Section: Community Medicine

Original Research Article

A CROSS-SECTIONAL STUDY TO ASSESS THE UTILIZATION AND PERCEPTION OF ONLINE HEALTH APPLICATIONS (MHEALTH APPS) AMONG URBAN RESIDENTS OF INDORE CITY, INDIA

Vijay Khare[1], Sanjay Silawat[2], Ayushi Shrivastava[3], Satish Saroshe[4], Shivam Dixit[5]

[1]*Post Graduate Resident, Department of Community Medicine, M.G.M. Medical College, Indore, Madhya Pradesh, India.*
[2]*Demonstrator, Department of Community Medicine, M.G.M. Medical College, Indore, Madhya Pradesh, India.*
[3]*Senior Resident, Department of Community Medicine, LN Medical College & Research Centre, Bhopal, Madhya Pradesh, India.*
[4]*Associate Professor, Department of Community Medicine, M.G.M. Medical College, Indore, Madhya Pradesh, India.*
[5]*Assistant Professor (Statistician), Department of Community Medicine, M.G.M. Medical College, Indore, Madhya Pradesh, India.*

Received *: 09/06/2025*
Received in revised form *: 17/07/2025*
Accepted *: 07/08/2025*

Corresponding Author:
Mr. Shivam Dixit,
Assistant Professor (Statistician), Department of Community Medicine, M.G.M. Medical College, Indore.
Email: dixit.shivam2007@gmail.com

DOI:10.70034/ijmedph.2025.3.329

Source of Support: Nil,
Conflict of Interest: Nonedeclared

Int J Med Pub Health
2025; 15 (3); 1792-1796

ABSTRACT

Background: Mobile health (mHealth) applications are increasingly used to support healthcare delivery, particularly in low- and middle-income countries. While global evidence underscores their role in improving access, awareness, and continuity of care, adoption patterns and barriers in urban Indian populations remain underexplored. **Objective:** To assess usage patterns, app types, challenges among users, and reasons for non-usage among adults in an urban Indian setting, providing insights for digital health strategies and policy initiatives.

Materials and Methods: A cross-sectional study was conducted among 167 adults of an urban locality of Indore city. Data was collected by using pre-designed semi structured questionnaire distributed through online and offline mode. Later data was analysed using OpenEpi software. Data were analysed using descriptive statistics and Chi-square test.

Results: Younger adults (26–35 years) and those with higher education (graduates or above) were significantly more likely to use mHealth apps ($p<0.05$), while gender showed no significant association. Pharmaceutical purchase (63.7%) and diagnostic booking (50.5%) apps were most commonly used, reflecting treatment-oriented adoption, whereas preventive health apps (fitness, diet) were less prevalent. Major challenges among users included technical glitches (28.6%) and high subscription costs (25.3%). Non-users primarily preferred traditional healthcare (42.1%) or lacked awareness (31.6%), with digital illiteracy (23.7%) also notable.

Conclusion: mHealth adoption in urban India is shaped by age and education, with strong reliance on treatment-focused services and persistent barriers related to usability, cost, and awareness. Targeted digital literacy programs, affordability measures, and culturally tailored outreach are needed to bridge gaps and support initiatives such as the Ayushman Bharat Digital Mission.

Keywords: mHealth apps, Telemedicine, Digital health, Online health applications.

INTRODUCTION

Mobile health (mHealth) applications have emerged as transformative tools within digital health, enabling the delivery of medical services, health monitoring, and patient education through smartphones and other portable devices.[1] mHealth apps are gaining popularity for their ability to enhance health outcomes by increasing self-management of chronic illnesses, enhancing preventive service access, and enabling real time patient provider communication.[2] The accelerated growth of mobile internet access and smartphone

penetration has further propelled the worldwide expansion of mHealth, especially in low- and middle-income nations where conventional healthcare infrastructure can be limited.[3]

The reach of mHealth has grown significantly in the last ten years. What used to be about fitness monitoring and health promotion in early days of mobile apps now encompasses sophisticated clinical functionalities like teleconsultation, remote diagnosis, and chronic illness management.[4] These innovations are aligned with international health priorities that seek to improve health systems and reduce inequities in service delivery through digital interventions.[5] Nevertheless, while they hold much promise, actual mHealth adoption is uneven, and it depends on factors such as age, education, socioeconomic status, and cultural orientation to technology use in healthcare.[6]

