



Mobile Applications for Enhancing Safety Audits in Healthcare Construction Sites

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Abstract

Background: Safety audits and inspections in healthcare construction are crucial to protect workers and vulnerable populations, particularly in resource-constrained countries like Bangladesh. Traditional paper-based methods are inefficient and error-prone. Mobile apps offer a promising solution by improving real-time data capture, communication, and overall safety management. **Methods:** This study employed a mixed-methods approach, incorporating both quantitative and qualitative data collection. Surveys were distributed to 150 safety managers, supervisors, and construction workers involved in healthcare construction projects in Bangladesh to evaluate the effectiveness of mobile apps in improving safety audits. Additionally, 20 qualitative interviews were conducted with key stakeholders, such as project managers and IT professionals, to gain in-depth insights into their experiences with mobile technology. **Results:** The results indicated that 78% of respondents observed significant efficiency improvements in safety audits and inspections when using mobile apps. Furthermore, 72% reported enhanced data accuracy, while 67% cited better communication and collaboration among stakeholders. However, challenges such as resistance to change, cost concerns, and data privacy issues were identified as

barriers to broader adoption. **Conclusion:** Mobile applications have the potential to revolutionize safety audits and inspections on healthcare construction sites in Bangladesh by improving efficiency, data accuracy, and communication. Despite the barriers to adoption, the benefits of mobile apps make them a valuable tool in enhancing safety management in construction. Training programs, cost-effective solutions, and robust data security protocols are recommended to overcome these challenges and maximize the potential of mobile technology in this sector.

Keywords: Mobile applications, Safety audits, Healthcare construction, Bangladesh, Risk management

Introduction

Safety audits and inspections are vital components of risk management, particularly in healthcare construction sites. These sites pose unique challenges due to the need to protect both construction workers and the surrounding community, including vulnerable populations like patients. In developing countries such as Bangladesh, healthcare construction often faces additional obstacles, including resource constraints, insufficient regulatory oversight, and varying levels of safety awareness (Ibrahimkhalil & Hadidi, 2023). These audits ensure that construction activities comply with established safety standards, reducing hazards and safeguarding workers' well-being. Traditionally, these processes have been manual, relying on paper-based methods, which are

Significance | This study demonstrates the potential of mobile applications to enhance safety audits in healthcare construction sites in Bangladesh.

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time-consuming, prone to human error, and inefficient. However, the rapid growth of digital technology offers an innovative solution—mobile applications. Mobile apps have emerged as powerful tools to streamline the safety audit and inspection process. By incorporating real-time data capture, digital checklists, and instant reporting, they transform how safety compliance is managed (Zorzenon et al., 2022). The complexities of healthcare construction sites—where safety is paramount due to both the construction environment and the involvement of vulnerable populations—make the adoption of mobile technology particularly relevant. These tools not only enhance the accuracy and efficiency of audits but also promote better communication between project stakeholders, such as safety officers, project managers, and construction workers. In environments where time-sensitive decisions are crucial, mobile apps can play a pivotal role in ensuring that potential hazards are quickly identified and mitigated.

This study aims to explore the potential benefits of mobile applications for safety audits and inspections on healthcare construction sites in Bangladesh. The primary objectives include: (i) evaluating the impact of mobile apps on audit efficiency, (ii) investigating the role of these apps in improving communication and collaboration among stakeholders, and (iii) examining how mobile technology influences safety culture and compliance within construction teams. With safety being a top priority in healthcare projects, particularly in a developing country like Bangladesh, it is crucial to assess how mobile apps can address existing challenges in the industry.

The construction industry in Bangladesh, including healthcare projects, faces significant hurdles. These include limited resources, varying safety protocols, and difficulties in maintaining consistent regulatory compliance (Datta, 2024). The introduction of mobile apps as a solution to streamline safety audits represents a promising approach to these challenges. By reducing administrative burdens, improving data accuracy, and enabling better decision-making, mobile apps offer a modern, efficient alternative to traditional methods (Tanha, 2021). This study aims to demonstrate the potential of mobile technology to revolutionize safety management in healthcare construction sites, making them safer and more efficient.

