Original Article

Caregiving in the Digital Age: Exploring Technological and AI-Based Interventions for Mental Health

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Abstract - Caregiving is a demanding role that often leads to various mental health challenges, such as depression, anxiety, and stress. With the rising prevalence of chronic illnesses, the need for adequate caregiver support is more critical than ever. This study investigates the intersection of technology, AI, and caregiver mental health, exploring how digital interventions can provide support across different age groups. This study employed a qualitative research design, conducting in-depth interviews with 11 caregivers (7 women and 4 men), predominantly between the ages of 20 and 50. The interviews were audio recorded and thematically analyzed to identify key findings regarding the effectiveness and desired features of technological tools. The key findings reveal that while no participant believed technology could fully replace human-based mental health services, they universally agreed it could be a meaningful supplement. Participants expressed a strong desire for personalized tools that balance practical caregiving assistance, such as medication and appointment reminders, with emotional support features. Specifically, they highlighted a need for an empathetic and human-like AI interface that provides emotional check-ins, offers positive affirmations, and gives reminders to prioritize self-care. This research concludes that the most effective technological interventions will be those that integrate both task-based and emotional support functionalities, underscoring the importance of a human-centered design approach to develop scalable, accessible digital tools that address the requirements of multigenerational caregivers.

Keywords - Caregiver, Caregiving, Mental-Health, Support, Technology.

1. Introduction

Caregiving is a structured and ongoing task that many individuals take up. It emerges from a relationship with the recipient in response to the requirement of support that exceeds what is typically anticipated because of impairment in functioning (Goodhead & McDonald, 2007). Caregivers provide care and support to another individual who needs vigilance and assistance with daily activities and medical care. Informal caregivers help individuals with the tasks that they are unable to do on their own. These can involve caring for oneself, caring for the home, handling money and paperwork, helping with mobility, and offering companionship and emotional support (Goodhead & McDonald, 2007; Pinquart & Sörensen, 2003). Patients with chronic illnesses have specific treatment requirements and hence need caregiver involvement, which complicates this already complex care further. Adding on, as better treatments have increased the life spans of most patients with chronic illnesses, caregivers are often required for several years (Given et al., 2001; Given et al., 2008). The role of a caregiver changes depending on their age, as well as the nature of the patient's condition. It is likely to include the caregivers taking responsibility to support the well-being of the recipient. This usually involves constant observation, communication with official care systems, and addressing any deficiencies not supplied by the paid healthcare professionals (Goodhead & McDonald, 2007; Schulz & Eden, 2016).

Caregiver health has drawn a considerable amount of attention in the past few years. This is because it has become clear that caregivers are at an increased risk for psychological and physical challenges, as well as weakened social functioning. Also, due to their health affecting their ability to provide support for the patient or family member they are caring for (Aldwin et al., 2007).

The heavy burden that caregivers take up acts as a significant threat to their own health, and the majority of caregivers report higher rates of illnesses, depression, stress, and emotional strain. Therefore, strengthening caregivers' mental health is crucial for optimal caregiving. Caregivers already have difficulties with the pressing demands of their role while coping with their own health problems, social, family, and work obligations (Petrovic, Milica, & Gaggioli, 2020).

According to a study by Piette et al. (2015), patients who have active and engaged caregivers have better self-care and positive health outcomes compared to those who have less involved caregivers. Informal caregivers play a crucial role in acting as a bridge between health care systems and the assistance that the care recipient requires (Petrovic & Gaggioli, 2020; Petrovic, 2023).

As the prevalence of chronic illnesses rises, the caregiving crisis will only intensify. The availability of technology-based solutions to assist family caregivers has grown, with a primary focus on social isolation, psychological, financial, and health and well-being support (Lindeman et al., 2020). Since they provide a significant amount of supporting care to family members in the community, the health of informal caregivers of older people with chronic illnesses is becoming increasingly significant. Internet-based therapies for informal caregivers have the potential to lessen the detrimental effects of caregiving on mental health because of their effectiveness and reach (Sherifali, Diana, et al., 2018).

Numerous examples of treatments are offered by the growing body of research on technology-based caregiving duties (Czaja et al., 2016). Six categories of technology-based interventions were identified by one systematic review of telehealth and caregivers (65 papers): social support, education, consultation, cognitive behavioral therapy, data collecting and monitoring, and clinical care delivery (Chi & Demiris, 2014). These many categories illustrate the duties associated with providing care as well as the upkeep and promotion of the caregiver's well-being.

Examples of further health-related technology applications in smart homes include those that support caregiver tasks and the needs of older individuals. According to Majumder et al. (2017) and Lindeman et al. (2020), these applications comprised embedded sensors and monitors, communication networks, computation and decision-making platforms, and sensors and actuators.

1.1. Technological Interventions and Their Role in Caregiver Mental Health

Caregivers experience various mental health challenges due to the demanding nature of their work. Some of these issues include chronic stress, depression, and anxiety (Pinquart & Sörensen, 2003). A few technologies have proved to be essential interventions in tackling the mental health issues they encounter, such as telehealth platforms, mobile Health applications (mHealth), and online support groups.

In particular, telebehavioral health services such as BetterHelp and Talkspace provide caregivers with trained therapists via video conferencing and messaging. This overcomes a few barriers, such as time constraints that usually restrict caregivers from taking regular therapy (Luxton et al., 2011). Moreover, mHealth programs such as Caregiver's Touch contain features such as mood monitoring, meditation instructions, and resources in crisis situations. Therefore, providing real-time help to caregivers in times of stress (Firth et al., 2017). However, only a few caregivers continue to use these platforms, with the majority of them discontinuing them within a month. This showcases the urgent requirement for alternative, personalized, and interactive designs (Baumel et al., 2019).

