

Dissertation Training

at

IIHMR Delhi

**Digital Overdose? Evaluating User Adoption, Perceived Burden, and Effectiveness of
Proliferating Health Apps and Websites in India**

by

Dr. Shefali Gupta

Enroll No.: PG/23/107

Under the guidance of

Dr. Mukesh Ravi Raushan

PGDM (Hospital & Health Management)

2023-25



**International Institute of Health Management Research
New Delhi**

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**International Institute of Health Management Research
New Delhi**

(Completion of Dissertation from respective organization)

The certificate is awarded to

Dr. Shefali Gupta

in recognition of having successfully completed her Dissertation

and has successfully completed her Project on

**Digital Overdose? Evaluating User Adoption, Perceived Burden, and Effectiveness of
Proliferating Health Apps and Websites in India**

Date: 5th July 2025

Organization: IIHMR Delhi

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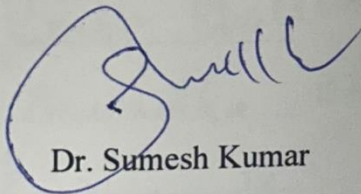
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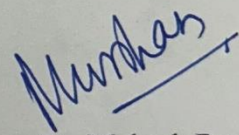
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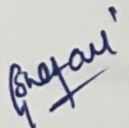
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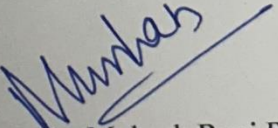
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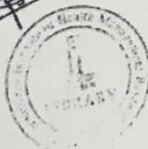
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LIST OF SYMBOLS AND ABBREVIATIONS

ABDM	Ayushman Bharat Digital Mission
BP	Blood Pressure
CoWIN	COVID Vaccine Intelligence Network
COVID-19	Coronavirus Disease 2019
EHR	Electronic Health Record
Fig	Figure
IIHMR	International Institute of Health Management Research
MFine	My Family Doctor Online (app name)
NCR	National Capital Region
PGDM	Post Graduate Diploma in Management
SMS	Short Message Service
TB	Tuberculosis

ABSTRACT

The expansion of digital health platforms in India, particularly following the COVID-19 pandemic, has reshaped healthcare access and service delivery. While mobile applications and web-based tools have offered convenience and increased outreach, their unchecked proliferation has led to unintended consequences. Users are increasingly reporting “app fatigue”, a sense of digital burden arising from the simultaneous use of multiple platforms with overlapping functions, inconsistent interfaces, and frequent notifications.

This cross-sectional study explores the impact of this digital saturation on user adoption, perceived burden, and satisfaction. Data were collected from 146 respondents across urban and semi-urban areas in India, primarily from the National Capital Region. The findings highlight that although 75% of respondents had installed at least one health-related app, 76% reported abandoning apps due to poor usability, data privacy concerns, or lack of relevance. Notification fatigue and technical glitches further contributed to disengagement.

Despite high digital literacy among participants, a majority expressed stress in managing multiple platforms, and 69% indicated a clear preference for a unified digital health interface over fragmented apps. While perceived usefulness was moderate (mean rating 5.74/10), the desire for simplification, better design, and enhanced data security was strong.

The study concludes that India’s digital health ecosystem must shift from quantity to quality, prioritizing user-centered design, platform integration, and policy-led oversight. Without addressing the cognitive and operational burden on users, the promise of digital health may remain unfulfilled.

Keywords: *Digital health, Mobile health applications, App fatigue, User engagement, Healthcare access, Digital overload, India, Privacy concerns, Health platform integration.*

1. INTRODUCTION

Over the past few years, India has witnessed a surge in the development and deployment of digital health platforms, ranging from government-sponsored applications to private enterprise solutions. Triggered largely by the effect of the COVID-19 pandemic, this rapid digitalization of the health sector was initially heralded as a necessary step toward modernizing healthcare delivery, improving accessibility, and reducing the burden on overstretched physical infrastructure. Indeed, apps enabled users to book appointments, receive lab reports, store electronic health records (EHR), and even consult doctors remotely. Initiatives such as the Ayushman Bharat Digital Mission (ABDM) and the eSanjeevani teleconsultation service were launched to promote these benefits at scale ^[1].

However, this enthusiastic embrace of digital solutions has also given rise to a growing concern: the overwhelming and often redundant proliferation of health apps and websites. Every government department, healthcare provider, NGO, and private entity seems to have developed its own standalone digital product. The result is a fragmented digital ecosystem where users are burdened by a multitude of apps with overlapping functions, excessive notifications, poor interoperability, and inconsistent user experiences. For many, instead of simplifying healthcare access, these tools have complicated it further leading to what we term a “digital overdose.”

Several studies have raised concerns about this phenomenon. Research from South India on app-based health record systems revealed operational inefficiencies and technological fatigue among users and health workers alike ^[2]. A systematic review of mobile health (mHealth) interventions in India reported positive outcomes in service utilization but also highlighted variability in user engagement and concerns about digital fatigue ^[3]. Similarly, a study in

Chandigarh noted that while a significant percentage of users had adopted digital health IDs, many lacked a clear understanding of their use or expressed mistrust in the system's data security provisions ^[4]. Among younger populations such as university students, the situation is no different challenges such as poor communication, low awareness, and limited perceived value continue to hinder adoption ^[5].

In this complex context, our study aims to evaluate user adoption, perceived burden, and the actual effectiveness of the multitude of health apps and websites currently in use across India. Specifically, we seek to answer: Are these tools achieving their intended purpose? Or have they inadvertently created a new layer of digital stress for users already navigating a challenging healthcare environment?

This inquiry is both timely and necessary. The scale of digital health investment in India is immense, and yet, without an understanding of how end-users interact with and perceive these tools, much of this investment risks being rendered ineffective. Exploring user fatigue, technological saturation, and barriers to sustained engagement can inform future policy and product design, ensuring that digital health solutions remain people-centric rather than system-centric. By identifying what works, what overwhelms, and what users genuinely value, this research hopes to contribute meaningfully to India's evolving digital health strategy.

Ultimately, this study matters because it addresses a growing but under-recognized issue in digital public health. It seeks to shift the discourse from technological optimism to practical realism where success is measured not by the number of apps launched, but by how well they are used, understood, and trusted by the people they were designed to serve.

2. LITERATURE REVIEW

Arora et al. (2024) conducted a comprehensive scoping review to identify the multifaceted challenges, barriers, and facilitators in implementing telemedicine across India^[8]. Their systematic analysis of 26 studies, following PRISMA-ScR guidelines, revealed a complex landscape of implementation factors operating at individual, provider, and system levels. At the individual level, the authors identified limited digital literacy as a primary challenge, particularly pronounced among older adults and rural populations. Health literacy issues further compound these difficulties, while infrastructural barriers including limited smartphone access and unreliable internet connectivity create substantial obstacles. Socio-cultural preferences for traditional in-person consultations emerged as another significant barrier to adoption.

The provider-level analysis revealed training deficits and quality of care concerns as major challenges, alongside insufficient technological infrastructure and medico-legal apprehensions. At the system level, integration challenges with existing healthcare infrastructure and data security concerns presented significant implementation barriers. However, the study also identified several facilitators including family involvement in healthcare decisions, comprehensive training programs, community outreach initiatives, ongoing professional development, clear clinical guidelines, user-friendly telehealth platforms, supportive policy frameworks, infrastructure investment, and collaborative stakeholder efforts. The authors concluded that successful telemedicine implementation requires a coordinated approach addressing digital infrastructure strengthening, digital literacy enhancement, protocol standardization, and clear regulatory framework development.

The application of digital health technologies in specialized care domains presents unique challenges and opportunities. Venkataramanan et al. (2022) examined digital inequalities in cancer care delivery, providing critical insights into the barriers preventing large-scale adoption of digital health technologies in oncology^[9]. The COVID-19 pandemic's disruption of cancer care services underscored the potential of digital health solutions to support cancer screening, early diagnosis, and specialized care access. However, significant challenges persist, including socio-economic barriers related to age, literacy levels, and entrenched socio-cultural norms that impede user adoption.

Healthcare providers face additional challenges including complex regulatory requirements, data security concerns, and operational difficulties in transitioning to new digital systems. The authors emphasized the critical importance of adopting a participatory approach that actively involves all stakeholders to effectively address the digital divide. They highlighted that health data sharing within the framework of Indian regulations and the Data Protection Act is essential for advancing digital health initiatives. Their recommendations focus on addressing these multifaceted challenges to ensure equitable digital healthcare access and improved cancer burden management.

The adoption of mobile health applications presents both opportunities and challenges in the Indian context. Sujarwoto and Maharani (2023) conducted a systematic review examining facilitators and barriers to mobile health app adoption for COVID-19 contact tracing across 16 countries, including India^[10]. Their analysis identified key facilitators including perceived COVID-19 risks, trust in technology and institutions, perceived benefits of app usage, supportive social norms, and technology readiness among users. However, data privacy and security concerns emerged as significant adoption barriers.

In low-middle-income countries like India, sociodemographic factors significantly influence adoption patterns, with females, individuals with lower educational attainment, lower income levels, and older adults showing reduced adoption rates. The authors concluded that addressing data privacy and security concerns while simultaneously enhancing trust, perceived benefits, social norms, and technology preparedness could substantially increase adoption intentions and actual app usage among the general population. They emphasized that tackling the digital divide remains crucial for successful mobile health app adoption in low-middle-income countries.

The acceptability of targeted digital health interventions varies across different disease conditions and populations. Jose et al. (2022) conducted an exploratory study assessing the acceptability of mobile phone-based adherence support for antituberculosis treatment among patients in South India^[11]. Their study of 100 participants at a TB treatment center in Kerala revealed encouraging findings regarding technology acceptance and privacy concerns.

The study found that 90% of participants routinely used mobile phones, with 84% owning their devices. While 95% were familiar with calling functions, only 35% could effectively use SMS services. Notably, 89% of participants did not consider mobile phone-based treatment adherence interventions as privacy intrusions, and 93% expressed no concerns about stigma if treatment reminders were received by others. A substantial majority (95%) preferred mobile phone reminders over traditional directly observed treatment approaches, with 80% specifically favoring voice call reminders over SMS. These findings suggest that mobile phones represent an acceptable platform for delivering treatment adherence interventions in South India, with voice call preferences informing future intervention design strategies.

3. RESEARCH QUESTION:

What is the relationship between the multiplicity of digital health platforms in India and users' perceived cognitive/operational burden ('app fatigue'), and how do usability, usefulness, and demographic factors (age, digital literacy, socioeconomic status) moderate this relationship?"

4. OBJECTIVES:

The broad objective of the study is:

To evaluate how the increasing number of health apps and websites in India affects user adoption, experience, and overall digital burden.

Specific objectives of the study are as follows:

1. To assess the relationship between the multiplicity of digital health platforms and users' perceived burden or "app fatigue."
2. To examine how usability, usefulness, and demographic factors (such as age, digital literacy, and socioeconomic status) influence user adoption and sustained engagement with health apps.

5. METHODOLOGY

5.1 Data

- Data was collected from 150 respondents, but we have received 146 responses (97.33%; Response rate)
- Microsoft Form was shared with current students and working professional

5.2 Study Design

Type: Random Sampling, descriptive statistics.

Respondents: Student who are enrolled in any college and working professionals

5.3 Methods:

Population & Sampling

Target Population: Adults (≥ 18 years) in India who used ≥ 1 digital health platform (app/website/chatbot) in the last 12 months.

Sampling:

Primary: NCR (Delhi, Gurugram, Noida, Ghaziabad, Faridabad).

Supplementary: Urban/semi-urban areas (Jaipur, Mumbai, Chandigarh, Alwar).

Technique: Stratified (socioeconomic/age/digital literacy) + Snowball (via WhatsApp/Telegram/social media) + Quota (gender/age balance).

Sample Size: 100–250 respondents (convenience).

5.4 Inclusion Criteria:

- Used ≥ 1 digital health platform (teleconsultation, e-pharmacy, EHR, appointment booking, lifestyle tracking) in past 12 months.
- Resides in target geographical areas (NCR + supplementary cities).
- Willing to provide digital consent.

5.5 Exclusion Criteria:

- Never used any digital health platform.
- Incomplete/inconsistent survey responses.

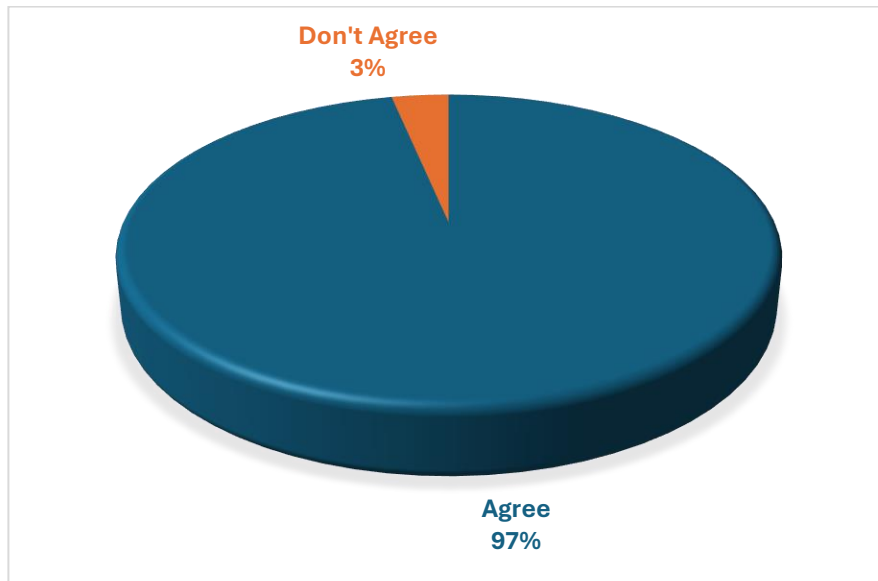
6. RESULTS

6.1. Chapter 1: Demography

6.1.1. Number of Respondents

Table 6.1.1: Number of Respondents

Number of Respondents	N	%
<i>Agree</i>	146	97%
<i>Don't Agree</i>	5	3%
<i>Total</i>	151	100%



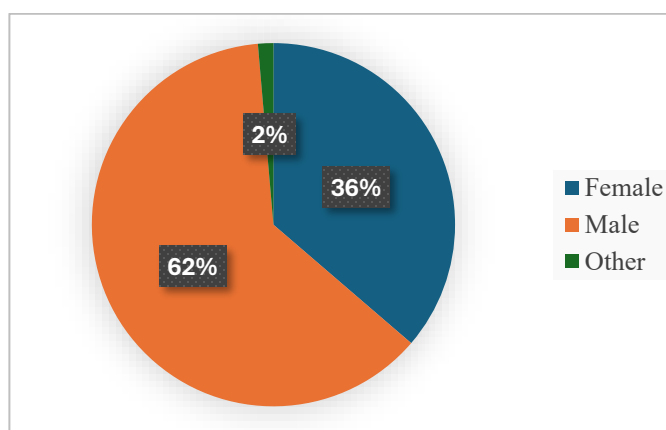
(Fig 6.1.1: Number of Respondents)

Out of a total of 151 individuals who participated in the survey, a significant majority, 146 respondents (97%) expressed agreement with the statement posed. In contrast, only 5 participants (3%) did not agree. The pie chart (*Fig 6.1.1*) visually captures this strong consensus, underscoring the clarity or relevance of the statement to most respondents.