In the context of India, the digital health environment has witnessed significant change, based on widespread mobile phone coverage, high-speed urbanization, and policy steps that promote digital adoption in health care.[7] The COVID-19 pandemic triggered a boost in the use of mobile health as lockdowns and social distancing measures created alternatives to physical consultations[8]. Mobile telemedicine applications, medicine delivery, and home diagnostic applications saw widespread adoption during this time, mirroring a desperate move towards remote care solutions.[9] Although this trend highlighted the flexibility of online health tools, uncertainties exist regarding the sustainability of these usage trends after the acute pandemic stage and the level at which preventive health applications, like fitness or nutrition websites, are adopted alongside cure-centred services.[10]

In spite of increasing interest, a number of barriers still impede the mass adoption of mHealth. Technical limitations, such as variability in app performance and user interface issues, tend to decrease usability and discourage ongoing use.[11] Cost factors also present a substantial barrier; although free basic services are sometimes provided by applications, paid membership or fees for additional features are common in many applications, which may be out of reach for low-income individuals.[12] In recognition of these challenges, the Government of India has launched initiatives such as the Ayushman Bharat Digital Mission, which seeks to establish a unified digital health ecosystem through interoperable health records, expanded telemedicine infrastructure, and improved access to quality care across diverse regions. Such initiatives underscore the strategic priority placed on digital health within national health policy frameworks and the need for research to inform their effective implementation. Privacy and data protection issues continue to be a concern, expressing larger worries about exposing personal health data on online platforms.[13] These challenges highlight the necessity of comprehensive strategies that not only expand access but also foster user trust and ensure equitable utilization of mHealth innovations.[14]

Existing literature on mHealth in India predominantly addresses specific diseases or evaluates individual applications rather than providing a comprehensive understanding of user behaviour across multiple health domains. Moreover, few studies simultaneously explore the perspectives of both users and non users, limiting insights into sociocultural and economic factors influencing adoption and non adoption. Understanding these dimensions is critical for developing interventions that are both user centred and contextually relevant, ensuring that digital health tools effectively bridge rather than widen health inequities.

The present study aims to assess usage patterns, types of mHealth apps adopted, challenges faced by users, and barriers among non users in an urban area of Indore. By exploring demographic correlates and user preferences, this study seeks to provide actionable insights for policymakers and app developers to enhance mHealth uptake and equity in digital health access.

Objectives of the study

Primary objective of the study is to assess the perception of study participants towards usage of these mhealth apps and secondary objective is to find the various dimensions of use of these apps and also challenges associated with them.

MATERIALS AND METHODS

Study Design and Setting

A **community-based cross-sectional study** was conducted between July and September 2024 in an urban ward of Indore, Madhya Pradesh, India. Indore is a major metropolitan centre with high smartphone penetration and mixed socioeconomic profiles.

Sample Size and Sampling

Sample size was calculated using the formula:

$$n = \frac{Z_\alpha^2 * p * (1-p)}{d^2}$$

Assuming 50% prevalence of mHealth app use (from prior Indian studies 4, 5), 95% confidence level, and 8% margin of error, 150 participants were required. To account for non-response (10%), 167 participants were enrolled.

Sample Size- (n=167)

Inclusion and Exclusion Criteria

- **Inclusion:** Adults ≥18 years, residents of the study area ≥6 months, owning a smartphone were included in the study.
- **Exclusion:** Individuals with cognitive impairment or unwilling to consent are excluded from the study.

Data Collection Tool

A semi-structured, pre-tested questionnaire was used for collecting the data. Convenience Sampling technique is used for data collection.

Data Analysis

Data were entered in MS Excel and analysed using OpenEpi. Descriptive statistics (mean, SD, percentages) summarized findings. Chi-square tests examined associations between demographic variables and app usage; $p<0.05$ was considered significant.

