciplinary approach enables a holistic understanding of the phenomenon – from subjective emotional experiences to objective social and biological markers of loneliness in a digitally mediated world.

Deep analysis of theoretical approaches to digital loneliness among men

A comprehensive analysis of existing scientific theories and concepts has allowed us to identify 8 fundamental theoretical approaches that explain the phenomenon of digital loneliness among men. Understanding this phenomenon relies on several key theories of social communication, cognitive psychology, and media studies. These theoretical frameworks explain why digital technologies, while expanding communication opportunities, do not always facilitate deep social connections and may, in some cases, even intensify feelings of isolation.

1. Social Presence Theory (Short, Williams & Christie, 1976).

The Social Presence Theory suggests that the degree of perceived presence of another person in a communication process depends on the communication channel. The more nonverbal cues (facial expressions, gestures, tone of voice) transmitted, the higher the level of social presence [7]. In digital communication settings (e.g., text messaging, social media, video conferencing), social presence is often lower than in face-to-face interactions, potentially contributing to feelings of loneliness. Empirical research supports this claim: individuals who communicate primarily through text-based interactions report higher levels of emotional isolation than those who engage in face-to-face or video-based interactions [8].

2. Hyperpersonal Communication Theory (Walther, 1996).

The Hyperpersonal Communication Theory posits that online communication can appear more idealized than real-life interaction because users control their self-presentation and can carefully curate responses, avoiding immediate reactions [9]. While this may enhance initial attraction and perceived intimacy, it results in superficial social connections that lack depth and do not provide emotional support. Studies confirm that men are more likely to use digital platforms for informational exchange rather than deep interpersonal relationships, potentially contributing to their digital loneliness [10].

3. Social Determinism and Gender Roles (Connell, 2005).

R. W. Connell's theory of hegemonic masculinity explains how men are socialized to suppress emotional openness and help-seeking behaviors [11]. This social pattern partly explains why men may experience digital loneliness even when actively engaging online. Empirical studies show that men tend to use digital platforms less for emotional disclosure or support and more for information or entertainment purposes, which contributes to a weaker sense of social belonging. Evidence from recent research on men's mental health during the COVID-19 pandemic confirms that men report higher rates of depressive symptoms and social withdrawal, despite the growing use of virtual communication tools [12].

4. Media Dependency Model (Ball-Rokeach & DeFleur, 1976).

This model explains how media dependency arises when digital technologies become the dominant medium for information, interaction, and emotional regulation [13]. Algorithmic personalization fosters digital echo chambers, reinforcing users' existing beliefs while narrowing their social exposure. Empirical evidence supports this mechanism among men: research shows that men experiencing loneliness tend to increase their time on social media in an effort to find connection, yet such engagement often intensifies psychological distress rather than alleviates it [14]. This dynamic illustrates how overreliance on digital environments can deepen men's sense of isolation, particularly when offline social bonds are weak.

5. Social Identity Theory (Tajfel & Turner, 1979).

The Social Identity Theory explains how group membership affects self-esteem and social interactions [15]. Within the context of digital loneliness, this theory highlights how online communities can either reduce isolation or exacerbate it. Men who actively engage in professional or social digital networks can develop strong group identities, which reduce feelings of loneliness [16]. However, as R. Tietjen notes, certain groups of men who experience profound loneliness – such as members of the online involuntary celibate (*incel*) community may transform their feelings of social exclusion into antagonistic emotions. Within these digital subcultures, loneliness is not alleviated but intensified, fostering resentment, misogyny, and ideological radicalization that deepen social alienation and polarization [17].

6. Social Learning Theory (Bandura, 1977).

In line with Bandura's Social Learning Theory, individuals may internalize social norms and relational expectations through observation of digital behavior [18]. In digital environments, increased social media use has been strongly associated with greater perceived social isolation (PSI) among young adults. According to a large-scale U.S. survey, participants in the highest quartiles of social media usage reported significantly higher levels of PSI compared to those with minimal engagement, suggesting a linear relationship between screen time and subjective loneliness [19]. Furthermore, passive consumption of digital content (e.g., learning new skills without engaging in discussions) can create an illusion of social interaction, which fails to replace real social support [8].

7. Social Capital Theory (Putnam, 2000; Lin, 2001).

Social Capital Theory emphasizes that strong, trust-based offline relationships are essential for well-being, social cohesion, and civic engagement [20, 21]. In contrast, digital environments often cultivate weak or superficial ties that lack emotional reciprocity. A recent meta-analysis on digital technology interventions found limited and statistically insignificant effects on reducing loneliness among adults, particularly in older populations [22]. These findings suggest that current digital interventions may fail to replicate the relational depth and sense of belonging that emerge through offline, trust-based interactions.

8. Cognitive Load Theory (Sweller, 1988).

Cognitive Load Theory posits that individuals possess a limited capacity for cognitive processing; when this capacity is exceeded, both learning and decision-making become impaired [23]. Although initially formulated within the domain of instructional design, the theory provides a valuable framework for understanding how constant multitasking in complex digital environments can reduce attentional resources needed to interpret social cues and sustain meaningful connections.

Table 1

Comparative characteristics of digital solitude and digital loneliness among men (developed by the authors based on systematic review data)

Aspects	Digital solitude	Digital loneliness
Volitional Nature	Intentional, self-directed withdrawal from digital communication for rest, reflection, or focus	Unintentional and often externally driven state resulting from weakened offline connections or social exclusion
Psychological Impact	Positive: promotes cognitive reset, emotional balance, and self-awareness	Negative: evokes emotional distress, anxiety, depressive symptoms, and loss of motivation
Social Function	Temporary disengagement enabling mental recovery and improved quality of future interactions	Chronic reliance on digital environments as a substitute for real social relationships
Health Outcomes	Associated with lower cortisol levels, improved sleep, and enhanced cognitive clarity	Linked to chronic stress, dysregulated cortisol, increased risk of depression, and cardiovascular strain
Behavioral Patterns	Mindful disconnection, digital minimalism, time-limited technology use	Excessive screen exposure, compulsive social media engagement, passive content consumption
Gendered Tendencies	More adaptive among men who consciously structure solitude for cognitive recovery	More prevalent among men who suppress emotional expression and seek digital compensation for social deficits

Recent evidence indicates that younger men experiencing loneliness tend to increase their time spent on social media, yet this behavior paradoxically intensifies psychological distress rather than alleviates it [14]. This pattern exemplifies a maladaptive digital coping mechanism shaped by masculine norms of self-reliance and emotional restraint-traits that inhibit help-seeking and foster prolonged digital isolation.

The analysis of digital loneliness among men through the lens of socio-psychological and communication theories demonstrates that this phenomenon is multidimensional, shaped by individual cognitive processes, gendered identity patterns, and evolves forms of digital socialization.

