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The Viability and Acceptability of a Virtual Wound Care Command Centre in Australia

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Abstract. The objective of this study was to assess the viability and acceptability of an innovative Virtual Wound Care Command Centre where patients in the community, and their treating clinicians, have access to an expert wound specialist service that comprises a digital wound application (app) for wound analysis, decision-making, remote consultation, and monitoring. Fifty-one patients with chronic (42.6%) wounds were healed, with a median time to healing of 66 (95% CI: 56-88) days. All patients reported high satisfaction with their wound care, 86.4% of patients recommended the Virtual Wound Care Command Centre with 84.1% of patients reporting the app as easy to use. The data revealed that the Virtual Wound Care Command Centre was a viable and acceptable patient-centred expert wound consultation service for chronic wound patients in the community.

Keywords. Chronic wounds, digital wound application, telehealth, virtual care, wound care

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1. Introduction

This paper presents a translational study on the viability and acceptability of utilising a digital app in a virtual Wound Care Command Centre (WCCC); a new Model of Care to improve wound care for individuals in metropolitan and rural New South Wales (NSW). In our previous study [1], conducted in one health service in NSW, we tested the acceptability and effectiveness of the Tissue Analytics™ digital wound app [2] among clinicians. The study found the digital app improved documentation and data management of wound care. Clinicians found the app was easy to use, assisted with objective wound assessment, and provided benefits to improve connectivity and continuity of care for patients. An opportunity was identified for further research into the feasibility of utilising the app to establish a virtual service providing remote access to specialist wound care for individuals with chronic or complex wounds.

2. Methods

2.1. Study Design

This was a prospective, observational study to test the viability and acceptability of an WCCC supported by a digital app, namely Tissue Analytics™ (Baltimore, Maryland, https://www.tissue-analytics.com), a purpose-designed digital wound management platform that can record, track, and analyse patient wounds [2] (referred as the 'digital app' hereafter). Participants were recruited to the study between 17 December 2020 and 28 May 2021, and wound data were collected until the wound healed or end of data collection on 6 August 2021. The study was approved by the local institutional review board. Written consent was obtained from all participants included in the study. The trial was registered on ANZCTR, registration number ACTRN12621000344897.

2.2. Study Setting

The study was undertaken across nine centres in metropolitan and rural health services in NSW in Australia that provides services to patients with wounds. There were 19 wound specialists (nurse specialists, podiatrists, doctors, surgeons) across the nine centres who were responsible for enrolling and monitoring patients in the WCCC.

2.3. Participants and Recruitment

Participants with a wound(s) and ≥18 years of age were invited to participate in the study. Participants were excluded if they had: (a) a non-healing wound (eg, palliative, malignant, or fungating tumours; wounds with a blind-ended track such as pilonidal sinus and sinus); (b) a wound that required specialised treatments (eg, burn); or (c) a superficial, fast healing wound requiring <1 week for wound closure.

2.4. The Intervention – the Virtual Wound Care Command Centre

The WCCC is an interdisciplinary nurse-led specialist care and support service, available to patients and their treating GP/nurse, which enables the application of treatment plans for people with chronic wounds in the community. The WCCC comprises: (a)

coordinated services of advanced wound specialists for the patient, their carer, or treating nurse/GP; (b) continuity of care for patients discharged from hospital into the community; (c) a comprehensive treatment plan by the wound specialists; (d) a digital app with real-time imaging of wounds [2] comprising a separate patient and clinician interface; (e) audiovisual communication to a command centre for the patient to promptly access their treating clinician (wound specialists, nurse/GP) and ensure early recognition of deterioration; and (f) a centralized database for benchmarking and generating reports. Patients are supported by their treating clinician and provided instructions. As such, the use of the digital app does not replace face-to-face care but complements these visits by providing additional support between appointments. The app has a secure messaging function for communication between the patient and treating clinician.

2.5. Outcome Measure

The primary outcome was the viability and acceptability of the WCCC, patient usability of the digital app, and efficacy of remotely monitoring wound care.

2.6. Data Collection

Occasions of service (OOS): Any examination, consultation, treatment, or other service provided by a clinician in a non-admitted setting to a client/patient. Each wound image and text note communicated using the app was counted as an OOS. Participant surveys: Two participant surveys were administered. The first survey administered at the beginning of the study captured participant satisfaction with wound care under standard practices and was repeated at the end of the study to capture satisfaction with care through the WCCC. To capture usability and acceptability of the digital app, a second survey based on a telehealth satisfaction instrument was administered at the end of the study [3]. Participant interviews: Participants expressed their overall experience with virtual wound care and the app and how it affected their wound care. Wound data: Characteristics of wounds, including wound type, wound size, and change in wound characteristics over time, were captured and downloaded from the app.

