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Socio-technical Effects and Innovative Support Options for Caring for Relatives in the 21st Century

Ronen Zur, Hila Fuchs

Gaia College – Academy of Applied Science & Technology, Israel

Abstract:

This study examines the evolution of family caregiving in the 21st century, focusing on current trends that impact family caregivers. It examines the complex interactions between macro-social trends, societal perceptions and technological advances that are shaping the caregiving experience. The study highlights key challenges facing the more than 40 million unpaid caregivers in the U.S., such as the impact of globalization, digitization, and changing views on disability and inclusion. Using a systematic literature review and qualitative analysis, the study identifies significant stressors for caregivers, including physical, psychological and economic pressures. It also highlights the potential of innovative technological solutions to alleviate these challenges. Digital technologies and remote care platforms have a significant impact on caregivers' emotional and practical experiences of managing long-term care, with most caregivers reporting positive experiences of using technology in daily care. The findings highlight the need for comprehensive support systems and interventions to improve caregiver well-being and suggest that future research should focus on developing integrated frameworks to better support caregivers in a rapidly changing world, particularly at the interface between technology use and psychological well-being.

Keywords: Family caregivers, Socio-technological impact, Innovative support options, Digital health interventions

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1 Introduction

The 21st century is characterized by fundamental changes affecting social, familial, and individual structures (Fuchs et al., 2023; Fuchs et al., 2024a; Petkova et al., 2024). Accelerated technological developments and profound social and cultural changes are creating a new reality that significantly impacts the role and status of primary family caregivers (Fuchs, 2025a). Rising life expectancy, which currently averages 83 years in industrialized nations (WHO, 2021), combined with the increasing prevalence of emotional and psychological challenges, has led to a significant increase in the number of people who need to act as family caregivers.

Accelerated individuation processes significantly impact family care work in the 21st century. What was an integral part of the family in human evolution (Stiner, Barkai, & Gopher, 2009) is coming back, forming an unnatural social formation (Fuchs, 2025b). This phenomenon, with its potential consequences, underscores the need for further research and understanding. Research shows that globalization and digitalization create a complex and intriguing paradox in caregiver research. While they provide unprecedented access to information and medical support, they also increase feelings of isolation and alienation, as Schulz (2020) highlights in his research on the impact of technology on primary caregivers. Pinguart & Sörensen (2011) emphasize the inherent tension between the values of autonomy and self-actualization and the demands of the caregiving role. Research by Greenwood et al. (2019) shows how changes in traditional family structures continue to influence the coping mechanisms of primary caregivers.

This study examines the phenomenon of family caregiving in the 21st century and focuses on how current changes affect the role, functioning and quality of life of caregivers. It aims to understand the complex interaction between macro-social trends (globalization, digitalization, individuation) (Petkova et al., 2024), changes in societal perceptions (disability perspective, inclusion, integration) (Fuchs, 2022) and technological developments in relation to the daily experiences and challenges of family caregivers. The research focuses on six core objectives that address the modern challenges of caregiving. First, it examines the factors driving the increasing need for family caregiving today, including demographic changes and evolving family structures. Second, the study analyzes how sociocultural changes, globalization and technology are impacting the quality of life and functioning of caregivers. Third, the study explores innovative support methods, in particular technological solutions and socio-technological entrepreneurial opportunities. Fourth, it develops a theoretical framework that explores the relationships between social perceptions, technological variables and caregiver strain. Fifth, the study creates a knowledge base for innovative interventions by identifying unmet needs of caregivers and potential business models. Finally, it examines the sustainability and scalability of care solutions, focusing on factors for successful implementation and expansion of reach.

Roth et al. (2015) emphasizes the importance of understanding today's care challenges. The study uniquely connects the traditional needs of caregivers with the technological and business opportunities of the 21st century by highlighting the potential for AI-powered decision support, IoT

remote monitoring systems and augmented reality applications for caregiver training. The study explores socio-technological entrepreneurial opportunities, including caregiver resource sharing platforms, blockchain-based service coordination and fintech solutions for caregivers' financial needs. The research contributes to policy innovation and intervention programs by proposing frameworks for career integration, financial support in the digital age and hybrid career paths. It explores collaborative innovation through digital and physical communities, including knowledge-sharing platforms and technology-based resource management systems.

The study's entrepreneurial focus highlights sustainable business opportunities in the care sector, making it valuable for social entrepreneurs, technology developers, policy makers, healthcare organizations and social investors. This comprehensive research combines theoretical understanding with practical applications, advancing both academic discourse and the development of solutions for family care. The results will inform policy development, drive technological innovation and improve support systems for family caregivers.