6.1.2. Gender

Table 6.1.2: Gender

Gender	%	N
<i>Female</i>	36%	53
<i>Male</i>	62%	91
<i>Other</i>	1%	2
<i>Total</i>	100%	146



(Fig 6.1.2: Gender)

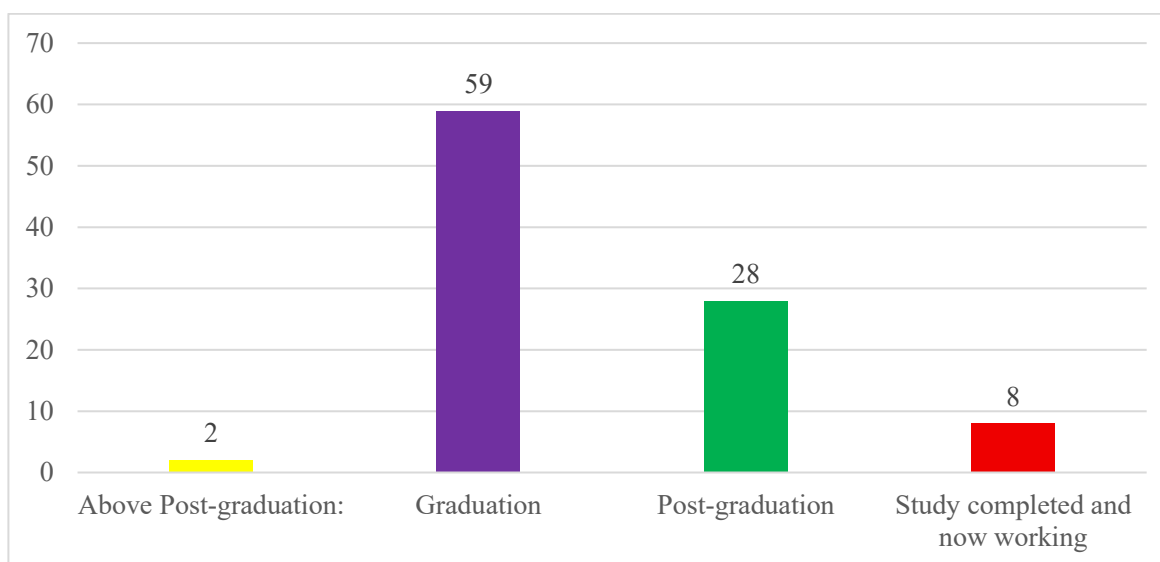
Gender-wise, the sample primarily consisted of male respondents (62.33%, n=91), followed by female participants (36.30%, n=53). A small percentage, 1.37% (n=2), identified as ‘Other’. The distribution shown in the *Fig 6.1.2* reflects a predominantly male response base, while also highlighting the presence of gender diversity within the sample.

6.1.3. Education

Table 6.1.3: Education

Education	%	N
<i>Above Post-graduation:</i>	2.06%	2
<i>Graduation</i>	60.82%	59
<i>Post-graduation</i>	28.87%	28
<i>Study completed and now working</i>	8.25%	8

Education	%	N
Grand Total	100%	97



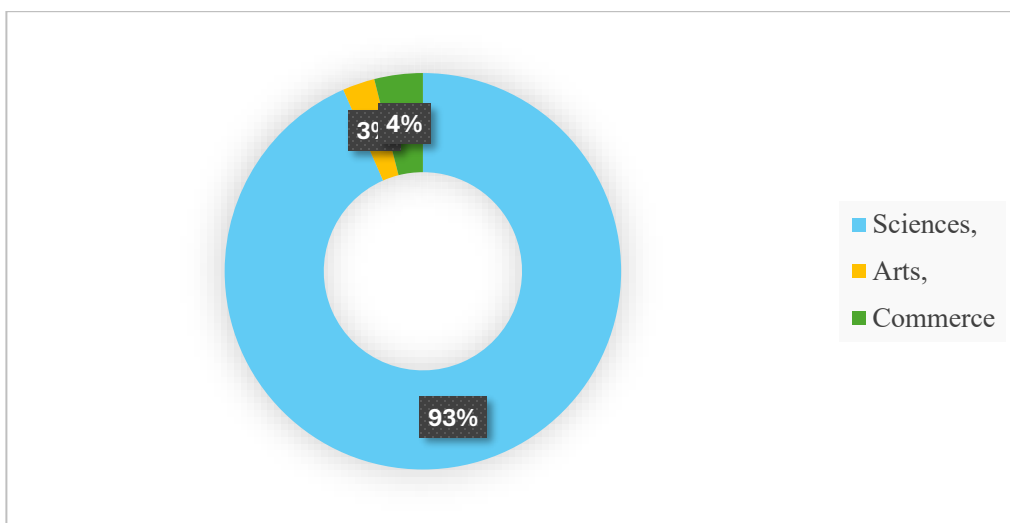
(Fig 6.1.3: Education)

Among the 97 respondents who reported their educational status, 60.82% (n=59) had completed graduation, making it the most represented category. This was followed by 28.87% (n=28) with post-graduation qualifications. Additionally, 8.25% (n=8) mentioned having completed their studies and currently being employed, while 2.06% (n=2) held qualifications above post-graduation. *Fig 6.1.3* presents these variations in educational attainment clearly.

6.1.4. Academic Stream of Students

Table 6.1.4: Academic Stream of Students

Academic Stream of Students	%	N
1. Sciences,	93%	71
2. Arts,	3%	2
3. Commerce	4%	3
Grand Total	100%	76



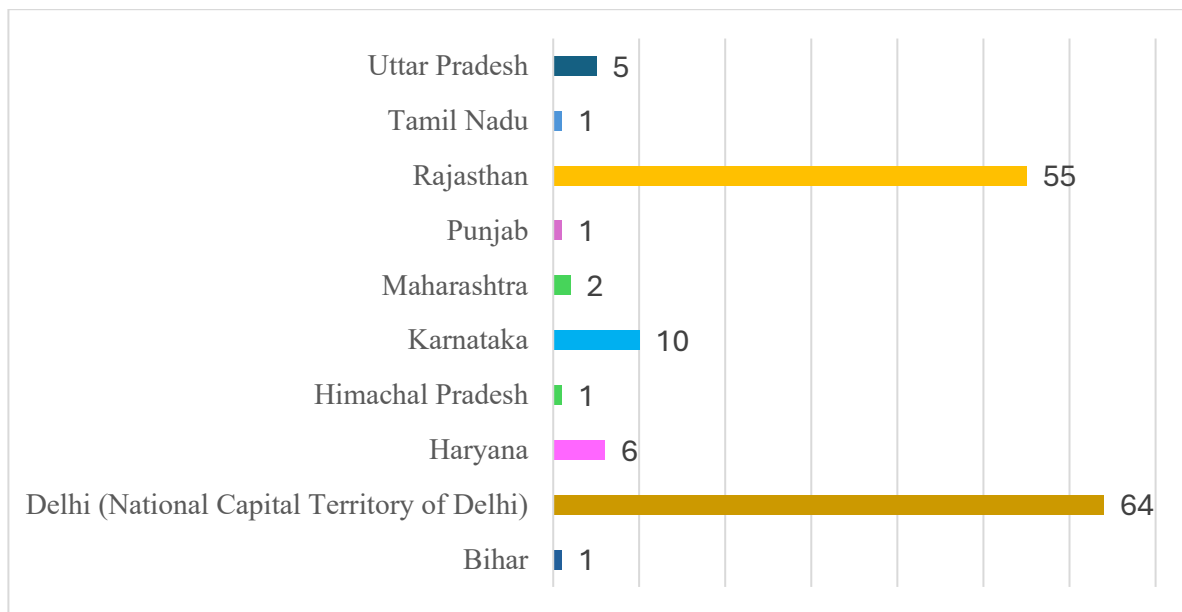
(Fig 6.1.4: Academic Stream of Students)

Out of the 76 respondents identified as students, the overwhelming majority—93.42% (n=71)—belonged to the Science stream. In contrast, 3.95% (n=3) were from Commerce and 2.63% (n=2) from Arts. Fig 6.1.4 reflects this academic concentration, pointing to a predominantly science-oriented student group within the sample.

6.1.5. State of Current Residence

Table 6.1.5: State of Current Residence

State where you are currently residing	%	N
<i>Bihar</i>	0.68%	1
<i>Delhi (National Capital Territory of Delhi)</i>	43.84%	64
<i>Haryana</i>	4.11%	6
<i>Himachal Pradesh</i>	0.68%	1
<i>Karnataka</i>	6.85%	10
<i>Maharashtra</i>	1.37%	2
<i>Punjab</i>	0.68%	1
<i>Rajasthan</i>	37.67%	55
<i>Tamil Nadu</i>	0.68%	1
<i>Uttar Pradesh</i>	3.42%	5
Grand Total	100%	146



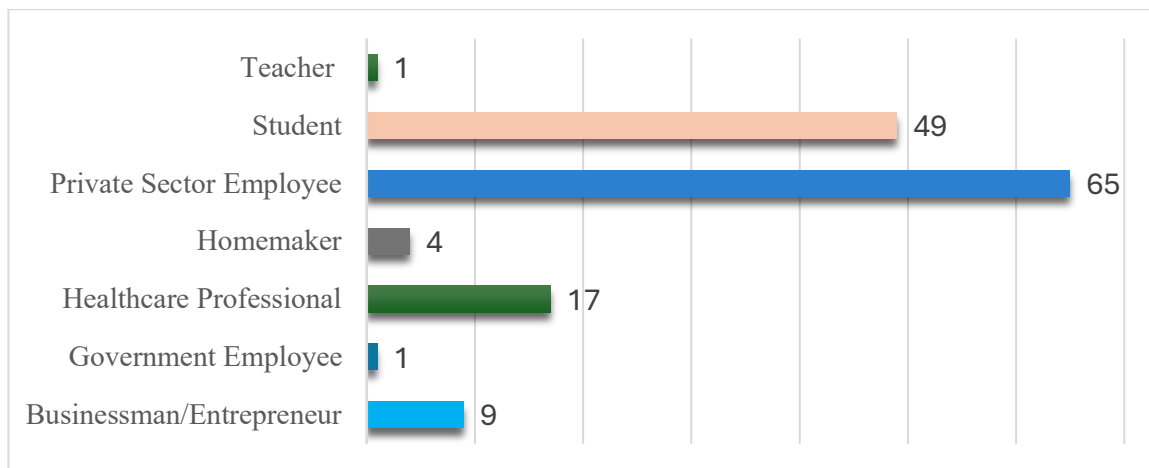
(Fig 6.1.5: State of Current Residence)

Participants hailed from various states, with the highest representation from Delhi (43.84%, n=64) and Rajasthan (37.67%, n=55). Other states included Karnataka (6.85%, n=10), Haryana (4.11%, n=6), and Uttar Pradesh (3.42%, n=5). Minimal participation came from Bihar, Himachal Pradesh, Maharashtra, Punjab, and Tamil Nadu—each contributing less than 1% of the total. The bar graph, Fig 6.1.5 visually highlights these geographic trends.

6.1.6. Profession

Table 6.1.6: Profession

Profession	%	N
<i>Businessman/Entrepreneur</i>	6.16%	9
<i>Government Employee</i>	0.68%	1
<i>Healthcare Professional</i>	11.64%	17
<i>Homemaker</i>	2.74%	4
<i>Private Sector Employee</i>	44.52%	65
<i>Student</i>	33.56%	49
<i>Teacher</i>	0.68%	1
<i>Grand Total</i>	100%	146



(Fig 6.1.6: Profession)

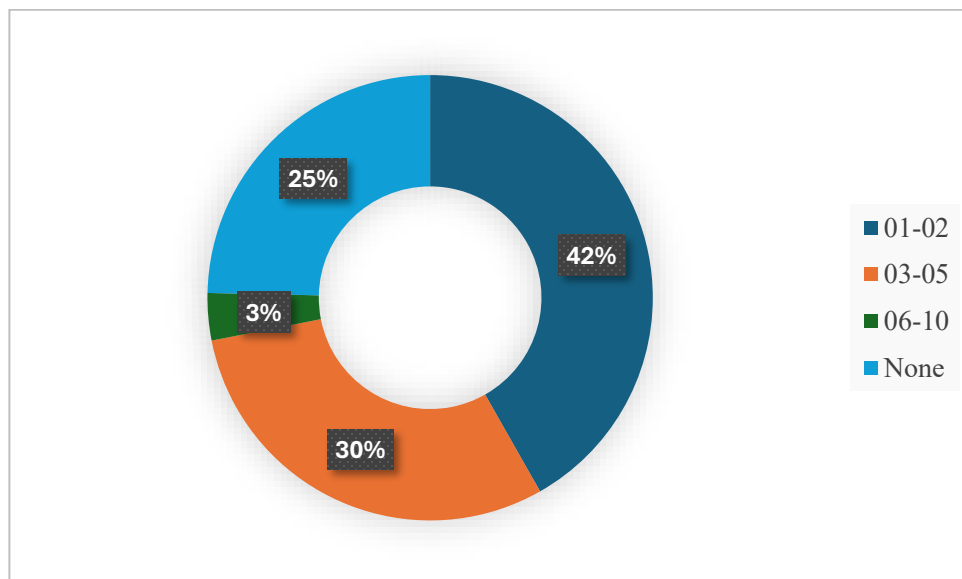
Regarding occupational status, 44.52% (n=65) of respondents were employed in the private sector, making it the largest professional category. Students comprised 33.56% (n=49), followed by healthcare professionals at 11.64% (n=17). Smaller segments included businessmen/ entrepreneurs (6.16%, n=9), homemakers (2.74%, n=4), and government employees and teachers, each at 0.68% (n=1). These professional categories are mapped in the bar graph, *Fig 6.1.6*, showing a workforce profile dominated by private sector engagement and students.