The Social Presence and Hyperpersonal Communication theories explain the emotional detachment and superficiality of men's online interactions, while Social Determinism and the Media Dependency Model reveal how algorithmic environments and masculine socialization reinforce emotional restraint and online segregation. The Social Capital framework underscores the erosion of strong, trust-based ties in digital contexts, and the Cognitive Load Theory clarifies how cognitive overload and multitasking hinder men's ability to engage in meaningful digital relationships.

Taken together, these frameworks position digital loneliness as both a psychological and structural construct – one rooted in cognitive and emotional mechanisms as well as in broader socio-technological systems. Understanding these interrelated mechanisms is critical for advancing the study of digital loneliness within the broader paradigm of men's mental health.

Furthermore, the distinction between *digital solitude* (intentional withdrawal for restoration or focus) and *digital loneliness* (unwanted disconnection and emotional deprivation) offers an important conceptual contribution. Recognizing this difference enables the development of more precise diagnostic and intervention strategies aimed at enhancing men's digital well-being-particularly among those with high exposure to professional or social digital environments.

Conceptual distinctions

The differentiation between *digital solitude* and *digital loneliness* lies in the volitional aspect, psychological outcomes, and adaptive consequences associated with each state (Table 1).

1. Digital solitude (constructive digital seclusion).

Definition: a self-imposed, intentional state of disengagement from digital interactions, aimed at enhancing personal well-being, self-reflection, creativity, or mental recovery.

Psychological implications: digital solitude is associated with positive cognitive and emotional outcomes, such as enhanced mindfulness, increased creativity, and reduced cognitive overload. Unlike forced isolation, digital solitude fosters a sense of autonomy, allowing individuals to regain control over their information consumption.

Examples: a professional deliberately disconnects from notifications to engage in deep work or creative writing; digital detox practices, including scheduled screen-free time, serve as a form of restorative solitude.

2. Digital loneliness (pathological digital isolation).

Definition: a state of involuntary social disconnection characterized by unfulfilled social needs, emotional isolation, and a reliance on digital communication that fails to provide meaningful interpersonal connection.

Psychological and health implications: digital loneliness is associated with negative emotional states, including anxiety, depression, and emotional exhaustion. Men, in particular, may experience exacerbated alexithymic tendencies, where they struggle to articulate emotional distress, leading to higher rates of digital dependency without seeking real-world social support.

Examples: spending excessive hours engaging with social media "likes" and virtual conversations, but feeling emotionally disconnected; high social media activity paradoxically increasing self-perceived isolation rather than mitigating loneliness.

The comparative analysis presented in Table 1 highlights the dual nature of digital connectivity in men's lives. While *digital solitude* may function as a self-regulatory strategy that supports cognitive recovery and stress reduction, *digital loneliness* emerges as an involuntary psychosocial state driven by emotional suppression, reduced offline intimacy, and overreliance on digital interaction. These contrasting modes reflect the broader continuum between adaptive and maladaptive digital engagement. The data suggest that fostering men's capacity for structured digital solitude-through digital-wellbeing education, reflective

self-awareness practices, and time-bound disconnection-can mitigate the neuropsychological risks associated with chronic digital loneliness.

Implications for men's health

Men's experiences of digital solitude and digital loneliness diverge due to sociocultural, cognitive, and neurobiological factors. Empirical evidence shows that men, unlike women, tend to use digital platforms primarily for information acquisition and instrumental purposes rather than for emotional self-expression [24]. This communication pattern limits opportunities for affective reciprocity and makes men more vulnerable to digital loneliness when offline social connections weaken.

Among older men, loneliness has been shown to mediate the relationship between interpersonal strain and depressive symptoms, whereas spousal and familial support serves as strong protective factors [25]. These findings highlight the need for gender-sensitive approaches to digital mental-health interventions that encourage emotional openness and adaptive help-seeking behaviors.

Prolonged exposure to digital loneliness is also linked to neurobiological dysregulation, manifested through elevated cortisol secretion and chronic stress responses, which contribute to higher cardiovascular and metabolic risks. Conversely, structured digital solitude-intentional and time-limited disconnection from online environments may have a restorative function by enabling cognitive reset and reducing stress reactivity [26].

Collectively, these insights underscore that men's digital well-being cannot be addressed solely through behavioral change or increased connectivity. Instead, it requires *integrative biopsychosocial strategies* that combine digital-literacy training, cognitive-behavioral interventions, and relational support systems designed to counteract emotional restraint and foster authentic connection.

Understanding the distinction between digital solitude and digital loneliness is essential for developing targeted interventions aimed at reducing the negative consequences of digital engagement on men's mental health. While digital solitude represents a proactive and constructive disengagement, digital loneliness signifies a pathological state of emotional emptiness exacerbated by unfulfilling online interactions. Future research should focus on integrating wearable biosensors to objectively measure the physiological impact of digital loneliness, as well as exploring gender-specific coping mechanisms for mitigating its effects. Additionally, digital literacy programs that educate men on the importance of balanced online-offline interactions could serve as preventive strategies against digital loneliness.

Digital loneliness as a socio-psychological phenomenon

Digital loneliness, as a socio-psychological phenomenon, remains insufficiently explored within the modern terminological framework of social and behavioral sciences. Despite a significant number of studies dedicated to traditional loneliness and its effects on mental and physical health, the concept of "digital solitude" has not yet received an established definition and scientific understanding. This is especially true regarding its connection to men's health, where the problem has been virtually unexplored in high-ranking international journals. However, some research traditions related to this topic can be found in studies examining wilderness solitude, digital connectivity, re-conceptualizing solitude in the digital era, digital and loneliness, solitude scale, social media solitude, digital isolation, online solitude, digital and solitude, and mental health.

Academic scientometric databases (SCOPUS, Web of Science, PubMed, IEEE Xplore, PsycINFO, Google Scholar) do not contain publications that directly use this term as a research subject. An analysis of English-language literature indicates that the stable concept of "*digital solitude*" is not well established. Searches such as "*digital solitude and men's health*" on Google Scholar yield a significant number of results (approximately 86,600), yet none of the studies examine digital loneliness as a separate concept or a factor affecting men's health.

Meanwhile, research on digital interaction, Internet addiction, social isolation, and their effects on psychosocial well-being has been actively evolving over the past 2 decades, primarily focusing on adolescent and youth populations [27–39]. These studies have established key foundations for understanding the behavioral mechanisms of digital engagement, such as compulsive Internet use, online gaming, and reduced real-life sociability and their associations with mental health risks including depression, anxiety, and social withdrawal. Although most empirical findings address younger cohorts, the same digital-behavioral mechanisms appear relevant for adult men, suggesting continuity between adolescent patterns of digital dependence and mature forms of digital loneliness. Existing research emphasizes various manifestations of social isolation, internet addiction, and technology overuse, yet these studies remain largely fragmented and predominantly descriptive. Investigations into the impact of digital technologies on adult mental health, though insightful, do not offer a unified conceptual framework for understanding how digital environments shape male-specific experiences of loneliness. The current evidence base focuses mainly on pathological technology use, such as internet or smartphone addiction, and its behavioral and affective outcomes. However, it overlooks the broader socio-psychological and gendered dimensions of digital connectivity. Therefore, developing an interdisciplinary research framework that systematically defines and examines *digital loneliness among men* represents a critical and timely direction for contemporary mental health science.