2 Theoretical background

2.1 Definitions and characteristics of family care

Family care is a complex, unpaid support system provided by family members for people with different health needs. In Van Goethem et al (2023), 7.6% of respondents reported caring for sick family members within a 12-month period. Family caregivers provide around 80% of long-term care in industrialized countries (Burtscher, 2020; Levine et al., 2010) and provide complex medical care, emotional support and household management (Parker et al., 2022). Studies show that caregivers spend an average of 24 hours per week providing care, with 25% spending more than 40 hours per week (Cha & Moon, 2021). In contrast to professional caregivers, family caregivers generally have no formal training (Colepaugh, 2004). 85% of them teach themselves medical and nursing skills (Stajduhar et al., 2013). Compared to professional caregivers, they spend 60% more time on psychosocial care activities (Parvizi & Ay, 2024).

The impact on caregivers is significant. The research highlights that 40-70% show clinical signs of depression, and 45% report chronic physical illness related to caregiving (Gallagher & Wetherell, 2020). The average duration of caregiving is 4.5 years (Maestas et al., 2024). Women make up 66% of family caregivers, which has a significant impact on their careers and financial security (Parker et al., 2022). The economic value of unpaid family care work is estimated at \$470 billion annually in the United States alone (Reinhard et al., 2023). This pattern underscores the need for improved support systems, considering technological advances (Redfoot, Feinberg, & Houser, 2013) and cultural factors (Cuartas et al., 2020) in caregiving practice.

2.2 The development of the role and historical context of family care services

Family care has a long history that has changed considerably over time due to changes in social structures, cultural norms and economic conditions (Tilley, 2015). The evolution and transformation of family caregiving reflects broader societal change and continues to adapt as new challenges and opportunities arise. Understanding the historical context is critical to developing effective strategies and support systems that meet the needs of today's caregivers.

In the past, caregiving was primarily as a feminine familial task (Liedloff, 2004; Zwar, König, & Hajek, 2023), embedded in the cultural phenotype and memetic family system in many cultures closer to quasi-organic social construction (Fuchs et al., 2024b; Dabur & Fuchs, 2025), older family members lived close to younger generations, which facilitated caregiving within the household. This model was prevalent in agrarian societies, where family units were larger and more interconnected. In many societies, caregiving was seen as a moral obligation that often fell to women due to traditional gender roles. This expectation was rooted in cultural norms that valued filial piety and familial duties, particularly in collectivist cultures such as Japan, where the value of dependency and privacy influenced caregiving practices (Hashizume, 2010). The industrial revolution and subsequent urbanization led to significant changes in family structures. As people moved to cities for work, nuclear families became more common, reducing extended family support for caregiving (Markus & Kitayama, 2014). This change increased the pressure on individual family members to provide care.

In the middle of the 20th century, social changes such as rising divorce rates, remarriage and geographical mobility led to a further diversification of family structures (Bloch, 2017). These changes challenged traditional models of care and required adjustments in the way care was provided. Globalization has also influenced caregiving by facilitating migration and intercultural exchange. For example, cross-border care has become more common as families spread across multiple countries, leading to new forms of "other motherhood" where care is provided remotely through referrals or virtual communication (Bloch, 2017). Due to demographic changes such as the aging population and longer life expectancy (Changing Family Dynamics and Elderly Care), caregivers today face challenges. These factors have increased the demand for care services and highlighted the need for formal support systems to supplement family care.

2.3 The modern care landscape: challenges, effects and interventions

The 21st century care landscape has unique features characterized by technological advances that provide new tools for support and monitoring, demographic change and changing social structures (Bloch, 2017). The role of family caregivers is increasingly recognized as critical to healthcare systems worldwide, despite facing significant emotional and financial burdens, leading to calls for targeted interventions and community support. The integration of technology has revolutionized caregiving practices across multiple channels. Advanced digital tools such as health monitoring applications, virtual support communities and telemedicine platforms have improved people's ability to manage caregiving tasks efficiently (Bloch, 2017).