6.2. Chapter 2: Digital Health App Usage Patterns

6.2.1. Number of Health-Related Mobile Applications Installed

Table 6.2.1: Number of Health-Related Mobile Applications Installed

Number of Health-Related Mobile Applications Installed in smartphone/tablet	%	N
<i>01-02</i>	42%	61
<i>03-05</i>	30%	44
<i>06-10</i>	3%	5
<i>None</i>	25%	36
<i>Grand Total</i>	100%	146



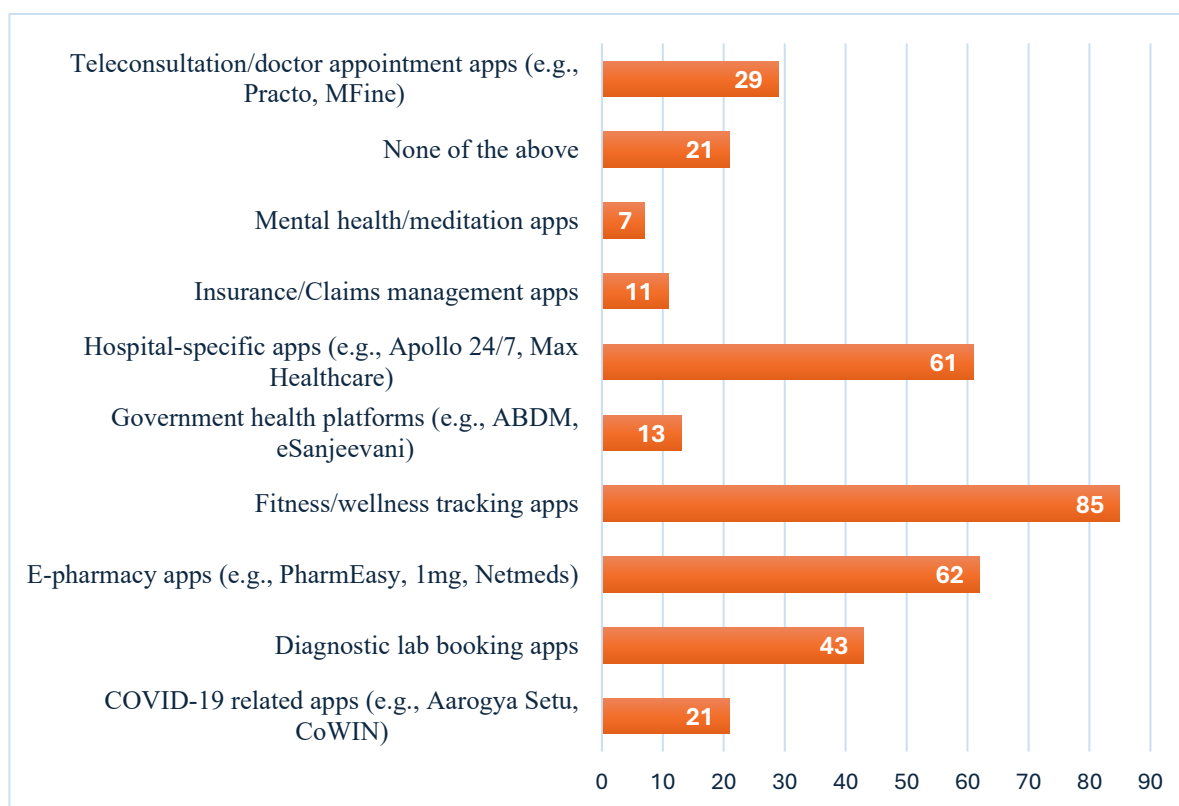
(Fig 6.2.1: Number of Health-Related Mobile Applications Installed)

When asked about the number of health-related applications currently installed on their smartphones or tablets, 41.78% (n=61) of respondents reported having 1 to 2 apps, while 30.14% (n=44) had 3 to 5 apps. A smaller group, 3.42% (n=5), indicated having 6 to 10 such applications. Notably, 24.66% (n=36) mentioned having no health-related apps installed at all. These findings are visually captured in Fig 6.2.1, providing insight into the overall digital health engagement at the app installation level.

6.2.2. Types of Healthcare Apps Used in the Past 12 Months

Table 6.2.2: Types of Healthcare Apps Used in the Past 12 Months

Types of Healthcare Apps Used in the Past 12 Months	%	N
<i>COVID-19 related apps (e.g., Aarogya Setu, CoWIN)</i>	5.95%	21
<i>Diagnostic lab booking apps</i>	12.18%	43
<i>E-pharmacy apps (e.g., PharmEasy, 1mg, Netmeds)</i>	17.56%	62
<i>Fitness/wellness tracking apps</i>	24.08%	85
<i>Government health platforms (e.g., ABDM, eSanjeevani)</i>	3.68%	13
<i>Hospital-specific apps (e.g., Apollo 24/7, Max Healthcare)</i>	17.28%	61
<i>Insurance/Claims management apps</i>	3.12%	11
<i>Mental health/meditation apps</i>	1.98%	7
<i>None of the above</i>	5.95%	21
<i>Teleconsultation/doctor appointment apps (e.g., Practo, MFine)</i>	8.22%	29
Grand Total	100%	353



(Fig 6.2.2: Types of Healthcare Apps Used in the Past 12 Months)

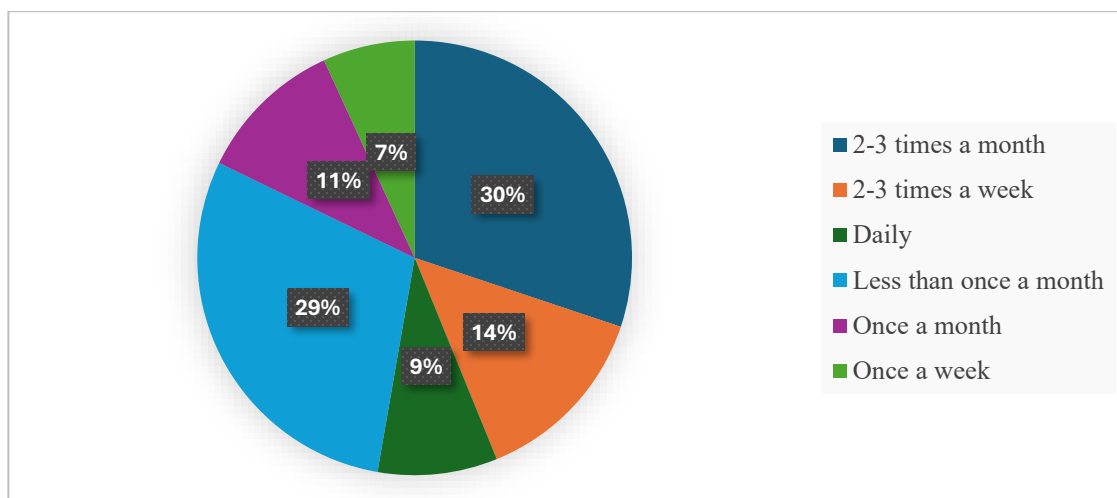
The use of healthcare applications varied across different categories over the past year. The most frequently used were fitness and wellness tracking apps, cited by 24.08% (n=85) respondents. E-pharmacy apps such as PharmEasy or 1mg followed at 17.56% (n=62), and hospital-specific apps like Apollo 24/7 were used by 17.28% (n=61) participants. Other notable categories included diagnostic lab booking apps (12.18%, n=43) and teleconsultation or doctor appointment apps (8.22%, n=29).

Less frequently used were platforms such as COVID-19 related apps (5.95%, n=21), government health portals (3.68%, n=13), insurance or claims apps (3.12%, n=11), and mental health or meditation apps (1.98%, n=7). Interestingly, 21 respondents (5.95%) had not used any of these app types. This distribution is illustrated in *Fig 6.2.2*, showing a clear preference for self-care and convenience-focused platforms.

6.2.3. Frequency of Using Health-Related Apps or Websites

Table 6.2.3: Frequency of Using Health-Related Apps or Websites

Frequency of Using Health-Related Apps or Websites	%	N
<i>2-3 times a month</i>	30%	44
<i>2-3 times a week</i>	14%	20
<i>Daily</i>	9%	13
<i>Less than once a month</i>	29%	43
<i>Once a month</i>	11%	16
<i>Once a week</i>	7%	10
<i>Grand Total</i>	100%	146



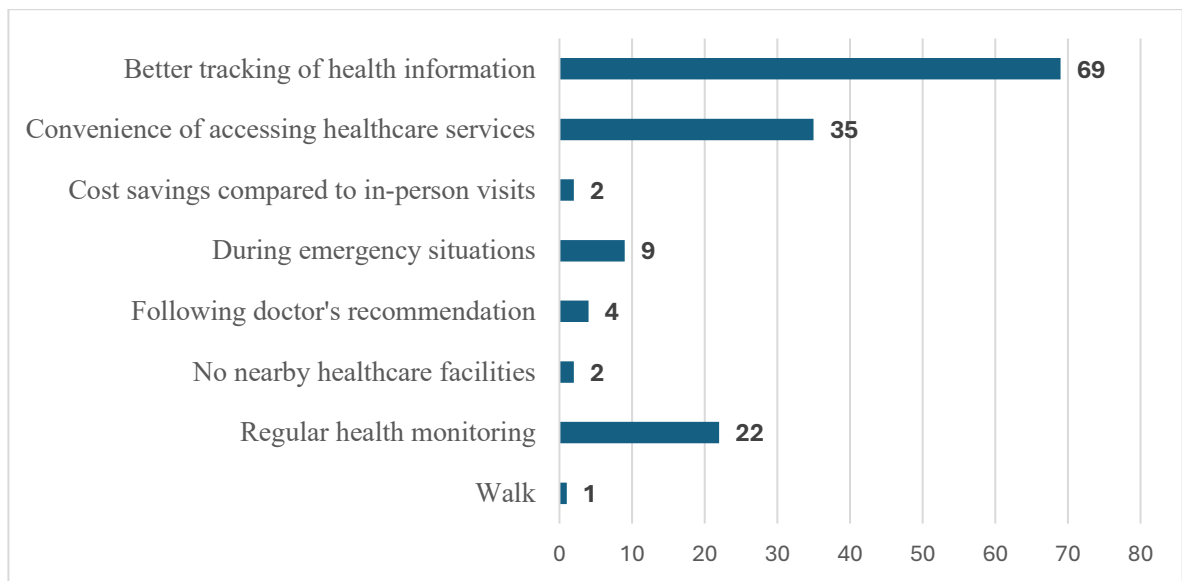
(Fig 6.2.3: Frequency of Using Health-Related Apps or Websites)

Regarding usage frequency, the responses revealed a mixed pattern. 30.14% (n=44) of participants used health-related apps or websites 2–3 times a month, while 29.45% (n=43) accessed them less than once a month. Daily usage was relatively low at 8.90% (n=13). Meanwhile, 2–3 times a week and once a month were reported by 13.70% (n=20) and 10.96% (n=16) of respondents, respectively. Only 6.85% (n=10) mentioned using such apps once a week. This usage pattern is depicted in Fig 6.2.3 to reflect varying levels of digital health engagement.

6.2.4. Primary Reason for Using Digital Health Platforms

Table 6.2.4: Primary Reason for Using Digital Health Platforms

Primary reason for using digital health platforms	%	N
<i>Walk</i>	0.69%	1
<i>Regular health monitoring</i>	15.17%	22
<i>No nearby healthcare facilities</i>	1.38%	2
<i>Following doctor's recommendation</i>	2.76%	4
<i>During emergency situations</i>	6.21%	9
<i>Cost savings compared to in-person visits</i>	1.38%	2
<i>Convenience of accessing healthcare services</i>	24.14%	35
<i>Better tracking of health information</i>	47.59%	69
<i>None</i>	0.69%	1
Grand Total	100%	145



(Fig 6.2.4: Primary Reason for Using Digital Health Platforms)

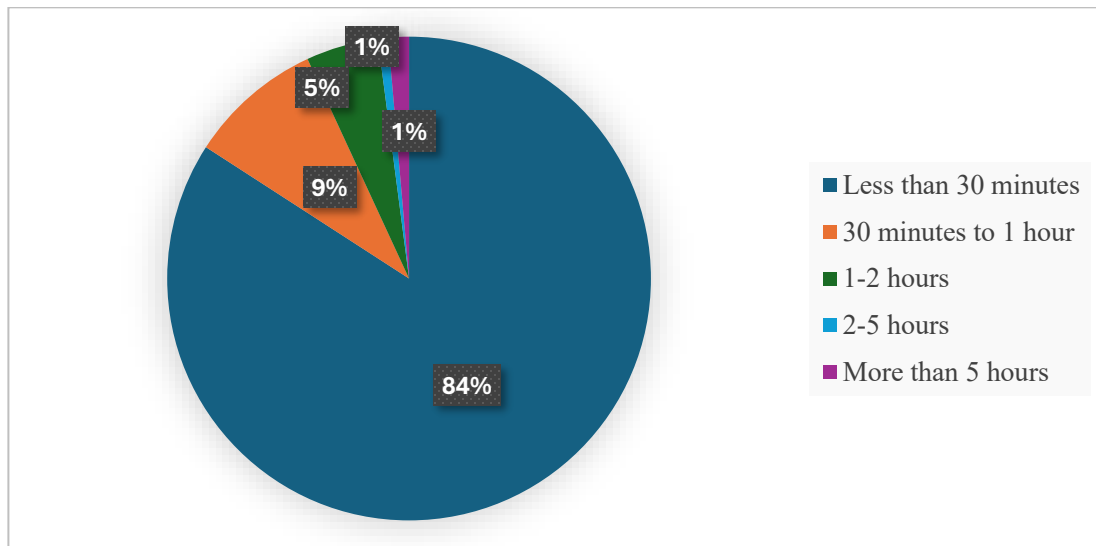
The dominant motivation behind using digital health platforms was better tracking of health information, reported by nearly half the participants (47.59%, n=69). Convenience of accessing services was the second-most cited reason, with 24.14% (n=35) choosing this option. Other motivations included regular health monitoring (15.17%, n=22), use during emergency situations (6.21%, n=9), and following doctor's recommendation (2.76%, n=4).

A small number of respondents cited factors such as lack of nearby facilities (1.38%, n=2) and cost savings (1.38%, n=2). Activities like walking (0.69%, n=1) and those selecting 'None' (0.69%, n=1) were the least represented. The diversity of these motivations is presented in Fig 6.2.4.

6.2.5. Time Spent on Health-Related Apps or Websites Per Week

Table 6.2.5: Time Spent on Health-Related Apps or Websites Per Week

Time spend on health-related apps/websites in a week	%	N
<i>Less than 30 minutes</i>	84%	122
<i>30 minutes to 1 hour</i>	9%	13
<i>1-2 hours</i>	5%	7
<i>2-5 hours</i>	1%	1
<i>More than 5 hours</i>	1%	2
<i>Grand Total</i>	100%	145



(Fig 6.2.5: Time Spent on Health-Related Apps or Websites Per Week)

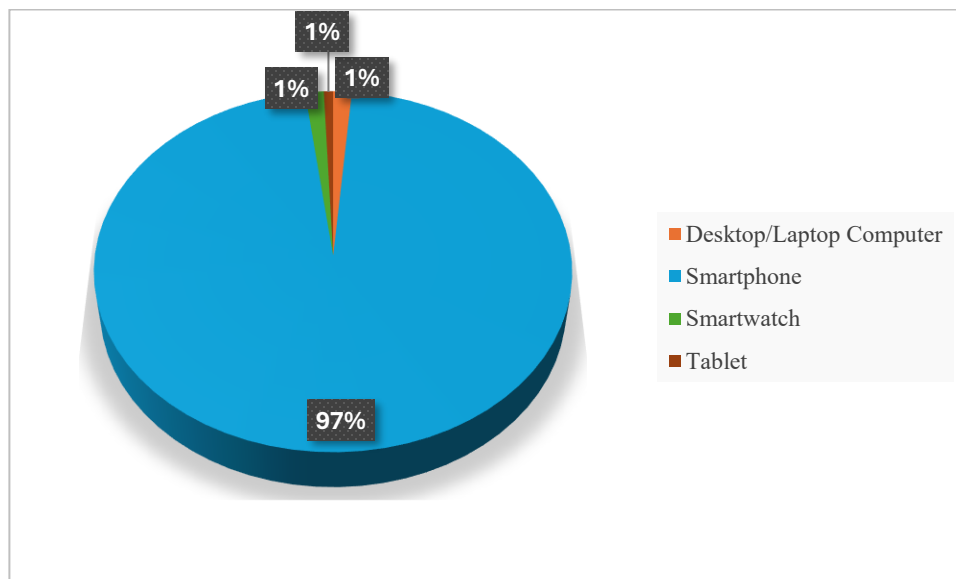
Time spent on digital health platforms during an average week revealed that the vast majority, 84.14% (n=122), engaged with such content for less than 30 minutes. 8.97% (n=13) reported using them for 30 minutes to 1 hour, while 4.83% (n=7) spent 1 to 2 hours weekly. A very small segment spent even longer, with 0.69% (n=1) using these platforms for 2–5 hours, and 1.38% (n=2) indicating usage of more than 5 hours per week. These trends are clearly shown in *Fig 6.2.5*.