Given the aforementioned, this study aims to synthesize existing research on digital loneliness and its impact on men's mental and physical health while proposing an interdisciplinary approach to examining this phenomenon. This work represents one of the first systematic analyses of the concept of digital loneliness specifically within the male population and its interconnection with key biopsychosocial factors.

Comparison with related concepts

In adjacent academic and popular discourses, several terms have emerged that are closely related to *digital loneliness*, though subtle distinctions between them are essential for conceptual clarity.

1. Digital deprivation.

Digital deprivation typically refers to the lack of access to digital communication and information technologies. In the context of loneliness, this concept describes situations

in which individuals are excluded from online interaction. For instance, older adults with limited digital literacy or populations residing in areas with insufficient internet infrastructure. Empirical findings confirm that digital exclusion correlates with increased loneliness, as restricted access to technology limits opportunities for social communication, civic participation, and professional integration. According to studies based on the Relative Digital Deprivation Theory, unequal access to digital resources reinforces social inequality and psychological isolation, particularly among socioeconomically disadvantaged groups [38].

In a broader sense, the notion of digital deprivation may also include *intentional disconnection* or short-term abstention from online activity (digital detox). Although temporary withdrawal can initially evoke anxiety or discomfort, it often contributes to improved mood and reduced stress when replaced with meaningful offline interactions. However, unlike structural deprivation, such voluntary digital breaks represent a self-regulatory practice rather than a form of social exclusion.

2. Digital solitude.

The notion of *digital solitude* was introduced to denote intentional withdrawal from digital communications. In contrast to enforced loneliness, solitude is typically voluntary and often regarded as beneficial. We advocate for a clear distinction between these phenomena: *digital solitude* constitutes a constructive form of self-imposed disconnection, allowing individuals to focus on introspection, offline hobbies, and psychological restoration. Digital detox practices may thus promote personal growth and mental balance.

Digital loneliness, by contrast, is an involuntary and adverse condition in which individuals feel socially disconnected despite being digitally connected. Put simply: solitude reflects being alone without suffering from it, whereas digital loneliness is characterized by emotional isolation amidst persistent online interactions, which is often contrary to one's wishes [39].

3. Cyber loneliness.

The term *cyber loneliness* (often interchangeably used with *virtual loneliness*) emerges primarily in the field of cyberpsychology and is frequently discussed alongside phenomena such as internet addiction, cyber victimization, and cyberbullying [42]. It reflects a paradoxical condition in which individuals engage intensively in online communication yet experience emotional detachment, impaired empathy, and reduced real-life social competence.

Empirical studies among university students indicate that excessive involvement in online environments correlates with diminished sensitivity to cyberbullying and lower scores on the *virtual sharing* dimension of loneliness scales [40]. This suggests that persistent immersion in digital interaction can desensitize users to the emotional quality of online relationships.

Conceptually, *cyber loneliness* differs from *digital loneliness* only in scope and disciplinary framing: while digital loneliness encompasses the broader socio-psychological effects of mediated communication, *cyber loneliness* emphasizes the addictive, compulsive, and dependency-based aspects of digital interaction. With the expansion of immersive digital ecosystems, such as metaverse and virtual reality platforms – this form of loneliness may intensify, reinforcing the *illusion of connectedness* while deepening emotional isolation.

4. Technological (media) isolation and digital alienation.

The concepts of *technological isolation* and *digital alienation* extend the understanding of digital loneliness into the domains of philosophy, cultural studies, and critical theory. They emphasize that excessive mediation through technology can distance individuals not only from others but also from their authentic experiences and embodied reality.

In his seminal work "*The Condition of Digitality*" describes digital alienation as a systemic form of detachment arising from the logic of digital capitalism, where individuals pursue a "digital ideal" that can never be fully realized. This pursuit fosters passivity and fragmentation of human agency, as interactions, identities, and emotions are increasingly structured by automated, networked systems rather than direct human intention [41]. Within this framework, alienation is not merely a psychological symptom but a cultural and economic condition embedded in the architecture of digital life.

Similarly, the notion of *media isolation* reflects the progressive replacement of direct interpersonal interaction with mediated communication. While such mediation expands access to information and global connectivity, it simultaneously amplifies feelings of existential disconnection and emotional discontinuity.

Both constructs intersect conceptually with *digital loneliness*: they illuminate how technological mediation transforms not only social relations but also the very *structure of human presence and connection* in digital environments. Thus, technological isolation and digital alienation can be regarded as *macro-level correlates* of digital loneliness, translating individual psychological experiences into collective socio-cultural phenomena.

5. Digital addiction and burnout.

Although not direct synonyms of loneliness, *digital addiction* and *digital burnout* are closely intertwined phenomena. *Digital burnout is* a state of emotional and physical exhaustion resulting from excessive digital engagement [4]; it is frequently reported alongside *digital loneliness*. Individuals become overwhelmed by the constant information flow and may find themselves lacking the emotional capacity for genuine offline relationships.

Empirical studies on cyber addiction and virtual loneliness demonstrate that increased sensitivity to online interaction often coexists with decreased emotional reciprocity and social sharing, suggesting that excessive connectivity paradoxically undermines authentic communication [42]. Moreover, dependence on smartphones and social media creates a feedback loop: rising anxiety and loneliness lead individuals to check notifications and social feeds more often. These behaviors offer only fleeting distraction and no true sense of connection, thereby reinforcing the experience of loneliness.

This cycle illustrates the deep entanglement of digital overuse and emotional disconnection, where the search for digital relief gradually transforms into a mechanism of self-perpetuating isolation.

Psychological aspects of digital loneliness

Digital loneliness is increasingly conceptualized as a paradoxical experience of emotional isolation that emerges

despite active engagement in online communication. A growing body of evidence highlights a strong association between excessive social media use and heightened feelings of loneliness. For instance, a cross-sectional survey involving 220 patients revealed that younger individuals who spend more time on social media platforms exhibit significantly higher levels of subjective loneliness and anxiety [43].

Young adults appear particularly vulnerable, often engaging in constant social comparison with curated and idealized representations of others on platforms such as Instagram and Facebook. This comparison dynamic tends to intensify feelings of inadequacy and social detachment, thereby reinforcing the cycle of loneliness [1].

Importantly, the quantity of online interactions does not compensate for the lack of meaningful offline relationships. Individuals may have hundreds of digital "friends" and yet feel profoundly misunderstood or emotionally disconnected. Clinical observations confirm this phenomenon, with digital loneliness now being proposed as a novel diagnostic construct in psychiatric assessment, given the increasing number of patients reporting technology-induced social isolation [43].

