RESEARCH PAPER

Assessing the digital literacy levels of the community pharmacy workforce using a survey tool

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Declaration of interest

The authors declare that there are no conflicts of interest.

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Data availability

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Abstract

Objectives. To investigate the digital literacy of staff in London, UK, community pharmacies and to explore their perceptions about the use of eHealth tools.

Methods. The study population was community pharmacy staff (N=21,346) in Greater London. A survey tool was divided into six sections: Use of the internet; Use of social media; Use of mobile health applications (MHAs); Perception of and practical use of digital health tools; Scenario-based questions; and demographics. Responses were analysed in SPSS. Following data collection, Health Education England's (HEE's) Digital Capabilities Framework (DCF) was published. The authors mapped the survey tool retrospectively to the framework.

Key findings. Almost all respondents (98.0%, n=551/562) used eHealth tools at work, mainly to access medicine information (89.8%, n=495/551). Almost one-third (31.7%, N=178/562) used social media regularly, while many (79.4%, N=446/562) were aware of MHAs. Self-perceived digital literacy indicated that 63.3% (n=356/562) deemed themselves to be above average. Under 35s rated their digital literacy more highly than over 35s ($p<0.001$). HEE's DCF indicated that actual digital literacy was lower than that self-perceived. Despite high use of eHealth tools, respondents were reluctant to recommend these to the public for health advice.

Conclusions. Community pharmacy staff self-report their digital literacy to be high yet do not use these skills for public health purposes. Furthermore, these self-reported skills appear to be over-estimated. Despite high levels of use of digital tools at work, staff do not use them for public health, therefore, further training to build confidence to better utilise them is recommended.

Key words. Community pharmacy; eHealth; digital literacy; social media; mobile health apps; digital capability.

Introduction

Globally, 2.5 billion people have a smartphone(1) and four billion use social media.(2) During the coronavirus (COVID-19) pandemic, many people were asked to use digital technology for a variety of reasons;(3) to track the spread of COVID-19, to record vaccination status, and to have video consultations with healthcare professionals (HCPs).(3)

Tele and digital technologies in healthcare have led to the coining of the term eHealth.(4,5) eHealth covers three domains [1] digital devices to monitor health, [2] digital devices to communicate with patients, and [3] digital devices to track public health data. A systematic review of randomised controlled trials (RCTs) highlighted the successful use of eHealth tools by community pharmacists to support patients with medication adherence and counselling,(6–12) to encourage vaccination uptake,(13,14) to offer smoking cessation support,(15) and to help patients manage hypertension.(5,16,17) Typically this was via telephone, with prompts to encourage the public to take an action, for example, to book a vaccination. Mobile health applications (MHAs) were only used in one study, as was the use of a photographic aging software, while social media was not used.(5) Given that social media and MHAs are widely used by the public irrespective of age, ethnicity, education, or socio-economic background, (18–22) this represents an opportunity for the community pharmacy profession to extend its reach.

The public regularly use eHealth tools themselves for health advice, sometimes above seeking advice from a community pharmacist.(18) Community pharmacists also reported that members of the public had used eHealth tools prior to their visit to the pharmacy.(19) Of concern, was that often eHealth information was neither evidence-based, nor accurate(18,19) and was instead from celebrity or brand accounts, posting content for commercial reasons, rather than to improve public health. The public have stated that they would access eHealth

information posted by community pharmacy staff, however, issues around public and pharmacy staff privacy and confidentiality would need to be addressed.(18,19)

As eHealth tools increase in popularity, it is likely that the public will turn to the most easily accessible HCPs, like community pharmacy staff, for advice on how to use them.(18,19) Consequently staff will need to be digitally 'literate'(23,24) or risk jeopardising the safety and care of their patients with inadequate advice.(25) Gilster(26) describes digital literacy as the ability of the user to, "… choose information pathways and explore them with ease," and that the public, "require basic skills and thinking competencies to thrive in the interactive environment" of the digital era. Age has been highlighted as a factor in digital literacy levels, with those under the age of 35 being described as "digital natives" and those over 35 as "digital immigrants".(27,28) The key difference is that digital natives have lived their whole lives with digital tools and have a familiarity with them, while digital immigrants have had to adapt as digital technology has changed the way the world works. (27,28)

