Trial of the Minuteful mobile application for wound care in an inpatient setting

KEY WORDS
- Acute care
- Chronic wounds
- Mobile application
- Wound care

A mobile application for wound care (Minuteful) was trailed over a seven-month period in an acute inpatient setting in Northwest England. During the trial an increase in the availability of wound photography was noted (+37%), a reduction in inappropriate tissue viability nurse reviews (–10%) and the identification of mis-reported pressure ulcers (n=65). Challenges noted during the implementation included initial software compatibility issues with the tablets available on the wards and poor staff engagement. Overall, this initial trial indicates the potential safety, economic and service efficiency improvements that may be possible via implementation of mobile application technology in wound care. Further robust studies are needed to explore the initial findings of this trial in greater depth.

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In the context of wound care there are a growing number of mobile applications intended for use by healthcare professionals or patients receiving care. The functions available from these applications are numerous and include both advanced diagnostic capabilities such as the detection of infection, healing time estimates in addition to administrative functions such as product ordering and documentation of care (Shamloul et al, 2019). This technology has now become the focus of national strategy intended to improve wound care. In 2018 the National Wound Care Strategy Programme (NWCSP) was commissioned by NHS England (Adderley, 2018). The purpose of the strategy is to drive forward improvements in wound care within England The strategy is organised by workstreams that focus on specific challenges associated with the delivery or monitoring of wound care. The 'Data and Information' workstream focuses on the monitoring of wound care. As part of this workstream a register of mobile application technology (MAT) suppliers has been created, offering health professionals working in wound care access to a single source of information on available MAT. Notably, a recent review of mobile applications for the identification of pressure ulcers (PU) reported that, currently all peer reviewed studies related to these applications focus on the initial phase of app development, rather than the efficacy of the application functions (Koepp et al, 2020). However, some early studies have indicated that the use of mobile applications in wound care can improve access to advice from specialist clinicians (Sood et al, 2016); allow faster and easier assessment of wounds (Shamloul et al, 2019) and increase the efficiency of wound care services (Zhang et al, 2021).

Aim

This report aims to describe our experiences of trailing a mobile application (Minuteful) over a seven-month period within an acute inpatient tissue viability service in Northwest England. This was not a robust research evaluation and therefore no controls were implemented to allow causal links between the implementation of the app and the outcomes reported to be determined. This report seeks to simply describe our experiences while testing the app as part of a free trial offered by the wound app company.

Functionality of the application

The Minuteful app performs many functions including:
- Documentation of wound care
- Obtaining and storing clinical images of wounds (which is accessible to all staff using the app)

- Automated wound area and dimensions and tissue type analysis calculations
- Providing oversight of data related to wound care via a dashboard
- Alerts for stagnating wounds (based on changes in wound dimensions)
- Percentage increase or decrease in wound dimensions
- Peer to peer review of TVN management plan and effectiveness of wound care plan
- App based, accessible to ward staff
- Visual representation of wound healing.

The Minuteful application being used to measure a wound can be seen in *Figure 1* and the data dashboard can be seen in *Figure 2*.

The data stored within the application could be accessed remotely by the tissue viability service. This includes access to wound photographs, which previously took time to be requested, obtained and then uploaded onto a shared server where they could then be reviewed. This could in some cases take days. Normal consent procedures for obtaining wound photography were adhered to. The data from this initial trial indicated that wound photography was available on the mobile application more often than it was via the normal medical illustrations system (*Table 1*).

It was thought that implementation of the mobile application may improve the following key service delivery issues by improving access to wound photography and remote access to wound care documentation by the TV service:

- Difficulty during triage of tissue viability referrals due to limited information related to the wound and current treatment included on referral forms
- Lack of photographs available to tissue viability nurses at time of referral to assist with triage and ongoing evaluation of care. Obtaining