Digital technologies and remote care platforms are having a significant impact on family caregivers' emotional and practical experiences of long-term care. Caregivers generally report positive experiences

with technology as they find it useful and easy to integrate into caregiving routines (Uhm et al., 2023). However, barriers such as compatibility with personal values and the digital divide can hinder the adoption of technology (Xiong et al., 2023; Farnood et al., 2024). Digital tools improve care-oriented communication, counteract social isolation and improve engagement (Oliver, 2022). Ethnographic studies emphasize the importance of trust and family dynamics in remote care (Ahlin et al., 2025). Telehealth tools offer important support, especially for caregivers in rural areas, by providing education and social support (Chi & Demiris, 2017). Overall, digital health interventions can improve caregivers' well-being and quality of life but must be tailored to specific needs and challenges (Zhai et al., 2023).

The financial impact goes beyond the direct costs. Studies show that the working hours of middle-aged women are reduced by 41% due to caregiving (Changing Family Dynamics and Elderly Care). Informal caregivers are 5–10% less likely to be employed than non-caregivers (Carmichael et al., 2010), which has a long-term impact on retirement security and economic stability, especially for female caregivers. Contrary to prevailing opinion, there is evidence of the positive effects of family caregiving time. Cohen et al (2002) found that 73% of their Canadian participants reported positive aspects such as companionship, fulfillment and enjoyment of caregiving. These positive outcomes were inversely related to depression, stress and self-rated health. Qualitative interviews by Ashworth & Baker (2000) support these findings. Approximately 40% of caregivers expressed satisfaction with their role.

Psychological effects and mental health. Tsai and Jirovec (2005) demonstrated that stress in caregivers leads to depression, which affects physical performance, self-esteem, marital satisfaction, and caregiver stress. Bacharz and Goodmon (2017) reported that 20% of family caregivers suffer from depression. Public health surveys show that they have significant physical and mental health problems compared to non-caregivers. Amirkhanyan and Wolf (2006) found that caregiving affects the well-being of the entire family, with the mere presence of a parent in need of care increasing the likelihood of depression. Pinquart and Sörensen's (2011) review of 228 studies found that behavioral problems, physical and cognitive impairment, and time spent providing care significantly influenced caregiver burden and depression symptoms.

Gender-specific differences in care. Bookwala (2009) has shown that the likelihood of depression increases over time in women, while it decreases in men. Female caregivers generally report higher levels of depression, anxiety, and lower levels of well-being (Yee & Schulz, 2000). Raschick and Ingersoll-Dayton (2004) found that women tend to be more burdened by the caregiving experience, perceive more costs of caregiving, and have lower life satisfaction.

Effects on physical health. The 2018 BCBS Health Index found that the physical health of caregivers was 26% more impaired than that of the comparison population (Norris, 2023). Pinquart and Sörensen (2011) found that the most severe physical impairments occurred among older, male caregivers and those caring for dementia patients. This finding represents a different risk group than in mental health research, where women perceive a higher burden of caregiving (Raschick & Ingersoll-Dayton, 2004).

Young adult caregivers. Gillen and Roland (2011) found that young adult caregivers scored above average on the Center for Epidemiological Studies' depression scale. The emergence of Generation Z as caregivers, especially among college students, presents unique challenges that require special attention and support.

Research on the mental well-being of family caregivers shows complex interactions between caregiving tasks and macrosocial trends. Increased life expectancy and changing family structures have resulted in more "sandwich" carers who may experience reduced generativity and autonomy compared to child carers (Hodgdon & Wong, 2022). However, the impact of multigenerational caregiving on well-being is minimal (Loomis & Booth, 1995). Employment can provide respite for caregivers, with full-time employment potentially offering greater benefits (Hansen & Slagsvold, 2014). The choice of care setting and the relationships between caregivers and care recipients have a significant impact on psychological well-being (Li & Lee, 2020). Social support, particularly from health services, plays a protective role in mitigating the negative effects of caregiving stress (Bongelli et al., 2024). Age, gender and marital status moderate the relationships between caregiving and well-being (Wong et al., 2019). These findings highlight the need for targeted workplace interventions and measures to support the mental wellbeing of caregivers (Kim & Min, 2006; Bongelli et al., 2024).

Intervention strategies. Family-centered intervention programs have been shown to effectively reduce stress, anxiety and depression in caregivers (Etemadifar et al., 2018). Family-based educational programs have been shown to be highly effective in reducing caregiver stress in various patient populations (Rabiei et al., 2020; Sotoudeh et al., 2019). These interventions have been shown to be successful for caregivers of patients with hemodialysis, epilepsy, cancer, dementia and stroke (Etemadifar et al., 2018; Sotoudeh et al., 2019).

