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ARTICLE

Empowering Health: Libraries as Catalysts for Mobile Health Services Adoption and Usage

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ABSTRACT

In the modern digital era, libraries have evolved into important centers for health information dissemination and digital inclusion, particularly in promoting the awareness, adoption, and utilisation of mobile health (mHealth) services. These services offer a wide range of benefits, including remote consultations, health monitoring, health education, and chronic disease management. Libraries support mHealth adoption by fostering digital literacy, providing access to technology, and serving as trusted community spaces where individuals can obtain guidance on the effective use of digital health tools. Through workshops, informational sessions, and personalised assistance, libraries can help bridge gaps in health information access and digital competency. However, the adoption and utilisation of mHealth services are influenced by multiple factors, including socioeconomic status, digital literacy, cultural perceptions, and the availability of adequate infrastructure and institutional support. These challenges may be particularly significant in resource-constrained settings, where access to digital technologies and healthcare resources remains uneven. As cost-effective community hubs, libraries can complement existing healthcare and digital inclusion initiatives by leveraging available infrastructure, trained personnel, and community trust to support digital health literacy and mHealth engagement. By addressing barriers to adoption and facilitating access to reliable health information and digital resources, libraries can contribute to improving the reach, accessibility, and equitable utilisation of mHealth services.

KEYWORDS:mHealth Services, Digital Literacy, Empowering Health, Information Technology, Community Engagement, Role of Library.

1 Introduction

In today's digital era, the convergence of healthcare and information technology has led to the rapid growth of mobile health (mHealth) services. These services utilise mobile devices such as smartphones and tablets to deliver healthcare support, including teleconsultation, health education, disease monitoring, medication adherence, and chronic disease management. mHealth technologies have demonstrated considerable potential in improving healthcare accessibility, enhancing patient engagement, and supporting health outcomes, particularly among underserved and geographically remote populations(Free et al., 2013; Laranjo et al., 2015). As mobile device penetration continues to increase globally, mHealth has emerged as a promising tool for strengthening healthcare delivery systems and promoting patient-centredcare(Ryu& Kim, 2023; Finkelstein & Patel, 2023)

Despite its potential, the adoption and effective utilisation of mHealth services remain uneven across populations. Several barriers, including socioeconomic disparities, limited digital literacy, inadequate technological infrastructure, and varying cultural attitudes toward digital technologies, influence the acceptance and use of mHealthapplications(Thomas et al., 2024; Bassi et al., 2018). These challenges are particularly significant in developing countries, where disparities in healthcare access and digital inclusion continue to affect the implementation and utilisation of digital health solutions(World Health Organisation, 2019; National Health Authority, 2023).

Libraries have increasingly evolved beyond their traditional role as repositories of knowledge and have become important community centers for information access, lifelong learning, and digital empowerment(Ministry of Health and Family Welfare, 2022; NITI Aayog, 2020; Lankes, 2018). In several developed countries, libraries have successfully contributed to health promotion by improving digital literacy, facilitating access to technology, and connecting individuals with reliable health

information resources(Kim & Lee, 2024; Jang & Lee, 2023). Through workshops, training programs, and personalised assistance, libraries can help individuals understand and effectively utilisemHealthservices(Aab& Ward, 2020; Shreeve, 2021). Their established presence within communities, commitment to equitable access, and reputation as trusted institutions position them as potential facilitators of digital health engagement(Williams & Baker, 2023; Thomas & Li, 2023).

However, the applicability and effectiveness of library-based mHealth promotion may vary considerably across regions. In countries such as India, public libraries often face challenges including limited technological infrastructure, inadequate funding, uneven geographic distribution, shortage of trained personnel, and declining public engagement(Thomas et al., 2024; Grant &Jeffs, 2022; Hartman & Lee, 2024). These factors may restrict the direct adoption of models that have been successful in developed nations. Nevertheless, libraries continue to represent valuable community assets that can support digital health initiatives when integrated with existing public health and digital inclusion programs(Pew Research Center, 2013; World Health Organization, 2019).

Rather than functioning as independent healthcare centers, libraries can serve as accessible community hubs that complement ongoing governmental and community-based initiatives aimed at improving digital literacy and healthcare access. In this context, library spaces may be utilised for conducting mHealth awareness programs, digital health literacy training, telehealth facilitation, and dissemination of reliable health information in collaboration with healthcare providers, educational institutions, and community organisations. Such an integrated approach may enhance the reach of mHealth services while minimising the need for establishing separate infrastructure(Thomas et al., 2024; National Health Authority, 2023; NITI Aayog, 2020), thereby offering a potentially sustainable model for resource-constrained settings.