Furthermore, online support communities, such as forums like ALZConnected and Reddit's r/CaregiverSupport, are providing caregivers with places where they can share their feelings and get support from others (Namkoong et al., 2016). In particular, these platforms are valuable for individuals caring for patients with rare conditions, as they provide access to receiving specialized advice, as well as peer understanding of their situation. These spaces allow caregivers to seek support whenever they wish, which works with their chaotic schedules.

Additionally, technologies for remote monitoring, such as wearable devices and home sensors, reduce caregivers' anxiety even further since they give them updates about their patients' health in real-time (Knight et al., 2023). Technologies such as CarePredict can identify falls or non-adherence to medications, and this reduces the caregiver's need to remain vigilant all the time (Rantz et al., 2015). Nonetheless, despite such advantages arising, the use of these platforms is still relatively low because of specific barriers, particularly among rural and elderly caregivers (Wildenbos et al., 2018).

Overall, technology can meaningfully supplement human empathy for caregivers' mental health. Hendriks et al. (2022) identified three ways technology can contribute to compassion in mental health care: showing compassion to people, enhancing self-compassion, or facilitating compassion between people. Overall, technology can be used as a balance between providing emotional support for caregivers, as well as helping them with their daily organizational tasks. A support system that combines all these features in one would be the most efficient for caregivers.

Therefore, integrating these various technologies into caregiver support systems showcases their ability to improve caregiver mental health outcomes. However, how effective these technologies are depends on being able to address engagement challenges and ensuring accessibility for all caregivers, regardless of their age or technological literacy.

1.2. Role of AI in Assisting Caregivers

Artificial Intelligence (AI) is changing caregiver support, as it creates scalable and tailor-made solutions, such

as mental health chatbots and predictive analytics. There are a few AI-driven chatbots, such as Woebot and Tess, that make use of natural language processing (NLP) to provide cognitive behavior therapy (CBT) strategies, which provide 24/7 emotional support (Fitzpatrick et al., 2017). Such interventions are beneficial for caregivers with stress issues between formal therapy sessions, as a 20-25% decrease in symptoms of depression and anxiety in regular users has been seen (Abd-Alrazaq et al., 2019). Beyond emotional support, predictive modeling from AI can also identify caregivers at risk using behavioral data analysis, such as sleep patterns and communication rates (Farhan et al., 2016).

AI is making a real difference in healthcare by helping doctors and caregivers make better, faster decisions. Systems like IBM Watson Health can analyze a patient's medical history to create personalized care plans and detect potential health complications, reducing the load on caregivers (Jiang et al., 2017). Computer vision technology uses smart sensors to detect falls or signs of distress while keeping individuals' privacy safe through on-device processing (Mekruksavanich & Jitpattanakul, 2020).

In addition to improving the quality of care, these technologies also give caregivers reassurance that they'll be alerted right away in an emergency. However, it's important to tackle ethical issues like data security and algorithm bias to make sure AI tools remain fair and trustworthy (Jobin et al., 2019). Being transparent about how AI makes predictions can help caregivers feel confident about relying on these systems.

The future of AI for caregiving lies in finding the right balance between human compassion and innovative technology. While AI can take care of routine tasks like scheduling, tracking health data, or managing paperwork, it can't replace the empathy that humans provide. Developers should prioritize building AI tools that are ethical, intuitive, and shaped by honest caregiver feedback. By resolving these challenges, AI has the potential to reduce caregiver burnout and help improve mental health and well-being for caregivers.

1.3. Age-Specific Needs: Technology Design for Multigenerational Caregivers

Caregivers may come from different generations, with each of them having their own comfort levels and concerns when it comes to technology. Because of this, support tools need to be flexible in order to meet a large variety of needs. For example, apps like Happify and CaringBridge resonate with modern caregivers by combining emotional support communities with practical care management features. Middle-aged caregivers (Gen X) balance both work and family responsibilities, so they benefit most from time-saving tools like automatic medication dispensers or voice-activated assistants.

While past studies have explored how different generations use caregiving technology (Wildenbos et al., 2018; Mitzner et al., 2018), there is still a lot to learn about how to design tools that work well for everyone, regardless of age, tech experience, or cultural background. This gap shows why it's so important to build adaptive and inclusive technology rather than focusing on one age group at a time. In response to this shortage, this study looks into how generationally responsive and human-centered designs can help improve caregivers' overall well-being (Nápoles et al., 2010).

Older caregivers (baby boomers and the Silent Generation) face different challenges. They may struggle with smaller text, complex apps, or limited mobility (Wildenbos et al., 2018). To them, simple interfaces with larger fonts, voice controls, and a mix of digital and human support tend to be most effective (Mitzner et al., 2018). Cultural influences also influence how people adopt technology, with collectivist cultures preferring platforms that allow families to share caregiving duties (Nápoles et al., 2010). Adding features like language support and culturally sensitive content can make these tools more welcoming, especially for minority caregivers who may not feel represented in mainstream platforms.

Looking ahead, technologies that can automatically adjust to users' preferences, such as font size, language, or layout, could make caregiving apps more inclusive for all. In addition, pairing these digital tools with support networks could also help to bridge the technology gap. When designers put people first, they can create tools that feel natural and relatable across generations, which ultimately improves both the caregiving experience and caregivers' mental health.

Overall, this paper explores the intersection of mental health, caregiving, and technology by focusing on how AI and digital interventions can better support caregivers' mental health across different age groups. It aims to combine current research, identify gaps, and explore the possibilities of scalable and accessible mental health tools.

This research includes interviews conducted with caregivers, providing first-hand insight into the mental health challenges they face and the effectiveness, or lack thereof, of technological tools currently available to them. Previous research on caregiver mental health support has mostly been done outside of India and without hearing from caregivers themselves.

In this study, interviews were conducted with caregivers in India directly, and their experiences were analyzed thematically to understand where they need the most help. The goal is to bridge this gap by acknowledging the kind of

technology and AI required by caregivers to provide personalized and meaningful mental health support.

