Abstract

Development of an Accident and Emergency Triage Mobile App Using Open Data Kit

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Abstract

Background: The process of triaging is performed as an effective solution to balance limited resources against high patient volumes, based on an assessment of the patient's medical condition and the application of an established patient categorization protocol. In Princess Marina Hospital (PMH), a national referral government hospital in the capital city of Botswana, the Princess Marina Hospital Accident and Emergency Centre Triage Scale (PATS) has been in use since 2010. Because the rules of these triage scales are very well defined, these protocols have been shown to be amenable to translation into computer algorithms. Thus, clinical decision support systems (CDSSs) that can assist with information management to support clinicians' decision-making abilities can be developed, leading to improved healthcare quality and patient safety.

Objective: This study aims to determine the feasibility of development of a mobile triage app based on the adult PATS using Open Data kit (ODK) open source software to be used as a CDSS on smartphones and tablet computers for correct patient categorization.

Methods: A user-centered design approach was used in designing the app, with participants recruited from the staff at the Accident and Emergency Department (A&E) at PMH. Forty clinical vignettes were used in the evaluation of the performance of the app as compared to the paper-based system currently in use with the emergency physician at PMH providing the gold standard categorization of these vignettes. Usability testing was also performed.

Results: The app scored 90% (n=36) of the vignettes correctly, as compared to the paper-based system which scored 82.5% (n=33) of the vignettes correctly. Both systems achieved an over-triage score of 7.5% with an equal number of vignettes over-triaged (n=3). The results of the chi-square test indicate that the difference in triage scores between the paper-based system and the mobile app is statistically significant at P=.001 in favour of the ODK app. An overall positive outcome was also achieved in the usability test with ease of use and speed of triage determined to be the most recurring themes in the user feedback survey. While the app does not require an internet connection for triaging patients, a reliable wireless internet connection is required to upload data to the server for viewing by medical officers and physicians in real time, and this can be provided by the hospital as part of the Botswana government eHealth strategy. Additionally, the app developed in this research allows for data collection up to the point of triage categorization, meaning that a separate form would be required for capturing the rest of the information on the PMH A&E triage form.

Conclusions: The triage app developed in this research was found to determine the triage category of patient vignettes more accurately than the traditional paper-based system based on PATS triage guidelines with good results obtained in usability testing. Future work includes use of the app developed in this research in a live setting involving real patients in the A&E in PMH.

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KEYWORDS

clinical decision support systems; computerized triage; emergency department; mobile app; decision-making; mHealth

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