In healthcare settings, construction presents unique risks that require stringent safety management protocols. Ensuring compliance with safety regulations is essential, especially in environments where vulnerable populations are present, such as hospitals and clinics (Dolphin et al., 2023). The traditional paper-based approach to safety audits is often criticized for its inefficiency, high error rates, and delays in processing and acting on data (Tan et al., 2024). This shift towards digital solutions is driven by the need for faster, more reliable tools, and mobile applications are at the forefront of this transformation.

Several studies have underscored the benefits of mobile applications in construction safety management. These tools streamline audits, enhance data accuracy, and improve overall safety performance by enabling real-time updates and reporting (Rabbani et al., 2022). For instance, research by Boudreau (2024) suggests that mobile apps can reduce the administrative load of manual safety audits by up to 60%, freeing resources for more strategic safety initiatives. Additionally, the ability to track and analyze safety data over time enables project managers to make more informed decisions, further improving safety outcomes on construction sites (Boudreau, 2020). An example of mobile apps enhancing safety inspections is the development of the RisGES application, which replaces traditional paper-based methods with digital checklists and real-time data entry (Forteza et al., 2023). By assessing risks on over 1,000 construction sites, RisGES demonstrates the potential of mobile technology to provide actionable insights for improving safety. These capabilities align with the needs of healthcare construction in Bangladesh, where effective risk management is critical.

The literature supports the argument that mobile apps offer significant improvements in communication and collaboration among stakeholders involved in construction projects (Jensen et al., 2016). Features such as instant messaging, photo-sharing, and real-time reporting allow for better coordination, ensuring that safety issues are quickly communicated and resolved. This is particularly beneficial in healthcare construction, where delays in addressing safety concerns can have severe consequences.

One study investigating the adoption of mobile apps for safety management in Bangladesh found that digital tools improved safety performance by reducing the time needed for safety inspections and allowing for immediate corrective action (Chowdhury & Jahan, 2014). Similarly, Lin et al. (2013) introduced a mobile RFID-based system to enhance safety inspections by using smartphones to streamline data acquisition, improving efficiency, and reducing the likelihood of rework. These innovations, designed to work in real-time, can significantly improve safety audits in healthcare construction sites, where timely action is critical.

Mobile apps also contribute to safety knowledge sharing within construction teams, fostering a proactive safety culture (Li et al., 2018). By making safety protocols easily accessible and allowing workers to participate in their implementation, mobile apps encourage adherence to safety standards and promote a more engaged workforce. In Bangladesh, where the construction industry often faces a lack of efficient monitoring tools (Wali et al., 2023), mobile apps provide a scalable, cost-effective solution that can be adapted to various project sizes.

Despite the numerous benefits, the adoption of mobile technology in safety management is not without its challenges. Key barriers include resistance to change from workers accustomed to traditional methods, the costs associated with implementation, and

concerns regarding data privacy and security (Bhadra et al., 2024). To address these challenges, it is essential to invest in training programs that familiarize workers with mobile apps and to implement robust data security protocols to build trust among users.

Mobile apps represent a significant advancement in the management of safety audits and inspections in healthcare construction sites in Bangladesh. By improving efficiency, enhancing communication, and fostering a proactive safety culture, these digital tools have the potential to revolutionize the way safety is managed in this sector. However, their full potential will only be realized if technological, organizational, and cultural challenges are addressed. As mobile technology continues to evolve, incorporating emerging innovations such as artificial intelligence and the Internet of Things, the future of safety management in construction appears increasingly digital (Thiede & Rosemberg, 2015).

2. Materials and Methods

This study employed a mixed-methods approach to assess the benefits of mobile applications for safety audits and inspections at healthcare construction sites in Bangladesh. A combination of quantitative and qualitative research methods was used to capture both statistical trends and in-depth insights, providing a comprehensive analysis of mobile app adoption in enhancing safety practices.

2.1 Materials Used

2.1.1 Survey Instruments: A structured questionnaire designed to capture quantitative data on the use, benefits, and challenges of mobile apps.

2.1.2 Interview Guides: Semi-structured questions tailored to explore detailed experiences and perspectives from stakeholders.

2.1.3 Mobile App Platforms: A review of popular mobile apps used for safety audits and inspections, such as Procore, SafeSite, and iAuditor, was conducted to understand their features and functionalities.