To address workforce digital literacy, Health Education England (HEE) created the Digital Capabilities Framework (DCF).(29) DCF divides digital capability into six domains (**Table 1**). Each domain then details four levels of capability, from level 1 indicating basic capability to level 4, representing expert capability. **Table 2** provides examples of the skills that are demonstrated at each level. Generally, level 1 represents awareness of eHealth tools. Those at level 2 know how to use eHealth tools themselves, level 3 represents confidence and the ability to make recommendations, whilst those at level 4 can coach and support others to use eHealth tools.

The experience of the COVID-19 pandemic has highlighted that face-to-face access to healthcare services may be stopped at any point,(30), it is, thus, important to consider how community pharmacy can continue to have an impact on public health from afar.(30) If not

addressed, this represents a missed opportunity for community pharmacists to engage the public in their health.

Study aims

This study explored English community pharmacy staff perceptions about eHealth tools for public health. It also investigated the digital literacy levels of community pharmacy staff and determined how community pharmacists and trainee community pharmacists would respond to different scenarios that included an eHealth aspect. Finally, this study retrospectively compared staff perceptions of their digital literacy against the HEE DCF to determine if self-perception matched actual skill level.

Methods

This cross-sectional study was carried out October 2017-April 2019. Following a literature review covering previous surveys, a knowledge gap with respect to the digital literacy levels of pharmacy staff members (community pharmacist , trainee community pharmacists, accuracy checking technicians, pharmacy technicians, dispensers, and healthcare assistants) working in community pharmacies in England was identified.(18,19,23,31–34) To address this gap, the authors determined that a survey would be an appropriate research tool to elicit a high volume of data at low cost and in a timely fashion.(35)

The sample population was all pharmacy staff members (community pharmacists/trainee community pharmacists, plus non-pharmacist staff (accuracy checking technicians, pharmacy technicians, dispensers, and healthcare assistants)) in community pharmacies in Greater London. London was chosen due to the diverse nature of its population and its proximity to the university. HEE reported that the pharmacy workforce in London was

21,346 people(36). A minimum sample size of 378 was calculated using Raosoft® sample size calculator at a 95% confidence level and 5% margin of error. (37)

A survey tool was created consisting of 51 questions divided into six sections: Access and use of the internet; Use of social media; Use of mobile applications; Perception of and practical use of digital health tools; Scenario-based questions; and demographics. Question types included 5-point Likert scales (choices from strongly agree to strongly disagree; and expert level to basic level), multiple choice questions, and open and close-ended questions.

The delegated ethical approval team operating under the University Science, Engineering and Computing faculty ethics committee granted ethical approval for the survey on 12th January 2017 (1213/045).

A pilot was conducted on 40 participants (around 10% of the recommended minimum) to ascertain whether the survey was easy to understand, the duration it would take to complete and whether any questions need to be amended. Post-pilot, several questions were amended slightly. For example, in question 1 “digital literacy levels” was revised to “information technology skills”. The final version of the survey tool is included as supplementary material.

Data collection was carried out by authors N.C., A.K., S.R. and Z.M. Each was assigned eight boroughs of Greater London to survey; thus all 32 boroughs of Greater London were covered. A list of all the community pharmacies in assigned boroughs was created and numbered. A randomisation tool (38), then generated a list of pharmacies to visit. Participant information sheets (PIS) were posted to the selected pharmacies, one week in advance of the visit. If a pharmacy did not wish to take part, then the next pharmacy on the list would be approached. Surveys could be completed on paper, or via Survey Monkey. Stamped addressed envelopes were provided if a participant could not complete the survey immediately. Pharmacies were given a reminder phone call two weeks later.

Following data collection, HEE's DCF was published.(29) The authors reviewed the survey retrospectively to determine what could be mapped to the framework. **Table 3** provides examples of how certain questions were mapped to the "Communication, collaboration, and participation" domain of the DCF, with participant answers to these questions offering an indication of their digital skill levels. This allowed the authors to determine participants' actual digital literacy levels, which were then compared to their self-perceived levels.