This review explores the role of libraries in promoting awareness, adoption, and utilisation of mHealth services. It examines how libraries can contribute to digital health empowerment through improved access to technology, health

information resources, and digital literacy programs. Furthermore, the review discusses key factors influencing mHealth adoption, including socioeconomic status, digital literacy, and cultural perceptions, while considering the opportunities and challenges associated with implementing library-supported mHealth initiatives in diverse community settings.

2 The Role of Libraries in Promoting mHealth Services:

Libraries have evolved from traditional repositories of information into dynamic community centers that facilitate learning, digital inclusion, and public engagement. In the context of healthcare, libraries can play an important role in promoting awareness, adoption, and effective utilisation of mobile health (mHealth) services. As trusted and accessible institutions, libraries can help bridge the gap between healthcare technologies and community members, particularly those with limited digital skills or restricted access to digital resources.

The contribution of libraries to mHealth adoption extends beyond merely providing information. Through digital literacy initiatives, technology access, health information support, and community engagement activities, libraries can create an enabling environment that encourages individuals to explore and utilise digital health services. These interventions collectively contribute to improved health literacy, increased confidence in using digital technologies, and enhanced access to healthcare information and services (Fig. 1).

2.1 Digital Literacy Programs

Digital literacy is a fundamental prerequisite for the successful adoption of mHealth services. Many individuals, particularly older adults and socioeconomically disadvantaged populations, may lack the skills required to navigate mobile applications, telehealth platforms, and online health resources (Pew Research Center, 2013;Simms& Johnson, 2024).

Libraries can address this challenge by organising digital literacy programs that provide practical training on the use of smartphones, mobile applications, internet-based health resources, and

telemedicine platforms. These programs may include workshops, group training sessions, and individualised support tailored to varying levels of technological proficiency. By improving digital competencies, libraries can enhance users' confidence and willingness to engage with mHealthservices(Czaja& Lee, 2023).

2.2 Access to Technology

Access to appropriate technology remains a significant barrier to mHealthutilisation for many individuals. Limited availability of smartphones, computers, internet connectivity, and digital devices can restrict participation in digital health initiatives.

Libraries help reduce these barriers by providing access to computers, internet services, Wi-Fi facilities, and, in some cases, mobile devices. Such resources enable users to explore mHealth applications, access teleconsultation services, retrieve health information, and participate in virtual healthcare interactions. By improving technological accessibility, libraries contribute to reducing the digital divide and promoting equitable access to healthcare resources.

2.3 Health Information Resources

The availability of reliable and evidence-based health information is essential for informed health decision-making. However, the abundance of online information can make it difficult for users to distinguish credible sources from misinformation.

Libraries serve as trusted providers of health information by curating access to authoritative health databases, digital resources, government health portals, and validated mobile health applications(National Institute on Aging, 2023). Librarians can assist users in identifying trustworthy information sources and navigating digital health platforms effectively. This guidance helps strengthen health literacy and promotes informed utilisation of mHealth services.

2.4 Community Engagement and Partnerships

Libraries function as important community gathering spaces that support educational and social activities. Their close

connection with local communities enables them to act as effective platforms for health promotion and public outreach.

Through collaborations with healthcare providers, public health agencies, educational institutions, and community organisations, libraries can organise health awareness campaigns, workshops, seminars, and training programs focused on mHealth services. Such initiatives can improve awareness of available digital health resources, encourage community participation, and foster trust in emerging healthcare technologies(Pew Research Center, 2013 and Pew Research Center, 2019). Community engagement activities also provide opportunities to address concerns related to technology use, privacy, and digital health adoption.

2.5 Libraries as Cost-Effective Community Hubs for mHealth Promotion

The successful implementation of mHealth awareness and digital health literacy initiatives often depends on the availability of adequate infrastructure, trained personnel, and sustainable funding mechanisms. In many developing countries, including India, establishing dedicated centers for digital health promotion often requires substantial investments in infrastructure, technology, personnel, and operational support. Such requirements can limit the scalability and sustainability of mHealth outreach programs.

Libraries offer a cost-effective alternative by utilising available community infrastructure. Most libraries already possess physical spaces, basic technological facilities, internet connectivity, and organisational structures that can be adapted to support mHealth-related activities. Leveraging these resources can significantly reduce the costs associated with establishing separate facilities for health awareness, digital literacy training, and telehealth support services.