2.2 Research Design

The methodology was divided into three distinct phases: a literature review, quantitative data collection via surveys, and qualitative interviews with key stakeholders. Each phase contributed unique perspectives on the research topic, ensuring a well-rounded understanding of mobile app usage in construction safety management.

2.3.1 Phase 1: Literature Review

A literature review was conducted to provide a theoretical foundation for the study. Relevant studies on mobile technology in construction, safety management, and healthcare infrastructure were reviewed to identify gaps in the existing body of knowledge. The review guided the design of the survey and interview questions and helped establish key variables for data collection.

2.3.2 Phase 2: Quantitative Survey

A structured survey was developed to gather quantitative data from safety managers, site supervisors, and construction workers actively involved in healthcare construction projects across Bangladesh. The survey aimed to quantify several key variables:

Frequency and nature of safety audits and inspections: To assess the standard practices in the construction industry.

Current use of mobile apps and digital tools: To evaluate the extent of technology adoption.

Perceived benefits: Including improvements in efficiency, data accuracy, communication, and overall safety performance.

Challenges and barriers to adoption: Exploring issues like resistance to change, cost implications, and technical limitations.

The survey was distributed electronically and in paper format to ensure broader reach and inclusivity across different regions of Bangladesh. A total of 150 responses were collected, providing a diverse sample representative of the healthcare construction sector. Data were analyzed using descriptive and inferential statistics, with software such as SPSS utilized to perform frequency analysis, cross-tabulations, and regression analysis. These statistical methods helped identify trends and correlations between the adoption of mobile apps and perceived improvements in safety audits and inspections.

2.3.3 Phase 3: Qualitative Interviews

To complement the survey data, in-depth qualitative interviews were conducted with a purposive sample of 20 stakeholders. The sample included project managers, safety officers, and IT professionals responsible for implementing mobile apps for safety management. The interviews were semi-structured, with open-ended questions designed to explore the following:

Detailed experiences and case studies: Real-world examples of how mobile apps were used in safety audits and inspections.

Perceived impact on safety culture: Insights into how digital tools influenced worker behavior and attitudes toward safety.

Implementation challenges: Including organizational, technical, and human factors affecting mobile app adoption.

Future potential and recommendations: Stakeholders' views on improving the effectiveness of mobile apps for safety management. Interviews were conducted in person and via video conferencing, recorded with participant consent, and transcribed for thematic analysis. Coding was applied to the transcribed data to identify recurring themes and patterns related to the impact, challenges, and best practices in using mobile apps.

2.4 Data Analysis

Quantitative data from the survey were analyzed using SPSS software. Descriptive statistics helped identify patterns in mobile app adoption, while regression analysis assessed the influence of various factors on the perceived benefits. Thematic analysis was applied to the qualitative data from interviews, allowing for the

extraction of insights into the practical challenges and success stories related to mobile app usage.

2.5 Ethical Considerations

The study adhered to ethical research guidelines, ensuring confidentiality and informed consent from all participants. Participants were anonymized, and their right to withdraw from the study at any time was respected. Ethical approval was obtained before data collection commenced.

The mixed-methods approach employed in this study provided a robust framework for evaluating the benefits and challenges of mobile apps in safety audits and inspections at healthcare construction sites in Bangladesh. Through the integration of quantitative and qualitative data, this research offered a comprehensive understanding of how mobile technology can improve safety practices and the barriers faced in its widespread adoption.

3. Results and Discussion

The findings of this study provide a comprehensive understanding of the role of mobile apps in enhancing safety audits and inspections on healthcare construction sites in Bangladesh. The combination of quantitative and qualitative data offers valuable insights into how these digital tools improve efficiency, communication, safety culture, and the challenges faced during their adoption.

3.1 Efficiency Gains in Safety Audits and Inspections

One of the most significant findings is the marked improvement in the efficiency of safety audits and inspections due to mobile app adoption. The survey results revealed that 78% of respondents reported a substantial enhancement in efficiency, primarily driven by features such as digital checklists and real-time data capture. These findings are consistent with previous studies, such as Teizer et al. (2017), which highlighted that mobile apps reduce administrative burdens, streamline processes, and eliminate manual data entry errors. In this study, 85% of participants cited reduced time spent on manual tasks like data entry and report generation, with the automation of these processes leading to quicker, more reliable safety assessments.