N.C., A.K., S.R. and Z.M. entered data into SPSS for analysis. PC checked entered data to ensure no errors. Statistical tests were carried out using chi-square to compare differences in responses based on gender, ethnicity, age, and job role (community pharmacists/trainee pharmacists versus non-pharmacist staff). An A-priori value of less than 0.05 was taken as significant.

Results

Of the 760 people approached, 562 agreed to complete the study survey, giving a response rate of 73.9%. Lack of time was the most cited reason for non-participation. Participants were 59.1% female and 76.9% were from ethnic minorities (excluding white minorities) (**Table 4**), 47.2% were aged 25-34 years old and 47.0% were community pharmacists or trainee community pharmacists.

Access to technology at home and at work

Almost all (99.5%, N=559/562) had access to the internet at home, typically via laptop/personal computer (93.7%, N=524/559), or smartphone (91.9%, N=514/559). Other devices included smart TVs and gaming consoles. The main reasons for home use were: social media (76.2%, N=426/559), online shopping (49.0%, N=274/559), and entertainment (36.0%, N=201/559).

Internet access at work was also common with 98.0% (N=551/562) of respondents having access, largely via the in-store computer (96.2%, N=530/551), with 30.7% (N=169/551) using a smartphone and 7.8% (N=43/551) having access to an in-store tablet device. The main work reasons were to access medicine information and medical guidelines (89.8%, N=495/551), to facilitate the electronic transfer of prescriptions (49.7%, N=274/551), and to check and place stock orders (37.0%, N=204/551). Of note, nobody stated that they used technology to support public health.

Social media and MHA use

Use of social media was high. Most (82.6%, N=464/562) had an account on Facebook, followed by YouTube (69.0%, N=388/562), Instagram (57.5%, N=323/562), and Twitter (33.0%, N=185/562). Almost one-third (31.7%, N=178/562) described themselves as being regular users of social media. Most (94.1%, N=529/562) used social media for socialising, while only 6.8% (N=38/562) used social media for public health promotion purposes. Almost half (45.6%, N=256/562) would recommend a social media health page to the public. Of those who would not, the most cited reason stated was that social media health pages were not reliable sources of health information. There were no differences in willingness to recommend a social media health page between community pharmacists/trainee pharmacists (45.5% would) and non-pharmacist staff (46.6% would) (p=0.685), neither were there based on gender (p=0.484), nor ethnicity (p=0.397). There were, however, differences based on age with 48.9% (n=183/374) of under 35s compared to 39.0% (n=73/188) of over 35s being willing to do so (p=0.023).

Again, almost all (89.9%, N=505/562) used mobile applications. Many (79.4%, N=446/562) indicated that they were aware of MHAs and almost two-thirds (61.4%, N=274/446) of them used MHAs for their own health needs. Just over one-third (35.2%,

N=198/562) would recommend an MHA to the public, with those who would not indicating they felt MHAs could confuse the public and that they themselves were not aware of which MHAs were endorsed by the NHS. There were no differences in willingness to recommend an MHA to the public when comparing community pharmacists/trainee pharmacists and non-pharmacist staff (p=0.939), neither were there based on gender (p=0.108), age (p=0.139), nor ethnicity (p=0.610).

Community pharmacists and trainee community pharmacists (n=264) actions in scenario-based questions

Almost half (47.7%, N=126/264) of community pharmacists/trainee community pharmacists used some form of eHealth in their work, typically telephone NMS consultations or to text patients to re-order or collect their prescriptions.

When provided with scenarios and asked to state what actions they would take to support patient health, community pharmacists and trainee community pharmacists, took similar approaches. In the case of an asthma patient using a salbutamol inhaler for the first time, 95.5% (N=252/264) would carry out an in-person demonstration with the patient. Additionally, one-quarter (27.3%, N=72/264) would also suggest the patient view an online video explaining how step-by-step.

