***Critical literature review – Lisa Duschek***

**APP DEVELOPMENT FOR EMERGENCY SERVICES**

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**Introduction**

Imagine being in dire need of rapid response, and no emergency services are available. In this era of advanced technology, emergency app development is critical in enhancing public safety through fast and effective crisis management. Crises such as natural disasters, accidents, violent attacks, and fire are inevitable, and people and organizations should be well-prepared to respond quickly and effectively. Rapid access to care for time-dependent emergencies is critical to improving outcomes (Júlia Loverde Gabellaet al., 2024). Every second counts during the heat of a moment crisis, and that is where emergency apps come into play. It is well known that disasters are unplanned, and one needs to be conscious to alert the audience. An emergency app makes it easy to monitor potential threats and respond to them on time. The emergency app is a crucial feature and pivotal solution as it leverages technology to enhance the effectiveness and speed of crisis and emergency management. This literature review will discuss how app development for emergency services is essential for providing connectivity and information that can dramatically improve response times and outcomes.

**Literature review**

*Emergencies Apps are essential*

Mobile apps are essential parts of our lives. According to the report *Check Out the New and Improved Red Cross Emergency App* from the American Red Cross Website, emergency apps are built to ensure emergency services are delivered in a timely and accurate to help protect people and their loved ones (2022). Smartphone applications are powerful in providing essential data to emergency teams (Repanovici and Nedelcu, 2021). The organization's website explains that an emergency app allows people to be ready when something happens around them. The apps allow one to monitor their happenings and alert the rest of the people if there is any danger or concern. Further, the app provides users with a step-by-step guide through actionable training modules to help individuals prepare for most risks. The website concludes by explaining that the primary purpose of an app is to allow people to receive alerts to better prepare and protect themselves and their loved ones in emergencies such as extreme weather events and medical conditions.

Being an organization that deals with emergencies, the content on the website might be based on the various research they encounter; thus, it can be considered a strength. The other strength of the report is that the significance of the data suggests the cause of having apps and their effect on outcomes. The main weakness of the whole report is that it is not based on a specific study, as it did not follow a particular design to produce the findings. Also, the report did not explain the issues that might hinder the emergency apps from functioning effectively, thus considered to have selection bias.

Indeed, emergency apps provide users with quick and easy access to emergency services that save their lives. Deokate et al. explain that designing and developing mobile applications for emergency services ensures Android users have easy access to emergency services (2022). Repanovici and Nedelcu (2021) study argues that emergency services remain critical for citizens and visitors; thus, apps can select optimal solutions depending on their emergency to ensure proper access to emergency services. The authors noted smartphone users take longer to search for the location of emergency services such as hospitals. Still, with emergency mobile apps, the searching is instant, thus saving time and lives. (Deokate et al., 2022). Mobile apps help users categorize a list of emergency services to avoid the complexity of search (Deokate et al., 2022). Emergency apps have preloaded content so users can access guidance without mobile connectivity (American Red Cross, 2022). The study concluded that mobile apps help display categorized emergency services, for example, police stations, hospitals, and fire brigades, to make a selection of emergency services more accessible when needed.

The strength of Deakate et al. (2022) study is that it includes many studies. The authors have analyzed the secondary data well and related it to their research. The findings have been presented logically and clearly, thus making the discussion coherent. The only weakness of the study is that the authors failed to use control studies to ensure that the survey was not unbiased.

Emergency apps are developed to improve responses to medical emergencies as they save time. Júlia Loverde Gabella and her colleagues' study argues that the design, development, and validation of emergency apps are meant to reduce the response time taken for emergency medical services (2024). In Scquizzato et al. (2020) study, they noted that time is significant when it comes to first responders responding to a medical emergency, and thus, implementing a smartphone app alert system will aid in reducing the period before the arrival of emergency management services. The team conducted two-phase research to validate the application of mobile apps to geolocate emergency calls. Júlia Loverde Gabella et al. (2020) study argues that there are noticeable delays in prehospital care, usually attributed to the call-taking process taking longer, miscommunication, and complex tracing of the uncertainty of call location. The authors realized that the caller often had difficulty accurately expressing their location during an emergency, resulting in delays. Thus, they suggest validating and developing apps to geolocate emergency calls to reduce pre-hospital emergency care response times. The research concludes that their study proves that having e-health apps in society is essential as they seek to save lives.

The study's strength is that the research question defined the population to be investigated. The study used comparative analysis, allowing for a side-by-side comparison of findings and ensuring no potential bias. Also, the study accurately interpreted the statistical data, suggesting a cause-and-effect relationship. Additionally, the researchers acknowledged to receive support to conduct the study. The only weakness of the study is that the authors failed to describe the sample populations, thus affecting the study's eligibility. Gabriella et al. (2024) acknowledge that more research needs to be done to understand the app's effectiveness, especially with new technologies coming up every day.