The qualitative interviews echoed these results, with several stakeholders emphasizing the transformative impact of mobile apps. A project manager remarked, "Using mobile apps has transformed our safety audits from a tedious, error-prone process to a streamlined, reliable system where information is at our fingertips." The availability of instant data synchronization and cloud storage was another important factor, enabling seamless access to updated information across different project teams. This ensures that safety data are always current and easily accessible, further improving the decision-making process and reducing the likelihood of delays caused by outdated or incomplete information.

3.2 Improvements in Data Accuracy

A notable 72% of survey respondents reported that mobile apps significantly improved the accuracy of safety data. This was largely attributed to the elimination of handwriting errors and the automated nature of digital inputs, ensuring that records are more precise and less prone to human error. As Teizer et al. (2017) also noted, digital tools enhance data reliability, which is critical in the construction industry where accurate safety records are essential for compliance and hazard mitigation. The ability to automatically generate reports and documentation from data collected on-site further minimizes errors and ensures that information is accurately recorded in real time.

3.3 Enhanced Communication and Collaboration

The study found that mobile apps significantly enhance communication among project stakeholders, with 67% of survey respondents citing improvements in this area. Features such as instant messaging, photo-sharing, and real-time reporting capabilities allow for swift communication of safety issues, which can then be addressed promptly. In healthcare construction sites, where safety risks can escalate quickly, this ability to document and share hazards in real-time is crucial.

The qualitative interviews revealed that stakeholders particularly valued the ability to document safety hazards with photos and instantly share them with team members, including remote stakeholders. This capability ensures that all relevant parties are immediately informed of potential risks, allowing for quick, coordinated responses. These findings align with Alaloul et al. (2020), who emphasized that digital tools improve collaboration and decision-making in construction projects by facilitating better communication among teams. In the context of healthcare construction, where the safety of both workers and the surrounding community is paramount, the enhanced communication enabled by mobile apps is especially valuable.

3.4 Positive Impact on Safety Culture

Another key finding is the positive impact of mobile apps on safety culture within construction teams. Over 60% of survey respondents reported that the use of mobile apps heightened their awareness of safety protocols and fostered a more proactive approach to risk management. One site supervisor commented, "Having a mobile app keeps safety at the forefront of everyone's mind. It's not just about checking boxes; it's about actively engaging with safety every day." This shift in mindset suggests that mobile apps not only streamline safety audits but also promote a cultural change within construction teams, making safety a core focus of daily operations. These results support existing literature on the role of digital tools in shaping organizational behavior and attitudes towards safety. Yang et al. (2020) observed that mobile apps can play a pivotal role in embedding safety as a core value within construction teams by making safety processes more visible and accessible. The ability to

quickly capture and analyze safety data helps reinforce the importance of adhering to safety protocols and encourages workers to take a more active role in identifying and mitigating risks.

3.5 Challenges and Barriers to Adoption

Despite the clear benefits, several challenges and barriers to the widespread adoption of mobile apps for safety audits and inspections were identified. The most commonly cited obstacles include resistance to change among workers (54%), the cost of implementation (48%), and concerns about data privacy and security (41%). These findings reflect broader challenges associated with the adoption of new technologies in the construction industry, particularly in developing countries like Bangladesh.

Interviews revealed that resistance to change was more prevalent among older workers, who were less familiar with digital tools and often hesitant to adopt new technologies. Younger workers and managers, on the other hand, were generally more receptive to using mobile apps. This generational divide highlights the need for targeted training programs to bridge the gap and increase overall acceptance of mobile apps across all age groups.

Cost was another significant barrier, with several stakeholders expressing concerns about the initial investment required for app subscriptions, device procurement, and continuous updates. A construction manager commented, “The benefits are clear, but we need to balance them against the costs and the effort required to bring everyone on board.” This concern is consistent with findings from Alaloul et al. (2020), who noted that cost considerations often limit the adoption of new technologies in construction, especially in developing regions.

Data privacy and security were also important concerns, with 41% of respondents indicating that they were hesitant to adopt mobile apps due to fears of data breaches and unauthorized access to sensitive information. Ensuring robust security measures is essential to alleviate these concerns and build trust among users.