The psychological consequences of digital loneliness are substantial and include increased levels of anxiety, depressive symptoms, lowered self-esteem, and sleep disturbances, particularly among those immersed in virtual environments. Digital loneliness has been identified as a mediating factor between excessive online activity and declining mental well-being, functioning as a crucial link that explains how constant but superficial connectivity may lead to deteriorating psychological health.

Notably, the impact of online time on loneliness is moderated by the quality of digital interactions. While emotionally supportive and meaningful engagement – such as participation in interest-based online communities – can mitigate loneliness, passive scrolling, consumption of content without reciprocity; and lack of genuine communication tend to foster a false sense of connection and deepen emotional isolation. As a result, many members of the so-called "digitally native" generation are reporting a paradoxical pattern: despite being constantly connected, they increasingly experience emotional detachment and an absence of authentic closeness [2].

Neurobiological and physiological aspects

Recent research on loneliness has expanded into the domain of neurobiology, identifying characteristic physiological changes among individuals experiencing digital loneliness. A core mechanism underlying this phenomenon is chronic stress resulting from PSI. It is well established that loneliness activates the hypothalamic-pituitary-adrenal axis, leading to elevated secretion of the stress hormone cortisol. Notably, this physiological response appears to be more pronounced in men. For instance, a recent study of older adults revealed that high levels of both emotional and social loneliness were associated with increased morning and diurnal cortisol concentrations in men, whereas no such correlation was observed in women [44].

Similar patterns are increasingly reported among younger men facing digital loneliness. Chronic stress affects multiple physiological systems, including immune and cardiovascular functioning, and is also linked to hormonal imbalances in males. Of particular concern is the documented decrease in testosterone levels among men who spend excessive time engaged with screens and experience persistent online isolation. This effect may be mediated by 2 interrelated mechanisms: first, the suppression of gonadal hormone production due to elevated cortisol levels; second, the sedentary lifestyle, lack of offline physical activity, and disturbed circadian rhythms commonly associated with nocturnal internet use.

Experimental studies reinforce these associations. For example, long-term daily exposure to mobile phone radiation in animal models resulted in a significant reduction in serum testosterone levels and impaired reproductive parameters [45]. In humans, testosterone deficiency has been linked to symptoms such as fatigue, apathy, reduced libido, and lowered fertility-complaints frequently reported by men experiencing digital burnout.

Beyond hormonal dysregulation, researchers are exploring the role of neuropeptides and neurotransmitters in digital loneliness. Face-to-face social interactions typically trigger the release of oxytocin, a neuropeptide associated with bonding, trust, and emotional regulation. However, such mechanisms are largely absent during virtual communication. The lack of physical presence, eye contact, and touch fails to stimulate the oxytocin system, resulting in a neurochemical void that may explain why prolonged engagement with social media rarely yields feelings of closeness or fulfillment [46].

Thus, from a neurobiological perspective, digital loneliness resembles a state of chronic stress and attachment deprivation characterized by elevated cortisol, suppressed androgen levels in men, oxytocin deficiency, and dopaminergic overstimulation without adequate emotional reward. These findings underscore the urgency of identifying objective biomarkers of digital loneliness (e.g., hormonal profiles, neuroimaging indicators) and integrating them into intervention strategies aimed at mitigating its adverse health outcomes.

Social aspects and consequences of digital loneliness

At the societal level, the phenomenon of digital loneliness reflects the paradoxes of contemporary hyperconnected life. On the one hand, digital platforms have enabled individuals to maintain long-distance connections, find like-minded communities across the globe, and overcome geographic isolation. On the other hand, the quality of social bonds has often declined. Studies report that active online presence can lead to social disengagement, as individuals increasingly avoid the complexities of in-person interaction in favor of the controllable environment of digital communication, where one can disconnect at will [1].

Over time, this dynamic contributes to a reluctance toward offline encounters and a growing fear of emotional intimacy, as digital interactions lack the interpersonal risk, vulnerability, and accountability inherent in face-to-face communication. Sociologists further associate digital loneliness with broader processes of societal atomization. In urban environments, where community ties were already weakened prior to technological mediation, the shift toward virtual communication has intensified anonymity and generational fragmentation.

Table 2

Comparative aspects of digital loneliness

No.	Aspects	Key manifestations	Typical risk groups	Mechanisms of influence
1	**Biological**	Sleep disturbances, elevated cortisol levels, reduced testosterone	IT specialists, gamers, e-sports participants, middle-aged men	Chronic stress → hormonal changes → somatic symptoms
2	**Psychological**	Anxiety, depressive symptoms, decreased self-esteem	Youth, active social media users, individuals with low life engagement	Online dependency → reduced quality of emotional life
3	**Social**	Loss of offline connections, social atomization, stigmatization	Urban residents, migrants, socially isolated individuals	Replacement of offline communication with fragmented digital ties

Note: IT – information technology.

Interest-based online communities frequently substitute traditional, place-based networks, yet these digital forms of belonging are often fragile. For instance, Generation Z reports significantly more communication through messaging platforms than in-person interaction, which has been linked by educators and psychologists to underdeveloped empathy skills and challenges in building lasting friendships. Another notable factor is the stigmatization of loneliness. Historically, loneliness has been perceived as a shameful state of "social failure", particularly among men, due to normative ideals of masculine independence and self-sufficiency [16].

While the digital era has begun to reduce this stigma, loneliness is now openly discussed and recognized by institutions such as the World Health Organization as a public health risk; however many individuals remain reluctant to admit they feel alone. Men, in particular, are more likely to mask their loneliness or compensate through excessive digital immersion-ranging from video games to compulsive online browsing. As a result, a kind of "digital curtain" emerges, concealing real emotional deprivation behind a screen of constant activity.

The societal consequences of digital loneliness are far-reaching. These include reduced civic engagement, when individuals feel isolated, disconnected from their communities, and thus contribute less to collective social capital. There are also potential demographic effects, as lonely men are statistically less likely to form families, exacerbating trends related to declining marriage rates and family cohesion.

Some researchers have drawn connections between digital loneliness and the emergence of destructive online subcultures. The *incel* (involuntary celibate) phenomenon, for example, is viewed by some scholars as a radicalized response to persistent loneliness and sexual frustration. These emotional states are often channeled into toxic ideologies and behaviors in digital spaces, contributing to new forms of social fragmentation.

In this way, the social landscape shaped by digital loneliness is characterized by weakened interpersonal bonds, a growing population of isolated individuals, and the rise of subcultures defined by alienation and detachment (Table 2).

The emergence of digital technologies and social isolation

The advent of digital technologies has fundamentally transformed social behavior. Simultaneously with the expansion of communication opportunities, there has been a rise in social isolation and loneliness, particularly among men. *Digital loneliness* is a phenomenon that arises due to the use of digital technologies, which replace real social connections and lead to emotional isolation. According to studies by Ukrainian scholars [47, 48], loneliness itself can have severe consequences for both mental and physical health, including depression, anxiety disorders, sleep disturbances, cardiovascular diseases, hormonal changes, and metabolic disorders, regardless of gender and age.