*Emergency Apps Enhance Response*

Similarly, emergency Apps enhance response to emergencies as they are designed to inform or alert guardians and first responders of a danger or emergency. A study conducted by Scquizzato and his colleagues found that mobile apps enhance how first responders respond to citizens' medical emergencies (2020). Effective emergency management plans and response protocols are critical as they enable coordinating resources and personnel to act on time (Damaševičius, Bacanin and Misra, 2023). The authors' sample population included citizens suffering from cardiac arrest who are receiving treatments from their homes. Through mobile phone technology, respondents can locate and alert citizens as first responders and increase CPR actions and deliberations to improve patient outcomes. Júlia Loverde Gabella et al. (20265) agree that digital technologies such as the activation of mobile apps aid accurately in locating patients and a caller to improve emergency personnel responses, thus reducing the overall Prehospital emergency care time response time. The findings argue that mobile apps make it possible for cardiac arrest patients to be reached by first responders before the arrival of an ambulance. This reduces the intervention's free time as they can offer CPR and attach an AED (2020). The research concluded that the effectiveness of mobile phone systems plays a critical role in responses.

The study was based on a comprehensive and exhaustive review of subsequent studies. Through an extensive search process, the authors formulated broad questions to produce the best evidence synthesis. Also, the authors disclosed that they had no conflict of interest. One of the weaknesses of the study is that it was restrictive to specific reports, which might make it biased and give a skewed view of the study. Also, Though the authors analyzed too many other studies, the volume of data makes the interpretation and analysis time-consuming as one tries to connect the hypothesis to the data. Furthermore, the authors used too many numerical results and discussion sections, making the discussion slightly less insightful in crucial content and context.

*Emergency Apps Enable Safety*

Emergency mobile apps track and monitor people's safety during an emergency. According to Damaševičius, Bacanin and Misra, research mentions that a critical aspect of the Internet of Emergency Services (IoES), which describes an Internet of Things system and device used for emergency management and responses, is to enhance public and respondents’ safety and crisis management efforts (2022). Emergency apps have features that aid in detailed home fire prevention and safety tips and features such as “I’m Safe” to help people connect with their loved ones by letting them know they are safe (American Red Cross, 2022). Damaševičius, Bacanin and Misra study explains that mobile apps can collect data such as environmental conditions, fire breakouts, or infrastructure statuses and send alerts to people (2022). They further explain that the app is crucial for the public and respondents' safety while dealing with emergencies. The authors explain that apps are developed with sensors that are used to automate specific emergency response processes that send alerts or deploy resources on time, thus minimizing the impact of these crises on communities, individuals, and responders. The authors conclude that wearable devices fitted with apps have great potential in emergency management and responses as they provide essential data to monitor emergency responders' and victims' health and safety.

The study was based on findings chosen from other studies over several years, ensuring the results' accuracy. The author also included comparison data to show that the app sometimes encounters challenges, thus affecting its effectiveness. The main weakness is that the author based their results on analyzing other research, which might have potential bias. If they had collected their observational data, they would have produced more robust support for their hypothesis.

*Emergency Apps Allow Dispatch Notifications*

Mobile apps are developed to provide real-time notifications when an emergency occurs, thus reducing response times. Repanovici and Nedelcu study's main objective is to analyze how mobile apps offer the potential to support emergency management (2021). The authors explain how mobile apps are a primary communication channel for many citizens when they make emergency calls. In emergencies, mobile apps seem like the only option for people to access emergency services as they automatically send relevant information to the authorities through alerts and notifications (Repanovici and Nedelcu, 2021). Alerts on emergency apps result in responders such as in-hospital teams responding quickly (Júlia Loverde Gabella et al., 2024). Mobile apps can alert emergency responders so they can respond more quickly and effectively to incidents, thus preventing further damage (Damaševičius, Bacanin and Misra, 2023). Júlia Loverde Gabella and her colleagues noted that emergency respondents can accurately get the relevant information and user location through these alerts and notifications. Also, they mentioned that users can get alerts from emergency apps to predict hazards and disasters. American Red Cross noted that the good thing about mobile apps is that they can be customized in different ways to give alerts and in other languages (2022), making communication during emergencies easy. The researchers concluded that though voice calls and SMS can be used for communication, mobile apps are good communication facilitators during emergencies.

Repanovici and Nedelcu descriptive research provides an in-depth view of how mobile notifications are essential during emergencies. They have found relevant information that supports their hypothesis by showing the relationship between mobile apps and fast response from emergency services. One of the main weaknesses is using generic technical terms for analysis.

**Conclusion**

The purpose of this literature review was to explain the purpose of having app development for emergency services. All the studies agree that having an emergency app has different benefits. The use of mobile technology in the current world is prevalent. Thus, it would be essential if emergency services adopted the same software to effectively and efficiently provide their services to the users. Emergency apps have proven crucial in mobile users' lives as they allow easy access to emergency services. Studies have shown that mobile technology is becoming indispensable for emergency responders and uses. Developing and utilizing these unique mobile apps for emergency services will offer real-time updates, save time, promote faster responses from emergency respondents, encourage routine communication through alerts and notifications, and ensure the safety of both the respondents and users. Therefore, the collaboration of mobile apps and emergency services will revolutionize how emergency responders respond to emergencies, thus enhancing the industry's efficiency.

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