Furthermore, when counselling a patient who was worried about alcohol consumption, face-to-face consultations were again first choice for most respondents (94.3%, N=249/264), however, half (51.9%, N=137/264) would also signpost the patient to the alcohol advice section on NHS One You.(39)

Information Technology Skills

Participants' self-perceived IT skills indicated that 63.3% (N=356/562) deemed themselves to be above average or expert while 4.4% (N=25/562) stated that they had below average or basic skills. The majority (68.2%, N=255/374)) of those under the age of 35 (digital natives) felt that they had above average IT skills while just over half (53.7%, N=101/188) of the over 35s (digital immigrants) felt the same ($p<0.001$). Community pharmacists/trainee community pharmacists were more likely to deem themselves to have above average IT skills (74.6% N=197/264) than non-pharmacist staff (53.4% N=159/298; $p<0.001$). There were no differences in self-perceived IT skills based on ethnicity ($p=0.135$) nor gender ($p=0.276$). Looking specifically at community pharmacists and trainee community pharmacists' responses, their actual IT behaviours in practice were then mapped against HEE's DCF (**Table 5**). Most pharmacists and trainee pharmacists (78.4%, N=207/264) had an awareness of MHAs (Table 5, indicative of level 1 on the DCF). Almost all (97.0%, N=256/264) used social media, and 88.3% (N=233/264) used mobile applications (of any type) themselves (Table 5, indicative of level 2 on the DCF). Despite high levels of use, only 44.3% and 39.0% would recommend a health-related social media page or MHA to their customers respectively (Table 5, indicative of level 3 on the DCF). These figures then drop to only 3.4% who would help a patient to use a smart device to access an MHA or health-related social media page (Table 5, indicative of level 4 on the DCF).

Pharmacy staff perceptions about how digital media will impact their role

Some pharmacy staff (25.8%, N=145/562) felt that public use of eHealth tools for health information presented a threat to their job (**Table 6**). Of note, non-pharmacists (33.2%, N=99/298) feared for their jobs more so than pharmacists/trainee pharmacists (17.4%, N=46/264) ($p=0.001$). Additionally, three-quarters (75.7%, N=425/562) felt that harmful

misinformation could be accessed by the public using eHealth tools. Nearly two-thirds (64.2%, N=361/562) feared that misinformation would go unchallenged, hypothesising that digital media would reduce face-to-face contact between the public and HCPs, and opportunities would be missed to counteract online falsehoods.

Some positive impacts of eHealth tools on public health were highlighted (**Table 6**). Nearly two-thirds (60.1%, N=338/562) felt that eHealth tools, used correctly, could improve public health knowledge, and consultation times could be reduced as health literacy improved. Easier signposting to credible digital health resources was noted as a positive by 68.4% (N=384/562), particularly when responding to public queries about health topics on which they were unfamiliar. An additional benefit of signposting, agreed by most (62.5%, N=351/562), was that the public could be directed to further resources on digital media post-consultation so that they would not be overwhelmed with information during the consultation.

Discussion

This study identified that English community pharmacy staff members deem themselves to have high levels of digital literacy, in contrast to studies from other countries.(23,33,34) Under 35s were more likely to believe that they had above average IT skills, as were pharmacists and trainee pharmacists (compared to non-pharmacist staff). Actual behaviours in practice (mapped on HEE DCF) indicated that only 39% of pharmacists/trainee pharmacists would recommend an MHA to the public and 44.3% would recommend a social media-health page (indicating above average digital literacy skills (level 3)). Furthermore, only 3.4% would support the public in the use of smart devices to access MHAs and social media health pages, therefore, the proportion actually exhibiting what would be deemed to be expert level IT skills (level 4) is much lower than the self-perceived proportion.

This is the first study to investigate English community pharmacists and trainee community pharmacists' actions in real-life scenarios relating to their use of eHealth tools to support patients. This work covered London, England only; therefore, community pharmacy staff perceptions in other regions/countries may not be represented fully. The authors do believe, however, that the outcomes of results are meaningful, particularly given that the minimum recommended sample size was exceeded.