3 Methodology

This study used a mixed methods approach to investigate family caregiving in the 21st century. We combined a systematic literature review with a qualitative content analysis to explore the theoretical framework and practical implications of contemporary caregiving challenges. The systematic literature review included peer-reviewed articles published between 2010 and 2024 and focused on high-impact journals from the fields of gerontology, healthcare and social sciences. To identify relevant literature, we used a series of keywords and their combinations, including "family caregiving", "informal caregiving", "caregiver burden", "caregiving in the 21st century" and "caregiving in the 21st century"

The inclusion criteria for the literature review were as follows: Articles published in English; studies dealing with family caregiving in a contemporary context; empirical studies, theoretical papers and systematic reviews; research dealing with technical, social or political aspects of caregiving. However, exclusion criteria included: studies published before 2010; articles that were not peer-reviewed; studies that focused exclusively on professional care; studies that did not address current challenges or innovations in care.

The selection process included a screening of titles and abstracts, followed by a full-text review of potentially relevant articles. To ensure reliability, two researchers carried out this process independently. The content analysis was complemented by a rigorous thematic analysis of the identified literature, which allowed us to identify important patterns and trends. It included detailed

coding of recurring themes with cross-validation through a multi-researcher review to increase the reliability and validity of the findings. This methodological approach facilitated the identification of emerging patterns while maintaining scientific rigor. The study integrates multiple theoretical perspectives in the development of our framework, including social support theories by Pinquart and Soerensen (2011), ecological models of care, and the resilience model described by Chi and Demiris (2017). This integration provides a solid foundation for understanding the complex dynamics of modern care work.

4. Results

4.1 Frameworks in nursing research

The Therapeutic Assessment (TA) Model and the Family Therapy Engagement Model provide a framework for understanding caregiver involvement in the clinical setting. Studies show that these collaborative approaches improve treatment outcomes, particularly in the pediatric context (Lantier, 2023; Alonso et al., 2022).

Contemporary theoretical perspectives offer important insights into caregiver adaptation. Role conflict theory explores the tensions between nursing and other life roles, while role theory emphasizes the benefits of role diversity with appropriate support (Brady et al., 2023). Symbolic interaction and action theories (Leiba, 2025) show how caregivers' role interpretations influence their experiences and decisions (Ivey, 2022).

Bonanno's concept of resilience is highly influential in understanding the maintenance of nurses' psychological well-being (Opsomer et al., 2022), as it emphasizes personal growth and the processes of advantage seeking. The ecological perspective (Chi & Demiris, 2017) provides a comprehensive framework for understanding care dynamics in broader contexts, with recent studies emphasizing the interplay between individual characteristics and societal influences (Ho et al., 2024). These theoretical frameworks emphasize the need for integrated approaches to develop effective support systems for caregivers.

4.2 Challenges for caregivers: A comprehensive analysis

Family caregiving in the 21st century involves complex challenges that impact the physical, psychological, social and economic well-being of caregivers. Research shows that managing multiple medical treatments leads to increased burnout and psychological stress (Sharma et al., 2021). Studies show significant physiological effects of stress in caregiving, including metabolic disturbances, chronic inflammation and accelerated cognitive decline. There is evidence that prolonged stress is associated with altered immune function and increased susceptibility to chronic disease (Sharma et al., 2021).

The economic impact is particularly severe and includes reduced working hours, missed career opportunities and withdrawal from the workforce. Recent economic analyses show significant indirect costs through lost productivity and healthcare expenditure (Kuenzig et al., 2019). For example, parents of children with cancer are faced with considerable direct costs and high care costs that threaten the financial stability of the family (Tsimicalis et al., 2020). Studies estimate that the lifetime costs of caregiving, including lost wages and benefits, can exceed \$300,000 for long-term caregivers (Oba et al., 2021). These multifaceted challenges underscore the need for comprehensive support systems and interventions to help caregivers manage their tasks while maintaining their own well-being.

4.3 Innovation and entrepreneurship in the care sector

The intersection of innovation, entrepreneurship and care represents a dynamic frontier of change in the healthcare sector. As demographic change places unprecedented demands on care systems, technological advances and entrepreneurial initiatives are proving to be key drivers in the development of solutions. The development of technology-enabled care solutions has led to significant changes in care models. Today's innovations include a wide range of solutions tailored to the various challenges of family caregiving. Research shows that entrepreneurs are increasingly focused on developing integrated systems that support aging in place while addressing the physical, psychological and social dimensions of care (Mirchev, 2019). These developments represent a significant shift from traditional approaches to care towards more sophisticated, technology-enabled models of care. The ORKESTA initiative is an example of this technological integration. It demonstrates how advanced speech and language technologies can improve communication and service delivery in home care settings (Bilad et al., 2023). This collaboration between technology centers and healthcare providers illustrates the potential for cross-sector partnerships to drive innovation in care services.

