Accuracy and efficiency of recording Paediatric Early Warning Scores (PEWS) using electronic hand-held devices compared with traditional paper-based documentation

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Introduction: Paediatric Early Warning Scores (PEWS) are advocated to assist healthcare professionals to identify early signs of serious illness or deterioration in hospitalised children. A weighting is applied to score components reflecting deviation from a pre-determined 'norm'. Higher aggregate scores trigger an escalation in care-delivery aiming to prevent adverse events. Knowledge to improve PEWS performance is evolving. Most published studies are from single sites using paper-based documentation, which limits the quantity and quality of data that can be collected and subsequently modelled. Process errors in documentation including missing data, illegible recording, plotting or calculation errors have potential to impede the reliability of the PEWS assessment.

Purpose: To determine the reliability of the PEWS assessment, we measured the accuracy of data recording, PEWS calculation and time to complete documentation for five clinical vignettes, using a hand-held electronic physiological surveillance system (VitalPAC®Paediatric) compared to traditional paper-based methods. We also explored the user acceptability of both methods.

Materials & Method: A mixed method controlled exercise of documenting paediatrics vital signs and clinical observations, and calculating the PEWS score was undertaken. A web based survey was also conducted to determine user acceptability.

Results: Twenty-three clinical staff participated in the controlled exercise. Using VitalPAC®Paediatric the accuracy of documentation improved from 85.6% to 98.5%, p<0.001. The time required to document vital signs and PEWS improved from 98 to 68 seconds, p<0.001. The accuracy of PEWS calculation was also superior using EPSS documentation compared with traditional paper charting: 94.6% vs 55.7%, p<0.001. Web-based survey of user-acceptability was completed by twenty-nine staff. 55% respondents stated their preference of recording data was using VitalPAC®Paediatric. Staff perceived that this technology offered clinical safety benefits including less likelihood of errors in documenting vital signs and clinical observation. Immediate visibility of recorded data to the entire clinical team contributed to situational awareness. However, it was highlighted that good technical support, Wi-Fi connectivity, and device reliability were essential.

Conclusion: In a controlled exercise, the VitalPAC®Paediatric prototype reduced human factor error in vital signs documentation and PEWS score calculation, and saved time.

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