2. Materials and Methods

2.1. Aim

This paper investigates the intersection of mental health, caregiving, and technology, with a specific focus on how AI and digital interventions can provide support for the mental health of caregivers of various age groups. It aims to bring together existing research, highlight what is missing, and explore the unique emotional and psychological challenges caregivers face at different stages of life. It also looks at how digital tools, like mental health apps, virtual support communities, and AI-powered monitoring systems, can make care more accessible, personalized, and responsive when people need it most.

2.2. Research Questions

RQ1: How can technology and AI-based interventions support caregivers' mental health across different age groups?

RQ2: How do caregivers perceive the trustworthiness, empathy, and effectiveness of AI-based mental health tools compared to human support?

2.3. Research Design

This research includes primary data collected through interviews with caregivers, providing first-hand insight into the mental health challenges they face and the effectiveness, or lack thereof, of technological tools currently available to them. This study adopts a qualitative approach, which aims to analyze and understand the quantitative trends, along with the lived, first-hand experiences of caregivers, to develop a more grounded, human-centered analysis of the digital interventions.

Thematic analysis was done to interpret the data systematically. This involved carefully coding participants' responses and organizing them into meaningful themes. Each theme was then described, highlighting the underlying patterns, shared experiences, and significant insights that emerged from the caregivers' stories.

2.4. Participants

A total of 11 participants were interviewed, ranging in age from 20 to 50 years. The sample included 7 women and 4 men. In terms of employment status, the majority were working professionals in corporate roles, including consultants, engineers, and school teachers, while two respondents were unemployed at the time of the interviews. The duration of their caregiving experiences varied significantly, from a few months to as long as 8 years. Some participants reflected on past caregiving experiences during their younger years, whereas others shared insights from their ongoing caregiving responsibilities.

2.5. Data Collection Procedure

Data was collected through online video-call interviews conducted via Zoom and audio-recorded for accuracy. These recordings were then transcribed into text and analyzed thematically.

All participants were based in India, specifically from Delhi and Hyderabad. To ensure the study upholds high ethical standards, all participants were fully informed about the nature and purpose of the research before participating.

Informed consent was sought from all participants before surveys and interviews. Participants were assured that their answers would be kept confidential and that all data would be anonymous for reporting and analysis. All the interviews were voice-recorded, and explicit permission was requested and noted in the audios.

Participants were also given the choice to refuse voice recording if they preferred. In addition, all participants were made aware that if at any time during the interview they did not feel comfortable or did not wish to respond to a question, they could omit the question or withdraw from the study altogether. These precautions served to ensure voluntary participation, privacy, and respect for participants' well-being throughout the research process.
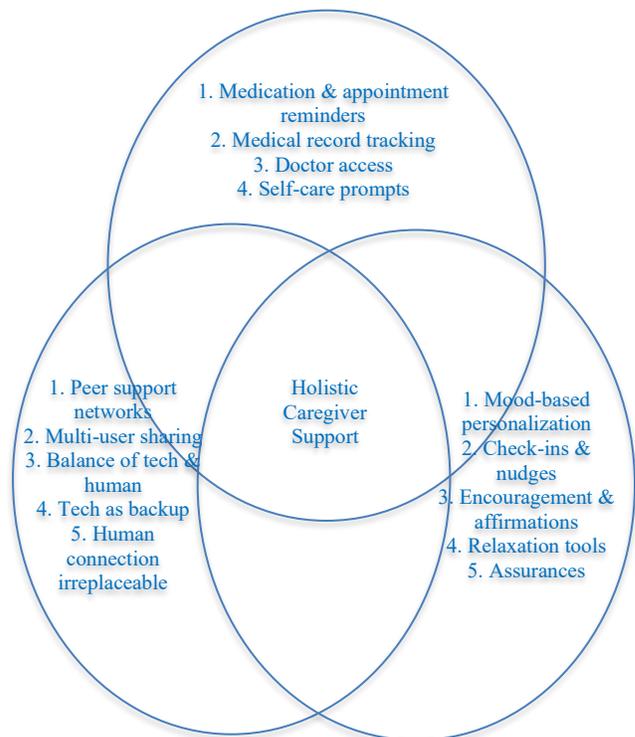
3. Results

Fig. 1 Shows the thematic map of Caregiving Support App Features.

Table 1. shows the thematic analysis of the interview responses.

Themes	Codes	Description
Caregiving for family members	Biological family	Participants primarily cared for close relatives such as grandparents, parents, cousins, and, in one case, adopted family members. The caregiving role was deeply rooted in family obligations.
	Extended family	
	Adopted family	
Caregiving for non-family members	Peers/Roommates	One participant extended caregiving beyond family, supporting peers and roommates, reflecting caregiving as a broader social responsibility, not limited to family responsibilities.
Reason to start caregiving	Situational trauma	Caregiving roles were usually initiated out of situational trauma, medical necessity, or even a sense of guilt and self-blame, indicating circumstantial and emotional motivators for taking on the role.
	Guilt/self-blame	
	Medical needs	
Age at which caregiving started	Started in school years	There were participants who started caregiving during their school days, while others initiated it later in life, showing the different life stages at which caregiving can start.
	Adult years	
Outcomes	Feelings of resilience	Caregiving led to a combination of resilience, natural duty feeling, and awareness of mortality, but also led to negative results such as stress, depression, loss of identity, interrupted life stages, and tension in relationships. Emotional ambivalence, bottled-up feelings, and physical or social consequences like neglecting one's health and social isolation were prevalent.
	Caregiving as a natural response	
	Stress from multiple responsibilities	
	Depression/hopelessness	
	Life-stage disruption	
	Reality of mortality	
	Loss of self/identity	
	Emotional ambivalence	
	Lack of emotional reciprocity	
	Anxiety & hyper-responsibility	
	Anger/irritability	
	Suppressed emotions	
Physical & social effects	Neglect of one's own health	Caregivers consistently reported neglecting their own health, social isolation, personal and work life interruptions, and feelings of being misunderstood or unappreciated. Relational tension, confinement, guilt, night disturbance, and restricted rest further increased the physical health and social costs caused by caregiving.
	Social isolation	
	Disrupted personal/work life	
	Misunderstood/unacknowledged	
	Relational strain with the care recipient	
	Physical/mental confinement	
	Guilt & moral pressure	