6.3. Chapter 3: Digital Health Platform Experiences

6.3.1. Primary Device Used to Access Health Apps or Websites

Table 6.3.1: Primary Device Used to Access Health Apps or Websites

Primary Device Used to Access Health Apps or Websites	%	N
<i>Desktop/Laptop Computer</i>	1%	2
<i>Smartphone</i>	97%	141
<i>Smartwatch</i>	1%	2
<i>Tablet</i>	1%	1
<i>Grand Total</i>	100%	146



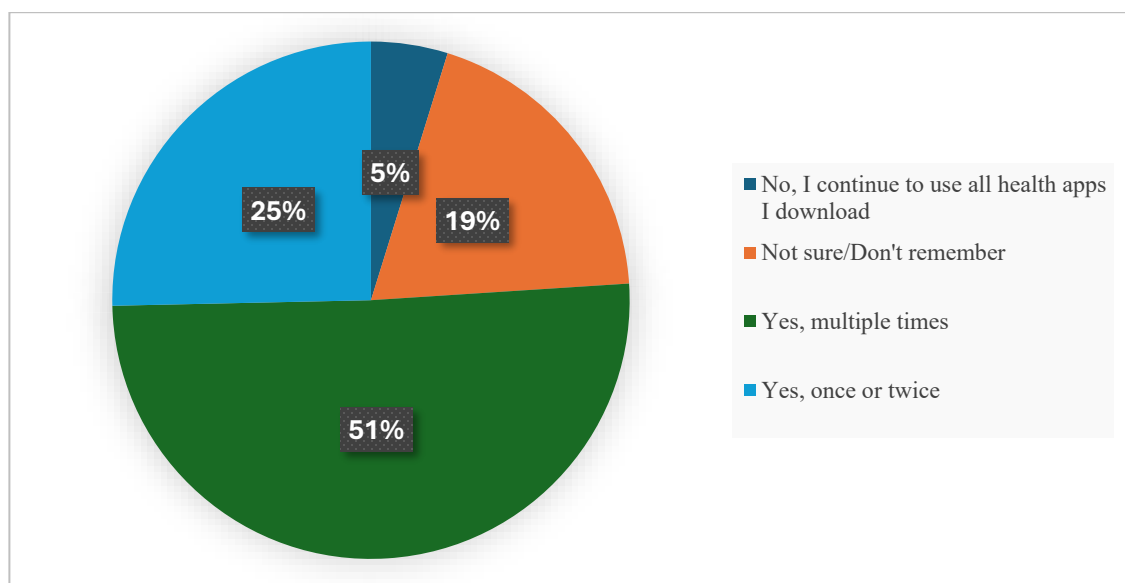
(Fig 6.3.1: Primary Device Used to Access Health Apps or Websites)

A large majority of participants reported using their smartphones as the primary device for accessing health apps or websites, with 96.58% (n=141) indicating this preference. In contrast, desktop/laptop computers and smartwatches were each used by only 1.37% (n=2) of respondents, while tablets were the least used, with just 0.68% (n=1) selecting this option. The dominance of smartphones as the preferred access point is visually summarized in Fig 6.3.1.

6.3.2. Abandonment of Health Apps After Installation

Table 6.3.2: Abandonment of Health Apps After Installation

Abandonment of Health Apps After Installation	%	N
<i>No, I continue to use all health apps I download</i>	5%	7
<i>Not sure/Don't remember</i>	19%	28
<i>Yes, multiple times</i>	51%	74
<i>Yes, once or twice</i>	25%	37
Grand Total	100%	146



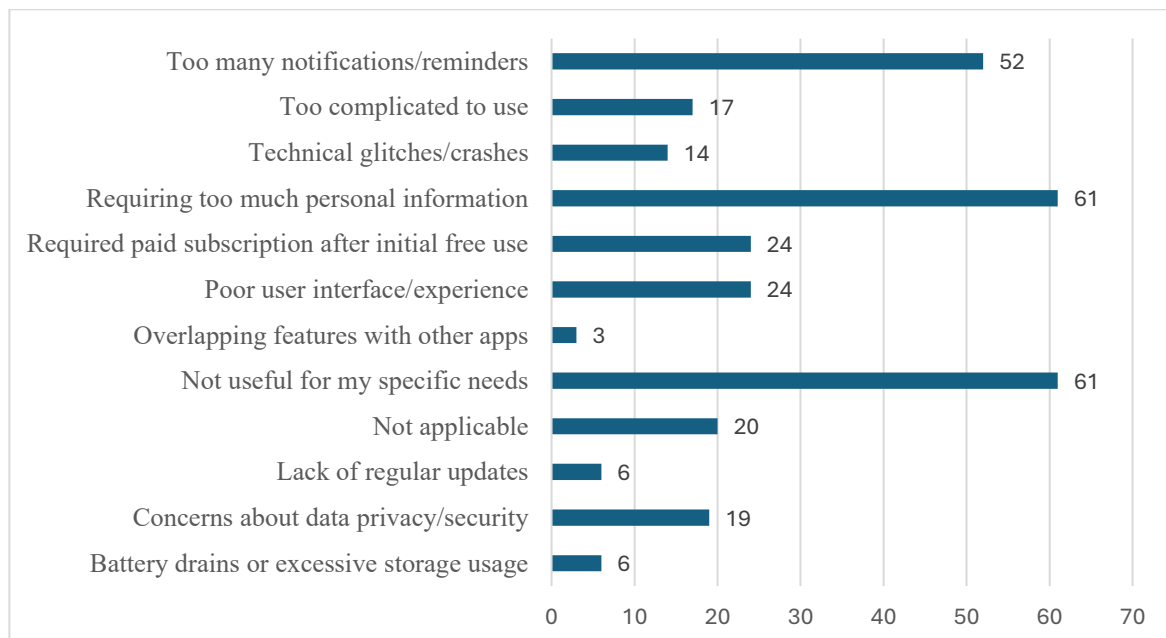
(Fig 6.3.2: Abandonment of Health Apps After Installation)

When asked about their continued use of health apps post-installation, 51% (n=74) of respondents admitted to having abandoned apps multiple times, and 25% (n=37) had done so once or twice. Only 5% (n=7) reported continuing to use all health apps they downloaded. Meanwhile, 19% (n=28) of participants were unsure or did not recall. This behavioral pattern is illustrated in *Fig 6.3.2*, highlighting app retention as a significant challenge.

6.3.3. Main Reasons for Uninstalling Health Apps

Table 6.3.3: Main Reasons for Uninstalling Health Apps

Main reasons for uninstalling the app	%	N
<i>Battery drains or excessive storage usage</i>	4%	6
<i>Concerns about data privacy/security</i>	13%	19
<i>Lack of regular updates</i>	4%	6
<i>Not applicable</i>	14%	20
<i>Not useful for my specific needs</i>	42%	61
<i>Overlapping features with other apps</i>	2%	3
<i>Poor user interface/experience</i>	16%	24
<i>Required paid subscription after initial free use</i>	16%	24
<i>Requiring too much personal information</i>	42%	61
<i>Technical glitches/crashes</i>	10%	14
<i>Too complicated to use</i>	12%	17
<i>Too many notifications/reminders</i>	36%	52
Grand Total	210%	307



(Fig 6.3.3: Main Reasons for Uninstalling Health Apps)

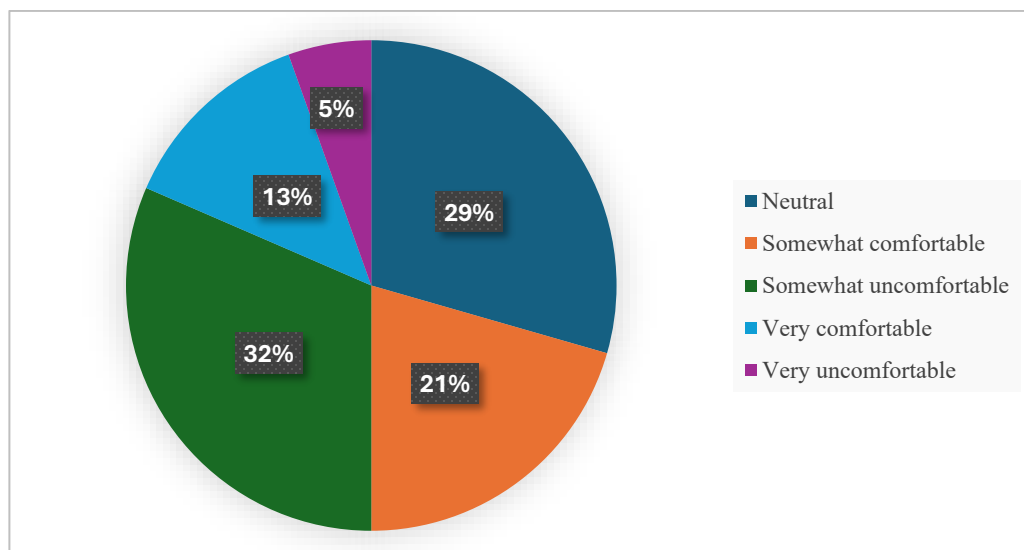
Respondents cited several reasons for uninstalling health-related apps. The two most common factors—each reported by 42% (n=61)—were that apps were either not useful for specific needs or asked for excessive personal information. Too many notifications or reminders was another prominent issue, noted by 36% (n=52) of respondents.

Other reasons included poor user experience (16%, n=24), required payment after initial free use (16%, n=24), and data privacy concerns (13%, n=19). Lesser-cited factors included technical glitches (10%, n=14), apps being too complicated (12%, n=17), and lack of updates or overlapping features. These findings are represented in *Fig 6.3.3*, emphasizing both technical and usability concerns as key drivers of app rejection.

6.3.4. Comfort Level in Sharing Health Data on Digital Platforms

Table 6.3.4: Comfort Level in Sharing Health Data on Digital Platforms

Comfort Level in Sharing Health Data on Digital Platforms	%	N
<i>Neutral</i>	29%	43
<i>Somewhat comfortable</i>	21%	30
<i>Somewhat uncomfortable</i>	32%	46
<i>Very comfortable</i>	13%	19
<i>Very uncomfortable</i>	5%	8
<i>Grand Total</i>	100%	146



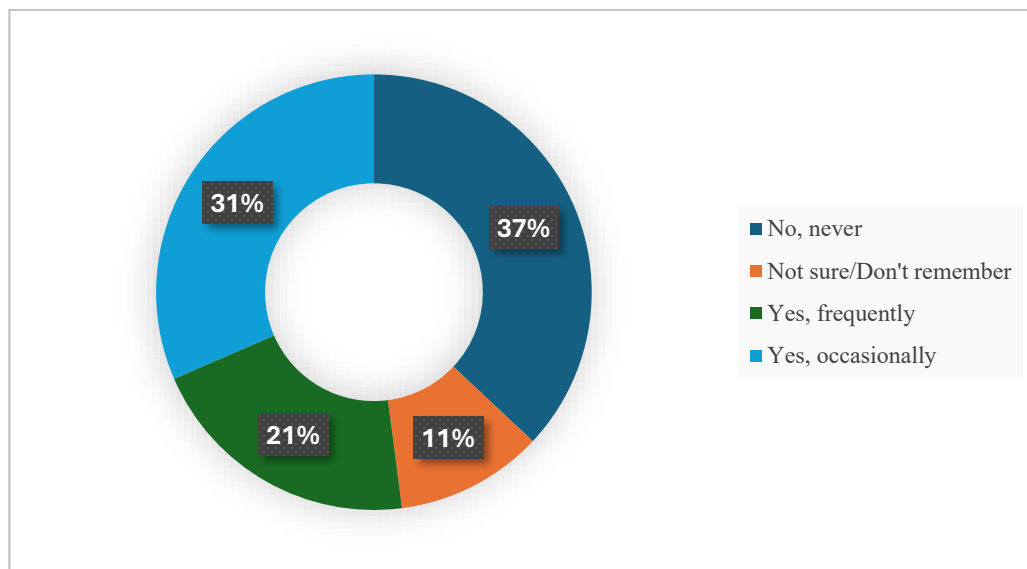
(Fig 6.3.4: Comfort Level in Sharing Health Data on Digital Platforms)

Participants expressed varied levels of comfort when it came to sharing personal health data digitally. A significant portion felt somewhat uncomfortable (31.51%, n=46), while 29.45% (n=43) held a neutral stance. Somewhat comfortable users accounted for 20.55% (n=30), whereas 13.01% (n=19) were very comfortable. A smaller group, 5.48% (n=8), indicated being very uncomfortable. This distribution is detailed in *Fig 6.3.4*, showcasing a generally cautious attitude toward data sharing.

6.3.5. Confusion Due to Conflicting Health Information Across Apps or Websites

Table 6.3.5: Confusion Due to Conflicting Health Information Across Apps or Websites

Confusion Due to Conflicting Health Information Across Apps or Websites	%	N
<i>No, never</i>	37%	54
<i>Not sure/Don't remember</i>	11%	16
<i>Yes, frequently</i>	21%	30
<i>Yes, occasionally</i>	32%	46
Grand Total	100%	146



(Fig 6.3.5: Confusion Due to Conflicting Health Information Across Apps or Websites)

When asked whether they had experienced confusion due to inconsistent or conflicting health information across digital platforms, 31.51% (n=46) of respondents admitted this occurred

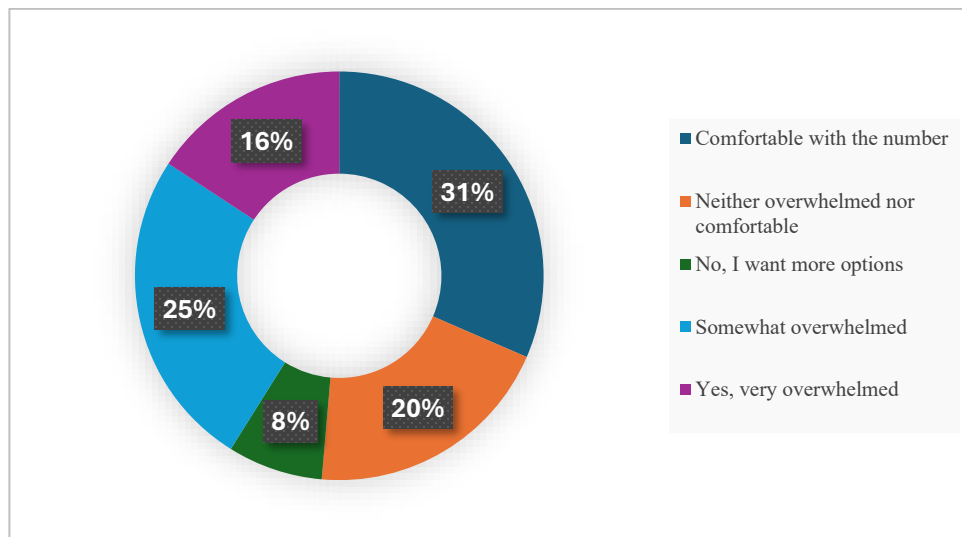
occasionally, while 20.55% (n=30) reported it happened frequently. Conversely, 36.99% (n=54) had never encountered such confusion, and 10.96% (n=16) were uncertain or did not recall. The responses, as presented in Fig 6.3.5, reflect a notable level of inconsistency in digital health content that may impact user trust and decision-making.

