

## A COMPREHENSIVE REVIEW OF MHEALTH STUDIES IN MALAYSIA: ADOPTION, USAGE, AND ATTITUDE

Nurfatihah Akmal Binti Jamaludin<sup>1\*</sup>  
Zarina Binti Zamani<sup>2</sup>  
Norerna Eddrina Binti Amir Nordin<sup>3</sup>  
Nurshazana Akmal Jamaludin<sup>4</sup>

<sup>1</sup> Department of Business Administration , Vision College, Selangor , Malaysia;

(Email: fatihah@vision.edu.my)

<sup>2</sup> Department of IT and Business Administration , Vision College, Selangor , Malaysia;

(Email: ina@vision.edu.my)

<sup>3</sup> Department of Business Administration , Vision College, Selangor , Malaysia;

(Email: norerna@vision.edu.my)

<sup>4</sup> Physiotherapy Programme, Faculty of Health Sciences, Universiti Teknologi MARA Cawangan Pulau Pinang, Kampus Bertam, Pulau Pinang, Malaysia;

(Email: shazanaakmal@uitm.edu.my)

\* Correspondence: fatihah@vision.edu.my; 011-10201709

### Article history

**Received date** : 15-8-2024  
**Revised date** : 16-8-2024  
**Accepted date** : 7-9-2024  
**Published date** : 15-10-2024

### To cite this document:

Jamaludin, N. A., Zamani, Z., Amir Nordin, N. E., & Jamaludin, N. A. (2024). A comprehensive review of mhealth studies in Malaysia: Adoption, usage, and attitude. *Journal of Islamic, Social, Economics and Development (JISED)*, 9 (66), 651 – 657.

---

**Abstract:** *This review synthesizes research from 2017 to 2023 on the adoption, usage, and attitudes towards mobile health (mHealth) in Malaysia. Key factors influencing mHealth adoption, such as performance expectancy, health literacy, and professional use, are examined alongside behavioral intentions and perceptions of various stakeholders. The findings highlight significant determinants and mediators of mHealth adoption, offering insights into areas for future research and potential interventions to enhance mHealth utilization. Recommendations include training programs for healthcare providers, developing tailored mHealth applications, and further investigating cognitive and psychological factors influencing mHealth adoption. These steps aim to support the effective integration of mHealth solutions in Malaysia's healthcare system.*

**Keywords:** *mHealth, adoption, usage, attitude, Malaysia*

---

## Introduction

Mobile health (mHealth) represents a critical innovation in healthcare delivery, leveraging mobile technology to enhance health outcomes. This review synthesizes research conducted from 2017 to 2023 on the adoption, usage, and attitudes towards mHealth in Malaysia, highlighting factors influencing adoption, behavioral intentions, and stakeholder perceptions. The aim is to identify determinants and mediators of mHealth adoption and provide recommendations for future research and training programs.

## Method

The review includes seven studies published in peer-reviewed journals, employing various methodologies such as cross-sectional surveys, mixed-methods studies, and theoretical frameworks like the Health Psychology Theory and the Technology Acceptance Model (TAM). These studies focus on different independent variables, including performance expectancy, health literacy, professional use, and perceived susceptibility, to understand their impact on dependent variables like behavioral intention, perception, and actual use of mHealth applications.

## Findings

### Adoption of mHealth by Healthcare Providers

Studies indicate that primary care physicians (PCPs) in Malaysia frequently use mHealth apps for clinical work but rarely recommend them to patients. Factors such as performance expectancy, facilitating conditions, and internet connectivity significantly influence this usage. However, the recommendation of mHealth apps to patients is less common, attributed to the need for further training on mHealth applications for patient use (Lim et al., 2020). Similarly, community pharmacists show a high adoption rate for professional and personal use, yet their perception of the benefits for patients is less favorable, resulting in lower recommendations (Ng et al., 2023). Mohamad & Ali, 2019).

### Health Literacy and Attitudes towards mHealth

Health literacy and positive health attitudes are significantly related to the adoption of mHealth. Studies highlight that individuals with higher health literacy and positive health attitudes are more likely to adopt mHealth solutions. For instance, a study by Yun et al. (2017) found a strong relationship between health literacy, health attitude, and the prevention of lifestyle diseases. This suggests that mHealth applications designed to enhance health literacy could play a critical role in disease prevention and health promotion.

### Behavioral Intentions and Cognitive Factors

Behavioral intention to adopt mHealth is influenced by various cognitive factors. Ahadzadeh et al. (2023) demonstrated that perceived susceptibility and health consciousness are significant predictors of the behavioral intention to adopt mHealth. Attitude towards mHealth acts as a mediator in this relationship, indicating that positive attitudes towards health technology facilitate the adoption of mHealth solutions. Additionally, internal health locus of control, as examined by Ahadzadeh et al. (2021), indirectly influences mHealth adoption through constructs of the Unified Theory of Acceptance and Use of Technology (UTAUT).