Libraries also employ information professionals with expertise in information management, user education, and digital resource navigation. With appropriate training in digital health resources and mHealth applications, library staff can assist users in accessing reliable health information, navigating digital health platforms, and improving digital literacy. Utilising available

personnel may be more economical and sustainable than recruiting additional staff exclusively for health awareness programs.

From a funding perspective, integrating mHealth initiatives within library services may improve long-term sustainability. Collaborative partnerships involving libraries, healthcare organisations, educational institutions, and governmental agencies can optimise resource utilisation while minimising duplication of infrastructure and operational expenditures. Such partnerships may facilitate the delivery of health education programs, digital literacy workshops, and telehealth support services within community settings.

By leveraging library infrastructure and the trust they enjoy within communities, governments, healthcare institutions, and community-based organisations can utilise libraries as accessible platforms for delivering mHealth-related interventions. This integrated approach may enhance the reach and sustainability of digital health programs while minimising the need for establishing separate service centers. Ultimately, libraries can contribute to improving digital health literacy, reducing access barriers, and strengthening community engagement with mHealth services.

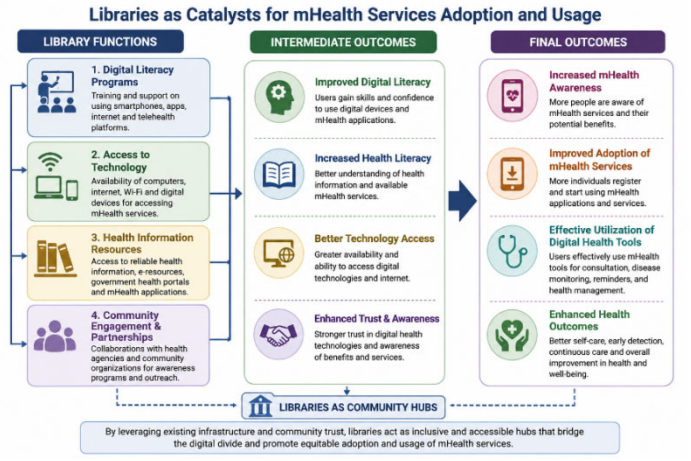


Fig.1:Conceptual framework illustrating how library functions support the adoption and utilisation of mHealth services.

3 Empowering Communities Through Digital Literacy and mHealth Access:

This initiative equips individuals with the skills and resources needed to navigate mobile health apps, bridging the technology gap and ensuring equitable access to essential health tools. By promoting digital literacy, libraries and community centers help those without access to technology or familiarity with digital health tools, ensuring that everyone, regardless of background or tech skills, can access vital health resources and take control of their well-being. The following programscan significantly enhance the promotion of mHealth usage through libraries.

3.1 mHealth Awareness Campaigns:

Libraries can organise awareness campaigns to educate the community about the benefits and uses of mobile health apps. These campaigns could include:

- **Workshops and Webinars**: Regularly scheduled sessions focused on specific mHealth apps, such as mental health tools, fitness trackers, or chronic disease management apps(Thomas & Lichtenstein, 2024). Library staff or healthcare professionals can demonstrate how to use these apps and answer any questions.
- **Information Flyers/Newsletters**: Distribute printed or digital materials that highlight key mHealth apps, tips for using them safely, and real-life success stories of people benefiting from mobile health technology(American Library Association, 2023).

Importance: Raising awareness helps people understand how mHealth apps can improve their health and empowers them to make informed choices about which tools will benefit their specific needs.

3.2 Health and Technology Literacy for Seniors:

Seniors often face challenges in using new technologies, including mobile health applications. A specialised program for older adults could offer:

- **Tech Support Sessions**: Library staff can set up drop-in hours to help seniors learn how to use smartphones, install apps, and navigate health-related resources online.
- **Senior-Focused mHealth Training**: Workshops tailored to seniors that focus on using mHealth apps designed specifically for their age group, such as medication reminders, fall detection apps, and health monitoring tools like blood pressure trackers.

Importance: Seniors are a population that can greatly benefit from mHealth apps, yet they may lack the confidence or knowledge to use them. These programs can help bridge the digital divide for older adults, promoting independence and better health management.