Use of social media by the pharmacy workforce was high, with Facebook being the most used platform. Most used social media to interact with family and friends, with only a very small proportion using it to share information about the health services their pharmacy offered and to improve public health. This is an interesting finding, yet not surprising, given that the community pharmacy workforce is often accused of not doing enough to raise awareness of its public health service offering.(40–42) The public are not aware of the services that pharmacies offer, however once they do become aware of these, they are likely to want to use them. There is, therefore, an opportunity for the profession to increase awareness of its services through social media. Echoing perceptions from a previous study,(19) many pharmacy staff were currently unwilling to promote social media health pages to the public given their lack of regulation and the potential for misinformation to be promoted by them. The creation of a social media health page maintained and monitored by community pharmacists may, therefore, alleviate some of these concerns.

Self-perceived IT skills were high amongst all pharmacy staff, however, under 35s rated their skills higher than those over 35, whilst pharmacists and trainee pharmacists rated their IT skills higher than other staff members. In comparison to other studies in community and hospital pharmacy,(33,34) those in this study appear to rate their digital literacy skills more highly. A theme consistent with the other studies, was a lack of confidence in using digital

technology to engage with patients, and the need for more support and training. Standard operating procedures for working with digital tools may overcome usability issues.(34)

Access to digital tools and the internet was high, at home and work, however, only a small proportion of staff had access to portable devices (smartphones and tablets) at work. As with other studies, this technology was typically used for dispensing processes, rather than public health promotion.(23,33,34)

Perceptions of how technology could impact community pharmacy were mixed. Non-pharmacist staff, in particular, felt that eHealth tools could reduce the need for their role and result in job losses. This is not entirely surprising given the evolution of dispensing robots, and the proliferation of online pharmacies, however, Law et al.(43) has highlighted that most patient interactions cannot and should not be automated. It is, therefore, important that when encouraging staff to use eHealth tools that they are reassured that these are intended to be complimentary to their role and will not replace them. Others felt that these tools could offer another method to engage customers and patients. Easier signposting and the potential to have shorter face-to-face consultations were noted as positives of the technology. In line with other research, appropriate training is required to increase utilisation of this technology.(23,25,33,34)

The inclusion of eHealth tools in the work of the community pharmacy team has become more prominent, particularly because of their increased uptake during the COVID-19 lockdowns.(3,44) eHealth tools offer staff alternative ways to interact with their customers and patients, enabling them to improve health away from the physical building of the community pharmacy.(20) The public already use these tools to locate health information, therefore, it is essential that the pharmacy workforce has the necessary skills to ensure that accurate, evidence-based information is being accessed.(18,19) This study can be used by those who support the pharmacy workforce to improve the sector's confidence in using digital technology for patient care.

Conclusions

This study has identified that staff working in community pharmacies in London, England self-report their IT skills to be high yet do not use these skills for public health purposes. Furthermore, these self-reported skills appear to be over-estimated when compared to a health industry digital literacy framework. Despite high levels of use of digital tools at home, staff are reluctant to use them in their work, therefore, further training to build confidence and support to better utilise them is recommended. Support tools, such as standard operating procedures or guidance from professional bodies may improve the situation. These recommendations should be taken into consideration by the pharmacy regulatory and pharmacy professional bodies.

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Table 1: Digital literacy domains from Health Education England's (HEE's) Digital Capability Framework (DCF)

Domains
1. Communication, collaboration and participation 2. Teaching, learning and self-development 3. Information, data and content literacies 4. Creation, innovation and research 5. Technical proficiency

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Table 2: The types of skills demonstrated at each level within a domain of Health Education England's (HEE's) Digital Capability Framework (DCF)

		What does this skill level mean?
Level 1	**Basic skills**	User demonstrates an awareness that digital tools are available to support a work task. For domain 1, for example, "I know that there are different methods of digital communication and that they can be used for different purposes and different audiences."
Level 2		User demonstrates an ability to use digital tools to carry out a task For domain 1, for example, "I can communicate using a range of digital tools in ways that respect differing needs, expectations, cultures and experience."
Level 3		User demonstrates that they are confident to, and capable of, using the digital tools available to carry out a task and can recommend these to others For domain 1, for example, "I communicate confidently and capably using a wide range of digital tools in ways that respect differing needs, expectations, cultures and experiences."
Level 4	**Expert skills**	User goes above just being confident to use a digital tool. User finds solutions to complex problems and leads and supports others in the use of these tools. For domain 1, for example, "I support others and can take a lead on the building, development, maintenance and management of digital networks and forums for communication and collaboration." And "I can create solutions to solve complex problems that are related to sharing and communicating through digital technologies."