In this regard, English-language scientific publications [49–53] predominantly address the relationship between loneliness and health outcomes, with particular emphasis on older adults. These studies explore loneliness as a factor contributing to physiological dysregulation, cardiovascular and immune changes, and increased morbidity and healthcare utilization. The research corpus includes both conceptual analyses of loneliness as a biopsychosocial construct [49, 50] and empirical investigations of its public health implications in aging populations [51–53]. Thus, the English-language literature mainly highlights health-related mechanisms and consequences of loneliness in later life, while digital and gender-specific dimensions remain less represented. Other studies emphasize the social aspects, such as the spread of loneliness due to the COVID-19 pandemic [54–56].

The terminological landscape and scientific context of the topic "*digital loneliness in men*" can be framed by synonymous terms such as digital solitude, social isolation, *technologically mediated isolation, cyberloneliness, digital alienation*. This review article considers the broad context, relevance of the issue, interdisciplinarity, and prospective directions of research into digital loneliness among men. This topic extends beyond an individual's psychological state to encompass *sociocultural, gender, cognitive, medical, behavioral, and technological* dimensions. A deeper analysis should consider these key perspectives, namely: neurobiological, biomedical, psychophysiological, psychological, economic, evolutionary, social, behavioral, sexological, sociological, political, professional, cultural and ethnic.

The gendered nature of digital loneliness

Analyzing gender aspects of digital loneliness reveals key insights:

1. Studies suggest that individuals who experience loneliness may increasingly rely on digital platforms for social interaction, yet this usage can inadvertently deepen isolation when it substitutes offline emotional connection [8]. This pattern may be particularly relevant to men, who are often less encouraged by societal norms to seek emotional support, including in digital contexts.

2. Differences in digital technology usage: gendered patterns of online behavior have been observed, with men more

likely to use digital platforms for pleasure, whereas women tend to seek social and informational engagement online [24].

3. Gendered trajectories of radicalization through online communities: philosophical analyses reveal that socially isolated men may be particularly susceptible to engagement in radical digital communities (e.g., *incel* groups), not as a means of resolving their loneliness, but as environments where feelings of exclusion are collectively reinterpreted and intensified through ressentiment. Rather than providing emotional relief, such communities amplify perceived rejection and foster antagonistic worldviews, contributing to affective radicalization and gendered hostility [17].

4. Emerging evidence suggests that men may exhibit distinct patterns of digital isolation, particularly in relation to problematic social networking site use (PSNSU) and sleep quality. Gender-specific analyses indicate that, unlike women, men with good sleep quality experience heightened loneliness when they display a stronger preference for online social interaction (POSI), whereas among men with poor sleep quality, higher self-regulation deficits in digital use correlate with lower loneliness. These patterns reflect complex gendered dynamics of digital coping and emotional expression, shaped by both psychosocial and physiological factors [36].

Digital loneliness across different age groups

Digital loneliness manifests with particular intensity among young men aged 18 to 25, who are increasingly exposed to the psychological effects of prolonged digital engagement. One of the central contributing mechanisms is the fear of missing out (FOMO) – a digitally reinforced anxiety linked to constant exposure to curated online content and social comparisons.

A nationally representative U.S. study found that individuals in the highest quartile of social media use were 2 to 3 times more likely to report PSI than those with lower use, revealing a linear and robust association between screen time and loneliness in young adults [22]. Although the study did not disaggregate by gender, young men, who are prominent users of platforms such as Instagram, Twitch, and TikTok, are considered a high-risk subgroup within this demographic.

Furthermore, research during the COVID-19 pandemic showed that digital strategies used by young men to cope with social distancing including increased gaming and passive social media consumption often failed to provide emotional relief. Instead, these behaviors mediated higher levels of loneliness, particularly among those with limited offline support-seeking behaviors [37]. This paradox underscores the importance of gender-sensitive approaches to digital mental health interventions, particularly during periods of enforced isolation.

The experience of digital loneliness among men manifests differently across age cohorts, shaped by distinctive psychosocial and technological dynamics.

Young men (18–25 years) constitute one of the most vulnerable groups. A significant contributor is FOMO, intensified by algorithm-driven social media platforms. Primack et al. revealed a robust positive association between high social media use and PSI among young adults [35]. Frequent exposure to idealized digital content on platforms such as Instagram or Twitch fosters upward social comparisons, contributing to anxiety and depressive symptoms. Moreover, Lisitsa et al. identified that during periods of enforced isolation-such as the COVID-19 pandemic-young men who turned to digital spaces for social connection paradoxically reported heightened loneliness, especially those active in gaming communities, where interaction often lacks emotional reciprocity [37].

For men aged 26–50, digital loneliness is frequently associated with demanding professional routines, prolonged screen time, and a deficit of offline social ties. According to Ellison et al., professionals in digital-intensive fields (e.g., IT, finance, analytics) often report a decline in social wellbeing due to chronic online engagement and blurred boundaries between work and personal life [12]. This pattern contributes to emotional exhaustion and symptoms of burnout. Shah et al. further demonstrated that remote digital work correlates with decreased physical activity and reduced offline interaction, both of which are significant risk factors for depression and anxiety in middle-aged men [22]. Notably, digital interventions targeting loneliness in this group show limited efficacy due to their inability to substitute authentic interpersonal contact.

For men aged 50+, the role of digital competence becomes particularly salient. Contrary to the common perception that digital communication tools necessarily exacerbate feelings of loneliness, recent conceptual work by Dwyer highlights their potential to foster meaningful connections-provided that users possess the necessary digital competence [16]. Although not gender-specific, this analysis is particularly relevant to older men, who often face a combination of emotional isolation and low digital literacy. The author emphasizes that the quality of interaction, rather than the medium itself, defines its impact on loneliness, and calls for greater attention to be paid to the concept of "meaningful connection" in digital design and policy interventions. Within this context, initiatives aimed at improving digital literacy among adults aged 50+ including older men, could play a crucial role in mitigating digital loneliness and promoting sustained social engagement in later life.

Older men (60+) represent a distinct high-risk group, particularly due to digital exclusion. Barriers such as low digital literacy, limited access to devices, and cognitive or physical impairments constrain their engagement in online spaces. While Jones et al. found that internet use can help reduce loneliness among older men living independently, they also noted that the effectiveness is contingent on users' ability to meaningfully integrate digital tools into their daily lives [57]. Importantly, evidence suggests that although information and communication technologies (ICTs) can facilitate social connectedness, they are not universally accessible and require tailored support structures to bridge the digital divide.

At the same time, those with at least basic digital competence can use digital technologies as tools for maintaining social connections (Table 3).