3.3 Mobile Health App Development Training:

For communities interested in creating their own mHealth solutions, libraries could offer programs that teach basic app development skills, such as:

- **Introductory Coding Classes**: Teach participants how to code, with a focus on health-related apps. This could include using platforms like MIT App Inventor, which allows beginners to create simple apps(Dourado& Martins, 2025).
- **Workshops on Designing Health Apps**: Collaborate with experts to offer workshops on how to design user-friendly, accessible apps specifically for healthcare purposes, focusing on user needs like readability, ease of navigation, and data privacy(MIT App Inventor, 2024).

Importance: Empowering individuals in the community to design their own health-related apps can lead to innovations that cater to local needs. It also increases the overall digital literacy and technological engagement within the community.

3.4 Telemedicine Access and Training:

Many people are still unfamiliar with the concept of telemedicine, especially in rural or underserved areas. Libraries could help by:

- **Telehealth Introduction Sessions**: Host sessions where people can learn about telemedicine, its benefits, and how to

access healthcare via virtual consultations (Smith & Hernandez, 2024).

- **Tech Support for Virtual Health Visits**: Offer hands-on help to ensure that community members can properly set up for telemedicine visits, whether it's troubleshooting video call issues or assisting with downloading required apps(U.S. Department of Health & Human Services, 2023b).

Importance: Telemedicine has become an increasingly essential tool in healthcare, particularly in rural or remote areas. By teaching people how to access and effectively use telemedicine, libraries help improve healthcare access for those who might otherwise struggle to get in-person appointments.

3.5 Mental Health Awareness Through Digital Platforms:

Mental health apps are widely used, yet there can be confusion about which ones are most effective. Libraries can host programs focusing on:

- **Introduction to Mental Health Apps**: Sessions that introduce the various mental health apps available, such as mood tracking, meditation, and stress management tools.
- **Support Groups via Apps**: Provide guidance on using peer support apps or online groups focused on mental health and wellness, fostering a sense of community and support(Patel &Lintner, 2024;Mental Health America, 2023).

Importance: With mental health issues on the rise, especially during challenging times, libraries can help individuals find reliable and effective digital resources for mental health support. These programs offer an accessible, private way for people to manage their well-being.

3.6 Health Data Privacy and Security Workshops:

As more individuals use mobile health apps, the concern about data privacy and security grows. Libraries could offer:

- **Workshops on Protecting Health Information**: Sessions on how to ensure that personal health data is kept secure while using mHealth apps, including advice on app permissions, encryption, and selecting apps with strong privacy policies(Johnson & Miller, 2024).

- **One-on-One Privacy Guidance**: Librarians could provide personalised consultations to help people understand the privacy settings on their mobile devices and apps, empowering them to take control of their data(U.S. Department of Health & Human Services, 2023a).

Importance: As digital health services grow, it's crucial that people feel safe and informed about their privacy when using these tools. These workshops would help demystify data privacy concerns and enable individuals to use mHealth services with confidence.

3.7 Chronic Disease Management Programs Using mHealth:

For individuals with chronic conditions like diabetes, hypertension, or asthma, libraries could offer programs to help manage these diseases using mHealth tools:

- **Chronic Disease Management Workshops**: Provide education on how to use specific mHealth apps that assist with tracking blood sugar levels, medication adherence, or symptom monitoring(Kahn & Friedman, 2024;American Diabetes Association, 2023).
- **Support and Tracking Groups**: Create group programs where individuals with similar chronic conditions use mobile health tools together to track progress, share experiences, and encourage each other.

Importance: Chronic disease management is crucial for improving quality of life. By teaching people how to use mHealth tools to track and manage their conditions, libraries can support healthier communities and improve health outcomes.

3.8 Children's Health and Wellness through mHealth Apps:

With the increasing use of smartphones by children, libraries could introduce programs that focus on promoting healthy habits through apps:

- **Healthy Habits for Kids**: Workshops for children and parents on using apps that encourage physical activity, good nutrition, and mental well-being(Kelly & Evans, 2023).

- **Parenting with Technology**: Guidance for parents on using mHealth apps that promote their children's health, such as growth trackers, developmental milestone apps, and apps for managing ADHD or autism-related symptoms(Centers for Disease Control and Prevention, 2023).

Importance: Introducing children and parents to healthy tech early on can promote lifelong wellness habits. These programs can help families use technology as a positive tool in health management.

These programscan help libraries play an even more impactful role in promoting digital literacy, improving access to healthcare, and enhancing community health through mobile health tools. They provide education, resources, and support that address diverse needs within the community.

