

Aim: To understand how digital technologies could be designed and delivered to better support patients with surgical health behaviour changes, specifically: 1) *what* do patients want from technologies, 2) *how* do they want to use them, and 3) *when* should they be implemented?

Methods: According to the EQUATOR guidelines, the consolidated criteria for reporting qualitative research (COREQ) checklist was followed. Pre- and post-operative patients attending bariatric surgery clinics within one large teaching hospital in the North of England were invited to take part. Purposive sampling was employed to recruit a representative sample of patients. Participants received an information sheet detailing the study purpose and aims. Written informed consent was obtained before conducting semi-structured interviews. Semi-structured interviews took place between February-March 2020 and were audio-recorded and transcribed verbatim. Interviews included questions on participant surgical experience, health behaviour change and perspectives on digital technologies. A reflexive thematic analysis approach enabled the development of themes from the data. NVivo 12 software assisted data organisation.

Results: Eighteen patients were recruited and interviewed. The average age of participants was 46-years. 55% (n=10) of participants had or were undergoing a gastric bypass procedure. The data analysis enabled the development of four themes which highlighted specific participant desires relating to the design, functionality and implementation of optimal digital technologies to best support them during the pre- and post-operative periods. Specifically, the themes related to an intervention's ability to: 1) provide structured content and support, 2) facilitate self-monitoring and goal-setting, 3) deliver information in an accessible, trusted and usable manner, and 4) meet patient information-seeking and engagement needs (Figure 1). *"In the first couple of weeks (following surgery), we need to be told what to do by the technology"* Participant 9.

Conclusion: This patient-informed research highlighted how interventions could be designed, what functionality would be most useful and when they should be implemented within the NHS pathway for bariatric surgical patients. This study is one of the first in this patient cohort to involve pre- and post-operative participants and provides key insights to fill knowledge gaps relating to the design and optimisation of person-centred digital interventions. We acknowledge some limitations with our work. Whilst we did not sample participants by socioeconomic status, it is possible that different socioeconomic classes may have varied experiences with technologies. Our focus was solely bariatric surgery and thus findings may not be generalisable to other elective surgical procedures. These findings have the potential to shape and influence future work on the co-design and optimisation of person-centred digital health technologies in modern healthcare settings.

References

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Figure 1: Participant desires relating to the design, functionality and implementation of digital health technologies for pre- and post-operative support.

PATIENT SAFETY

EXPLORING THE USE OF VARIABLE RATE INTRAVENOUS INSULIN INFUSION IN HOSPITAL: A HIERARCHICAL TASK ANALYSIS

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Introduction: Variable rate intravenous insulin infusion (VRIII) is a cornerstone treatment for controlling elevated blood glucose (BG) in inpatients who are missing meals, and/or have a critical illness. VRIII can cause serious harm to patients if used incorrectly. Traditional approaches to improving safety have focused on identifying errors, then finding solutions to prevent future recurrence. Such approaches fail to fully take into account the complex adaptive nature of healthcare systems, which cannot be controlled solely by standards or procedures. The Resilient Health Care (RHC) approach proposes that understanding the variability in healthcare practitioners' everyday work e.g. a physical and cognitive activity directed toward achieving a specific goal, is key to enhancing patient safety (1). There are a considerable number of studies on using RHC to enhance safety, however, no studies to date have researched resilience in the use of VRIII.

Aim: This study sought to comprehensively understand, within a RHC framework, how VRIIIs are used in the clinical environment.

Methods: A qualitative observational study was conducted in a Vascular Surgery Unit. A purposive sample of two inpatients and all healthcare practitioners caring for VRIII aspects for these patients were recruited. The researcher

video-recorded healthcare practitioners while prescribing, administering and monitoring VRIII. The video data were then transcribed and inductively coded to construct a deep understanding of the use of VRIII. A hierarchical task analysis (HTA) which is a core human factors approach (2) was used to represent the actual task for the use of VRIII.