6.4. Chapter 4: App Fatigue and Digital Burden

6.4.1. Perception of the Number of Health-Related Apps and Websites

Table 6.4.1: Perception of the Number of Health-Related Apps and Websites

Felt overwhelmed by the number of health-related apps and websites available	%	N
<i>Comfortable with the number</i>	32%	46
<i>Neither overwhelmed nor comfortable</i>	20%	29
<i>No, I want more options</i>	8%	11
<i>Somewhat overwhelmed</i>	25%	37
<i>Yes, very overwhelmed</i>	16%	23
<i>Grand Total</i>	100%	146



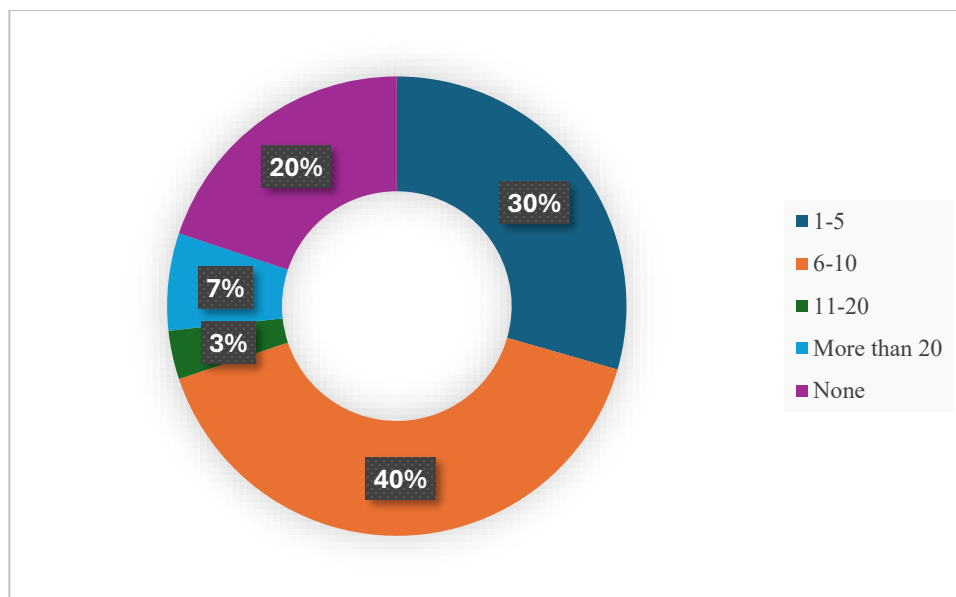
(Fig 6.4.1: Perception of the Number of Health-Related Apps and Websites)

Respondents showed varied reactions when asked whether they felt overwhelmed by the number of available health-related apps and websites. While 31.51% (n=46) felt comfortable with the current number, 25.34% (n=37) reported being somewhat overwhelmed, and 15.75% (n=23) were very overwhelmed. Meanwhile, 19.86% (n=29) chose a neutral stance, and 7.53% (n=11) expressed a desire for more options. These perspectives are illustrated in *Fig 6.4.1*, indicating that although many users are managing well, a significant portion experiences some degree of digital overload.

6.4.2. Weekly Volume of Notifications from Health Apps

Table 6.4.2: Weekly Volume of Notifications from Health Apps

Notifications from health apps in a week	%	N
<i>1-5</i>	29%	43
<i>6-10</i>	40%	59
<i>11-20</i>	3%	5
<i>More than 20</i>	7%	10
<i>None</i>	20%	29
<i>Grand Total</i>	100%	146



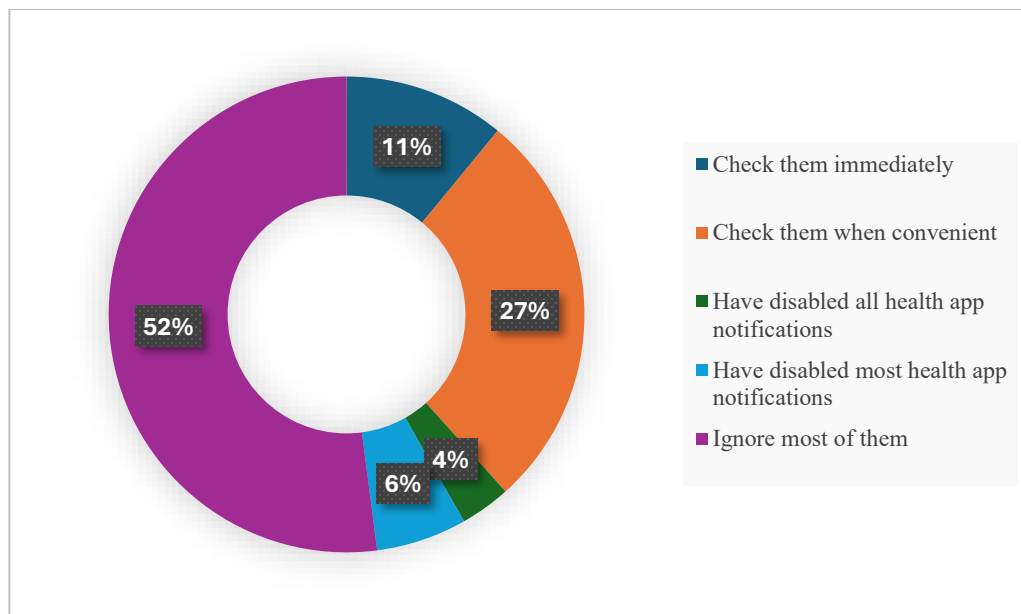
(Fig 6.4.2: Weekly Volume of Notifications from Health Apps)

The frequency of notifications from health apps varied across the sample. 40.4% (n=59) of respondents received 6 to 10 notifications per week, making it the most commonly reported range. 29.5% (n=43) received 1 to 5 notifications, while 6.8% (n=10) experienced more than 20 weekly alerts. A smaller group, 3.4% (n=5), received 11 to 20 notifications. Notably, 19.9% (n=29) reported receiving no notifications at all. These figures, shown in *Fig 6.4.2*, reflect the extent to which health app notifications permeate users' digital environments.

6.4.3. Typical Response to Health App Notifications

Table 6.4.3: Typical Response to Health App Notifications

Typial Response to Health App Notifications	%	N
<i>Check them immediately</i>	11%	16
<i>Check them when convenient</i>	27%	40
<i>Have disabled all health app notifications</i>	3%	5
<i>Have disabled most health app notifications</i>	6%	9
<i>Ignore most of them</i>	52%	76
Grand Total	100%	146



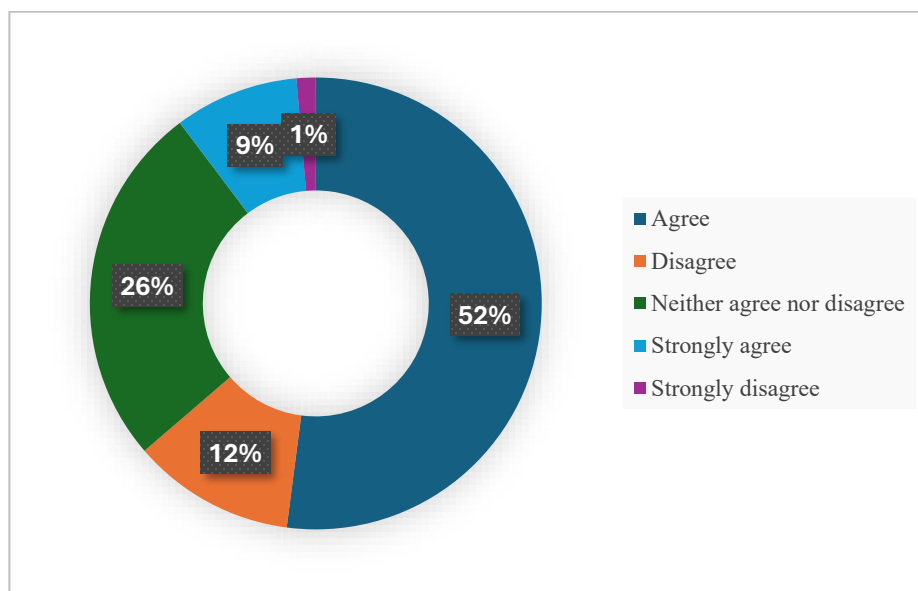
(Fig 6.4.3: Typical Response to Health App Notifications)

A majority of users reported ignoring most notifications, with 52.1% (n=76) selecting this response. 27.4% (n=40) said they check notifications when convenient, and only 11.0% (n=16) reported checking them immediately. Meanwhile, 6.2% (n=9) had disabled most notifications, and 3.4% (n=5) had disabled them entirely. As depicted in *Fig 6.4.3*, these responses highlight a trend of low engagement with push notifications among health app users.

6.4.4. Stress Perceived Due to Use of Multiple Health Platforms

Table 6.4.4: Stress Perceived Due to Use of Multiple Health Platforms

Stress Perceived Due to Use of Multiple Health Platforms	%	N
<i>Agree</i>	52%	76
<i>Disagree</i>	12%	17
<i>Neither agree nor disagree</i>	26%	38
<i>Strongly agree</i>	9%	13
<i>Strongly disagree</i>	1%	2
<i>Grand Total</i>	100%	146



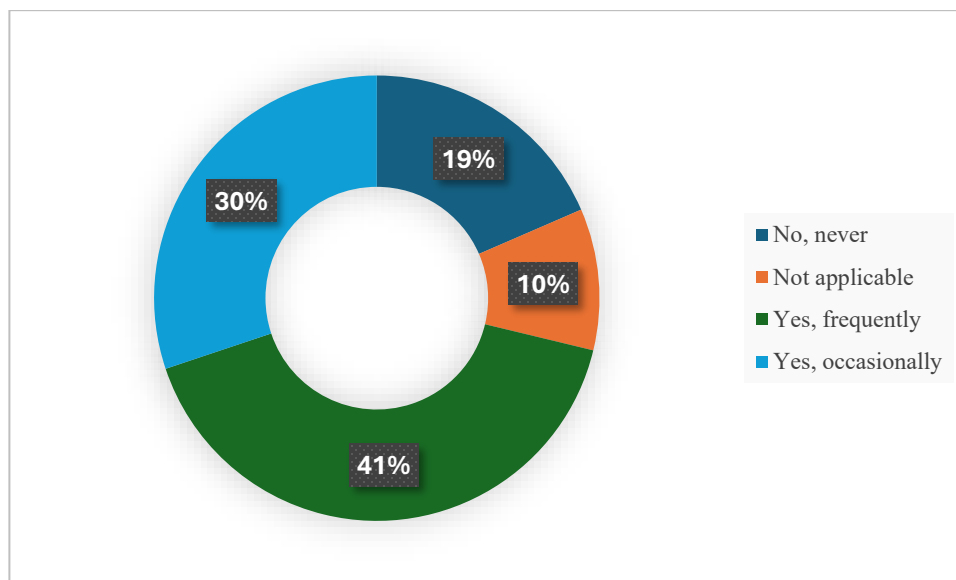
(Fig 6.4.4: Stress Perceived Due to Use of Multiple Health Platforms)

The impact of using multiple health platforms on users' mental well-being emerged clearly. A combined 61% (n=89) of participants agreed (52.1%, n=76) or strongly agreed (8.9%, n=13) that the use of multiple apps was increasing their stress rather than reducing it. In contrast, 11.6% (n=17) disagreed, and only 1.4% (n=2) strongly disagreed. Another 26.0% (n=38) remained neutral. These findings, presented in *Fig 6.4.4*, suggest that for many users, digital health tools may be contributing to psychological burden.

6.4.5. Instances of Taking a Break from Health Apps or Websites

Table 6.4.5: Instances of Taking a Break from Health Apps or Websites

Felt the need to take a break from using health apps/websites	%	N
<i>No, never</i>	18%	27
<i>Not applicable</i>	10%	15
<i>Yes, frequently</i>	41%	60
<i>Yes, occasionally</i>	30%	44
Grand Total	100%	146



(Fig 6.4.5: Instances of Taking a Break from Health Apps or Websites)

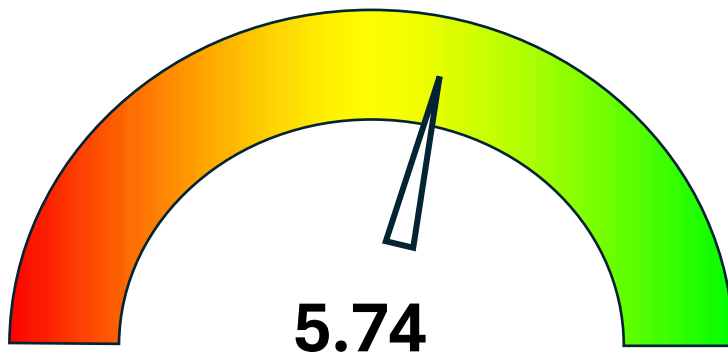
Taking breaks from digital health platforms was common among respondents. 41.1% (n=60) reported doing so frequently, while 30.1% (n=44) had done so occasionally. 18.5% (n=27) had never felt the need, and 10.3% (n=15) marked the question as not applicable. These trends, reflected in *Fig 6.4.5*, indicate a significant portion of users engage in digital detox from health apps, perhaps in response to fatigue or stress.