Individualistic vs collectivist societies digital loneliness among men

The prevalence of digital loneliness among men varies substantially across cultural contexts, particularly between individualistic and collectivist societies. In individualistic cultures such as the USA, Canada, and the

Table 3

Age-specific drivers and health implications of digital loneliness among men

Age group, years	Key factors of digital loneliness	Impact on mental and physical health	Suggested interventions
18–25	Excessive engagement in social media, FOMO, cyberbullying, constant comparison with idealized digital personas (Primack et al., 2017; Lisitsa et al., 2020)	Elevated anxiety levels, depressive symptoms, decreased self-esteem, disrupted emotional regulation	Psychoeducational programs on digital well-being, structured digital detox strategies, development of media literacy and resilience
26–50	High-intensity online work routines, dominance of remote and digital communication, limited access to emotionally supportive offline networks (Ellison et al., 2021; Shah et al., 2021)	Professional burnout, cognitive overload, increased risk of hypertension, sleep disturbances, and emotional exhaustion	Work-life balance support policies, promotion of physical and social offline engagement, integration of mental health resources into workplace settings
50+	Low digital literacy, technostress, restricted access to modern ICTs, reduced digital inclusion, and erosion of traditional social circles (Jones et al., 2015; Shah et al., 2021). Additional barriers, such as cognitive or physical impairments, further constrain engagement in online spaces	Social withdrawal, heightened vulnerability to loneliness-related cognitive decline, increased risk of depression and dementia. The effectiveness of internet use in reducing loneliness is contingent on users' ability to meaningfully integrate digital tools into their daily lives. ICTs are not universally accessible and require tailored support structures to bridge the digital divide	Lifelong digital literacy education, age-sensitive community-based digital support programs, facilitation of hybrid (online/offline) social activities. Tailored support structures are required to bridge the digital divide, with a focus on accessible ICT infrastructure

Notes: ICTs – information and communication technologies; FOMO – fear of missing out.

UK, digital loneliness tends to be more pronounced due to the emphasis on autonomy, self-reliance, and a reduction in sustained interpersonal bonds. According to Primack et al., young men in these settings frequently use social media to seek interaction, yet paradoxically report heightened feelings of isolation [35]. This pattern is further supported by Nowland et al., who argue that digital communication in such societies often fails to compensate for the erosion of real-life social interactions, thereby amplifying feelings of disconnection among men [8]. The absence of traditional social structures in individualistic societies exacerbates this issue. Western norms of self-sufficiency limit the availability of communal or familial support systems, which previously acted as buffers against isolation. Nowland et al. highlight that American men, in particular, experience increased digital dependency in the absence of these support structures, intensifying their experience of social isolation [8]. Cekini et al. analyzing data collected during the COVID-19 pandemic, confirmed that digital loneliness increased disproportionately among men in Western countries compared to those in collectivist cultures [58]. This discrepancy is attributed to the relative weakness of offline social networks in individualistic societies, which left many men psychologically vulnerable during periods of digital confinement.

In contrast, collectivist societies, such as those found in East Asia (e.g., Japan, China, South Korea) tend to foster more resilient offline social connections, which serve as protective factors against digital loneliness. Shah et al. note that even online interactions in collectivist contexts are typically embedded within real-world social norms and expectations, helping to sustain a sense of belonging [22]. These findings are echoed by Liang et al., whose study demonstrated that Chinese men who actively use social media report lower levels of loneliness, as they tend to interpret digital platforms as extensions of existing relationships rather than as replacements for them [32].

Cultural embeddedness also influences the psychological interpretation of online behavior. In collectivist societies, men are more likely to receive emotional regulation and support through intergenerational and community-based interactions. This continuity between online and offline worlds significantly reduces the cognitive dissonance and emotional detachment that men in individualistic contexts often experience [33, 36, 39]. Such findings indicate that digital loneliness is not solely a technological issue but a culturally modulated phenomenon, shaped by broader social norms, support systems, and identity constructs.

The extent of digital loneliness among men across different regions is deeply influenced by cultural norms of socialization and digital adaptation. For example, in Canada, digital loneliness tends to be more prevalent among younger men who lack emotionally supportive face-to-face interactions, particularly in individualistic environments where social ties are often weaker [16]. Conversely, in several East Asian societies, older men may experience digital isolation due to challenges in digital adaptation and limited ICT competence. Although not all regional studies provide conclusive evidence, barriers to meaningful online engagement among older male populations are often linked to generational gaps in digital literacy [59].

In Middle Eastern societies, digital loneliness exhibits distinct gendered characteristics. In traditional cultures with strict social norms, men may face higher levels of digital alienation, as openness in online communication is often culturally discouraged. This social constraint reinforces interpersonal strain and emotional disconnection, which, according to Santini et al. can increase vulnerability to mental health issues through the mediating role of loneliness [25].

These findings underscore that digital loneliness among men is: more pronounced in individualistic cultures, where the fragmentation of social networks reduces perceived connectedness, moderated by digital literacy levels, especially among older adults, shaped by cultural expectations regarding emotional expression and virtual communication norms.

Table 4

Age-specific drivers and health implications of digital loneliness among men

Culture	Digital loneliness level	Main causes	Protective factors
Individualistic (USA, UK, Canada)	High	Lack of stable offline connections, autonomy, self-sufficiency culture	Social media as an attempt to compensate for the lack of offline interactions
Collectivist (China, Japan, South Korea)	Low	Preservation of traditional social structures, constant social support	Family ties, social norms of interaction, community stability

Table 5

Impact of digital loneliness on men's mental health

Psychological aspects	Key research findings
Depression	Elevated depressive symptoms among men due to lack of emotionally supportive offline relationships and excessive reliance on social media platforms. Digital engagement fails to provide affective reciprocity
Anxiety Disorders	Heightened social anxiety and emotional dysregulation linked to virtual overexposure and avoidance of face-to-face interaction
Cognitive Fatigue	Mental overload and reduced executive functioning associated with constant digital multitasking and information saturation, particularly in tech-intensive male occupations
Digital Burnout	Emotional exhaustion and chronic stress resulting from excessive digital engagement, especially among lonely men using online platforms for emotional support

As such, the regional differentiation in digital loneliness reflects a complex interplay between technological adaptation, cultural scripts of masculinity, and access to emotionally resonant social ties (Table 4).

Depression and anxiety disorders: associations with digital social isolation

Digital loneliness has been consistently associated with elevated levels of depression and anxiety among men, particularly in young adult populations. Primack et al. found that frequent social media use significantly correlates with PSI in men aged 19–32, which, in turn, predicts depressive symptomatology [35]. Their nationally representative study revealed that participants in the highest quartile of social media use had more than twice the odds of experiencing high levels of perceived isolation compared to those in the lowest quartile.

Lisitsa et al. analyzing mental health during the COVID-19 pandemic, confirmed that increased reliance on digital communication particularly when not accompanied by active support-seeking behaviors intensifies feelings of loneliness and contributes to anxiety and depressive symptoms in young men [37]. These effects are further exacerbated when social media substitutes face-to-face interactions, without providing emotional reciprocity.

Moretta et al. emphasized the role of sleep disturbances as a compounding factor [36]. Their study demonstrated that men with poor sleep quality reported both more severe PSNSU and higher levels of loneliness. Specific PSNSU patterns, such as POSI over offline interaction and deficient self-regulation were especially pronounced among men, contributing to increased depressive vulnerability through neuroendocrine dysregulation and social withdrawal.