### Acceptability and Usage in Specific Populations

The acceptability of mHealth varies across different healthcare providers. For instance, Sidek et al. (2023) reported high acceptability of mHealth apps among healthcare providers working

with stroke caregivers. Key features such as service availability, knowledge provision, and caregiver support were identified as essential for the effective use of mHealth. This indicates the potential for targeted mHealth applications to support specific patient groups and their caregivers.

### **Consumer Attitudes and Intention to Use**

Consumer attitudes significantly impact the intention to use mHealth. A study by Hussein, Oon, and Fikry (2017) found that positive consumer attitudes towards mHealth strongly influence their intention to use these technologies. This highlights the importance of addressing consumer perceptions and attitudes in the design and implementation of mHealth solutions to ensure higher adoption rates.

### **Discussion**

The studies reviewed indicate that various factors influence the adoption and usage of mHealth in Malaysia. Performance expectancy and facilitating conditions are critical for healthcare providers, while health literacy and attitude play significant roles for the general population. Professional use of mHealth apps among pharmacists shows promise, but there is a gap in patient recommendations, highlighting the need for further training. The Unified Theory of Acceptance and Use of Technology (UTAUT) and Health Psychology Theory provide valuable frameworks for understanding these dynamics.

### **Performance Expectancy and Facilitating Conditions**

The study by Lim et al. (2020) in Family Practice reveals that primary care physicians (PCPs) predominantly use mHealth apps for clinical purposes, yet they exhibit hesitancy in recommending these apps to patients. This discrepancy highlights a gap in perceived usefulness for patient engagement, suggesting that while PCPs recognize the clinical benefits of mHealth, they may lack confidence in its efficacy for patient use. Addressing this gap through targeted training programs can improve PCPs' understanding and appraisal of mHealth benefits, potentially leading to higher patient adoption rates. Future research should focus on developing comprehensive training modules that emphasize the dual benefits of mHealth for both clinical and patient engagement purposes.

### **Perceived Susceptibility and Severity**

Ahadzadeh et al. (2023) in Makara Human Behavior Studies in Asia underscore the importance of attitudes towards mHealth in mediating the relationship between perceived health threats and the intention to adopt mHealth technologies. This finding indicates that positive attitudes towards mHealth can enhance users' willingness to adopt these technologies. Therefore, interventions aimed at improving attitudes towards mHealth, such as awareness campaigns and educational programs, could significantly boost adoption rates. Future studies should delve deeper into other cognitive factors that influence mHealth adoption, providing a more comprehensive understanding of user behavior and facilitating the design of more effective intervention strategies.

### **Health Literacy and Attitude**

The correlation between health literacy and mHealth usage, as highlighted by Yun et al. (2017) in ICRIS, suggests that individuals with higher health literacy are more likely to engage with mHealth applications for managing lifestyle diseases. This relationship underscores the need for mHealth applications that are tailored to different levels of health literacy, ensuring accessibility and usability for a broader audience. Developing and testing such applications can

help bridge the gap for individuals with lower health literacy, making mHealth technologies more inclusive and effective. Future research should focus on creating and evaluating mHealth solutions that accommodate varying literacy levels, ultimately enhancing the overall impact of mHealth interventions.

### **Professional and Personal Use**

The high adoption rate of mHealth apps among community pharmacists, as reported by Ng et al. (2023) in *International Journal of Pharmacy Practice*, indicates strong acceptance of these technologies within the pharmacy sector. This dual usage for both professional and personal purposes suggests that pharmacists recognize the value of mHealth apps in improving healthcare delivery and personal health management. Future research should explore strategies to further enhance pharmacists' engagement with mHealth apps, such as incorporating user feedback into app development and providing ongoing support and training. Assessing the effectiveness of these tools in real-world settings can provide valuable insights into their impact on patient care and health outcomes.

### **Acceptability and Expectations**

The study by Sidek et al. (2023) in *Frontiers in Neurology* highlights the high acceptability of mHealth among healthcare providers, coupled with expectations for integrating these technologies into routine practice. This positive perception is crucial for the successful implementation of mHealth solutions, as provider endorsement can significantly influence patient adoption. Future research should investigate the practical aspects of integrating mHealth apps into existing healthcare systems, focusing on seamless integration and workflow optimization. Establishing the feasibility and practicality of mHealth solutions in everyday medical practice can ensure their sustained use and maximize their potential benefits for healthcare delivery.