6.5. Chapter 5: Perceived Usefulness and Satisfaction

6.5.1. User Rating of Overall Usefulness of Health Apps/Websites

Table 6.5.1: User Rating of Overall Usefulness of Health Apps/Websites

On a scale of 1-10, how would you rate the overall usefulness of health apps/websites in managing your health? (1 = Not useful at all, 10 = Extremely useful)	
Score	Count
0	5
1	4
2	2
3	6
4	11
5	53
6	14
7	16
8	18
9	7
10	10
Grand Total	146



(Fig 6.5.1: User Rating of Overall Usefulness of Health Apps/Websites)

Participants rated the usefulness of health apps and websites on a scale of 1 to 10, with 1 being 'Not useful at all' and 10 representing 'Extremely useful'. The most common rating was

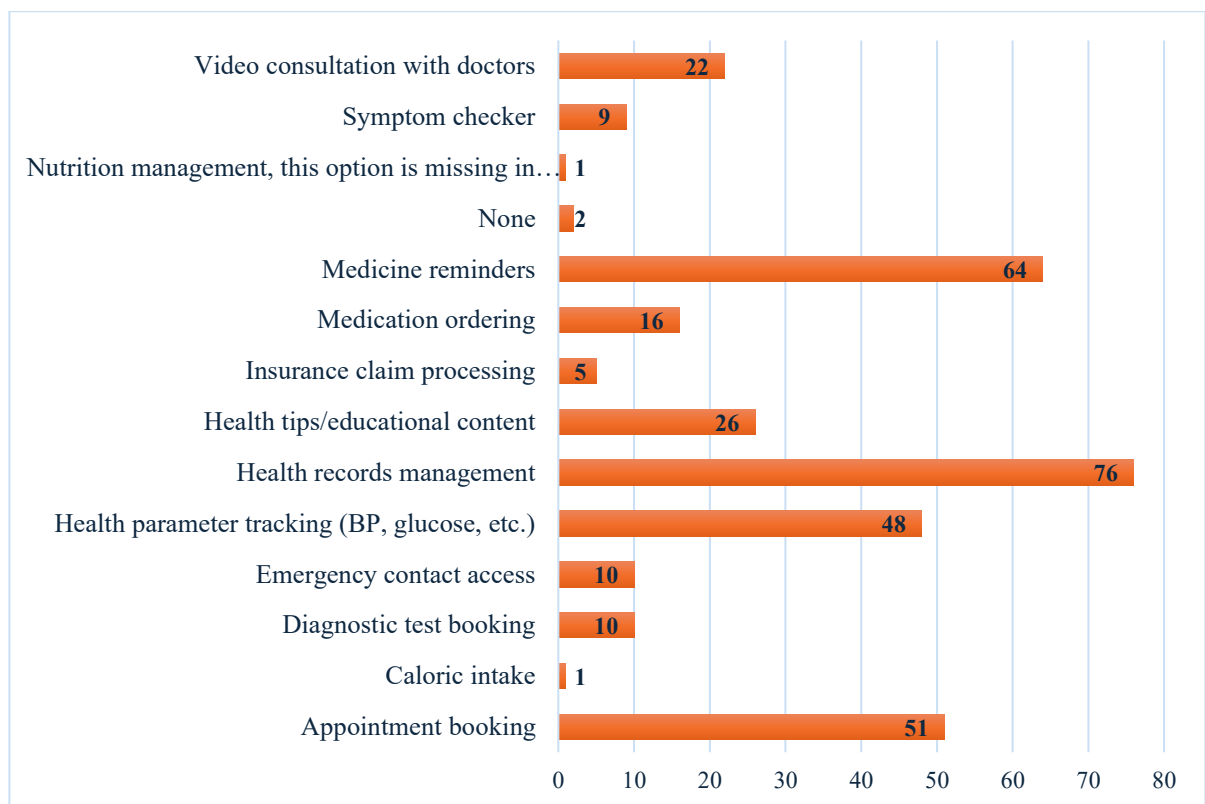
5, given by 53 participants, followed by 8 (n=18) and 7 (n=16). Lower-end ratings like 0 (n=5), 1 (n=4), and 2 (n=2) were also recorded, indicating some dissatisfaction.

At the higher end, 10 participants gave a full 10 rating, and 7 selected 9. The overall average rating was 5.74, indicating moderate perceived utility. This distribution is represented in *Fig 6.5.1*, which visually illustrates the central tendency toward moderate usefulness with a slight positive skew.

6.5.2. Most Valuable Features of Health Apps

Table 6.5.2: Most Valuable Features of Health Apps

Features of health apps do you find most valuable. (Selected up to 3)	%	N
<i>Appointment booking</i>	14.96%	51
<i>Caloric intake</i>	0.29%	1
<i>Diagnostic test booking</i>	2.93%	10
<i>Emergency contact access</i>	2.93%	10
<i>Health parameter tracking (BP, glucose, etc.)</i>	14.08%	48
<i>Health records management</i>	22.29%	76
<i>Health tips/educational content</i>	7.62%	26
<i>Insurance claim processing</i>	1.47%	5
<i>Medication ordering</i>	4.69%	16
<i>Medicine reminders</i>	18.77%	64
<i>None</i>	0.59%	2
<i>Nutrition management, this option is missing in most of the survey</i>	0.29%	1
<i>Symptom checker</i>	2.64%	9
<i>Video consultation with doctors</i>	6.45%	22
Grand Total	100%	341



(Fig 6.5.2: Most Valuable Features of Health Apps)

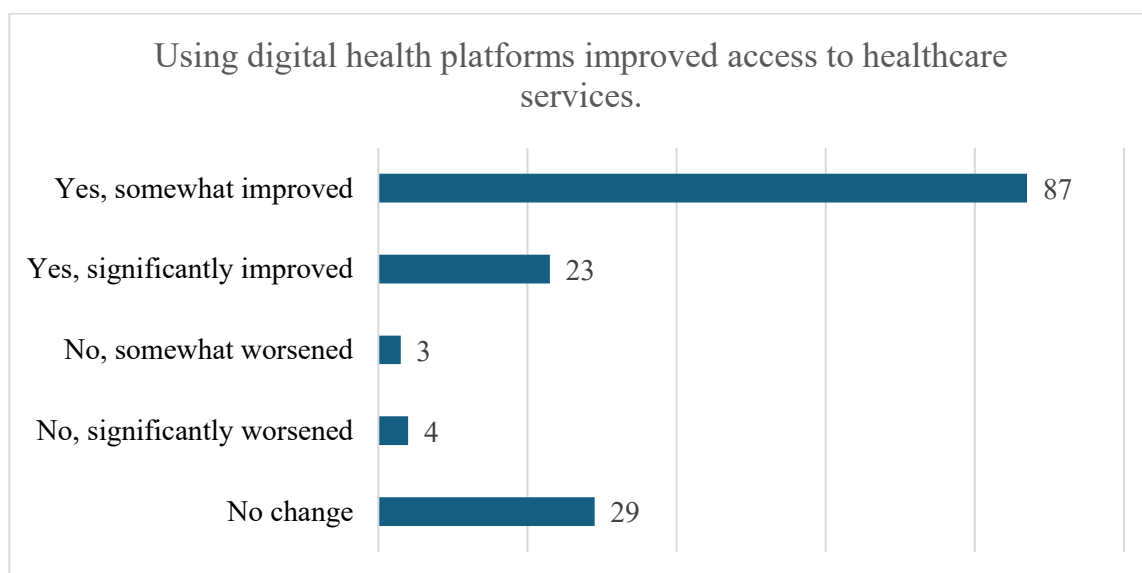
When asked to identify the top three features they valued in health apps, 22.29% (n=76) of responses pointed to health records management, making it the most frequently appreciated feature. Medicine reminders (18.77%, n=64) and appointment booking (14.96%, n=51) were also rated highly, suggesting a preference for practical, service-oriented functionalities.

Other notable mentions included health parameter tracking (14.08%, n=48) and health tips or educational content (7.62%, n=26). Video consultation with doctors (6.45%, n=22) and medication ordering (4.69%, n=16) were selected less frequently. Features like insurance claim processing, symptom checkers, emergency contact access, and diagnostic test booking received minimal preference. The complete distribution is reflected in Fig 6.5.2, highlighting the dominance of features that support organization and medication adherence.

6.5.3. Perceived Impact of Digital Health Platforms on Access to Healthcare

Table 6.5.3: Perceived Impact of Digital Health Platforms on Access to Healthcare

Using digital health platforms improved access to healthcare services.	%	N
<i>No change</i>	19.86%	29
<i>No, significantly worsened</i>	2.74%	4
<i>No, somewhat worsened</i>	2.05%	3
<i>Yes, significantly improved</i>	15.75%	23
<i>Yes, somewhat improved</i>	59.59%	87
<i>Grand Total</i>	100%	146



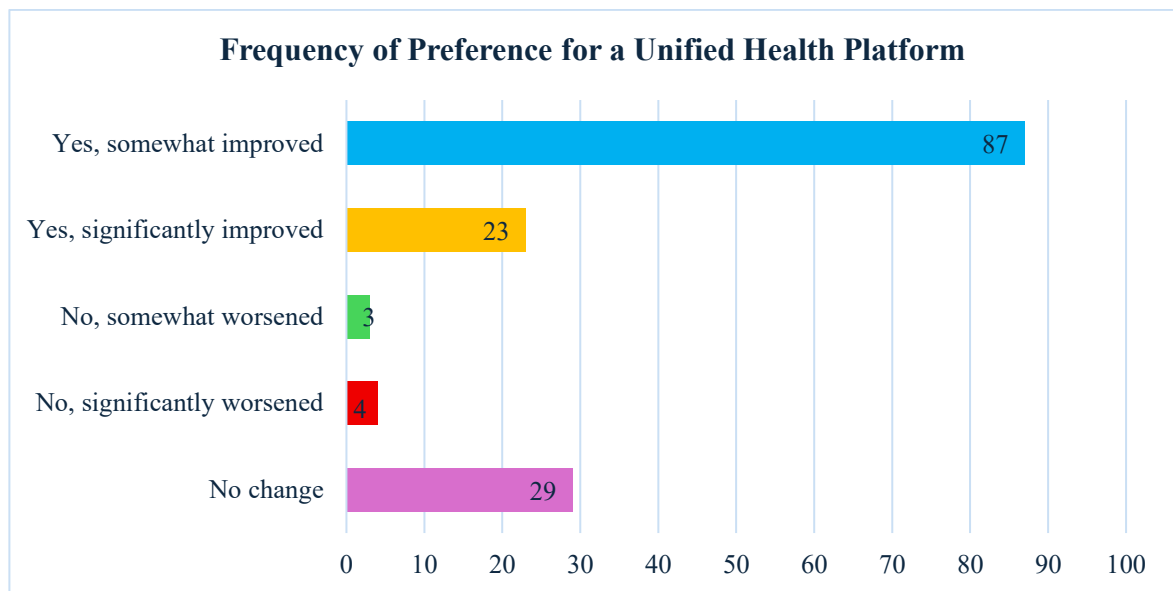
(Fig 6.5.3: Perceived Impact of Digital Health Platforms on Access to Healthcare)

A majority of respondents felt that digital platforms had positively influenced their access to healthcare, with 59.59% (n=87) reporting it had somewhat improved, and 15.75% (n=23) noting it had significantly improved. On the other hand, 19.86% (n=29) observed no change, and a minority experienced negative impacts—2.05% (n=3) noted it had somewhat worsened, while 2.74% (n=4) felt it had significantly worsened. These perspectives, visually presented in Fig 6.5.3, underscore a largely favorable reception of digital platforms in improving healthcare access.

6.5.4. Frequency of Preference for a Unified Health Platform

Table 6.5.4: Frequency of Preference for a Unified Health Platform

Preference for one unified health platform rather than multiple apps	%	N
<i>Frequently (about half the time)</i>	15.07%	22
<i>Never</i>	6.16%	9
<i>Occasionally</i>	43.15%	63
<i>Rarely</i>	29.45%	43
<i>Very frequently (almost every time)</i>	6.16%	9
<i>Grand Total</i>	100%	146



(Fig 6.5.4: Frequency of Preference for a Unified Health Platform)

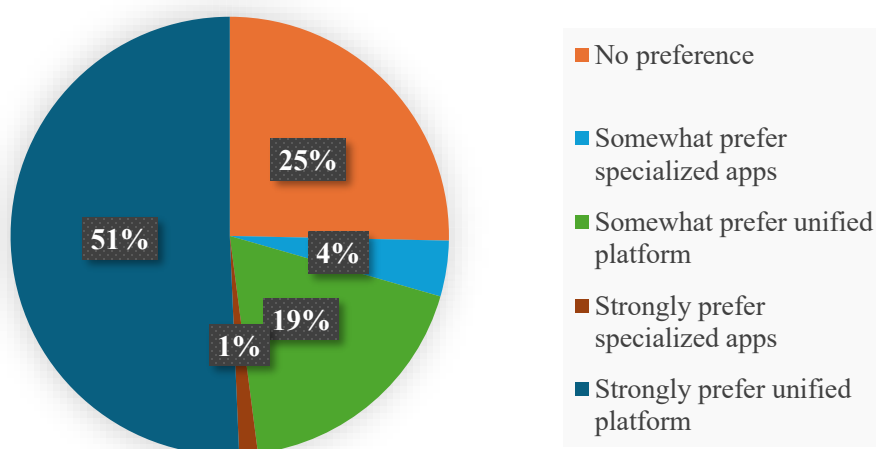
Respondents were asked how often they would prefer using one unified health platform instead of multiple specialized apps. The most common response was ‘Occasionally’ (43.15%, n=63), indicating intermittent interest. 29.45% (n=43) reported this preference ‘Rarely’, and 15.07% (n=22) said they preferred it ‘Frequently’. A smaller group indicated this preference ‘Very frequently’ (6.16%, n=9), while an equal percentage reported ‘Never’ (6.16%, n=9). The spread of responses, shown in Fig 6.5.4, suggests that while users are not unanimously in favor of a unified platform, a considerable number lean toward it under certain conditions.

6.5.5. Overall Preference Between Unified vs. Specialized Health Platforms

Table 6.5.5: Overall Preference Between Unified vs. Specialized Health Platforms

Overall Preference Between Unified vs. Specialized Health Platforms	%	N
<i>No preference</i>	25%	37
<i>Somewhat prefer specialized apps</i>	4%	6
<i>Somewhat prefer unified platform</i>	18%	27
<i>Strongly prefer specialized apps</i>	1%	2
<i>Strongly prefer unified platform</i>	51%	74
Grand Total	100%	146

Preference for one unified health platform rather than multiple apps



(Fig 6.5.5: Overall Preference Between Unified vs. Specialized Health Platforms)

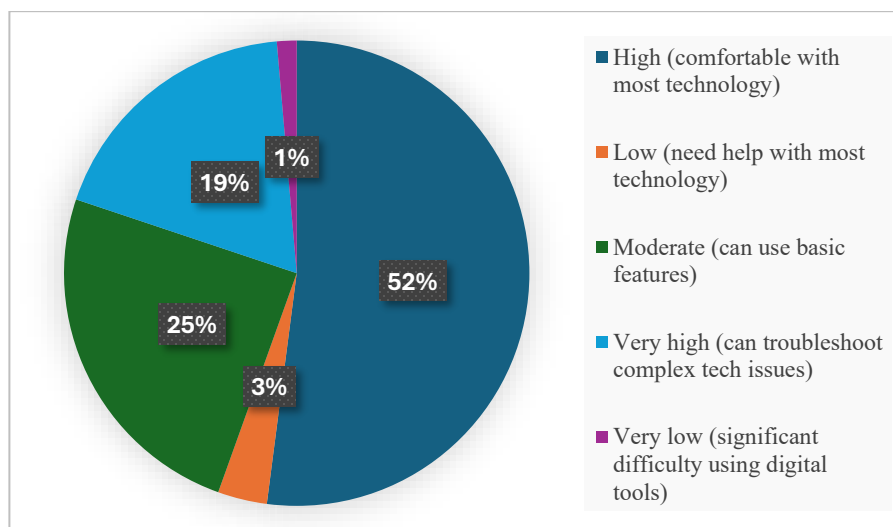
When directly asked to state a preference between a single unified health platform and multiple specialized apps, 50.68% (n=74) expressed a strong preference for a unified platform, while 18.49% (n=27) said they somewhat preferred it. On the contrary, only 4.11% (n=6) somewhat preferred specialized apps, and just 1.37% (n=2) strongly preferred them. 25.34% (n=37) had no clear preference either way. The results, depicted in Fig 6.5.5, indicate a strong inclination among users toward streamlined, integrated health solutions over fragmented digital ecosystems.