Table 3: Comparison of the study survey tool against Health Education England's (HEE's) Digital Capability Framework (DCF) - Domain 1

Domain 1	Level	Relevant survey questions
Communication, collaboration, and participation	**Level 1 Basic**	If participant answers 'Yes' to: Are you aware of any health-related applications available on mobile phones?
	Level 2	If participant answers 'Yes' to: Do you use applications on your mobile phone?
	Level 3	If participant answers 'Yes' to: Have you ever recommended a health-related application to the public?
	Level 4 Expert	If participant answers 'Yes' to: Have you helped a patient in the use of a smart device?

Table 4: Demographics of participants (N=562) who completed study survey

	N=	Percentage (%)
Gender		
Male	214	38.1
Female	332	59.1
Prefer not to disclose	16	2.8
Age (years)		
18-24	109	19.4
25-34	265	47.2
35-44	121	21.5
45-54	49	8.7
55+	18	3.2
Ethnicity		
White British and white minorities	130	23.1
Minority ethnicity (excluding white minorities)	432	76.9
Job role		
Pharmacist	218	38.8
Trainee Pharmacist	46	8.2
Non-pharmacist staff member	298	53.0

Table 5: Community pharmacist and trainee community pharmacist responses (N=264) to Health Education England's (HEE's) Digital Capability Framework (DCF) related questions

Domain 1	Level	Relevant survey questions	Responses
Communication, collaboration, and participation	**Level 1**	Are you aware of any health-related applications available on mobile phones?	207/264 (78.4%) community pharmacists/trainee community pharmacists were aware
	Level 2	What social media platform do you use? AND How often do you use social media? Do you use applications on your mobile phone?	Facebook was the most used platform (79.2%, N=209/264), followed by YouTube (63.6%, N=168/264) and Instagram (53.8%, N=142/264) Only 3.0% (N=8/264) never used social media 233/264 (88.3%) community pharmacists/trainee community pharmacists had used mobile applications themselves
	Level 3	Would you recommend a health-related social media page to the public? Have you ever recommended a health-related application to the public?	117/264 (44.3%) community pharmacists/trainee community pharmacists would recommend a health social media page 103/264 (39.0%) community pharmacists/trainee community pharmacists had recommended a health-related application
	Level 4	Have you helped a patient in the use of a smart device?	9/264 (3.4%) community pharmacists/trainee community pharmacists had helped patients to use smart devices

Table 6: Pharmacy staff (all job roles) (N=562) perceptions about the impact of digital media on their role, in general and in public health

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Public use of digital media is a threat to my job	54 (9.6%)	226 (40.2%)	137 (24.4%)	113 (20.1%)	32 (5.7%)
Public use of digital media has the potential to reduce face-to-face time contact with a healthcare professional	10 (1.8%)	98 (17.4%)	93 (16.5%)	312 (55.5%)	49 (8.7%)
Public use of digital media is harmful as they could find incorrect information	13 (2.3%)	34 (6%)	90 (16%)	296 (52.7%)	129 (23%)
Public use of digital media could harm the reputation of the pharmacy profession	25 (4.4%)	103 (18.3%)	175 (31.1%)	211 (37.5%)	48 (8.5%)
Public use of digital media will enhance their health knowledge, therefore, reducing consultation times	4 (0.7%)	63 (11.2%)	157 (27.9%)	289 (51.4%)	49 (8.7%)
Public use of digital media allows me to signpost patients to reliable health sources if I do not have sufficient knowledge regarding a matter	8 (1.4%)	37 (6.6%)	133 (23.7%)	301 (53.6%)	83 (14.8%)
Public use of digital media allows me to not overwhelm patients with information during a consultation	11 (2%)	34 (6%)	166 (29.5%)	291 (51.8%)	60 (10.7%)