RESULTS

Table 1: Demographics of the study participants (n=167)

Variable	Category	Users n=91 (%)	Non-Users n= 76 (%)	Chi-square	p-value
Age Group (years)	18–25	20 (22.0%)	14 (18.4%)	8.10	0.041*
	26–35	36 (39.6%)	22 (28.9%)		
	36–45	23 (25.3%)	20 (26.3%)		
	46–55	8 (8.8%)	12 (15.8%)		
	>55	4 (4.4%)	8 (10.5%)		
Gender	Male	48 (52.7%)	41 (53.9%)	0.02	0.88
	Female	43 (47.3%)	35 (46.1%)		
Education	Postgraduate & above	22 (24.2%)	10 (13.2%)	10.6	0.014*
	Graduate (Bachelor's)	42 (46.1%)	26 (34.2%)		
	Diploma/Intermediate	17 (18.7%)	20 (26.3%)		
	Secondary & below	10 (11.0%)	20 (26.3%)		

Usage was highest among the 26–35 year group (39.6%), followed by 18–25 years (22%). Usage steadily declined with increasing age — only 4.4% of users were >55 years. The Chi-square value of 8.10 ($p = 0.041$) indicates a statistically significant relationship, suggesting younger adults are more inclined towards adopting health apps. Male and female participants demonstrated nearly equal adoption rates (52.7% vs 47.3%, respectively), with no significant difference ($p = 0.88$). This implies gender may not be a strong determinant of health app utilization in this urban population. An upward trend in usage with increasing education level was observed — 70% of users were graduates or above compared to only 11% among those with secondary or below. The Chi-square value of 10.6 ($p = 0.014$) confirms this association is statistically significant, highlighting that higher education correlates with greater digital health engagement.

Table 2: Types of mHealth Apps Used (n=91 users)

Type of App	Examples Reported	Primary Use / Purpose	Frequency (n)	Percentage (%)
Pharmaceutical Purchase	1mg, NetMeds, PharmEasy, Apollo Pharmacy	Ordering medicines, home delivery	58	63.7%
Diagnostics / Lab Booking	Tata 1mg, Redcliffe Labs, Dr. Lal PathLabs	Booking lab tests, receiving reports online	46	50.5%
Teleconsultation	Practo, mfine, Apollo 24/7, Tata Health	Online doctor consultation, follow-up	39	42.8%
Fitness / Exercise Tracking	Google Fit, Fitbit, Samsung Health	Step counting, workouts, physical activity	34	37.3%
Diet & Nutrition	MyFitnessPal, HealthifyMe, Lifesum,	Calorie tracking, diet planning	28	30.7%
Chronic Disease Monitoring	Diabetes Tracker, Glucose Buddy, Blood Pressure Log	Monitoring BP, glucose, chronic conditions	20	22.0%
Mental Health / Wellbeing	Headspace, Calm, Mindfulness Coach	Meditation, stress relief, mood tracking	14	15.4%

Apps for pharmaceutical purchases are used most frequently (63.7%), followed by diagnostics (50.5%) and teleconsultation (42.8%) — showing treatment-oriented adoption. Fitness (37.3%) and diet apps (30.7%) reflect preventive health behaviours. Chronic disease (22%) and mental health apps (15.4%) are less common but growing in niche segments.

Table 3: Challenges Faced by Users of mHealth Applications (Users, n = 91)

Challenge Faced	Description / Examples	Frequency (n)	Percentage (%)
Technical Difficulties	App crashes, slow performance, payment failures	26	28.6%
High Subscription or Service Costs	Expensive premium plans, consultation fees	23	25.3%
Poor Customer Support	Lack of response or slow query resolution	19	20.9%
Limited Regional/Local Services	App doesn't cover local pharmacies or diagnostics	17	18.7%
Data Privacy Concerns	Fear of misuse or unauthorized sharing of personal health	15	16.5%
Difficulty in Integration	Cannot sync with doctors or wearable devices	13	14.3%
Other Challenges	Language barrier, poor customization	9	9.9%

Among mHealth app users (n=91), the leading challenges were technical glitches (28.6%) and high subscription costs (25.3%), followed by poor customer support (20.9%) and limited regional services (18.7%). Privacy concerns and integration difficulties were also noted, though less frequently.

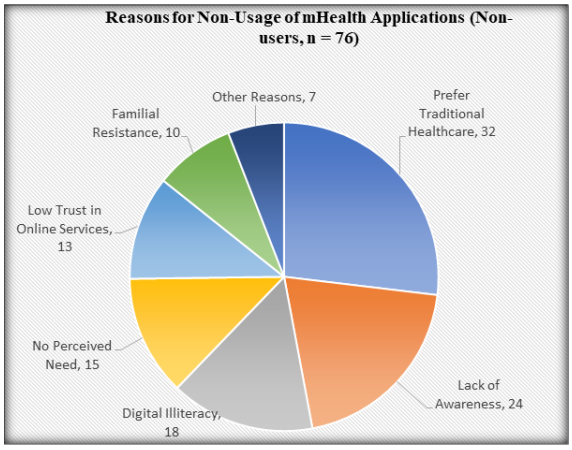

Figure 1: Reasons for non-usage of mHealth Applications (Non-users, n = 76)

For non-users (n=76), the predominant reasons for non-usage were preference for traditional healthcare (42.1%) and lack of awareness (31.6%). Other key barriers included digital illiteracy (23.7%), no perceived need (19.7%), and low trust in online services (17.1%). Cultural resistance and personal disinterest were cited by a smaller proportion.