### **Proposed Conceptual Framework**

The proposed conceptual framework integrates the Unified Theory of Acceptance and Use of Technology (UTAUT) model to explore key variables and their relationships in the context of mHealth apps in Malaysia. The framework includes components such as performance expectancy, facilitating conditions, perceived susceptibility and severity, health literacy, professional and personal use, and acceptability and expectations. These independent variables (IVs) influence attitudes, which serve as a mediator, ultimately affecting the intention to use mHealth apps (the dependent variable, DV).

Performance expectancy and facilitating conditions significantly influence healthcare providers' use of mHealth apps. Addressing gaps in perceived usefulness through targeted training programs can enhance healthcare providers' understanding and appraisal of mHealth benefits, leading to higher patient adoption rates. Studies have shown that performance expectancy is a crucial predictor of mHealth adoption among healthcare professionals (Hoque & Sorwar, 2017). When healthcare providers believe that mHealth apps will improve their job performance and patient outcomes, their attitudes towards these apps become more positive. Perceived susceptibility and severity, which reflect users' beliefs about their risk of health issues and the seriousness of these issues, are cognitive factors that influence the intention to adopt mHealth apps. Interventions aimed at improving attitudes, such as awareness campaigns and educational programs, can significantly boost adoption rates by making users more aware of the potential health benefits of mHealth apps (Duarte & Pinho, 2019).

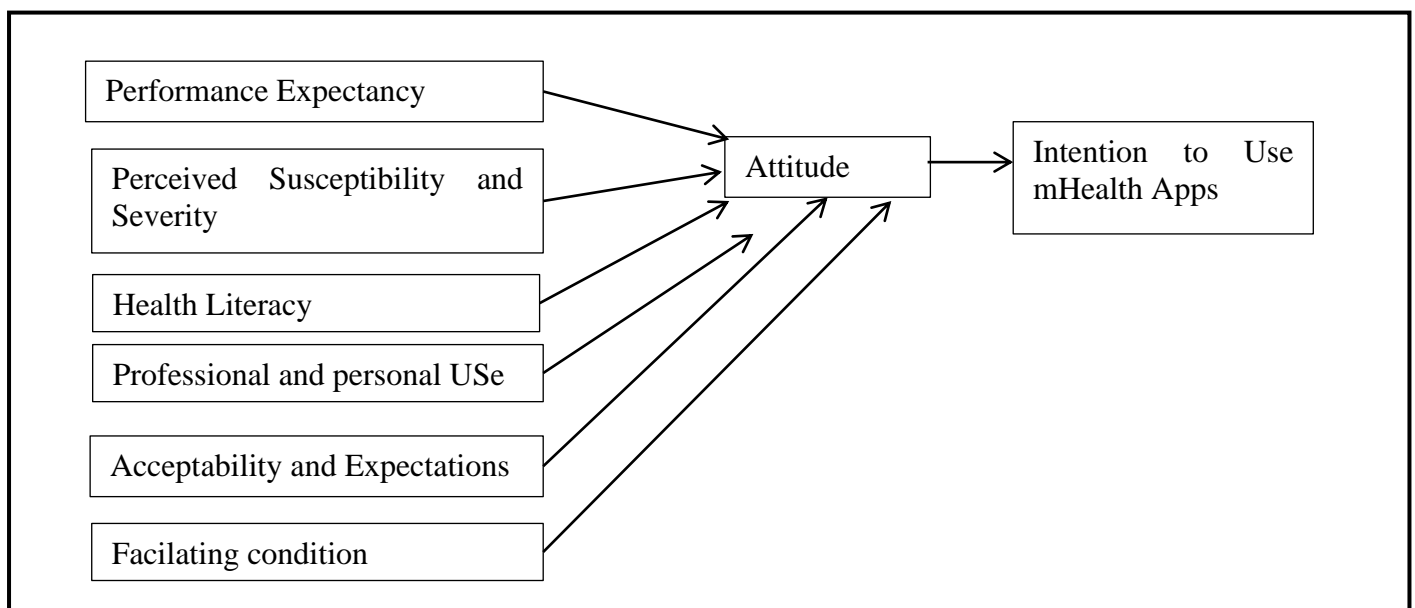
Health literacy and attitude are critical for mHealth usage among the general population. Developing mHealth applications that cater to different levels of health literacy ensures accessibility and usability for a broader audience. Health literacy impacts how effectively individuals can understand and use health information provided by mHealth apps, thereby influencing their overall attitude towards these technologies.

The framework also emphasizes the professional and personal use of mHealth apps. Encouraging healthcare professionals to integrate mHealth apps into their routine practice can lead to increased engagement and recommendations to patients, thereby boosting overall adoption. Acceptability and expectations among healthcare providers are high, and integrating mHealth apps into routine practice can significantly influence patient adoption (Azam et al., 2023).