6.6. Chapter 6: Digital Literacy and Accessibility

6.6.1. Self-Rated Digital Literacy and Comfort with Technology

Table 6.6.1: Self-Rated Digital Literacy and Comfort with Technology

Self-Rated Digital Literacy and Comfort with Technology	%	N
<i>High (comfortable with most technology)</i>	52%	76
<i>Low (need help with most technology)</i>	3%	5
<i>Moderate (can use basic features)</i>	25%	36
<i>Very high (can troubleshoot complex tech issues)</i>	18%	27
<i>Very low (significant difficulty using digital tools)</i>	1%	2
<i>Grand Total</i>	100%	146



(Fig 6.6.1: Self-Rated Digital Literacy and Comfort with Technology)

Respondents were asked to assess their digital literacy and comfort with using technology. A majority, 52% (n=76), reported being highly comfortable with most technologies, while 18% (n=27) rated themselves as having a very high level, indicating confidence even with troubleshooting complex technical issues.

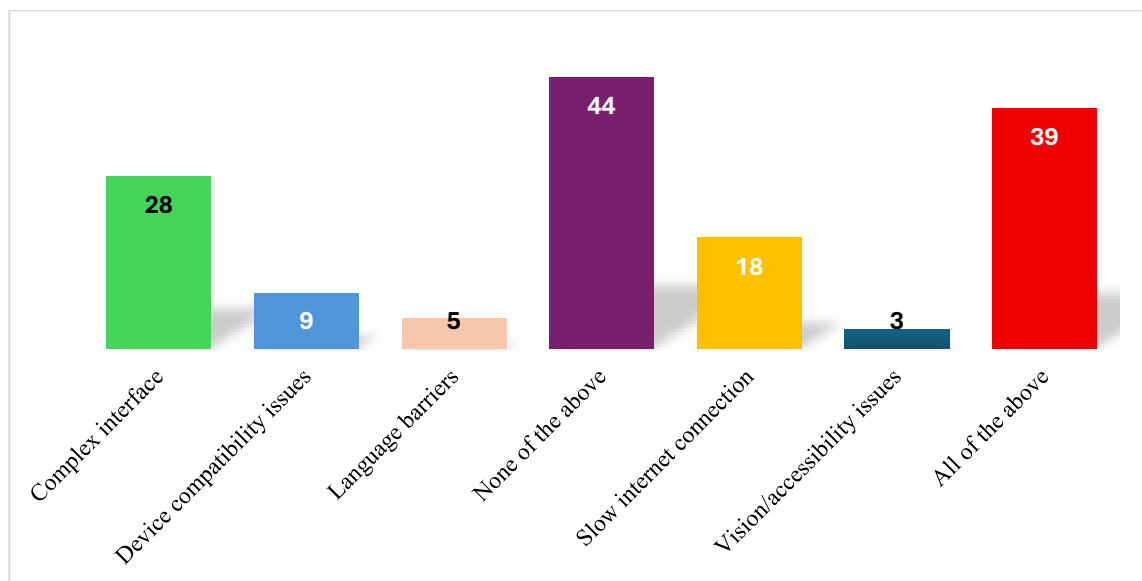
A moderate level of digital proficiency was noted by 25% (n=36), who stated they could use basic features. At the lower end of the scale, 3% (n=5) needed help with most technology, and 1% (n=2) indicated significant difficulty using digital tools, suggesting very low digital literacy. These

variations are visually represented in *Fig 6.6.1*, showing a generally tech-savvy user base with a small proportion requiring support.

6.6.2. Barriers Faced While Using Health Apps

Table 6.6.2: Barriers Faced While Using Health Apps

Barriers Faced While Using Health Apps	%	N
<i>Complex interface</i>	19.18%	28
<i>Device compatibility issues</i>	6.16%	9
<i>Language barriers</i>	3.42%	5
<i>None of the above</i>	30.14%	44
<i>Slow internet connection</i>	12.33%	18
<i>Vision/accessibility issues</i>	2.05%	3
<i>All of the above</i>	26.71%	39
<i>Grand Total</i>	100%	146



(Fig 6.6.2: Barriers Faced While Using Health Apps)

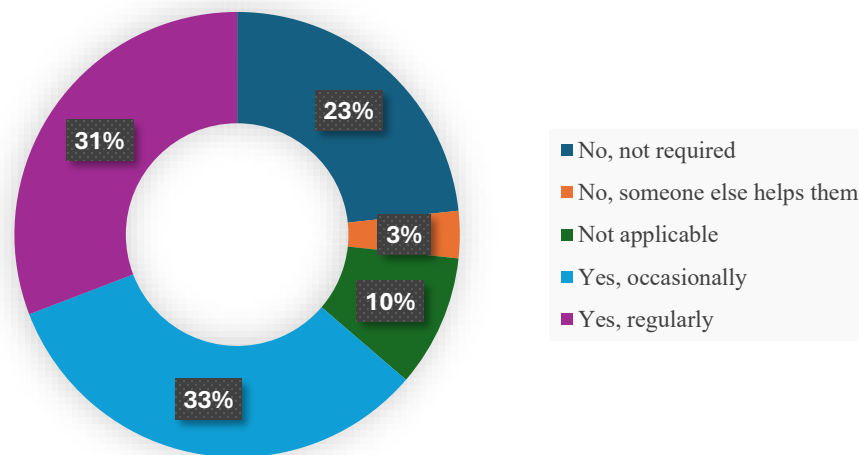
When asked about obstacles encountered while using health apps, the most common response was "All of the above", selected by 26.71% (n=39), indicating multiple simultaneous difficulties. 30.14% (n=44) reported no issues, reflecting a smooth user experience for nearly a third of the sample.

Among specific challenges, complex interfaces were cited by 19.18% (n=28), followed by slow internet connectivity (12.33%, n=18). Fewer users experienced device compatibility issues (6.16%, n=9), language barriers (3.42%, n=5), or vision/accessibility issues (2.05%, n=3). The distribution shown in *Fig 6.6.2* highlights how design complexity and infrastructure issues remain key concerns for a significant portion of users.

6.6.3. Support Provided to Family Members in Using Health Apps

Table 6.6.3: Support Provided to Family Members in Using Health Apps

Help any family members (especially elderly) in using health apps/websites.	%	N
<i>No, not required</i>	23%	34
<i>No, someone else helps them</i>	3%	5
<i>Not applicable</i>	10%	14
<i>Yes, occasionally</i>	33%	48
<i>Yes, regularly</i>	31%	45
Grand Total	100%	146



(Fig 6.6.3: Help any family members (especially elderly) in using health apps/websites.)

Support roles in helping family members, particularly the elderly, with health app usage were common. 33% (n=48) of respondents said they help occasionally, while 31% (n=45) assist regularly, reflecting active engagement in digital caregiving.

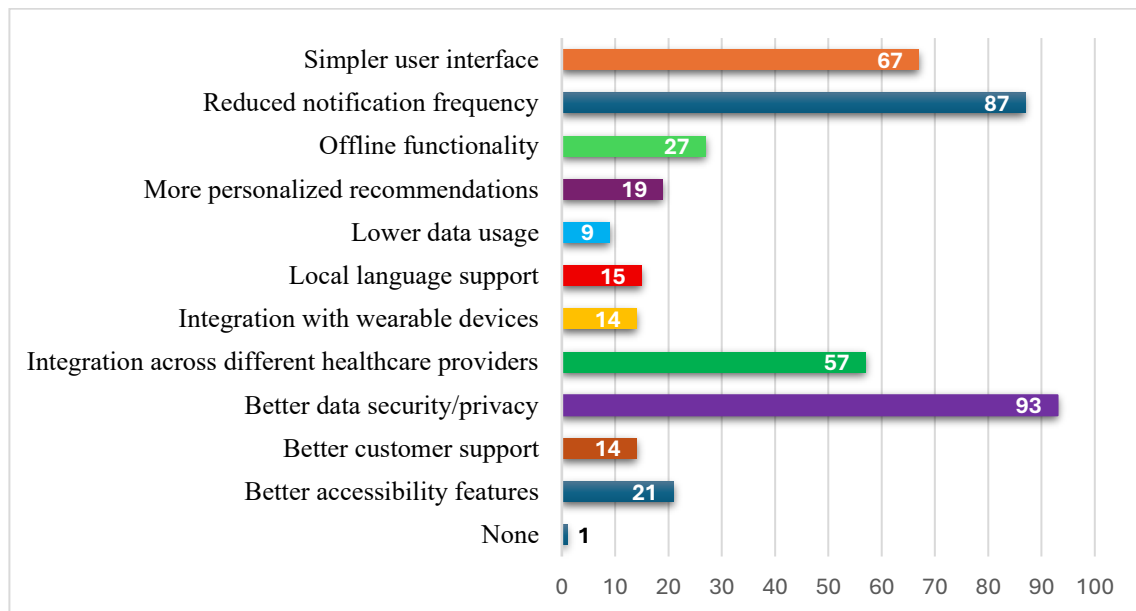
Conversely, 23% (n=34) mentioned that help is not required, and 3% (n=5) reported that someone else takes on this role. 10% (n=14) marked the question as not applicable, possibly indicating they have no elderly dependents or relevant family responsibilities. This spectrum of support behaviors is illustrated in *Fig 6.6.3*, emphasizing the importance of digital literacy not just for self-use, but within broader household contexts.

6.7. Chapter 7: Future Expectations

6.7.1. Desired Improvements in Health Apps and Websites

Table 6.7.1: Desired Improvements in Health Apps and Websites

Desired Improvements in Health Apps and Websites	%	N
<i>None</i>	0.2%	1
<i>Better accessibility features</i>	5.0%	21
<i>Better customer support</i>	3.3%	14
<i>Better data security/privacy</i>	21.9%	93
<i>Integration across different healthcare providers</i>	13.4%	57
<i>Integration with wearable devices</i>	3.3%	14
<i>Local language support</i>	3.5%	15
<i>Lower data usage</i>	2.1%	9
<i>More personalized recommendations</i>	4.5%	19
<i>Offline functionality</i>	6.4%	27
<i>Reduced notification frequency</i>	20.5%	87
<i>Simpler user interface</i>	15.8%	67
Grand Total	100%	424



(Fig 6.7.1: Desired Improvements in Health Apps and Websites)

Respondents were asked to indicate up to three improvements they would like to see in health-related digital platforms. The most frequently selected need was better data security and privacy, chosen by 21.9% (n=93) of total responses. This was closely followed by a desire to reduce the frequency of notifications, cited by 20.5% (n=87).

Other common suggestions included a simpler user interface (15.8%, n=67) and integration across different healthcare providers (13.4%, n=57), indicating a growing demand for unified and user-friendly digital experiences.

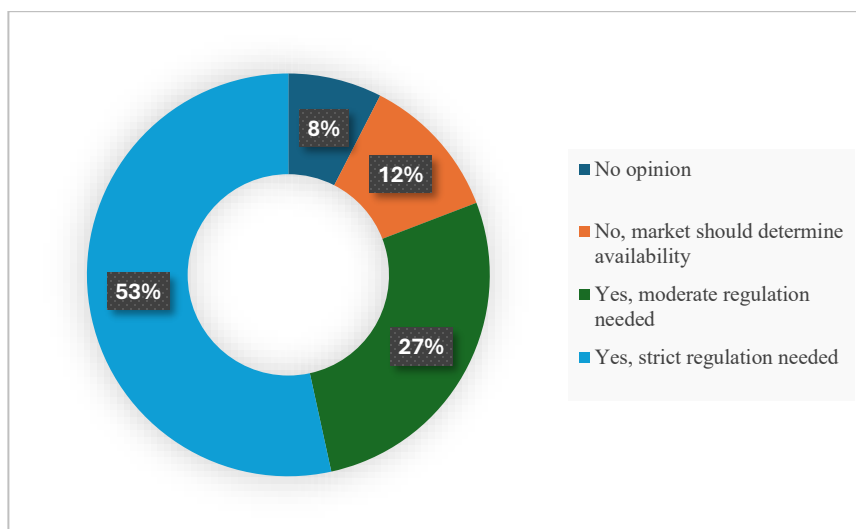
Requests for offline functionality (6.4%, n=27) and better accessibility features (5.0%, n=21) reflect user concerns around internet connectivity and inclusivity. Some also emphasized the need for more personalized recommendations (4.5%, n=19) and local language support (3.5%, n=15), pointing toward gaps in cultural and contextual relevance.

Less frequent but notable improvements included better customer support (3.3%, n=14) and integration with wearable devices (3.3%, n=14). A very small number, 0.2% (n=1), indicated that they saw no need for any improvement. The diverse set of responses is visually summarized in *Fig 6.7.1*, reflecting both technical and experiential expectations from users.

6.7.2. Public Opinion on Government Regulation of Health App Proliferation

Table 6.7.2: Public Opinion on Government Regulation of Health App Proliferation

Public Opinion on Government Regulation of Health App Proliferation	%	N
<i>No opinion</i>	8%	11
<i>No, market should determine availability</i>	12%	17
<i>Yes, moderate regulation needed</i>	27%	40
<i>Yes, strict regulation needed</i>	53%	78
Grand Total	100.00%	146



(Fig 6.7.2: Public Opinion on Government Regulation of Health App Proliferation)

When asked about potential government regulation to limit the number of health apps and prevent digital overload, more than half of the respondents—53.42% (n=78)—believed that strict regulation is needed. An additional 27.40% (n=40) supported the idea of moderate regulation, indicating broad support for some level of governmental oversight.

In contrast, 11.64% (n=17) felt that the market should determine app availability, without intervention, and 7.53% (n=11) had no opinion on the matter. These preferences are illustrated in *Fig 6.7.2*, underscoring a clear inclination toward policy measures that could streamline user choices and prevent digital fatigue.

7. DISCUSSION

7.1 Overview

This cross-sectional study examined the relationship between the proliferation of digital health platforms and user-perceived burden or "app fatigue" among 146 respondents across India, with primary focus on the National Capital Region. The findings reveal a complex landscape where digital health adoption is widespread yet accompanied by significant user burden, abandonment patterns, and desire for platform consolidation.

7.2 Digital Health Platform Adoption and Usage Patterns

The study demonstrates substantial penetration of digital health platforms among Indian users, with 75% of respondents having at least one health-related mobile application installed (109 out of 145 respondents who provided complete data for this question). This adoption rate is notably higher than reported in previous studies from resource-limited settings, suggesting growing digital health acceptance in urban and semi-urban India.

Fitness and wellness tracking apps emerged as the most popular category (85 responses), followed closely by e-pharmacy apps (62 responses) and hospital-specific applications (61 responses). This pattern aligns with the broader trend toward preventive healthcare and the convenience-driven adoption of pharmaceutical services, particularly accelerated during the COVID-19 pandemic. Interestingly, government health platforms showed relatively low adoption (13 responses), indicating potential gaps in public sector digital health engagement that warrant policy attention.

The frequency of usage reveals a predominantly occasional engagement pattern, with 44 respondents using health apps 2-3 times monthly and 43 using them less than once monthly. Only 13 respondents reported daily usage, suggesting that while adoption is high, sustained

engagement remains challenging. This finding is consistent with research by Sharma et al. (2024), who identified user engagement barriers in telehealth adoption across India.