Results: Twenty-two hours of video recordings of 10 healthcare practitioners were used to develop the final HTA with a top-level goal of controlling elevated BG using VRIII. The HTA clearly illustrated the complexity of using VRIII by highlighting more than 100 practical activities to achieve the goal. The observed challenges were mainly related to lack of knowledge e.g. the co-prescription of appropriate concurrent IV fluids, and system and technology problems e.g. the need for frequent BG monitoring. The analysis of the video data identified various strategies that healthcare practitioners used to respond to variability in work including knowledge, standardising practice e.g. the using of ready-to-administer insulin infusions, and context-dependent adaptations including asking available colleagues to countersign administration and assigning the monitoring task to other staff when the nurses were busy. Most of the observed adaptations had positive outcomes in terms of patient care delivery.

Conclusion: This study was the first to have explored how 'work is done' in reference to the use of VRIII using HTA. The study was limited by time, the Covid-19 pandemic and number of participants. However, the developed HTA provided detailed tasks and, by highlighting when and how adaptations were used, systematically presented the process as it was actually done. Future work will focus on using the data from this study to model RHC in the use of VRIII in a way that allows the study site to better enhance patient safety.

References

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UNDERSTANDING THE IMPLEMENTATION AND MEDIUM-LONGER TERM SUSTAINABILITY OF THE PRIMARY CARE PRESCRIBING SAFETY INTERVENTION, PINCER: PRELIMINARY RESULTS FROM A LONGITUDINAL PROCESS EVALUATION

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Introduction: Medication errors are an important cause of morbidity and mortality across primary care in England. In the National Health Service, approximately 71% of 237 million medication errors made annually are attributable to primary care(1). The complex pharmacist-led IT-based intervention to reduce clinically important medication errors (PINCER) intervention has been shown to significantly reduce medication errors when tested in a cluster randomised controlled trial and when implemented on a larger scale across one geographical region of England. However, with a national rollout of PINCER now underway across England,

there remains a limited understanding of whether and how wider implementation, impact and medium-longer term sustainability across diverse regions is achieved, and what factors may influence these processes.

Aim: This study aimed to explore the contextual factors that influenced the nature and extent of translation, implementation and sustained use of PINCER in diverse settings over time.

Methods: Intervention developers and personnel involved in the PINCER rollout and staff members from Academic Health Science Networks (AHSNs), Clinical Commissioning Groups (CCGs) and general practices from four regions of England, UK, were purposively recruited via research team connections and Clinical Research Networks. Interviews aimed to capture short-term (≤ 6 months), medium-term (6 – 18 months) and long-term (≥ 18 months) use of PINCER. Interview guides were informed by Normalisation Process Theory (NPT). Semi-structured, face-to-face or telephone interviews were conducted and digitally recorded. A preliminary thematic analysis was performed on the data collected.

Results: Forty-eight participants from 30 establishments, including two intervention developers, three involved in the PINCER rollout and five AHSN, seven CCG and thirty-one general practice employees were interviewed between June 2018 – June 2020. Their engagement with PINCER had either been in the medium (n=13) or long-term (n=17), (range 8 months - 5 years plus). Emerging themes identified in the preliminary analysis were: development and spread which incorporated intervention and training improvements as well as uptake, perceptions of PINCER which included awareness of PINCER as well as opinions on it and factors influencing the use of PINCER and sustainability which were mainly contextual but also related to PINCER functionalities. Within the development and spread theme, and relating to perceptions of PINCER theme, clear communication and ensuring there was an understanding of what PINCER entailed was considered important in initiating interest and uptake. Overall, PINCER was perceived positively. Key challenges to the implementation of PINCER identified were initial IT issues and workload. Policies advocating the use of PINCER, evidencing impact in reductions in the number of patients identified as being 'at risk' of hazardous prescribing and being able to benchmark results against other CCGs and practices helped facilitate the implementation and sustainability. Some changes made to prescribing and monitoring processes as a result of the implementation and use of PINCER, appeared to have become embedded into routine practice giving an indication of sustainable use.

Conclusion: Further interviews will establish if and how PINCER has been more widely adopted and normalised within primary care, in order to generate important learning to support its optimal and sustainable impact.

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