2.7. Data Analysis

OOS: Linear regression was conducted to determine the average OOS frequency per participant. The digital app recorded the date and time of image and text communications. Response times were calculated to assess the efficiency in using the digital app as a mode of communication between wound specialists and patients. Participant surveys: The mean score of each question across all participants were calculated for each category for both surveys. Participant interviews were analysed using Braun and Clarke's guidance. Thematic analysis [4] was conducted in six steps: familiarisation with data; generation of initial codes; search for themes; review of themes; definition and naming of themes; and preparation of a written report. Wound data: Percentage change in wound surface area (SA) for each wound was calculated using the difference in wound SA evaluated from date of enrolment to last wound evaluation date. Healing rate was calculated per Gorin et al.'s formula [5].

3. Results

51 participants were enrolled in the WCCC and data were collected for up to 7 months. From these participants, data on 61 wounds were analysed. Participants enrolled in the study were aged from 30 to 91 years, with a mean age of 61.9 years (SD 13.4 years). 53% of participants were male and 47% were female.

3.1. Occasions of Service

Over 229 days, a total of 828 OOS was provided to 51 participants through the WCCC. Linear regression analysis showed each participant received on average one occasion of service every 4.4 days ($r^2 = 0.55$), in addition to any phone calls that were conducted but not captured in the study. Approximately 50% of communication notes were responded to within 2 hours by the wound specialist, and a median response time of 1.5 hours.

3.2. Participant Survey – Virtual Wound Care Command Centre

Table 1. Participant survey on wound care service on Likert scale (1: strongly disagree to 5: strongly agree)

Survey categories for the virtual Wound Care Command Centre	Mean score	
	Baseline	Post WCCC
Perception of care services	4.8	4.9
Timely access to wound care services	4.6	4.8
Ease of communication with wound specialist	4.6	4.7
Ease of travel and seeing the wound specialist	3.8	3.8
Self-empowerment and confidence to manage own wounds	4.6	4.7
Preference for face-to-face consultation	4.5	4.3

3.3. Participant Interviews

The two themes which reflect patient experiences of the WCCC are: (a) connectivity is valuable for ongoing access to, and confidence in, wound care; and (b) remote consultation complements face-to-face visits. The narrative themes regarding the digital app included: (a) a digital record in your pocket; (b) tracking the progress of wound-healing is simple; and (c) digital apps—learning to overcome technical challenges.

3.4. Participant Survey – Digital App Use

Table 2. Participant survey on the digital app on Likert scale (1: strongly disagree to 5: strongly agree).

Survey categories for the digital app	Mean score
Ease of use	4.2
Timely access to wound care services	4.0
Ease of communication with wound specialist	4.0
Reducing travel to see the wound specialists	3.6
Self-empowerment and confidence to manage own wounds	4.0
Supporting face-to-face consultation	4.4
Recommended for wound care management	4.5

3.5. Wound Analysis

Analysis of each wound was conducted from time of enrolment until the wound healed or the final wound evaluation date for an unhealed wound. 26/61 (42.6%) wounds were

completely healed within the 7-month study period, with a median time to healing of 66 (95% CI: 56-88) days. Nineteen out of 26 wounds (73.1%) healed in <12 weeks, and all 26 wounds that healed did so within 24 weeks. Out of the remaining wounds that were still being managed by WCCC, 29 (82.9%) had improved since the time of enrolment, with a mean reduction in wound SA of 51.9% (SD 21.2%). There were 6 (17.1%) wounds, with a mean increased wound SA of 25.9% (SD 25.8%).

4. Discussion

Individuals with chronic wounds receiving remote wound care services through the WCCC using the digital app had improved timely access to wound care services, ease of communication with their wound specialist, and self-empowerment to manage their wounds. Remote monitoring of wounds did not decrease the quality of care or increase risk to the patient. Patients valued the direct connectivity afforded by the digital app to their wound specialist for continued wound care and confidence in wound management. In addition, most patients found the digital app easy to use, suggesting the use of new digital technology was acceptable among older people who are prone to chronic wounds.

5. Conclusions

The study provides a valuable analysis of the WCCC, demonstrating its viability and acceptability for providing virtual wound services while maintaining quality patient experience. This supports continued expansion of this work across the health network.

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