The emergence of social tech entrepreneurship has revolutionized the development of smart technologies for aging. Recent advances in robotic companion systems and digital home automation represent significant progress in addressing care challenges, particularly in contexts where labor shortages affect the quality of care (Izonin et al., 2023). These innovations go beyond purely technological solutions and encompass comprehensive approaches to improve both the efficiency of caregivers and the well-being of those in need of care (Adelman et al., 2014). This comprehensive approach combines technological innovations with educational resources, resulting in a measurable reduction in caregiver strain and an improvement in the quality of care.

4.4 Impact of digitalization on care patterns and support systems

The digital revolution has fundamentally changed care through innovative tools and platforms. Virtual communities and telemedicine services facilitate information sharing and emotional support, with studies showing better outcomes and reduced caregiver isolation. The COVID-19 pandemic has accelerated the adoption of telehealth, improving access to healthcare and coordination between caregivers and support workers (Mirchev, 2023).

Modern digital tools, including AI and machine learning technologies, have revolutionized remote patient monitoring, enabling comprehensive health monitoring and predictive analytics (Bilad et al.,

2023). Specialized applications, such as complementary medicine in autism care, demonstrate the value of machine learning in the care context (Izonin et al., 2023).

Digital health information systems have improved care coordination and communication networks (Mirchev, 2023). The mHealth app "CommitFit" is an example of innovative approaches that use gamification to change caregiver and patient health behaviors (Braddock et al., 2024). Web-based interventions have been shown to be effective in reducing depression and anxiety in caregivers of cancer patients (Bilad et al., 2023).

Research by Chi and Demiris (2014) found that telehealth tools can positively affect chronic disease care, home, and hospice care, with more than 95% of studies reporting significant improvements in caregivers' outcomes and high satisfaction with technology. Videoconferencing technology has been particularly effective in enriching the distant caregiving experience, creating a sense of closeness, including residents in family interactions, and reducing feelings of guilt and isolation (Demiris et al., 2008).

Digital interventions have shown promise in supporting specific caregiver populations. For example, Project VITAL At Home, which provided tablets and access to supportive programs for dementia caregivers during the COVID-19 pandemic, showed improvements in caregiver well-being by alleviating stress and improving access to resources (Nguyen et al., 2022). Similarly, a digitally supported care management program for dementia caregivers demonstrated positive effects on perceived health outcomes (Klein et al., 2024). Chronic grief management interventions delivered through synchronous online video have proven feasible with high caregiver satisfaction (Paun & Cothran, 2019).

However, challenges persist, including potential healthcare disparities due to uneven technology access, data privacy concerns, and incomplete integration with traditional healthcare systems (Mirchev, 2023). A study on remote monitoring technologies for dementia caregivers identified four key themes that influence technology adoption: the unique relationships in family care, the risk-benefit conundrum accompanying technology use, human-technology interaction and usability issues, and the importance of creating tailored solutions (Snyder et al., 2020). Despite these challenges, online educational platforms and digital resources continue to provide accessible, high-quality training for caregivers while maintaining schedule flexibility.

Internet-based digital tools have proven valuable in reducing social isolation and addressing support needs among informal caregivers. By connecting with peers in online communities, caregivers report regaining a sense of social inclusion and belonging (Newman et al., 2021). These platforms can be cost-effective and convenient ways to develop programs that help unpaid caregivers form communities, gain support, and access resources.

The impact of technology dependence on care recipients and their family caregivers is complex. While home technology care allows patients to remain in their preferred environment (Gotani & Fuchs 2024), it also creates challenges in administering complex therapies. Both patients and caregivers need additional support to reduce the physical, emotional, social, and financial burdens they experience (Winkler et al., 2006). A greater level of preparedness for managing home technology and technology-related problems may improve quality of life for both caregivers and care recipients.

4.5 Psychological Well-being of Family Caregivers in Contemporary Contexts

Family caregivers' psychological well-being is significantly influenced by various factors in today's rapidly changing social environment. Research comparing sandwiched caregivers (providing multi-generational care) with filial caregivers (caring primarily for parents) reveals important distinctions. Sandwiched caregivers exhibit lower levels of generativity than filial caregivers, but those with greater decision authority in the workplace trend toward greater autonomy and experience significantly less difficulty with instrumental activities of daily living (Hodgdon & Wong, 2022). Additionally, sandwiched caregivers with strong supervisor support tend to exhibit higher levels of generativity compared to other caregivers.