Social media dependency as a reinforcing mechanism

An emerging body of evidence suggests that men often engage in social media use as a compensatory strategy for offline social deficits. Yet paradoxically, this reliance may deepen their experience of loneliness. According to Baker and Algorta, sustained engagement with online social networks does not mitigate loneliness but reinforces it, especially in men predisposed to social anxiety or emotional withdrawal [60]. This dynamic was further supported by Nowland et al., who found that excessive digital engagement may displace time spent in meaningful face-to-face interactions, reducing access to authentic social support and weakening emotional connectedness [8].

Together, these findings demonstrate a feedback loop wherein digital loneliness contributes to deteriorating mental health, while maladaptive digital habits exacerbate the very isolation they aim to remedy. This cyclical pattern underscores the necessity of gender-sensitive interventions that address not only the quantity but the quality and intentionality of men's digital social engagement.

Digital burnout in men: cognitive and emotional consequences

Emerging research highlights digital burnout as a significant psychosocial consequence of prolonged digital loneliness in men. A study by Magid et al. (2024) demonstrated that lonely male users of digital mental health platforms often experience elevated levels of stress, emotional exhaustion, and reduced psychological well-being. Engagement in such platforms, while offering remote support, does not always mitigate the underlying emotional strain associated with isolation and unmet interpersonal needs [61].

Key findings and implications

Digital loneliness in men is strongly associated with burnout, depression, and cognitive fatigue-especially among those with high digital exposure and low emotional reciprocity. Gaming and social media may serve as maladaptive substitutes for social intimacy, inadvertently reinforcing isolation. There is an urgent need to design gender-sensitive interventions that promote digital hygiene, offline engagement, and emotionally resonant social ties for men at risk of digital burnout (Table 5).

Table 6

Pyramid of interventions against digital loneliness

Level	Focus area	Description
6	Genuine human connection	Real-life emotional support, sense of belonging, authentic human bonds
5	Hybrid strategies	Blending online tools with offline group engagement & real meetings
4	Cautious use of emerging tech	Ethical use of AI / VR tools as supplementary – not substitutive – interventions
3	Human-centered platform design	Design platforms to foster deep interactions, not endless scrolling
2	Digital literacy & emotional competence	Digital hygiene, emotional intelligence, mindful communication
1	Structural & policy initiatives	State & community programs, inclusion policies, gender-responsive strategies

Notes: AI – artificial intelligence; VR – virtual reality.

Digital loneliness as a multidimensional phenomenon

Digital loneliness represents a multidimensional and cross-disciplinary phenomenon situated at the intersection of psychology, sociology, public health, and digital technology. It has evolved alongside the widespread integration of the Internet and digital media into daily life and is now widely recognized as a pressing challenge to mental and population health. Crucially, the core issue lies not in the technologies themselves, but in the patterns of digital engagement and the social ecosystems in which they are embedded. As noted by Dwyer (2024), digital environments often amplify pre-existing trajectories of isolation, particularly in the absence of emotionally supportive offline interactions [16].

To address this emerging public health concern, a multifaceted framework of interventions is required – one that spans individual behavior, technological design, psychosocial support, and community-level engagement (Table 6).

1. Enhancing digital literacy and emotional competence.

Intervention efforts should prioritize the development of critical digital literacy, equipping individuals, who are particularly men, with skills to engage mindfully with online platforms, interpret idealized content, and complement virtual communication with meaningful in-person interactions. In parallel, psychoeducational and cognitive-behavioral programs may assist users in managing digital dependency, building emotional intelligence, and enhancing social skills necessary for sustained offline relationships.

2. Human-centered technological design.

Digital platforms and apps should be re-engineered to support qualitative social interaction, rather than maximize passive screen time. Features such as interest-based group formation, ethical algorithms promoting supportive connections, or facilitation of offline meetings could reorient digital tools toward social integration rather than fragmentation.

3. Critical evaluation of emerging digital therapies.

Although AI companions, chatbots, and therapeutic virtual reality (VR) simulations are being explored as solutions to loneliness, caution is warranted. There is growing concern that such interventions, when used as substitutes rather than supplements to human connection, may inadvertently deepen emotional detachment by reinforcing the illusion of relational fulfillment in fully virtual spaces.

4. Integrating online and offline approaches.

Promising strategies involve hybrid interventions – for example, using digital tools to facilitate discovery of interest-based communities with the explicit goal of in-person connection. Online peer support groups can serve as initial engagement spaces that transition into real-world mutual aid or hobby networks.

5. Community and policy-level initiatives.

At the structural level, policymakers and public health institutions should support initiatives that foster social infrastructure: from community "interest clubs" to intergenerational mentorship programs, these efforts can restore opportunities for genuine interaction and shared meaning. Importantly, such initiatives should account for gendered patterns of social withdrawal, ensuring that programs are accessible and resonant for men at risk of digital alienation.

Ultimately, the most effective antidote to digital loneliness is not technological sophistication, but relational authenticity. Technology should function as a facilitator of human connection, not a replacement for it. This requires a paradigmatic shift from designing platforms that optimize engagement metrics to those that nurture psychosocial well-being and communal belonging.

Defining digital loneliness among men

A core outcome of this systematic review is the identification of definitional ambiguity surrounding the construct of *digital loneliness among men*. In response, we offer a comparative framework that traces the evolution of our conceptual understanding – from the preliminary definition developed prior to this review to a refined, evidence-based formulation grounded in interdisciplinary scholarship.

Initial conceptualization. Our initial definition described digital loneliness in men as a persistent psychological state emerging from the dominance of digital communication over offline interactions, resulting in reduced social integration, diminished emotional engagement, and erosion of the perceived significance of interpersonal connections.

Critical reappraisal and key insights. Following a systematic synthesis of the literature, we identified several conceptual gaps and areas for refinement:

1. Clarifying conceptual boundaries. The preliminary definition framed digital loneliness as a psychological state, but failed to differentiate between subjective perception and objective social deprivation. The literature suggests digital loneliness may manifest both subjectively (e.g., emotional disconnection despite frequent online activity) and objectively (e.g., measurable decline in face-to-face interactions due to digital overreliance).

2. Distinguishing digital loneliness from social isolation. Although the initial formulation implied causality between digital communication and loneliness, this relationship is more nuanced. Digital loneliness may emerge not only as a consequence of digital dominance, but also as a compensatory response to pre-existing conditions such as disability, geographic isolation, or occupational constraints. Therefore, digital loneliness should be conceptualized as a distinct socio-psychological phenomenon, shaped by algorithmic design, interaction quality, and evolving digital social norms.

3. Accounting for gender-specific mechanisms. The male dimension of digital loneliness was acknowledged in the original definition but not clearly delineated. The review highlights that men may experience digital loneliness differently due to socialized emotional suppression (alexithymia), lower propensity to seek help online, and masculinity norms discouraging emotional vulnerability. As such, gender should not merely be treated as a demographic variable, but as a critical axis for analysis.