3.6 Recommendations

Based on the study’s findings, several recommendations can be made to maximize the benefits of mobile apps for safety audits and inspections in healthcare construction sites in Bangladesh:

3.6.1 Training and Capacity Building: Comprehensive training programs should be developed to familiarize workers with mobile apps and reduce resistance to change, particularly among older employees.

3.6.2 Cost-Effective Solutions: To address cost concerns, organizations should explore affordable app options, negotiate bulk licensing deals, or consider industry partnerships to reduce expenses related to implementation and ongoing maintenance.

3.6.3 Data Security Measures: Robust data security protocols should be implemented to address privacy concerns and ensure that sensitive information is protected. This will help build trust among users and encourage broader adoption of mobile apps.

4. Conclusion

The results of this study demonstrate the strong potential of mobile apps to revolutionize safety audits and inspections in healthcare construction sites in Bangladesh. By streamlining safety processes, improving communication, enhancing data accuracy, and promoting a positive safety culture, mobile apps offer significant benefits to the construction industry. However, challenges such as resistance to change, cost, and data security concerns must be addressed to ensure their successful and widespread adoption. With appropriate training, cost management, and security measures in place, mobile apps can play a transformative role in improving safety practices in healthcare construction projects across Bangladesh.

Author contributions

R.D. was responsible for conceptualization, methodology, and data collection. P.K.S. contributed to data analysis, interpretation of results, and drafting the original manuscript. L.S. conducted the literature review, assisted with data collection, and contributed to visualization. M.H. managed software requirements, performed formal analysis, and contributed to reviewing and editing the manuscript. M.R.K. provided supervision, oversaw project administration, and secured funding. All authors reviewed and approved the final version of the manuscript for submission.

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Competing financial interests

The authors have no conflict of interest.

References

- Amaechi, C. V., Reda, A., Kgosiemang, I. M., Ja'e, I. A., Oyetunji, A. K., Olukolajo, M. A., & Igwe, I. B. (2022). Guidelines on asset management of offshore facilities for monitoring, sustainable maintenance, and safety practices. *Sensors*, 22(19), 7270.
- Bhadra, S., Arafin, S. S., & Uddin, M. S. (2024). Role of participation committee in developing workplace condition, safety and welfare services in Ready-Made Garment Industry of Bangladesh.
- Boudreau, L. (2020). Multinational enforcement of labor law: Experimental evidence from Bangladesh's apparel sector. *Private Enterprise for Development in Low-Income Countries Working Paper*, 7(11), 179–184.
- Boudreau, L. (2024). Multinational Enforcement of Labor Law: Experimental Evidence on Strengthening Occupational Safety and Health Committees. *Econometrica*, 92(4), 1269–1308.
- Chowdhury, M. M. H., & Jahan, S. (2014). Applicability of mHealth for healthcare management in developing countries: A study in Bangladesh. *International Journal of Bio-Science and Bio-Technology*, 6(4), 113–122. <https://doi.org/10.14257/ijbst.2014.6.4.11>