The impact of multigenerational caregiving responsibilities on well-being appears more nuanced than previously assumed. Early research by Loomis and Booth (1995) found that changes in family responsibilities had little to no effect on caregivers' well-being, even after considering factors such as gender and employment hours. More recent studies support this finding while adding important context about moderating factors (Wong et al., 2019).

Employment status and work environment significantly influence caregiver well-being. Hansen and Slagsvold (2014) found that out-of-household caregiving has no significant relationship with well-being, regardless of employment status. However, in-household caregiving is associated with lower psychological well-being, but only among women who do not work full-time. This suggests that full-time employment may offer protective benefits for caregivers, possibly by providing greater opportunity to achieve the full benefits that employment has to offer.

The relationship between caregivers and care receivers, along with caregiving choice, significantly impacts psychological well-being. Li and Lee (2020) found that family caregivers for spouses and children report significantly worse psychological well-being, whereas having choice in becoming a caregiver is associated with better outcomes. Additionally, their research demonstrated a significant moderation effect of caregiving choice on the association between caregiver-receiver relation and psychological well-being.

Social support plays a crucial protective role in mitigating the negative effects of caregiving burden. Bongelli et al. (2024) identified a significant negative correlation between caregiving burden and psychological well-being, with caregiving burden being a significant predictor of reduced well-being. Conversely, greater perceived social support was positively correlated with better psychological well-being, with support from social and health services having the most notable impact. Their findings highlight the need for interventions focused on reducing caregiving burden and enhancing support systems.

Work-family interactions also significantly affect caregiver well-being. Hodgdon and Wong (2022) found that sandwiched caregivers with high levels of negative work-to-family spillover exhibited higher negative affect than comparison groups. Similarly, those with high levels of negative family-to-work spillover showed higher negative affect and lower self-acceptance. These findings suggest the importance of workplace programs that address spillover between work and home to promote caregiver well-being.

The relationship between caregiving, employment, and well-being may also be influenced by cultural and societal factors. Cross-cultural studies have identified differences in how gender, caring roles, and work responsibilities interact to affect psychological well-being, with more complex relationships observed in more egalitarian countries (Hori & Kamo, 2014). This highlights the importance of considering both micro-level predictors and macro-level gender climate when examining caregiver well-being.

Family dynamics and personal resources also play important roles in shaping caregiving experiences. The effects of caregiving on women's emotional health are moderated by previous psychological well-being, with caregivers with high prior well-being reporting high subsequent well-being (Moen et al., 1995). Additionally, previous social integration (in the form of religiosity and multiple-role involvements) and other currently occupied nonfamily roles (worker and volunteer) influence how caregiving affects well-being.

Recent research has advocated for a more balanced view of the caregiving experience. Marino et al. (2017) propose reframing caregiver well-being to include both hedonia (levels of positive and negative affect) and eudaimonia (personal growth) as equally important constructs. This approach recognizes that while caregiving can produce negative psychological effects among subgroups of highly strained caregivers, most caregivers are resilient and report personal growth and psychological benefits from their experiences.

5. Discussion

The research findings reveal significant transformations in contemporary caregiving practices, particularly in relation to technological integration and societal changes. The implementation of digital solutions, as discussed by Schulz et al. (2020), has created unprecedented opportunities for caregiver support while simultaneously presenting new challenges related to accessibility and adoption. Lee et al. (2023) found that caregivers who used technology for caregiving reported generally positive experiences and satisfaction, rating technologies as useful and easy to incorporate into care arrangements. However, Xiong et al. (2023) identified important barriers to technology adoption, including compatibility with personal values and abilities and the need for technology to be tailored specifically toward caregivers' needs.

The digital divide emerges as a critical concern, particularly affecting older caregivers and those in resource-limited settings, potentially exacerbating existing inequalities in care provision. As Farnood et al. (2024) note, while digital health interventions can positively impact caregivers' overall well-being, challenges related to privacy concerns and access inequalities must be addressed to maximize benefits.

Socioeconomic implications of caregiving have become increasingly prominent in the contemporary context. Adelman et al. (2014) highlight the significant financial strain faced by caregivers due to reduced work hours or career interruptions. This economic impact is amplified by extended caregiving periods resulting from increased life expectancy, more complex care needs requiring specialized

knowledge, and limited access to formal support services. The intersection of caregiving responsibilities with economic pressures creates a complex dynamic that affects both caregiver well-being and care quality.