	Parallel life experience	
	Night-time disruptions	
Coping strategies	Therapy	Participants relied on therapy, spirituality, and peer or family support as coping mechanisms, showing a mix of formal and informal resilience-building strategies.
	Spirituality	
	Peer/family support	
Care structure	Medication & meal schedules	Routine caregiving was organized around activities like medication and meal timing, morning care, and record-keeping. Yet, some participants indicated that they had no routine at all, which reflects variability in care practices.
	Morning is a critical period.	
	No fixed routine	
Tasks	Physical care (feeding, bathing, toileting)	Core tasks were comprised of physical care (bathing, feeding, toileting), reminding about medications, coordinating appointments, managing medical records, and coordinating doctor visits, emphasizing the multifaceted nature of caregiving.
	Medication & appointment reminders	
	Medical record storage & tracking	
	Doctor access/connection	
Support received	Compliments & validation	Some caregivers indicated that they received positive responses in the form of compliments and validation, as well as reassurance from peers or members of the community. These sources of validation gave them encouragement and relief.
	Peer/community support	
Lack of recognition & support	Caregiver mental health is overlooked.	Caregivers reported that many of them perceived that their work still went unrewarded, with their own mental health considerations being frequently ignored. They also had cultural and gendered assumptions placed upon them, which amplified their load, systemic care gaps, and, in certain instances, a feeling of self-worth existing based only on patient outcome.
	Cultural & gendered narratives	
	Absence of systemic provisions	
	Worth tied to patient outcomes	
Support required	Shared caregiving duties	Patients voiced the desire for shared responsibility for caregiving, assistance with daily activities, therapy access, structured rest, and emotional outlets. The accessibility issues of therapy being viewed as a luxury were significant obstacles.
	Help with daily tasks.	
	Someone to listen	
	Structured outlets & rest	
	Accessibility- therapy is seen as a luxury.	
Current Technology Use	Medication/reminder apps	Technology use was used but fragmented, with the use of apps as reminders, smart home devices, meditation aids, scheduling tools, and sometimes avoidance or skepticism. There was emphasis placed on the lack of caregiver-specific apps.
	Calendars/scheduling tools	
	Smart devices	
	Meditation/online guidance	
	Avoidance or skepticism	

	Lack of caregiver-specific apps	
Limits of tech	Cannot replace empathy	Technology was perceived as applicable for operational backup and support, but could not replace empathy or human connection, reinforcing the view of technology as a supplement rather than a substitute.
	Can supplement, not substitute	
	Tech as operational backup	
Use in support	Medication/reminder tools	Technology was seen as applicable for practical assistance, such as medication reminders and scheduling tools, helping caregivers stay organized and manage essential daily care tasks more effectively.
	Scheduling/organization	
Personalization & Adaptive Support	Mood-based personalization	Participants emphasized the need for mood-sensitive and adaptive tools, with options for personalization and customization (such as voice features), to create experiences that felt more empathetic and tailored to individual contexts.
	Customization & voice options	
Caregiver Well-being & Emotional Support	Mental health check-ins & mood tracking	Caregivers highlighted the importance of digital tools that foster well-being, including mood-tracking, mental health check-ins, guided meditation or relaxation aids, and supportive prompts for rest and nourishment. Encouragement, reassurance, and consistent positive reinforcement were also valued forms of emotional support.
	Encouragement & positive reinforcement	
	Guided meditation, breathing, relaxation tools	
	Repeated assurances / over-communication	
	Prompts for eating, resting, and breaks	
Community & Shared Responsibility	Peer support networks	Shared caregiving was viewed as essential, with participants showing interest in peer support networks and multi-user platforms that allow responsibilities to be split between caregivers, reducing isolation and distributing the burden more evenly.
	Multi-user access/shared tasks	
Balance of Tech & Human Support	Balance of both	Caregivers emphasized that while technology could handle procedural aspects, emotional caregiving required human connection. The ideal approach was seen as a balance between both.
	Tech as backup when humans aren't available	
	Tech cannot replace human emotional depth.	
Priority on Caregiving Responsibilities	Care tasks prioritized over emotions.	Care responsibilities often took precedence over emotional needs, with participants suggesting that technology be used to manage operational tasks.
	Tech to handle operational/procedural tasks	
Emotional Support from Tech	Accept if human-like/thoughtful.	Technology was more acceptable when designed to feel thoughtful, supportive, and unobtrusive, providing small-scale nudges and check-ins rather than attempting to replace authentic human empathy.
	Micro-supports: check-ins, nudges, reminders	
	Skepticism toward over-analysis by tech	

Table 2. Shows the summary of coding density

Analysis Component	Count
Participants	11
Codes	79
Themes	21

*Note. This table summarizes the coding density from the thematic analysis. A total of 79 codes were generated from 11 participants, resulting in 21 overarching themes.