Refined definition

Drawing upon these insights, we propose the following revised definition: digital loneliness among men is a multidimensional socio-psychological state characterized by reduced quality of social connection, emotional attunement, and relational significance in the context of digitally mediated communication. It is distinct from general social isolation and is shaped by a convergence of neurocognitive, sociocultural, algorithmic, and gender-related factors. Digital loneliness may arise from both subjective experiences of disconnection and objective reductions in interpersonal engagement. Among men, it is further intensified by gender-specific dynamics such as emotional inexpressiveness, reduced online help-seeking, and digital social withdrawal. Consequences include elevated stress, cognitive fatigue, and increased susceptibility to depression and anxiety.

Future research directions

Future research on digital loneliness among men should move beyond descriptive analyses toward the development of evidence-based, gender-sensitive interventions. The findings of this systematic review highlight that men's experiences of digital loneliness are mediated by emotional restraint, role expectations, and learned patterns of self-reliance that limit help-seeking behaviors. Addressing these barriers requires combining psychological, educational, and technological approaches that enhance emotional literacy, promote meaningful online interaction, and foster real-world social reconnection.

Evidence from related domains of men's health supports this integrative approach. Studies on infertile male athletes, for instance, demonstrate that men exhibit distinct emotional coping typologies from active realization to destructive denial, indicating the need for personalized psycho-therapeutic and behavioral interventions tailored to male emotional dynamics [62]. Such patterns mirror the digital sphere, where emotionally withdrawn men often turn to technology for control or distraction rather than genuine connection, deepening their isolation.

By contrast, recent research on women's adaptive strategies in stressful environments shows that women tend to engage in socially determined coping mechanisms, developing leadership and self-regulation skills even under high pressure [63]. This contrast underscores the necessity of differentiated digital mental-health programs: for men, interventions should prioritize emotional awareness, peer-based connection, and balanced digital engagement; for women, initiatives may build upon resilience and leadership capacity to prevent role overload and digital fatigue.

Ultimately, a gender-responsive framework for addressing digital loneliness should bridge digital literacy, psychotherapeutic support, and community-level engagement. Technology must evolve not as a substitute for human presence but as a facilitator of genuine belonging – a tool to help men reconnect with others, themselves, and the broader social world. The Ukrainian context offers a distinctive contribution to global men's health research. Recent evidence demonstrates the effectiveness of integrative rehabilitation approaches for male veterans exposed to extreme psychological and physiological stressors [64].

These programs, combining psychotherapeutic, physical, and social interventions, resulted in significant reductions in post-traumatic stress disorder, anxiety, depression, and somatic symptoms. Such findings suggest that comprehensive, multimodal rehabilitation frameworks that were originally developed for war veterans, may serve as a valuable model for addressing digital loneliness among men in post-crisis societies. The adaptation of these integrative methods to digital environments could enhance resilience, promote emotional regulation, and facilitate social reintegration through both online and offline mechanisms.

Another promising direction for addressing men's digital loneliness involves embodied resilience strategies that bridge psychological support with physical activity. Evidence from sport psychology demonstrates that structured physical routines, peer interaction, and self-regulatory practices can effectively counteract isolation by re-establishing a sense of agency and belonging.

A recent qualitative case study of a veteran judo and sambo athlete illustrated how sport functions as a multidimensional system of psychological stabilization and identity reconstruction among displaced men over 40 years of age [65]. The embodied resilience model for displaced athletes proposed in this study highlights how the integration of cognitive and behavioral strategies, embodied awareness, and systematic health monitoring can mitigate the effects of prolonged stress, displacement, and social disconnection. These findings suggest that sport-based interventions may serve as viable analogues for digital mental-health programs, emphasizing structure, social integration, and bodily engagement as protective factors against loneliness in the digital era. Male digital loneliness is a complex phenomenon that requires further interdisciplinary analysis. Existing academic publications only partially explain its mechanisms and consequences, highlighting the need for new research approaches. Potential future research directions include:

Integrating wearable technology data (smartwatches, sensors) to measure stress levels and social activity among men.

Adapting existing psychological support methodologies for online assistance to men experiencing digital loneliness.

Conducting comparative studies on male versus female digital loneliness.

Developing standardized scales to assess male digital loneliness, considering the specifics of their online interactions.

Can we develop metrics to measure digital loneliness?

One of the persistent challenges in researching digital loneliness is the absence of standardized and context-specific assessment tools. While traditional instruments such as the UCLA (University of California, Los Angeles) Loneliness Scale offer validated means to measure general loneliness, they fail to capture the unique characteristics of digitally mediated social disconnection.

A recent study by Qirtas et al. highlights the potential of passive sensing technologies and digital behavioral biomarkers in addressing this gap. By analyzing phone usage patterns, location-based data, and frequency of online interactions, the study demonstrated that machine learning algorithms can accurately differentiate between social and emotional loneliness, achieving a predictive accuracy of 78.5% using the XGBoost (eXtreme Gradient Boosting) model [66]. These findings suggest that digital loneliness can be operationalized not only through self-report but also via objective behavioral markers, paving the way for more personalized and data-informed interventions in men's digital mental health.

CONCLUSIONS

This study has established digital loneliness among men as a scientifically and practically relevant issue through a systematic interdisciplinary review of the literature on its impact on men's mental and physical health. The key contributions of this review include:

1) the formulation of digital loneliness as a distinct phenomenon requiring academic and societal attention;

2) an analysis of its implications across multiple disciplines, including psychology, physiology, cognitive science, technology, and cultural studies, and

3) the development of recommendations for researchers, policymakers, and technology companies to mitigate its risks.

The findings demonstrate that digital loneliness is a complex, multi-level phenomenon shaped by social, psychological, neurobiological, and technological factors. The rapid development of digital technologies introduces new challenges to male identity, masculinity, and mental well-being, necessitating an integrative approach that combines scientific research, social initiatives, and technological innovation. Key insights and implications: digital loneliness negatively affects men's mental and physical health, contributing to increased stress levels, depression, sleep disorders, and cardiovascular risks, men in digital professions (e.g., IT, data analytics, esports, programming) are particularly vulnerable due to prolonged screen exposure, low offline interaction, and occupational isolation, VR and AI companions have the potential to alleviate certain aspects of digital loneliness, but long-term effects remain unclear, warranting further empirical research, digital loneliness may hinder men's career development by limiting networking opportunities and reducing professional mobility.

There is an urgent need for objective measurement tools for digital loneliness, integrating biomarkers, social media analytics, and big data methodologies. Addressing digital loneliness among men requires a multi-sectoral response, involving medical, technological, and social policy interventions. Future research should focus on developing standardized assessment frameworks, targeted prevention programs, and digital literacy initiatives to mitigate the risks associated with excessive online engagement and declining offline social interactions.

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