- Datta, R. M. S. (2024). A Comparative Analysis of Safety Performance in Commercial and Residential Construction: Unraveling Critical Insights. <https://journals.stmjournals.com/joci/article=2024/view=150101>, 15(01), 1–10.
- Dobrucali, E., Sadikoglu, E., Demirkesen, S., Zhang, C., Tezel, A., & Kiral, I. A. (2023). A bibliometric analysis of digital technologies use in construction health and safety. In *Engineering, Construction and Architectural Management*. Emerald Publishing. <https://doi.org/10.1108/ECAM-08-2022-0798>
- Dolphin, W. S. Y., Alshami, A. A. M., Tariq, S., Boadu, V., Mohandes, S. R., Ridwan, T., & Zayed, T. (2023). Effectiveness of policies and difficulties in improving safety performance of repair, maintenance, minor alteration, and addition works in Hong Kong. *International Journal of Construction Management*, 23(5), 814–829. <https://doi.org/10.1080/15623599.2021.1935130>
- Forteza, F. J., Carretero-Gómez, J. M., Estudillo, B., & Sesé, A. (2023). From Risk Assessment on Site to How to Improve Safety: An Easy “App” to Control Construction Site Conditions. *International Journal of Environmental Research and Public Health*, 20(5). <https://doi.org/10.3390/ijerph20053954>
- Hossain, E., Rahman, W., Islam, T., & Hossain, S. (2019). Manifesting a mobile application on safety which ascertains women salus in Bangladesh. *International Journal of Electrical and Computer Engineering*, 9(5), 4355–4363. <https://doi.org/10.11591/ijece.v9i5.pp4355-4363>
- Huq, A. O., Mahmud, H. M. E., & Haque, K. M. F. (2014). Health status, occupational hygiene & safety practices among female workers in Bangladesh. *Iranian Journal of Public Health*, 43(Supple 3), 172–179.
- Ibrahimkhil, M. H., & Hadidi, L. (2023). Is the construction site a safer place under the USACE or local government guidelines? The case of Afghanistan. *Engineering, Construction and Architectural Management*, 30(4), 1379–1400.
- Jensen, M. F., Kathuria, S., & Malouche, M. M. (2016). Meeting the quality challenge: technical regulation, sanitary and phytosanitary measures, and quality infrastructure. *Strengthening Competitiveness In Bangladesh—Thematic Assessment: A Diagnostic Trade Integration Study*, 155–192.
- Li, R. Y. M., Chau, K. W., Ho, D. C. W., Lu, W., Lam, M. W. Y., & Leung, T. H. (2018). Construction safety knowledge sharing by Internet of Things, Web 2.0 and mobile apps: Psychological and new institutional economics conceptual analysis. *IOP Conference Series: Materials Science and Engineering*, 365(6). <https://doi.org/10.1088/1757-899X/365/6/062042>
- Lin, Y.-C., Su, Y.-C., Lo, N.-H., Cheung, W.-F., & Che, Y.-P. (2013). Application of Mobile RFID-Based Safety Inspection Management at Construction Jobsite. In *Radio Frequency Identification from System to Applications*. InTech. <https://doi.org/10.5772/53176>
- Rabhani, M. B. A., Musarat, M. A., Alaloul, W. S., Ayub, S., Bukhari, H., & Altaf, M. (2022). Road accident data collection systems in developing and developed countries: a review. *International Journal of Integrated Engineering*, 14(1), 336–352.
- Saak, A. E. (2019). A review of best food safety practices: International experiences and lessons for Bangladesh.
- Tan, S. Y., Sumner, J., Wang, Y., & Wenjun Yip, A. (2024). A systematic review of the impacts of remote patient monitoring (RPM) interventions on safety, adherence, quality-of-life and cost-related outcomes. *NPJ Digital Medicine*, 7(1), 192.
- Tangari, G., Ikram, M., Sentana, I. W. B., Ijaz, K., Kaafar, M. A., & Berkovsky, S. (2021). Analyzing security issues of android mobile health and medical applications. *Journal of the American Medical Informatics Association*, 28(10), 2074–2084.
- Tanha, M. (2021). Adoption of H&S practices in shipbreaking operations: an empirical investigation of shipbreaking industry in Bangladesh.
- Thiede, M., & Rosemberg, N. (2015). Mapping and documentation of work processes in the BRAC and SSK health security schemes.
- Uddin, J., Biswas, T., Adhikary, G., Ali, W., Alam, N., Palit, R., Uddin, N., Uddin, A., Khatun, F., & Bhuiya, A. (2017). Impact of mobile phone-based technology to improve health, population and nutrition services in Rural Bangladesh: A study protocol. *BMC Medical Informatics and Decision Making*, 17(1). <https://doi.org/10.1186/s12911-017-0502-9>
- Wali, M. F. I., As-Saber, S. N., Ullah, M. W., Wali, M. M. I., & Kamal, N. (2023). Evaluation in Bangladesh. In *The Institutionalisation of Evaluation in Asia-Pacific* (pp. 95–124). Springer.
- Zaira, M. M., & Hadikusumo, B. H. W. (2017). Structural equation model of integrated safety intervention practices affecting the safety behaviour of workers in the construction industry. *Safety Science*, 98, 124–135.
- Zorzenon, R., Lizarelli, F. L., & Daniel, B. A. de A. (2022). What is the potential impact of industry 4.0 on health and safety at work? *Safety Science*, 153, 105802.