91.8% of them believes that the government should make enabling policies to facilitate and popularize mHealth applications in the country.

71.4% agrees that these apps were more useful during the COVID times. 35.7% of them have used them for online consultation with doctors during COVID times and out of them only 52.8% had a satisfactory experience.

DISCUSSION

This study explored patterns of usage, challenges, and barriers related to mobile health (mHealth) applications among an urban Indian population. The findings provide insights into user demographics, app preferences, and reasons for non-use, highlighting both opportunities and gaps for improving digital health adoption in India.

Younger adults (26–35 years) exhibited the highest usage of mHealth apps (39.6%), with adoption declining in older age groups. This trend aligns with observations by Kim and Lee,[1] and Krebs and Duncan,[2] who reported higher acceptance of digital health tools among younger, tech-savvy individuals. Gender differences were minimal; however, education strongly influenced adoption — 70% of users were graduates or above — indicating that health literacy and digital familiarity drive utilization, as described by Fan et al.[3]

Pharmaceutical purchase (63.7%) and diagnostics booking (50.5%) apps dominated usage patterns. This treatment-oriented behaviour reflects users' preference for digital tools to access medicines and laboratory services, particularly during and after the COVID-19 pandemic, as highlighted by Reddy et al.[4]

Conversely, preventive health apps such as fitness (37.3%) and diet/nutrition (30.7%) were moderately used, while chronic disease monitoring (22%) and mental health (15.4%) apps were least used. Selvaraj and Sriram,[5] and Peng et al,[6] similarly noted that preventive and wellness apps face barriers due to cultural attitudes and limited personalization in the Indian context.

Technical glitches (28.6%) and high subscription costs (25.3%) were the most reported challenges. Peng et al,[6] found similar concerns in qualitative studies, where app crashes and usability issues discouraged continued use. Cost barriers, particularly for teleconsultation services, remain significant despite increasing availability of free apps, as also noted by Agarwal and Biswas.[7]

Privacy concerns (16.5%) and integration issues (14.3%) were less frequently reported but remain critical. Frontiers in Public Health,[8] emphasized privacy as a major barrier globally, and WHO,[9] advocates for robust governance and security frameworks to address this.

Non-users predominantly cited preference for traditional healthcare (42.1%) and lack of awareness (31.6%). Singh et al,[10] described similar cultural tendencies, where face-to-face consultations and personal trust remain central to healthcare-seeking behaviour in India. Digital illiteracy (23.7%) and scepticism toward online services (17.1%) also constrained uptake, consistent with global reviews by Frontiers in Public Health[8] and Labrique et al,[11]

These findings underline the importance of targeted health literacy campaigns and simplified app designs to enable adoption among digitally inexperienced users.

Our results reinforce the relevance of initiatives such as the Ayushman Bharat Digital Mission,[12] which seeks to integrate electronic health records, scale telemedicine, and improve access to quality care nationwide. To optimize impact, digital health strategies must focus on:

Affordability: Subsidized or tiered pricing models for consultations and diagnostics.

Technical reliability: Addressing app instability and enhancing customer support.

Localization: Incorporating regional languages and covering local pharmacies and labs.

Digital inclusion: Onboarding older adults and lower-educated populations through tailored training.

We found that 91.8% of them believes that the government should make enabling policies to facilitate and popularize mHealth applications in the country. These findings support the World Health Organization's guideline, which identifies digital literacy as a key determinant for effective implementation of digital health interventions, especially in low- and middle-income contexts. Similarly, the Ayushman Bharat Digital Mission emphasizes inclusive strategies to bridge digital divides and target underserved populations.[12]

In our study we found that 71.4% agrees that these apps were more useful during the COVID times. 35.7% of them have used them for online consultation with doctors during COVID times and out of them only 52.8% had a satisfactory experience. Experiences during the COVID-19 pandemic demonstrated the scalability of telehealth solutions and their potential for long-term integration into healthcare systems, as highlighted by Monaghesh and Hajizadeh.[13] Sustaining active engagement remains a challenge; Yang et al,[14] noted that while downloads are high, active long-term use is often low, requiring ongoing user-centric design and engagement strategies.