The first theme that emerged is "Caregiving for family members," which showcases the respondents who cared for a family member. 3 codes were generated: "Biological family", "Extended family", and "Adopted family. 9 respondents had taken on caregiving responsibilities for their biological family members, with one of these respondents also caring for an extended family member, and 1 respondent had done it for their adopted sibling. This respondent held that *"I was a caregiver for my sibling, and she was an adoptive sibling, so growing up, and she had a disorder called ISP, and being a caregiver for her would mean like a constant check on whether or not she's getting injured, but also making sure that if ever she does, then, you know, we rush her to the hospital quickly."*

The next theme that arose is "Caregiving for non-family members," which showcases respondents who cared for individuals outside their own family, and it generated one code called "peers/roommates," because one respondent cared for their roommate in college. She stated, *"So this roommate of mine, we started sharing the same room at the beginning of the year, and midway through the year, she went through something extremely traumatic. She was raped, and then she had to go through an abortion. And that's how it started."*

Another theme that emerged is of "Reasons to start caregiving", which emphasizes the different situations/ways in which the respondents' caregiving roles were initiated. Here, 3 codes emerged: "Situational trauma", "Guilt/self-blame", and "Medical needs". 9 respondents had taken on these responsibilities due to a medical urgency such as cancer, stroke, Alzheimer's, tumors, or neurological conditions. Some also had taken on this role due to situational trauma calling for them or feelings of guilt/self-blame if they did not take up this responsibility. One of the respondents said that *"there were certain kinds of situations where I had to take care of this person because they fell ill or, you know, they were suffering or they had like 107 fever, brain fever, and all of that."* This reveals that situational needs required the individual to step into their caregiving role. Additionally, the person stated, *"You feel".*

Even guilty for not being there for five minutes. And then you feel guilty for whatever prolonged time you haven't given the care and whatever goes wrong." This also showcases how feelings of guilt force them to take up their role. However, another respondent held that *"my caregiving journey began three years ago when my mother came to visit for a family wedding and suddenly fell ill. It started as a fever, and before we knew it, it led to a diagnosis of a rare Neuroendocrine Tumor."* This is an example of how medical needs can lead to individuals taking up their caregiving role.

Additionally, the next theme is "Age when caregiving started", which states the variety of ages at which the respondents acted as caregivers. Two codes emerged: "Started in school years" and "Adult years", with a majority of them starting in their adult years. However, a few of the caregivers started their caregiving journey at a younger age due to unchangeable circumstances, such as a sibling or parent being ill, whom they needed to care for. One respondent said, *"It started, I think, when I was 11 years old at that time. So, I was the youngest one, and like my father, you know, was going to work, so he was not with us in the daytime, although he came in the evenings. So, by that time, I was taking care of my mother."* However, the majority of the respondents started their caregiving journeys between the ages of 20 and 40.

Another central theme is "Outcomes," which refers to the effect of caregiving responsibilities on the caregivers. Twelve codes were generated within this theme pertaining to the different caregiving outcomes experienced by the respondents. These ranged from "Caregiving as a natural response", "Depression/hopelessness", to "Reality of mortality". One respondent held, *"Now, caregiving is basically my full-time life. Every decision I make in the day kind of revolves around him. It's like, at first it was occasional help, and now it's, it's the center of everything."* This emphasizes how their entire life revolves around caregiving, showcasing their multiple responsibilities at all times.

Another respondent said, *"It was difficult to see her go through what she went through". I think in the beginning, it was a lot to do with how I was unsure of what to do to help because, of course, nothing was helping."* This showcases how they felt helpless at times, and it was difficult to watch their friend go through that. Moreover, another respondent stated that *"But then there are days when I feel trapped. I see people living freely, traveling, chasing their careers, and I feel jealous. And then I immediately feel guilty for even thinking that, because it sounds selfish when my dad needs me. It's this constant cycle of exhaustion, guilt, and then more exhaustion."* This once again demonstrates the negative feelings they go through.

The next theme that emerged is "Physical and Social effects" with 9 codes generated. This theme emphasizes the specific physical and social effects that caregiving has on the respondents. The codes ranged from "Neglect of own health", "Social isolation", to "Disrupted personal/work life". One respondent said, "*The pressure on me kept increasing as the months went by, and now I realize that without knowing, I was slowly not taking care of myself and my mental health. My physical health, as well, for that matter. Because I caught COVID-19 during that time due to the frequent hospital visits.*" This showcases how the caregivers often neglected their own health in the process, leading to them falling sick themselves.

Adding on, the next theme is "Coping strategies", which explains the different ways in which the respondents coped with the side effects of caregiving. Here, 3 codes emerged called "Therapy", "Spirituality", and "Peer/family support". One respondent conveyed that "*there were times I felt really overwhelmed, but I personally think that practices like Art of Living meditations, Sudarshan Kriya, and the support of my husband and kids helped me get through it,*" showcasing how they relied on spiritual practices as well as family support in order to overcome the stress.

The next theme that emerged is "Care structure", which conveys the manner in which the respondents structured their caregiving routines, with 3 codes: "Medication & meal schedules", "Morning as critical period", and "No fixed routine". One respondent held "*you take them for the basic, like to the loo, then you get the shower done, then you make particular food, then you feed them the food and the particular medicines, and get the doctor at home for checkup,*" emphasizing the way in which their caregiving was structured around routines such as medications, meals, and other basic necessities.

The next theme that emerged is "Tasks," which highlights the specific activities and responsibilities that caregivers regularly undertake. A total of 4 codes were generated within this theme: "Physical care (feeding, bathing, toileting)," "Medication & appointment reminders," "Medical record storage & tracking," and "Doctor access/connection." These tasks reflect both the physical and administrative dimensions of caregiving, where caregivers often have to balance hands-on support with organizational duties. One respondent stated, "*managing her medications and ensuring she takes all the required medicines, every month I take her for Sandostatin injections and blood tests, and every three months, I take her for Lutetium therapy,*" which demonstrates how caregiving requires managing a broad spectrum of tasks.

Another theme is "Support Received," which emphasizes the recognition and practical assistance caregivers reported they received. Two codes were generated within this theme: "Compliments & validation" and "Peer/community support." These small but meaningful forms of acknowledgment alleviated the intensity of caregiving and validated caregivers' efforts. One respondent mentioned, "*Yeah, like, when you see these sorts of improvements, so people are also complimenting you, saying wow, he has done a lot,*" highlighting how even a little appreciation can act as a powerful source of emotional relief.