7.3 Evidence of Digital App Fatigue

7.3.1. Abandonment Patterns and Underlying Causes

The study provides compelling evidence of widespread app fatigue, with 111 out of 146 respondents (76%) having abandoned health apps after installation—74 reporting multiple abandonments and 37 abandoning apps once or twice. This abandonment rate significantly exceeds typical mobile app retention benchmarks and indicates systemic issues within the digital health ecosystem.

The primary reasons for abandonment illuminate key pain points: 61 respondents cited apps as "not useful for specific needs," while an equal number (61) reported concerns about "requiring too much personal information." Additionally, 52 respondents were deterred by excessive notifications, and 24 each cited poor user interface and unexpected paid subscriptions. These findings suggest a fundamental misalignment between app design and user expectations, coupled with privacy concerns that may be culturally specific to the Indian context.

7.3.2. Notification Overload and Response Patterns

The study reveals significant notification burden, with 59 respondents receiving 6-10 health app notifications weekly, and 15 receiving more than 10. More critically, 76 respondents (52%) ignore most notifications, indicating notification fatigue that undermines the intended engagement benefits. This finding supports the theoretical framework of digital burden, where increased connectivity paradoxically reduces meaningful engagement.

7.3.3. Perceived Burden and Stress

A substantial majority (89 out of 146, or 61%) agreed that using multiple health platforms increases rather than reduces stress, with 13 strongly agreeing. This represents a critical finding that challenges the assumption that more digital health options inherently improve user experience. Furthermore, 104 respondents (71%) reported feeling the need to take breaks from health apps, with 60 requiring frequent breaks.

The overwhelming preference for platform consolidation—101 out of 146 respondents (69%) preferring a unified health platform over specialized apps—strongly suggests that the current fragmented ecosystem creates cognitive burden rather than enhanced functionality. This finding has significant implications for digital health policy and platform development strategies.

7.3.4. Digital Literacy and Accessibility Challenges

Despite 103 respondents (71%) reporting high to very high digital literacy, accessibility challenges persist. Notably, 93 respondents (64%) reported helping family members, particularly elderly individuals, with health app usage, indicating intergenerational digital divides that may limit broader population benefits.

Complex interfaces affected 28 respondents, while slow internet connectivity impacted 18 users. These technical barriers, though affecting a minority, highlight infrastructure and design challenges that may disproportionately impact vulnerable populations, consistent with findings by Venkataramanan et al. (2022) regarding digital inequalities in healthcare delivery.

7.3.5. User Satisfaction and Perceived Usefulness

Despite the evidence of fatigue and abandonment, respondents demonstrated moderate satisfaction with digital health platforms. The average usefulness rating of 5.74 (on an unspecified scale) suggests that users recognize value in these platforms even while experiencing burden. This apparent contradiction indicates that the problem may not be with digital health technology per se, but with the current implementation approach and ecosystem fragmentation.

Health records management (76 responses) and medicine reminders (64 responses) emerged as the most valued features, followed by appointment booking (51 responses) and health parameter tracking (48 responses). These preferences suggest users prioritize organizational and reminder functions over interactive or diagnostic capabilities.

7.3.6. Privacy and Security Concerns

Data privacy emerged as a significant concern, with 93 respondents prioritizing better data security/privacy improvements, the highest response for any desired improvement. Only 49 respondents (34%) felt comfortable or very comfortable sharing health data on digital platforms, while 54 (37%) expressed discomfort. This privacy apprehension may reflect broader cultural attitudes toward health information sharing in India and represents a critical barrier to deeper digital health engagement.

7.3.7. Technical Issues and Platform Reliability

Technical problems remain a significant challenge, with 94 respondents (64%) encountering issues occasionally or frequently, and 31 experiencing problems very frequently or about half the time. Only 9 respondents never encountered technical issues, highlighting reliability concerns that likely contribute to abandonment and fatigue.

7.3.8. Regulatory Perspectives and Future Expectations

The strong support for government regulation—118 respondents (81%) favoring moderate to strict regulation—indicates user recognition that market forces alone may not optimize the digital health ecosystem. This regulatory sentiment, combined with preferences for platform consolidation, suggests users perceive the current proliferation as potentially counterproductive.

7.4. Implications for Digital Health Policy and Practice

7.4.1. Platform Consolidation vs. Specialization

The overwhelming preference for unified platforms challenges the current trend toward specialized app development. Policymakers and developers should consider integration frameworks that maintain specialized functionality while reducing cognitive burden. The success of super-apps in other sectors suggests potential models for health platform consolidation.

7.4.2. Privacy-First Design Principles

The high prioritization of data security improvements and discomfort with data sharing necessitates privacy-first design approaches. This may require regulatory frameworks that mandate transparent data practices and give users meaningful control over health information sharing.

7.4.3. Notification Management

The evidence of notification fatigue suggests need for intelligent notification systems that prioritize relevance over frequency. Machine learning approaches that adapt to individual user preferences and behavior patterns may help address this challenge.

8. STUDY LIMITATIONS

Several limitations should be acknowledged. The convenience sampling approach and geographic concentration in NCR and supplementary urban areas may limit generalizability to rural populations. The cross-sectional design prevents causal inference about the relationship between platform proliferation and user burden. Additionally, the sample skewed toward higher digital literacy may underestimate barriers faced by less digitally literate populations.

Self-reported measures of app usage and abandonment may be subject to recall bias, and the study did not capture objective usage data that could provide more precise engagement metrics. Future research should consider longitudinal designs with mixed-methods approaches to better understand the causal pathways between platform proliferation and user experience.

9. CONCLUSION

This study provides substantial evidence that the proliferation of digital health platforms in India, while increasing access and adoption, is simultaneously creating significant user burden and "app fatigue." The high abandonment rates, preference for platform consolidation, and reported stress increase suggest that the current approach to digital health ecosystem development may be reaching diminishing returns.

The findings challenge the assumption that more digital health options necessarily improve user experience and health outcomes. Instead, they suggest that strategic consolidation, improved privacy practices, and user-centered design approaches may be more effective than continued platform proliferation.

For policymakers, these results indicate need for regulatory frameworks that encourage integration and standardization rather than unlimited platform proliferation. For developers, the findings emphasize importance of user-centered design, privacy protection, and meaningful rather than frequent engagement. For healthcare systems, the results suggest that digital health strategies should prioritize platform interoperability and user experience over technological novelty.

The study contributes to growing evidence that digital health success depends not only on technological capability but also on human-centered design that considers cognitive burden, privacy concerns, and user preferences for simplicity over complexity. As India continues to expand its digital health infrastructure, these insights can inform more sustainable and user-friendly approaches to technology-enabled healthcare delivery.

10.ANNEXURE

ANNEXURE-1

CONSENT FORM

Digital Overdose? Evaluating User Adoption, Perceived Burden, and Effectiveness of Proliferating Health Apps and Websites in India

Namste, I am Dr. Shefali Gupta, a student of PGDM, IIHMR Delhi, India. This study aims to evaluate user adoption, perceived burden, and effectiveness of health apps and websites in India. The research examines whether these digital tools are achieving their intended purpose or creating additional digital stress for users following the COVID-19 pandemic's acceleration of healthcare digitalization.

Your participation involves completing an online questionnaire taking approximately 15 minutes.

I hope you understand that your participation is completely voluntary, and you can withdraw at anytime before submitting your final responses without any consequences. All the information you provide will remain anonymous and confidential, with no personally identifiable information. Data will be stored securely.

While there are no direct personal benefits, my responses will contribute to improving digital health solutions in India. There are minimal risks associated with participation.

Consent to participate in the study:

☐ I agree (1) ☐ I do not agree (2)

Date: _____

If you have any questions, feel free to reach out to below mentioned detail:

By: Dr. Shefali Gupta (PG/23/107), 2nd Year Student, Health IT Stream, IIHMR Delhi

For more information: shefali_2325@iihmrdelhi.edu.in

ANNEXURE 2

Questionnaire

Introduction Section

1. Name: _____
2. Age: _____
3. Gender:
 - Male
 - Female
 - Non-binary/Third gender
 - Prefer not to say
4. State of permanent Residence:
5. State where you are currently residing and filling this form:
6. Name of the district or subdivision from where you are filling the responses: _____
7. Work status:
 1. Student
 2. Businessman/Entrepreneur
 3. Government Employee
 4. Private Sector Employee
 5. Healthcare Professional
 6. Homemaker
 7. Retired
 8. Others (Please specify): _____

If student can you please write your

7.1. Stream:

1. Sciences,
2. Arts,
3. Commerce
4. Other Specify:

7.2. Class

1. <10
2. 10-12
3. Graduation
4. Post-graduation
5. Above Post-graduation:
6. Some Diploma
7. Study completed and now working:

Section A: Digital Health App Usage Patterns

6. How many health-related mobile applications do you currently have installed on your smartphone/tablet?

1. None
2. 1-2
3. 3-5
4. 6-10
5. More than 10

7. Which of the following types of healthcare apps have you used in the past 12 months? (Select all that apply)

1. Teleconsultation/doctor appointment apps (e.g., Practo, MFine)
2. Hospital-specific apps (e.g., Apollo 24/7, Max Healthcare)
3. Government health platforms (e.g., ABDM, eSanjeevani)
4. E-pharmacy apps (e.g., PharmEasy, 1mg, Netmeds)
5. Insurance/Claims management apps
6. Fitness/wellness tracking apps

7. Disease-specific management apps (e.g., diabetes, hypertension)
8. Mental health/meditation apps
9. Diagnostic lab booking apps
10. COVID-19 related apps (e.g., Aarogya Setu, CoWIN)
11. None of the above

8. How frequently do you use health-related apps or websites?

1. Daily
2. 2-3 times a week
3. Once a week
4. 2-3 times a month
5. Once a month
6. Less than once a month

9. What is your primary reason for using digital health platforms? (Select one)

1. Convenience of accessing healthcare services
2. Cost savings compared to in-person visits
3. Better tracking of health information
4. Following doctor's recommendation
5. No nearby healthcare facilities
6. During emergency situations
7. Regular health monitoring
8. Other (Please specify): _____

10. How much time do you typically spend on health-related apps/websites in a week?

1. Less than 30 minutes
2. 30 minutes to 1 hour
3. 1-2 hours
4. 2-5 hours

5. More than 5 hours

Section B: Digital Health Platform Experiences

11. Which device do you primarily use to access health apps/websites?

1. Smartphone
2. Tablet
3. Desktop/Laptop Computer
4. Smart TV
5. Others (Please specify): _____

12. Have you ever abandoned using a health app after installing it?

1. Yes, multiple times
2. Yes, once or twice
3. No, I continue to use all health apps I download
4. Not sure/Don't remember

13. If you abandoned health apps, what were the main reasons? (Select up to 3)

1. Too complicated to use
2. Requiring too much personal information
3. Concerns about data privacy/security
4. Poor user interface/experience
5. Technical glitches/crashes
6. Not useful for my specific needs
7. Required paid subscription after initial free use
8. Too many notifications/reminders
9. Battery drains or excessive storage usage
10. Overlapping features with other apps
11. Language barriers
12. Lack of regular updates

13. Not applicable

14. How comfortable are you with sharing your health data on digital platforms?

1. Very comfortable
2. Somewhat comfortable
3. Neutral
4. Somewhat uncomfortable
5. Very uncomfortable

15. Have you ever experienced confusion due to conflicting information across different health apps/websites?

1. Yes, frequently
2. Yes, occasionally
3. No, never
4. Not sure/Don't remember

Section C: App Fatigue and Digital Burden

16. Do you feel overwhelmed by the number of health-related apps and websites available?

1. Yes, very overwhelmed
2. Somewhat overwhelmed
3. Neither overwhelmed nor comfortable
4. Comfortable with the number
5. No, I want more options

17. How many notifications from health apps do you receive in a typical week?

1. None
2. 1-5
3. 6-10
4. 11-20
5. More than 20

18. How do you typically respond to health app notifications?

1. Check them immediately
2. Check them when convenient
3. Ignore most of them
4. Have disabled most health app notifications
5. Have disabled all health app notifications

19. Do you feel that using multiple health apps/platforms is increasing your stress rather than reducing it?

1. Strongly agree
2. Agree
3. Neither agree nor disagree
4. Disagree
5. Strongly disagree

20. Have you ever felt the need to take a break from using health apps/websites?

1. Yes, frequently
2. Yes, occasionally
3. No, never
4. Not applicable

Section D: Perceived Usefulness and Satisfaction

21. On a scale of 1-5, how would you rate the overall usefulness of health apps/websites in managing your health? (1 = Not useful at all, 5 = Extremely useful)

1. 1 (Not useful at all)
2. 2
3. 3
4. 4
5. 5 (Extremely useful)

22. Which features of health apps do you find most valuable? (Select up to 3)

1. Appointment booking
2. Medicine reminders
3. Health records management
4. Video consultation with doctors
5. Health tips/educational content
6. Symptom checker
7. Medication ordering
8. Diagnostic test booking
9. Health parameter tracking (BP, glucose, etc.)
10. Insurance claim processing
11. Emergency contact access
12. Others (Please specify): _____

23. Has using digital health platforms improved your access to healthcare services?

1. Yes, significantly improved
2. Yes, somewhat improved
3. No change
4. No, somewhat worsened
5. No, significantly worsened

24. How often do you encounter technical issues (e.g., crashes, errors) while using health apps/websites?

1. Very frequently (almost every time)
2. Frequently (about half the time)
3. Occasionally
4. Rarely
5. Never

25. Would you prefer having one unified health platform rather than multiple specialized apps?

1. Strongly prefer unified platform
2. Somewhat prefer unified platform
3. No preference
4. Somewhat prefer specialized apps
5. Strongly prefer specialized apps

Section E: Digital Literacy and Accessibility

26. How would you rate your digital literacy/comfort with technology?

1. Very high (can troubleshoot complex tech issues)
2. High (comfortable with most technology)
3. Moderate (can use basic features)
4. Low (need help with most technology)
5. Very low (significant difficulty using digital tools)

27. Have you ever faced difficulties in using health apps due to:

11. Language barriers
12. Complex interface
13. Slow internet connection
14. Device compatibility issues
15. Vision/accessibility issues
16. All of the above
17. None of the above
18. Other (Please specify): _____

28. Do you help any family members (especially elderly) in using health apps/websites?

1. Yes, regularly
2. Yes, occasionally
3. No, not required
4. No, someone else helps them

5. Not applicable

Section F: Future Expectations

29. What improvements would you like to see in health apps/websites? (Select up to 3)

1. Simpler user interface
2. Better data security/privacy
3. Reduced notification frequency
4. Integration across different healthcare providers
5. Local language support
6. Offline functionality
7. Better accessibility features
8. More personalized recommendations
9. Integration with wearable devices
10. Lower data usage
11. Better customer support
12. Other (Please specify): _____

30. Do you believe the government should regulate the number of health apps to prevent digital overload?

1. Yes, strict regulation needed
2. Yes, moderate regulation needed
3. No, market should determine availability
4. No opinion
5. Other (Please specify): _____

Thank you for completing this survey. Your responses will help us better understand the impact of digital health platforms and suggest improvements for future development.

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