Facilitating conditions, which refer to the technical and organizational infrastructure supporting mHealth app usage, are essential for overcoming adoption barriers. Ensuring adequate support, such as reliable internet access and technical assistance, is crucial in the Malaysian context to facilitate the smooth adoption of mHealth apps (Alam et al., 2020).

Attitude serves as a mediating factor between the independent variables (performance expectancy, perceived susceptibility and severity, health literacy, professional and personal use, acceptability and expectations, and facilitating conditions) and the dependent variable (intention to use mHealth apps). A positive attitude towards mHealth apps can significantly enhance the intention to adopt these technologies (Ahadzadeh et al., 2021).

In conclusion, this conceptual framework guides future research and interventions aimed at promoting mHealth adoption in Malaysia. Understanding the various factors and their interactions can help develop targeted interventions to enhance mHealth utilization, ensuring a comprehensive understanding of user behavior and facilitating the design of more effective mHealth solutions.



**Diagram 1.** Proposed Conceptual Framework



## Conclusion

This review highlights the multifaceted nature of mHealth adoption in Malaysia, driven by performance expectations, health literacy, and user attitudes. Understanding these determinants and mediators provides valuable insights for enhancing mHealth adoption. Training and education for healthcare providers, along with further research into cognitive factors and user perceptions, are essential for enhancing mHealth utilization. Future studies should continue exploring diverse factors influencing mHealth adoption to develop targeted interventions that promote widespread acceptance and use.

## Acknowledgments

The authors would like to acknowledge the support of Vision College and UiTM Penang for their assistance in conducting this review

## References

- Ahadzadeh, A. S., Ong, F. S., & Wu, S. (2023). Health-related Cognitive Factors and Intention to Adopt mHealth: The Mediating Influence of Attitude. *Makara Human Behavior Studies in Asia*.
- Ahadzadeh, A. S., Wu, S., Ong, F. S., & Deng, R. (2021). Internal Health Locus of Control and mhealth Adoption: The Mediating Influence of UTAUT.
- Ahadzadeh, A. S., Wu, S., Ong, F. S., & Deng, R. (2021). The Mediating Influence of the Unified Theory of Acceptance and Use of Technology on the Relationship Between Internal Health Locus of Control and Mobile Health Adoption: Cross-sectional Study. *Journal of Medical Internet Research*.
- Alam, M., Hu, W., Barua, Z., & Hoque, M. R. (2020). Factors influencing the adoption of mHealth services in a developing country: A patient-centric study. *International Journal of Information Management*, 50, 128-143.
- Azam, M., Naeem, S. B., Boulos, M. N. K., & Faiola, A. (2023). Modelling the Predictors of Mobile Health (mHealth) Adoption among Healthcare Professionals in Low-Resource Environments. *International Journal of Environmental Research and Public Health*, 20.
- Bawack, R., & Kamdjoug, J. K. (2018). Adequacy of UTAUT in clinician adoption of health information systems in developing countries: The case of Cameroon. *International Journal of Medical Informatics*, 109, 15-22.
- Duarte, P., & Pinho, J. (2019). A mixed methods UTAUT2-based approach to assess mobile health adoption. *Journal of Business Research*.
- Hoque, Md. R., & Sorwar, G. (2017). Understanding factors influencing the adoption of mHealth by the elderly: An extension of the UTAUT model. *International Journal of Medical Informatics*, 101, 75-84.
- Hussein, Z., Oon, S. W., & Fikry, A. (2017). Consumer attitude: does it influencing the intention to use mHealth?. *Procedia Computer Science*, 105, 340-344.
- Lim, H., Dunn, A., Ooi, S. M. F., Teo, C. H., Abdullah, A., Woo, W. J., & Ng, C. (2020). mHealth adoption among primary care physicians in Malaysia and its associated factors: a cross-sectional study. *Family Practice*.
- Ng, H. L., Sellappans, R., & Loo, J. (2023). A survey of the adoption and perception of mobile health applications among community pharmacists in Malaysia. *The International Journal of Pharmacy Practice*.
- Sidek, N., Ismail, T. A. T., Kamalakannan, D. S., Chen, X. W., Romli, M., Mat Said, M. Z., Nadal, I. P., Ibrahim, K. A., & Musa, K. I. (2023). A mixed-methods study on the implementation of a mobile health application (mHealth app) for stroke caregivers in Malaysia: healthcare providers' perspective. *Frontiers in Neurology*.

Yun, M. W., Abdullah, N. L., Idrus, R., & Keikhosrokiani, P. (2017). Lifestyle disease prevention: Health literacy, health attitude and mHealth. 2017 International Conference on Research and Innovation in Information Systems (ICRIIS).