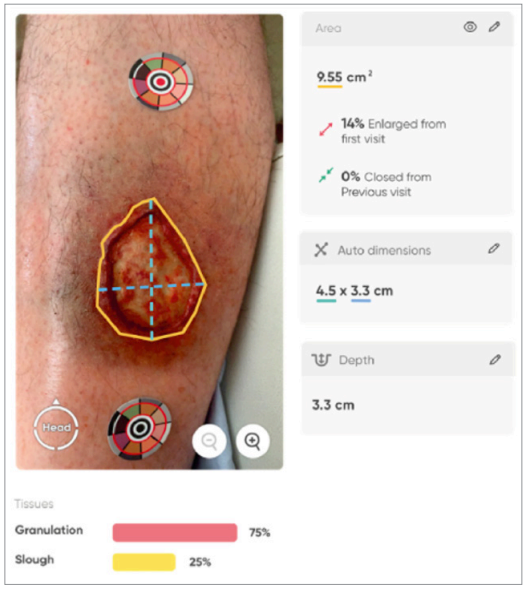

Figure 1. The Minuteful application used to measure a wound

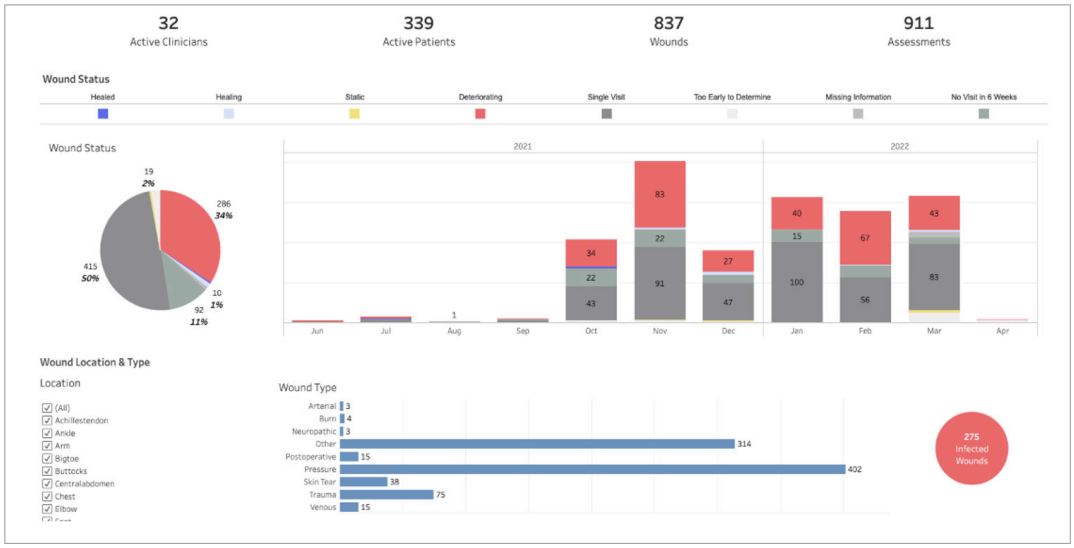

Figure 2. The Minuteful wound care data dashboard

wound photographs is considered an important aspect of wound documentation allowing accurate communication and continuity of care (Langemo et al, 2006).

- Difficulty accessing medical photography services for hospital inpatients with wounds, in a timely manner. Particularly for COVID-19 positive patients who could not always be seen by medical photographers
- Lack of consistency/accuracy of categorising PU. Leading to over-categorisation/incorrect categorisation and subsequent investigation.
- Inappropriate referrals to the TVN service
- Inconsistent or absent documentation of wound care.

MINUTEFUL APPLICATION TRIAL

Access and training to the Minuteful app were provided to an acute medical unit. Over the proceeding seven-month period, wound care carried out in these areas was documented using the application. Referrals to the TVN were triaged based on the data available via the application and accessed remotely from the TVN base. There was no disruption to the normal process for documenting wound care, referral processes or access to the established hospital medical photographers service during the trial. Data from the application was reviewed to determine whether a reduction, if any, was achieved in the number of tissue viability referrals lacking a complete wound assessment and/or wound photography. A manual record of tissue viability referrals resulting in a TVN visit following the implementation of the application onto the trial wards was maintained by the tissue viability team. Photographs of PU reported during the trial period were also reviewed on the application by the TVN to help determine the accuracy of the diagnosis and reporting. Key findings from the application trial relating to patients referred to the tissue viability service can be seen in *Table 1*. At the end of the trial over 300 patients had been involved in the trial of the application, which included over 800 wounds.