Cultural and demographic shifts have substantially influenced caregiving dynamics in the 21st century. Greenwood et al. (2019) emphasize how globalization has impacted traditional family structures, leading to evolving support systems and changing cultural perceptions of caregiving roles. These shifts necessitate adaptive responses in both policy and practice to address emerging needs effectively.

The emergence of innovative technological solutions has created new opportunities for caregiver support, including remote monitoring systems, digital health platforms, and virtual support communities. These developments align with Schulz's et al. (2020) observations about technology's transformative potential in caregiving contexts. Chi and Demiris (2017) highlight the valuable role that telehealth tools can play in supporting family caregivers, especially those in rural areas or providing remote care. Their research demonstrates that telehealth can effectively deliver education, consultation, psychosocial therapy, social support, monitoring, and clinical care to caregivers.

The psychological well-being of caregivers is influenced by a complex interplay of factors. Hodgdon and Wong (2022) found significant differences between sandwiched and filial caregivers, with workplace factors like decision authority and supervisor support moderating these effects. Hansen and Slagsvold (2015) demonstrated that employment, particularly full-time work, may provide important benefits for caregivers rather than adding to their burden. This highlights the need for workplace policies that support caregivers in maintaining employment while fulfilling their care responsibilities.

Contemporary support models demonstrate increasing sensitivity in addressing caregiver needs through the integration of formal and informal support systems, adaptation to diverse cultural contexts, and enhancement of community-based resources. Bongelli et al. (2024) emphasize the protective role that social support plays in mitigating the negative effects of caregiving burden on psychological well-being, with support from social and health services having particularly notable impacts.

Policy implications emerging from this research suggest the need for enhanced financial support mechanisms, improved integration of caregiving support into healthcare systems, and comprehensive training programs. Practice guidelines emphasize the importance of standardized assessment protocols, technology integration, cultural competency, and regular evaluation of intervention effectiveness.

6. Summary

This comprehensive study investigates the evolving landscape of family caregiving in the 21st century, emphasizing the multifaceted impacts of contemporary trends on caregivers. The research

documents the complex challenges encountered by over 40 million Americans providing unpaid care for adults aged 65 and older. It explores key phenomena, including globalization, digitalization, changing societal perceptions, and individualization processes.

The study significantly contributes to the theoretical understanding of family caregiving in several respects. It integrates diverse theoretical frameworks, including social support theories, ecological models of care, and resilience frameworks, thus providing a more comprehensive perspective on modern caregiving dynamics. Furthermore, the research extends existing theories by incorporating the influences of technological advancements and globalization on caregiving practices, offering new insights into the evolving nature of care provision. The findings contribute to developing a more inclusive theoretical framework for comprehending the interaction between macro-social trends and the individual experiences of caregivers.

The integration of research on digital technologies and caregiving reveals both opportunities and challenges. Lee et al. (2023) found that while caregivers are generally active users of technology for themselves, their use of technologies specifically for caregiving lags behind. Those who do use technology for caregiving report positive experiences, finding the technologies useful and easy to incorporate into care arrangements. However, as highlighted by Xiong et al. (2023), barriers to technology adoption include compatibility with personal values and abilities, and the need for technologies to be tailored specifically to caregiver needs.

Research on psychological well-being adds important nuance to our understanding of caregiving experiences. While caregiving has traditionally been viewed as primarily burdensome, studies like those by Marino et al. (2017) suggest the need for a more balanced perspective that acknowledges both the challenges and potential benefits of caregiving. The complex interplay between caregiving and employment, as demonstrated by Hansen and Slagsvold (2014), challenges the assumption that combining work and caregiving necessarily harms well-being. Instead, full-time employment may offer important benefits for caregivers, suggesting that "double burden" concerns may be misplaced.

The research outlines important implications for healthcare managers, policymakers, and organizations that support caregivers. It underscores the necessity for more flexible workplace policies to accommodate the intricate needs of caregiving employees, which may help mitigate workforce attrition and enhance productivity. Additionally, the study emphasizes the importance of developing targeted support programs designed to address the specific challenges faced by contemporary caregivers, including training in technological tools and assistance with financial planning. The findings suggest that healthcare organizations should prioritize the

The findings suggest that healthcare organizations should prioritize the integration of family caregivers into formal care teams, recognizing their critical role in influencing patient outcomes and treatment adherence. Digital health interventions, as explored by Zhai et al. (2023), show promise in providing high-quality assistance to caregivers by improving psychological health, self-efficacy, caregiving skills, quality of life, social support, and problem-coping abilities.