4 Factors Affecting the Usage of mHealth Services:

Despite the promising benefits of mHealth, its adoption and utilisation remain uneven across different populations. Various factors influence whether individuals can effectively use mHealthservices(Centers for Disease Control and Prevention, 2023). Understanding these factors is crucial for developing strategies to promote the widespread adoption of mHealth and ensure that its benefits are accessible to all, regardless of socioeconomic status, digital literacy, or cultural background.

4.1 Socioeconomic Status:

Socioeconomic disparities significantly influence the adoption of mHealth services. Individuals from lower socioeconomic backgrounds may face several barriers:

- **Limited Access to Technology:** People from low-income households may not have smartphones, tablets, or reliable internet connections, making it difficult to use mHealth services (Davidson & Harris, 2024).
- **Lack of Digital Literacy:** Without the necessary skills to navigate digital tools, these individuals may struggle to access and effectively use mHealth applications.

- **Financial Constraints:** The cost of mobile devices, internet plans, and potential fees for mHealth services can be prohibitive, further limiting access.

Approaches to manage: Libraries can mitigate these challenges by providing free access to technology, offering digital literacy programs, and guiding individuals in using mHealth services effectively. By addressing these socioeconomic barriers, libraries help ensure equitable access to digital health resources.

4.2 Digital Literacy:

Digital literacy is a critical determinant of mHealth usage. It involves the ability to understand and use digital tools and applications effectively.

- **Navigation Skills:** Individuals with limited digital skills may find it challenging to navigate mHealth applications, leading to frustration and lower adoption rates (Choi & Park, 2024).
- **Privacy and Security Concerns:** A lack of understanding about digital privacy and security can prevent people from trusting and using mHealth services (Jacob et al, 2022).

Approaches to manage: Libraries play a vital role in addressing this barrier through targeted digital literacy programs. These programs can teach individuals how to use mobile health applications, understand privacy settings, and protect their health data. By enhancing digital literacy, libraries empower individuals to take full advantage of mHealth services.

4.3 Cultural Perceptions:

Cultural beliefs and perceptions about health and technology can impact the acceptance and use of mHealth services.

- **Trust in Technology:**Certain sections of society may be skeptical about using digital health tools due to a lack of trust in technology or concerns about data privacy (Alvarado & Wang,2024).
- **Health Practices:** Traditional health practices and beliefs may influence how individuals perceive and use mHealth services.

Approaches to manage: Libraries can help address these cultural barriers by engaging with diverse communities and promoting a more inclusive approach to mHealth adoption. This can be achieved by:

- **Providing Multilingual Resources:** Offering health information and mHealth guidance in multiple languages to cater to diverse populations.
- **Cultural Sensitivity Training:** Ensuring library staff are trained to understand and respect different cultural perspectives on health and technology.

4.4 Infrastructure and Institutional Support

The availability of adequate infrastructure and institutional support significantly influences the adoption and effective utilisation of mHealth services.

- **Digital Infrastructure:** Reliable internet connectivity, access to smartphones or digital devices, and uninterrupted power supply are essential for accessing and using mHealth applications. Limited digital infrastructure, particularly in rural and underserved areas, can restrict the reach and effectiveness of mHealth services.
- **Institutional Support:** Support from government agencies, healthcare organisations, educational institutions, and community-based organisations plays a crucial role in promoting mHealth adoption. Policies, awareness campaigns, training programs, and technical assistance can create an enabling environment for the successful implementation of digital health initiatives.

Approaches to manage: Strengthening digital infrastructure, expanding internet accessibility, improving availability of digital devices, and fostering collaboration among healthcare, educational, and community institutions can enhance the accessibility and utilisation of mHealth services. Libraries can complement these efforts by providing community-based support for digital health literacy and access to reliable health information.

5 Conclusion:

Libraries have the potential to play an important role in promoting awareness, adoption, and utilisation of mobile health (mHealth) services through digital literacy initiatives, access to technology, reliable health information resources, and community engagement activities. However, the effectiveness of library-supported mHealth initiatives may vary across regions depending on socioeconomic conditions, digital literacy levels, cultural perceptions, and the availability of supporting infrastructure. In resource-constrained settings such as India, libraries can serve as cost-effective community hubs that complement existing healthcare and digital inclusion efforts by leveraging available infrastructure, personnel, and community trust. Strengthening collaborations among libraries, healthcare providers, educational institutions, and governmental agencies may further enhance the reach and sustainability of mHealth services, contributing to improved digital health literacy and more equitable access to healthcare information and services.

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Conflict of interest:

The authors declare no conflict of interest.

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