Alongside limited recognition, the theme of "Lack of Recognition & Support" emerged strongly, underscoring the unmet needs of caregivers. Four codes were generated: "Caregiver mental health overlooked," "Cultural & gendered narratives," "Absence of systemic provisions," and "Worth tied to patient outcomes." These reflect the invisibility of caregivers' struggles within families, systems, and society. One respondent explained: "*When I met this person, it was when they made me realize that all of your life has been caregiving, so you attach your worth to it. I realized I have still attached my worth to it; I don't know how it's still here.*" This demonstrates that when the respondent met with a therapist, they realized that they neglected their own mental health and attached their worth to the patient's outcomes, resulting in negative feelings.

The next theme is "Support Required," which focuses on the unmet support systems caregivers said they felt were needed. Four codes were generated, ranging from "Shared caregiving duties," "Help with daily tasks," to "Someone to listen." Most caregivers described wanting both emotional and practical support to ease the constant responsibility and stress on them. One respondent stated, "*Sometimes I just wish there was a room full of people going through the same thing, so I wouldn't feel like I'm doing this alone.*" This underscores the need for empathetic human connection alongside daily help.

Another theme that arose is "Current Technology Use," which refers to the tools caregivers reported they were currently using as part of their care practices. Five codes were generated, ranging from "Medication/reminder apps," "Meditation/online guidance," to "Avoidance or skepticism." Caregivers primarily relied on fragmented tools designed for general use. One respondent conveyed, "*I use a medicine reminder app because otherwise I'll definitely forget with so many tablets at different times. I also got this emergency bell thing, like a button he can press if he needs me and I am in another room.*" This showcases how various tools are used for different tasks, with no app containing all of them.

The theme "Limits of Technology" explores caregivers' perceptions of where technology can and cannot help. Three codes emerged: "Cannot replace empathy," "Can supplement, not substitute," and "Tech as operational backup." Respondents felt that digital tools were practical and supportive, but ultimately limited in addressing

emotional depth. One respondent said, *"I feel like no matter how advanced or smart AI gets, the human touch is what makes a difference, and yeah, that is non-negotiable."* This emphasizes the irreplaceability of human empathy in the caregiving role, with technology best positioned to be used as a supplement.

The next theme, "Use in Support," focuses on the direct ways respondents envisioned technology assisting them. Two codes emerged called "Medication/reminder tools" and "Scheduling/organization." These features represented practical ways to reduce mental load and keep caregiving organized. One caregiver described *"having a reminder on my phone that told me every day at what time the medicine was due took so much stress off my mind."* This underscores the value of technology as a tool for simplifying logistical burdens.

The theme "Personalization & Adaptive Support" reflects the importance of technology designed to adjust to caregiver needs. Here, two codes were generated: "Mood-based personalization" and "Customization & voice options." Caregivers wanted digital tools that felt adaptive, empathetic, and user-centered, as one respondent explained, *"Maybe having a feature of like choosing the voice of a person that I like or love. So yeah, I think more personalization."* This emphasizes the need for personalized and flexible design.

Another theme is "Caregiver Well-being & Emotional Support," which centers on technological features that promote emotional health. Five codes were generated, ranging from "Mental health check-ins & mood tracking," "Encouragement & positive reinforcement," to "Guided meditation, breathing, relaxation tools." Caregivers highlighted how these tools could remind them to prioritize their own needs. One shared: *"something like a fortune cookie, like, when I am very low and I tap on it, something just very refreshing and nice, kind of like a small quote that can motivate or boost me."* This illustrates how even simple digital affirmations can provide moments of emotional care for caregivers.

The next theme, "Community & Shared Responsibility," highlights the importance of shared caregiving roles and reducing caregiver isolation. Two codes were generated, called "Peer support networks" and "Multi-user access/shared tasks." These features support collaboration and help distribute responsibility, so that caregivers do not feel alone with their responsibilities. A respondent emphasized: *"The caregiving app should be accessible, by let's say not just one person, but multiple people, so that the responsibilities can also be divided to the point where the one person, who's the primary caregiver, is also not burning out."* This showcases the desire for technology that extends responsibility beyond a single individual.

Another theme, "Balance of Tech & Human Support," captures the nuanced perspective that emerged around digital tools. Here, three codes were generated called "Balance of both," "Tech as backup when humans aren't available," and "Tech cannot replace human emotional depth." Caregivers stressed that practical support from technology was helpful, but emotional fulfillment still required human contact. One participant held that *"I think having a balance of both, because we are in the era of technology, so we should use technology, but people still need people, like the human touch of feedback, compliments, and positive notes."* This demonstrates the importance of having a balance between organizing caregiving tasks with technology and emotional connection from humans.

The next theme that emerged is called "Priority on Caregiving Responsibilities," and reflects how using technology for caregiving tasks is preferred over using it for caregivers' own emotional needs. Two codes emerged here called "Care tasks prioritized over emotions" and "Tech to handle operational/procedural tasks." One respondent emphasized, *"I think priority would always be the caregiving responsibilities. But if I can help me with my emotions, then I would not have a problem,"* showcasing that they prefer technology for caregiving tasks over emotional support.

The final theme that emerged is "Emotional Support from Tech," which focuses on the conditions under which caregivers were open to technology for emotional support. Three codes were generated: "Accept if human-like/thoughtful," "Micro-supports: check-ins, nudges, reminders," and "Skepticism toward over-analysis by tech." Caregivers preferred small, human-like forms of reassurance but expressed being uncomfortable with technology attempting to intrude too deeply. One respondent shared: *"I would be pretty comfortable with emotional support from technology, as long as it feels human and thoughtful. I think that small emotional check-ins or reminders to breathe."* This points to the importance of subtle, thoughtful digital interventions for emotional support. Another respondent held, *"I don't want technology to try to dissect me. I do want technology to reassure me subtly."* This demonstrates how they don't want technology to intrude on their personal matters excessively.