Considering the study's findings, several avenues for future research are proposed. One key area is conducting longitudinal studies to assess the long-term effects of technology adoption on caregiver well-being and care recipient outcomes. The systematic review by Chi and Demiris (2017) showed that telehealth interventions can positively affect chronic disease care and hospice care, but longer-term

studies are needed to understand sustainability. Cross-cultural comparative studies could provide valuable insights into how varying societal contexts shape caregiving experiences and support needs. As demonstrated by Ahlin et al. (2025), the integration of digital technologies in caregiving practices differs across cultural contexts, with factors such as family values and trust significantly influencing adoption patterns.

Additionally, it would be beneficial to investigate the effectiveness of various intervention models, particularly those that leverage emerging technologies, in alleviating caregiver burden and enhancing care quality. Klein et al. (2024) and Paun and Cothran (2019) have shown promising results for digitally supported interventions for dementia caregivers, but more research is needed across different caregiver and care recipient populations. Lastly, exploring the economic implications of caregiving across different demographic groups could inform the development of sustainable financial support models, addressing the concerns raised by Li and Lee (2020) regarding the differential impact of caregiving based on caregiver-receiver relationships and caregiving choice.

The reliance on existing literature may not fully capture the most recent trends and developments in caregiving practices, especially given the rapid pace of technological change. While the study's broad scope offers a comprehensive overview, it may restrict the depth of analysis in specific caregiving areas. The focus on published research could introduce bias, potentially overlooking important insights from unpublished or ongoing studies. Furthermore, although the study employs rigorous methodology, it may not sufficiently account for the diversity of caregiving experiences across various cultural and socioeconomic contexts. These limitations highlight opportunities for future research to further refine our understanding of family caregiving in the 21st century and to develop more targeted interventions and support systems.

7. Conclusions

The findings of this research demonstrate that family caregiving in the 21st century is characterized by increased complexity due to technological integration, greater need for systematic support structures, evolution of traditional caregiving roles, and emergence of innovative support solutions. These changes necessitate adaptive responses from both policy makers and practitioners.

Digital technologies have fundamentally transformed the caregiving landscape, offering new opportunities for support while introducing unique challenges. As Lee et al. (2023) found, caregivers generally view technologies positively when they are easy to use and integrate into care arrangements. However, the digital divide remains a significant concern, with access disparities potentially exacerbating inequalities in care provision. Newman et al. (2021) highlight how internet-based digital tools can reduce social isolation and address support needs among caregivers, enabling them to connect with peers, gain support, and access resources in cost-effective and convenient ways.

The psychological well-being of caregivers is influenced by a complex interplay of factors, including employment status, caregiver-receiver relationships, and social support. Hansen and Slagsvold (2014) found that full-time employment may benefit caregivers rather than adding strain, challenging conventional assumptions about work-care conflicts. Bongelli et al. (2024) demonstrated the crucial protective role of social support in mitigating the negative effects of caregiving burden on psychological well-being. These findings suggest that interventions should focus on enhancing support systems and facilitating employment continuity for caregivers.

The emergence of sandwiched caregiving as a prevalent phenomenon requires particular attention. Hodgdon and Wong (2022) found that sandwiched caregivers exhibit lower levels of generativity than filial caregivers, but workplace factors such as decision authority and supervisor support can moderate these effects. This highlights the importance of workplace policies that support caregivers in balancing their multiple responsibilities.

Future research directions should address several critical areas that emerged from this study. The long-term impact of technological interventions requires careful examination, as does the effectiveness of hybrid support models. Nguyen et al. (2022) showed promising results from pairing tablets with caregiving supports during the COVID-19 pandemic, but randomized trials are needed to more fully assess the benefits of such interventions. Cultural adaptation of support programs and economic sustainability of caregiving solutions represent additional areas requiring focused investigation.

This research has identified several limitations that warrant consideration in future studies. The geographic concentration of existing research, limited longitudinal data, and focus on specific caregiving contexts suggest the need for more diverse and comprehensive research approaches. Future studies should prioritize cross-cultural comparative analyses, long-term effectiveness evaluations, and detailed economic impact assessments.

The evolution of family caregiving in the 21st century presents both challenges and opportunities for improvement. The future of caregiving will require innovative approaches that balance technological advancement with human-centered care. The successful integration of these elements, combined with appropriate policy support and practical implementation strategies, will be crucial in addressing the complex needs of contemporary caregivers.

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