Strengths, Limitations, and Future Directions

This study contributes to limited Indian literature by comparing users and non-users and exploring both types of apps used and reasons for non-use in the same cohort. However, limitations include Cross-sectional design limits causal inference; self-reported data may entail recall bias. Sample restricted to one urban locality; include the urban sampling frame, and lack of longitudinal follow-up. Future research should incorporate rural populations, evaluate clinical outcomes linked to app use, and explore interventions to reduce digital divides.

CONCLUSION

The study highlights a growing but uneven adoption of mHealth applications in India, skewed toward younger, educated users and treatment-oriented services. Addressing technical, financial, and awareness barriers — while leveraging national digital health initiatives — could accelerate equitable uptake and optimize the role of mHealth in strengthening India's health system.

Source of Funding: None

Conflict of Interest: None

REFERENCES

1. Kim BY, Lee J. Smart devices for older adults managing chronic disease: A scoping review. JMIR mHealth and uHealth. 2017;5(5): e69. Available from: https://mhealth.jmir.org/2017/5/e69
2. Krebs P, Duncan DT. Health app use among US mobile phone owners: A national survey. JMIR mHealth and uHealth. 2015;3(4):e101. Available from: https://mhealth.jmir.org/2015/4/e101
3. Fan S, Jain RC, Kankanhalli MS. A comprehensive picture of factors affecting user willingness to use mobile health applications. arXiv. 2023;2305.05962. Available from: https://arxiv.org/abs/2305.05962
4. Reddy LKY, Madithati P, Narapureddy BR, et al. Perceptions about health apps on smartphones toward telemedicine during COVID-19 in India: a cross-sectional study. J Pers Med. 2022;12(11):1920. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC9697835/
5. Selvaraj SN, Sriram A. The quality of Indian obesity-related mHealth apps: PRECEDE-PROCEED model–based content analysis. JMIR mHealth uHealth. 2022;10(5):e15719. Available from: https://mhealth.jmir.org/2022/5/e15719
6. Peng, W., Kanthawala, S., Yuan, S. et al. A qualitative study of user perceptions of mobile health apps. BMC Public Health 16, 1158 (2016). https://doi.org/10.1186/s12889-016-3808-0
7. Agarwal, Neeraj & Biswas, Bijit. (2020). Doctor Consultation through Mobile Applications in India: An Overview, Challenges and the Way Forward. Healthcare Informatics Research. 26. 153-158. 10.4258/hir.2020.26.2.153.
8. Frontiers in Public Health. Facilitators and barriers to mHealth app adoption in low- and middle-income countries: A systematic review. Front Public Health. 2023; 11:122260. Available from: https://www.frontiersin.org/articles/10.3389/fpubh.2023.1222600/full
9. World Health Organization. WHO guideline: recommendations on digital interventions for health system strengthening. 2019. Available from: https://www.who.int/publications/i/item/9789241550505
10. Singh, Ajeet & Joshi, Hari Shanker & Singh, Arun & Agarwal, Medhavi & Kaur, Palveen. (2018). Online medical consultation: a review. International Journal Of Community Medicine And Public Health. 5. 1230. 10.18203/2394-6040.ijcmph20181195.
11. Labrique AB, Vasudevan L, Kochi E, Fabricant R, Mehl G. mHealth innovations as health system strengthening tools: 12 common applications and a visual framework. Global Health: Science and Practice. 2013;1(2):160–71. Available from: https://www.ghspjournal.org/content/1/2/160
12. Ministry of Health and Family Welfare, Government of India. Ayushman Bharat Digital Mission. Available from: https://abdm.gov.in
13. Monaghesh, E., Hajizadeh, A. The role of telehealth during COVID-19 outbreak: a systematic review based on current evidence. BMC Public Health 20, 1193 (2020). https://doi.org/10.1186/s12889-020-09301-4
14. Yang W, Wu T, Chen Z. Active usage of mobile health applications: a cross-sectional study. JMIR. 2021;23(12):e25330. Available from: https://www.jmir.org/2021/12/e25330.