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A qualitative case study of ehealth and digital literacy experiences of pharmacy staff

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ABSTRACT

Background: eHealth's many forms are benchmarked by the World Health Organization. Scotland is considered an advanced adopter of ehealth. The third global survey on ehealth includes pharmacy-related ehealth indicators. Advances in ehealth place an obligation on pharmacy staff to demonstrate proficiency, or digital literacy, in using ehealth technologies.

Objective: The aim of this study was to provide an indepth exploration of the ehealth and digital literacy experiences of pharmacy staff in the North East of Scotland.

Method: A qualitative local case study approach was adopted for observational and interview activities in community and hospital pharmacies. Interview and observational data were collated and analysed using a framework approach. This study gained management approval from the local health board following ethical review by the sponsor university.

Results: Nineteen pharmacies and staff ($n = 94$) participated including two hospitals. Most participants were female ($n = 82$), aged 29 years and younger ($n = 34$) with less than 5 years pharmacy experience ($n = 49$). Participants identified their own digital literacy as basic. Most of the pharmacies had minimum levels of technology implemented ($n = 15$). Four themes (technology, training, usability, processes) were inducted from the data, coded and modelled with illustrative quotes.

Conclusion: Scotland is aspirational in seeking to support the developing role of pharmacy practice with ehealth, however, evidence to date shows most pharmacy staff work with minimum levels of technology. The self-reported lack of digital literacy and often mentioned lack of confidence in using IT suggest pharmacy staff need support and training. Informal work based digital literacy development of the pharmacy team is self-limiting. Usability of ehealth technology could be a key element of its' acceptability. There is potential to better engage with ehealth process efficiencies in both hospital and community pharmacy. As Scotland increasingly invests in ehealth pharmacy technology, it is important that it also invests in pharmacy staff training.

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1. Introduction

eHealth is defined by the World Health Organization (WHO) as the adoption of information and communication technologies in delivering health services.¹ There are many forms of ehealth including, for example, telehealth, mobile health (mhealth), electronic prescribing (e-prescribing) and technology enabled care (TEC).^{1,2} Advances in ehealth are benchmarked by WHO in their Global Observatory reports.³ These reports present country by country ehealth implementation and adoption levels as

determined ehealth experts identified by WHO in each of 125 countries. Pharmacy-related ehealth indicators were included in the third global survey on ehealth recognizing the profession alongside physicians, dentists and nurses.³ eHealth pharmacy information management systems, storing patients' contact details, their primary care physician practice, allergies and dispensing data, are included in the report's electronic health record category. Central to the push for global ehealth adoption is the potential to promote patient safety.^{1–3} As these national indicators show, WHO are not alone in recognizing that patients, as health care consumers, are moving towards more proactive participation in taking decisions about their own well-being often influenced by online health-related information.^{4–6}

Pharmacy should not be viewed as different from other

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technology developments which involve modification of working practices and processes, training in the application of the technology and service evaluation to promote usability and acceptance. The King's Fund highlight eight technologies which it predicts, 'will be changing how and where care is delivered; and offering new ways to prevent, predict, detect and treat illness.'⁷ The eight technologies include: the smart phone; at-home or portable diagnostics; smart or implantable drug delivery systems; digital therapeutics; genome sequencing; machine learning; blockchain; and, the connected community.⁷ Many of these predictions are already reality for the general public in community settings across Scotland. For example, health information for promoting patients' self-management of healthy living, support for living with long-term conditions, voluntary sector support and signposting to access the right care at the right time. In Scotland this is led by: award winning ALISS (A Local Information System for Scotland; ALISS.org)⁸; Alliance Scotland (Alliance-Scotland.org.uk) supporting health and social care integration with a focus on giving voice to people who are disabled or living with one or more long-term conditions and their carers⁹; also part of The Alliance is Digital Health and Care (DHC; <http://dhcscot.alliance-scotland.org.uk/>) encouraging citizen participation in developing ehealth applications which support shared care¹⁰; the Digital Health & Care Institute (DHI; <https://dhi-scotland.com/>) bringing together researchers in innovation pools¹¹; NHS Choices website facilitates symptom checking (patient based Decision Support System; www.nhs.uk) with recommendations for follow up actions¹²; and NHS24 telehealth and telecare organization website (nhs24.com) and remote delivery of pharmacy services¹³; and condition specific support such as MyDiabetesMyWay (NHS Tayside).¹⁴ The wide range of technology enabled care innovations continues to emerge in Scotland (sctt.org.uk)¹⁵ including mobile health (mHealth) technologies for patients and health and social care staff based on smart (cell) phone and tablet access or 'Attend Anywhere' technology from Australia¹⁶ promoting equality of access to remote pharmaceutical services in NHS Highland in Scotland.¹⁷

Each holds clear implications for health and social care staff training in keeping pace with the ehealth information and digital literacy while 'changing how and where care is delivered.'¹⁸ The Scottish general public is not alone in gaining access to systems which allow online access to book GP practice appointments, order repeat prescription and to see their own GP-held medication history and allergies.