4. Discussion

The present study found that respondents felt a "loss of self-identity" as an outcome when partaking in caregiving responsibilities. This is supported by previously conducted research on caregiving, which reveals the significant impacts on caregiver identity and sense of self. Skaff & Pearlin (1992) identified "loss of self" as a key consequence of role engulfment in Alzheimer's caregiving, particularly affecting spouses, females, and younger caregivers with limited social contact and roles outside caregiving. This loss was associated with lower self-esteem, reduced mastery, and increased

depression. However, Farkas & Himes (1997) found contrasting evidence, showing that caregiving did not necessarily reduce voluntary activities or result in loss of self, suggesting caregivers may use outside activities for stress relief or effectively balance multiple roles. Grant & Davis (1997) documented four specific self-losses in stroke caregivers: loss of familiar, autonomous, affiliative, and knowing selves. Similarly, Ugalde et al. (2012) found that cancer caregivers experienced substantial changes to self-identity, often struggling with role recognition and difficulty taking breaks, with some unable to stop thinking about caregiving responsibilities. In addition, the present study found that "stress from multiple responsibilities" and "Depression/hopelessness" were a few more outcomes that caregivers experienced. This is supported by previously conducted research revealing that caregiving stress significantly contributes to depression and hopelessness across diverse caregiving contexts. Multiple studies reveal that both primary stressors (care recipient behaviors) and secondary stressors (role overload) are associated with increased depressive symptoms in caregivers (Mausbach et al., 2012; Tang et al., 2015). Numerous mediating pathways, such as diminished personal mastery, diminished self-efficacy, increased activity restriction, and avoidance coping mechanisms, are involved in the link between stress and depression (Mausbach et al., 2012). Self-efficacy particularly mediates the pathway from daily hassles to depression (Tang et al., 2015). Cultural factors also influence these relationships, with mutuality in the caregiver-care recipient relationship serving as a protective factor that can mitigate stress-related depression among Mexican descent caregivers (Crist et al., 2017). Additionally, hopelessness emerges as a significant concern, particularly linked to parenting stress and affiliate stigma in caregivers of children with ADHD (Liu et al., 2023). Additionally, this study also found that a majority of the caregivers felt a "neglect of their own health," supported by previously conducted research revealing that caregivers frequently neglect their own health while providing care to others, creating a significant public health concern. Research shows that approximately one-third of the estimated 44 million American caregivers continue providing care while coping with their own health problems (Bruhn & Rebach, 2014). Women caregivers with chronic conditions employ specific strategies to manage their health issues, including normalizing their conditions, neutralizing illness effects, and forgetting they are chronic sufferers, all to continue caregiving (Martínez-Marcos & de la Cuesta-Benjumea, 2014). This self-neglect is pervasive across healthcare professionals and family caregivers alike, with individuals consistently prioritizing others' needs over their own medical care (Gutekunst, 2012). The consequences are substantial, as caregivers with compromised health provide lower-quality care and face increased risks of harmful behaviors toward care recipients. Stress, depression, and insomnia represent the most significant negative health impacts on caregivers (Grady & Rosenbaum, 2015).

Adding on, the present study revealed that respondents relied on "therapy" and "peer/family support" as coping strategies for the stress they were experiencing. Previously conducted research reveals that family-based therapy and psychotherapeutic interventions show significant promise for supporting dementia caregivers who face substantial emotional, social, and economic burdens. Family-based therapy can effectively increase social support for caregivers by addressing interactional patterns and reducing isolation from family members (Mitrani & Czaja, 2000). Caregiver Family Therapy (CFT) provides a structured systems approach with three core stages: identifying problems, structuring caregiver roles, and ensuring self-care, helping families balance their needs with those of care recipients (Qualls & Williams, 2013). Evidence-based psychotherapeutic strategies, particularly cognitive-behavioral therapy approaches, can address challenging behaviors, stress management, emotion regulation, and relationship changes through modular interventions (Wilz, 2023). Short-term interventions like the 8-session START program, which teaches coping strategies including relaxation, communication, and behavior management, significantly reduce depression and anxiety in caregivers while being cost-effective compared to usual care (Slomski, 2015).

A significant finding in the present study is the use of technology to provide support for caregivers' mental health, and the ways in which it has the ability to provide support, along with its limitations. This study found that technology "cannot replace human empathy," but it "can supplement, not substitute." This was supported by previously conducted research revealing that technology can supplement but not replace human empathy in mental health caregiving. Lin (2024) argues that while AI and immersive technologies promise expanded access to care, they must remain supplementary tools guided by providers' wisdom, as "no algorithm can replicate the seat of dignity within." Feijt et al. (2018) demonstrate that despite proven efficacy of social interaction technologies in psychotherapy, adoption remains low due to perceptions that mediated communication cannot provide satisfying empathic interactions, though new developments offer opportunities to enhance rather than replace empathic connections. Hendriks et al. (2022) identified three ways that technology can compassionately contribute to mental health care. This is by demonstrating compassion for others, developing compassion for oneself, or encouraging compassion amongst others. However, none of the technologies under consideration satisfied every component of compassion (Torous et al., 2023). Lautenschlager et al. (2017) emphasize that technological innovations like telehealth and online support can better support family carers, particularly those in remote areas or unable to attend face-to-face programs. Additionally, this study found that technology can be used for various tasks, ranging from "Medication/reminder tools,"