In addition to the data highlighted in *Table 1*, 65 misreported PUs were also identified via the application. However, this data was only available two months into the trial, when it was noticed, via use of the app, that non-PUs were reported as PUs within the app. Therefore, this may be an underestimate of the misreported PU during the trial period. This was an unanticipated finding. Misreported PUs were noted to be of a variety of aetiologies including moisture associated skin damage (MASD), old scars, bruising, diabetic foot ulcers (DFU) and traumatic wounds.

DISCUSSION

This preliminary trial of the Minuteful app appeared to demonstrate a beneficial impact on the efficiency of the tissue viability service. Improved access to wound photography and a centralised digital and remotely accessible wound care record allowed a more robust triage to be undertaken before a visit to the ward by a TVN. The application also provided a daily chronological update of photos taken which

Table 1. Impact of the application on key service quality metrics

	Before mobile application implementation 3 months	%	During 7 months trial of the Minuteful application	%	% change
TV referrals containing a complete wound assessment and current treatment plan	(n=59/136)	43%	(n=59/182)	32%	–11%
TV referrals with wound photography	(n=31/136)	23%	Image available from: Minuteful application (n=144/241) Medical illustrations (n=115/241)	 60% 48%	 +37% +25%
TV referrals resulting in visit by TVN	(n=77/105)	73%	(n=153/241)	63%	-10%

TV– tissue viability; TVN–tissue viability nurse

allowed a TVN to review all wound photographs taken the previous day and identify patients which had not been referred to the tissue viability service but who may have required tissue viability input. This was an unexpected finding and represents an opportunity to improve the safety of patients with wounds and hasten a review by a TVN.

Challenges were noted during the initial implementation period and throughout the trial. The initial process of downloading the application onto the tablets already available in the hospital was hindered by software compatibility issues. This was compounded by initial poor engagement by clinical staff with the technology although the reasons for this were unclear and no formal evaluation was undertaken. Informal feedback highlighted that the tablets were difficult to use for the purpose of imaging wounds. It is possible that future efforts to implement these technologies could be improved by using mobile phones rather than tablets that may be easier to use for taking photographs. Identification of an app 'champion' who was responsible for encouraging use of the app on the ward may also improve uptake, and this was an approach adopted successfully during this trial. Training on the app was provided by company representatives as part of the trial.

Notably, the data gathered on misreported PU was only possible due to the remote access to wound care data by the TVN, indicating the potential of organisational systemic misreporting of PUs within the hospital. This finding provides a rich source of data indicating knowledge and training needs among the nursing staff responsible for reporting PU.

It is important to note that this was a user trial and therefore the data reported must be interpreted with caution. It is unclear if the quantitative findings of this trial are statistically significant. The trial took place over a short period of time in only one hospital and on only one ward. This trial does however provide some preliminary evidence of the potential impact of mobile applications in the wound care context.

CONCLUSIONS

The initial trial of the Minuteful application improved access to clinical photography and clinical data that supported the triaging and ongoing monitoring of patients on the tissue viability caseload and those not on the caseload. This initial trial indicates the potential opportunities for integration of mobile applications into inpatient wound care services as a mechanism to improve both the clinical effectiveness and economic efficiency of tissue viability services. In future, studies using robust methodologies are required to formally evaluate the longer-term impacts of the integration of these technologies into wound care practice. Organisations seeking to implement these technologies into wound care practice should consider undertaking these studies as part of the implementation process to better understand both how engagement with the technology can be improved, in addition to its clinical and economic value to healthcare services.

Remote access to clinical wound care data by specialist nurses may also assist in both ongoing monitoring of the quality of PU reporting and identify training needs related to wound care. It is possible that workload can be re-focused away from tasks generated from PU investigations such as root cause analysis, which is not required if the PU was misreported, and this was identified via the app. WUK

Declaration of interest

Access to wound care application provided on a trial basis by Healthy.io.

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