These advances in both healthcare professional and patient ehealth activity place an obligation on pharmacy staff to demonstrate proficiency, or digital literacy, in using technology in their daily pharmacy practice, as is the expectation across not just health but all sectors of employment.¹⁸ Digital literacy is described as 'being able to make use of technologies to participate in and contribute to modern social, cultural, political and economic life.'⁷ Importantly, making effective use of those skills through digital engagement in occupationally based activities is a widely-held expectation. As ehealth is increasingly the norm within healthcare, the digital literacy of the workforce comes into focus.^{19,20} Indeed, few United Kingdom (UK)-based healthcare providers can readily function without ehealth technologies. However, the curricula for accredited pharmacists or pharmacy technicians, regulated by the General Pharmaceutical Council (GPhC) in the UK, does not explicitly include ehealth or digital literacy, unlike their United States equivalent, the Accreditation Council for Pharmacy Education (ACPE).^{21,22}

Within Scotland, National Health Service (NHS) care and prescriptions are dispensed free of charge. Electronic prescribing (e-prescribing or electronic transfer of prescriptions) is the norm in primary care with the prescriber, usually the primary care general

practitioner (GP), providing the patient with a printed prescription.²³ Community pharmacy technology infrastructure is designed around the barcoded, paper-based prescription and the Scottish wide area network (SWAN; changeover in progress from the N3 network, NHS National Network).²⁴ The barcode represents a unique prescription number (UPN). All GP practices and community pharmacies are linked via SWAN (or N3) to a central server. When a prescriber issues a barcoded paper-based prescription to a patient, an e-message containing the details is sent via SWAN (or N3) to be held on the central e-pharmacy message store server.²⁵ When the patient hands in the related prescription at a community pharmacy, the barcode is scanned and the matching e-message is retrieved to populate the patient's pharmacy care record (PCR) on the pharmacy management system (PMS) ready for the pharmacy team to check and dispense listed items based on the prescriber's instructions.²³

While this simplified description of the e-prescribing process may reflect the patients' side of the pharmacy counter, behind the scenes presents varying digital literacy challenges for pharmacy staff. A range of PMS are installed on a spectrum of complexity of hardware infrastructure. While fulfilling the same NHS Scotland contracted core services, each pharmacy management system features different interfaces and different functionality.²⁵ NHS contracted community pharmacies in Scotland provide four core services: (1) the Acute Medication Service (AMS) for emergency medicines supply; (2) the Minor Ailment Service (MAS) providing free over-the-counter medicines for registered, eligible patients for common, self-limiting conditions; (3) the Chronic Medication Service (CMS) for review and supply of medicines for registered patients with long-term conditions on a shared care plan with optional (24 or 28 week) serial prescribing, as agreed with the general practitioner/physician; and, (4) the Public Health Service (PHS) which promotes healthy lifestyle choices, local health promotion activities and smoking cessation. The first three services (AMS, MAS, CMS) are ehealth related and technology-based, collectively referred to as e-pharmacy.²³ As with any business, there will also be a range of additional software functionality for stock control and ordering, email, website maintenance, pharmacy group or national chain multiples linking anything from a single Ethernet connected PC-based network server with linked barcode reader and label printer to a multiple robotic medicines management system with organization-based intranet, wi-fi and multiple PCs each with barcode reader and label printer. Although hospital-based pharmacies fulfil a different function, dispensing for both inpatient and outpatient clinics, their hardware infrastructure will be similar to that of a large community pharmacy.

Scotland has 14 local health boards delivering a free-at-point-of-care National Health Service.²⁶ NHS Grampian in the North East of Scotland employs over 17,000 staff delivering healthcare to a population of over half a million. The area has eight hospitals, only two of which would be considered major, and 131 community pharmacies (51 in Aberdeen City, 53 in Aberdeenshire, 27 in Moray).²⁷ Key findings from a recent quantitative study conducted in the area found that, with few exceptions, pharmacy staff perceived their own digital literacy to be at a basic level.⁸ Secondary outcome measures of role, age, gender and work experience were not found to be clear determinants of digital literacy. However, given the global policy driven aims to embrace the potential of ehealth, pharmacy staff need to be more digitally literate to harness technologies in pharmacy practice effectively and efficiently.^{1–3}

The Scottish Government and NHS in Scotland have recognized that everyone within the pharmacy team needs to be 'supported to make the best use of new technology' if pharmacy is to fulfil its potential in meeting patient care and safety needs. This progressive aim has found support from professional bodies such as

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