"Scheduling/organization", to "Mental health check-ins & mood tracking," and "Guided meditation, breathing, relaxation tool." This showcases how technology can be used as a balance between providing organizational support with tasks and emotional support. This was supported by previously conducted research, which reveals that technology offers significant potential for supporting caregiver mental health across multiple domains. Mobile health (mHealth) tools can provide essential functions, including medication and appointment reminders, symptom tracking, and facilitating communication between caregivers and healthcare providers (Mather et al., 2018). Communication technologies have been found to be effective in reinforcing healthy caregiving practices by enhancing self-efficacy, knowledge, and communication skills between parents and children (Jansen & Reid, 2020). Digital mental health technologies particularly empower caregivers through the development of coping skills, regulation of emotions, skill acquisition, and educational materials, with caregivers indicating generally favorable effects on their health (Petrović & Gaggioli, 2020). The wider technological environment comprises teletherapy, virtual care platforms, mental health mobile apps, and wearable technology that can track stress levels and sleep patterns as mental health markers (Altaf et al., 2023). Yet, there are challenges such as digital access inequalities, issues around privacy, and the demand for evidence-based app regulation to provide high-quality interventions (Altaf et al., 2023; Petrović & Gaggioli, 2020).

This research makes a novel contribution, not just by identifying the gaps left by earlier studies, but by truly centering the real lives and voices of caregivers. In contrast to previous research that explores a single gap or outcome in caregivers' mental health, this research is more inclusive because it listens directly to caregivers, valuing their personal experiences and what they believe matters most for their mental health and well-being. By grounding its findings in these lived experiences, the study emphasizes the importance of creating solutions that reflect the actual needs of caregivers, rather than relying on one-size-fits-all interventions. One key takeaway is the need for a comprehensive mobile app or platform that offers more than just a few isolated features, something that supports both the practical and emotional sides of caregiving. For instance, one caregiver suggested a feature that could "play the voice of a loved one," showing how such technology could provide both comfort and assistance. Ultimately, the goal is to design tools that recognize caregivers as whole people, meeting both their functional needs and emotional well-being needs.

5. Conclusion

Caregiving, as this study explores, is so much more than just helping with daily tasks; it is emotional, physical, and deeply psychological work. Caregivers often face intense challenges, including stress, exhaustion, isolation, and even neglect of their own health. Many report losing their sense of self while trying to juggle multiple responsibilities, leading to them experiencing feelings of frustration, guilt, or sadness. These experiences highlight how, while caregiving is essential for a patient's recovery, it can take a real toll on the caregiver's personal well-being.

The study also reveals that while many caregivers turn to therapy or family and friends for support, technology has started to play a helpful role in easing some of the strain on them. Tools like telehealth services, scheduling apps, online support communities, and AI-based systems can help caregivers stay organized and emotionally supported. Still, both this study and previous research agree that technology can never replace human empathy; it can only supplement it. Features like mood-tracking, guided relaxation, and stress management reminders can make support more accessible and consistent, but the heart of caregiving lies in compassion and connection.

In the future, the study points to both challenges and opportunities. The future of caregiving support lies in blending technology with human-centered care, creating hybrid models that are inclusive, accessible, and sensitive to different cultures and age groups. It's equally important to close gaps in digital access so that every caregiver, no matter their background, can benefit from these innovations. Prioritizing caregiver well-being through accessible and empathetic digital solutions, alongside systemic support and recognition, will be crucial in reducing burnout and enabling caregivers to sustain their role without compromising their own health. In finding a balance between innovation and empathy, the caregiving environment can change to meet better the needs of both patients and those who spend large portions of their lives caring for them.

5.1. Limitations of the Study

1. Recency of caregiving experiences: Some participants had only recently taken up the caregiving role, which may have influenced their responses, as they may have focused more on immediate stressors rather than long-term experiences.
2. Socioeconomic and geographic background: The sample did not capture a wide range of socioeconomic diversity, as all caregivers interviewed were from Delhi or Hyderabad in India. Hence, this limits the ability to generalize findings across caregivers from different regions or financial contexts.
3. Exclusion of professional caregivers: The study focused exclusively on informal caregivers, who were obligated to their role due to family pressures, and this omitted the perspectives of professional caregivers whose experiences and coping mechanisms may differ.
4. Sample size: The sample size was comparatively low, limiting the range of viewpoints and minimizing statistical generalizability.

5. Research design: The research was mainly based on qualitative data (interviews), and using a mixed-methods design involving surveys might have given further quantitative information.

5.2. Future Recommendations

1. Variety in caregiving experiences: There should be future research exploring variability in needs between long-term experienced caregivers, professional caregivers, newly established caregivers, and those drawing on previous caregiving experiences. This would offer better insights into how needs change over time and in different situations.

2. Incorporating professional caregivers: Research can go beyond family member caregivers and address professional caregivers, who have unique challenges that include juggling multiple clients, coordinating formal work responsibilities, and dealing with institutional expectations. This will emphasize differences in coping, stressors, and support needs.

3. Diverse perspectives and larger samples: Conducting more research among caregivers from various regions and cultural backgrounds will provide more representative and diverse views. With larger sample sizes and incorporating surveys as well as interviews, it

is also possible to make the information more reliable and extensive.

4. Health tech innovation: Policymakers and technology companies should collaborate to create end-to-end caregiving platforms, which provide a combination of functions in one application. Developments should focus on creating more intuitive interfaces and hybrid models that combine digital tools with human support. By tailoring interventions to the necessities of caregivers specifically, technology plays a crucial role in mitigating the mental health crisis among caregivers. If they make such tools affordable and accessible, the caregiver burden would decrease significantly.

5. Policy and social initiatives: Policymakers can encourage caregiver mental health care through insurance coverage, caregiver leave policies, and workplace flexibility programs. These initiatives would make caregiving part of the societal norm and an individual's isolated burden.

6. Recommendations for caregivers themselves: Caregivers should sit down and invest time in seeking out therapy, support groups, and making special time for their own well-being. Building self-awareness of the need to maintain their own physical and emotional health is the key to being able to continue long-term caregiving duties.

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