The role of non-technical skills in community pharmacy practice: an exploratory review of the literature

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Abstract

Background Non-technical skills (NTS) are the cognitive and social skills that complement technical skills in safe and efficient practice, and include leadership, teamwork, task management, decision-making and situation awareness. Other areas within healthcare have heavily invested in producing taxonomies to aid training and assessment of NTS within their disciplines, and have found them to be essential for improving patient safety. In pharmacy, no validated taxonomy has been produced, nor has the existing literature been appraised to aid the future development of a validated taxonomy.

Objective(s) To examine the literature on NTS within a community pharmacy setting and establish the research conducted thus far on each NTS and how they are applied by community pharmacists.

Methods A literature search of six electronic databases (EMBASE, PsychINFO, Medline, SCOPUS, CINAHL Plus and HMIC) using the generic list of NTS identified in previous studies. Only empirical studies were included. Examples of behaviours or skills were extracted and categorised within each NTS.

Key findings Seventeen studies were identified that contained one or more examples of NTS specific to community pharmacy practice. Altogether, 16 elements were extracted. Four elements were identified within leadership and task management. A further three were identified within situation awareness and decision-making, and a final two within teamwork and communication.

Conclusion A framework consisting of the skills and how they’re applied has been presented which describe the NTS required by community pharmacists from the published literature. This framework can provide a foundation for further investigation into NTS use within pharmacy practice.

Keywords: Non-technical skills; community pharmacy; leadership; human factors; pharmacy practice
Introduction

Internationally, community pharmacists are seen as accessible healthcare professionals that operate out of for-profit community pharmacy businesses, delivering both clinical and non-clinical services to customers and patients.[4] Currently, pharmacists are required to complete a University degree, and obtain licensing with a local regulatory body in order to practice within a community pharmacy. Some countries, such as the United Kingdom, require pharmacists to conduct a period of practical experience (pre-registration placement) before they are eligible to practice as a pharmacist. Community pharmacists are expected to dispense regular and acute medicines, as well as deal with over-the-counter concerns and provide treatments. In recent years, the team within the pharmacy has developed to include other individuals who are legally permitted, as well as technically capable, of aiding the pharmacist in the completing of some of these clinical responsibilities.[2]

In order to manage the various demands and resources in their work, pharmacists must use a range of so-called ‘non-technical skills’ (NTS) to maintain efficiency and safety. The most widely accepted definition of NTS, which was introduced by Flin et al.,[3] is ‘the cognitive, social and personal resource skills that complement technical skills, and contribute to safe and efficient task performance’. A generic list of NTS, developed by the same authors, included situation awareness; decision-making; leadership; teamwork and communication; managing stress; and coping with fatigue.[3, 4] Studies within healthcare have reported that failures of a healthcare professional’s NTS can lead to patient death, with one study reporting 46.6% of retrospectively analysed causes of death to be attributable to NTS failure.[2] No study was found that reported a potential link between NTS failures and medication safety incidents within a pharmacy, however factors related to NTS have been reported to potentially have an impact on patient safety within a community pharmacy.[6]

The concept of NTS originates from the aviation industry, some 40 years ago, when it was first referred to as ‘crew resource management’. Since then, it has been applied in a number of healthcare and non-healthcare domains. In healthcare, research relating to NTS has largely focused on secondary care roles, with NTS frameworks developed for anaesthesia,[13] surgery[14] and scrub nursing.[15] Initial work has also been conducted showcasing the importance of NTS for paramedics,[10] medical students,[11] as well as for emergency helicopter personnel.[12] A key difference between the generic list of NTS, mentioned above, and those identified in healthcare has been the identification of ‘task management’ as a critical NTS, both in anaesthesia and in scrub nursing. Additionally, other domains have combined communication and teamwork, considering them as one NTS. This is because communication and teamwork were seen as inherent to one another and could not be separated when focusing on the NTS elements within other domains.[3] While the NTS identified in these domains are similar, considerable differences are observed in how these skills are applied depending on the context and the role being investigated. This is important as it means work conducted on NTS in other sectors cannot be directly utilised in different sectors or even for different roles. Instead, data must be extracted through reviews of the literature and empirical research to identify which NTS are important in a role, as well as the specific expression of that skill, unique to the field.

Within healthcare, NTS failures have been shown to be a contributory factor in patient safety incidents.[11] However, within pharmacy the importance of NTS as a body of skills is not yet determined. This review is the first step in collating all published information on this topic, to set a foundation for future exploration in this area. The aim of this review is to examine the existing literature on NTS within a community pharmacy setting and establish the research conducted thus far on each individual NTS and their use by community pharmacists. By doing this it will become apparent which NTS have been recognised as important to the role of the pharmacist, and how these important skills apply within a community pharmacy setting.

Methods

The method used in this paper draws on previous reviews of NTS in other domains, notably those conducted within scrub nursing,[15] medicine[14] and for paramedics.[10] A systematic search of the literature was conducted using the NTS identified in other areas of healthcare and was informed by the guidelines for systematic reviews.[19]

The NTS searched consisted of situation awareness, decision-making, leadership, teamwork and communication, as well as task management. These were based on previously identified skills within healthcare, which included those previously proposed by Flin et al.,[3] with the addition of task management. As witnessed in other domains, the ‘teamwork’ skill and ‘communication’ skill were combined and considered as a single skill, in this review. As the review aimed to extract the important NTS and elements reported from contemporary academic literature, the literature search covered the last 15 years, from January 2005 until January 2020.

Databases and keywords searched

Six electronic databases were searched, namely: EMBASE; PsychINFO; Medline; SCOPUS; CINAHL Plus; and Health Management Information Consortium (HMIC). The search terms combined the previously mentioned NTS, as well as community pharmacy and related search terms. Only empirical studies that investigated the use of an NTS within a community pharmacy setting by the pharmacist were included. Review and opinion papers were excluded, in addition to any studies that focused exclusively on technical knowledge or skills.

Data screening

The titles and abstracts of the studies identified were screened against the inclusion and exclusion criteria by the first reviewer. For any studies where it was not clear if the study had met the inclusion and exclusion criteria by the first reviewer, then this was reviewed independently by a second reviewer (DLP). The search strategy, in full, can be found in Supplementary Material. Only peer-reviewed journal articles, written in English, reporting on empirical quantitative or qualitative data of observable skills or behaviours of community pharmacists were included. Any opinion pieces or review articles were excluded, in addition to any articles exploring the technical skills of community pharmacists or focusing on pharmacists working outside the scope of community pharmacy.

Data extraction and analysis

Data were extracted by the first reviewer and all included studies were checked by the second reviewer (DP) to ensure suitability. The data for each study included author(s); study title; year of publication; study methods used; participants (number and role); study aim; the NTS elements reported; and the country where the study took place. Version 12 of the NVivo computer program was used to aid with organising the data from the included studies. The tabulated
Results
Included studies and characteristics
In total, 17 studies, meeting the inclusion criteria, were identified. The majority (n = 13, 76%) were conducted in the United Kingdom, with two undertaken in Canada (12%) and a single study conducted in each of Australia (6%) and Italy (6%). Fourteen studies utilised a single method, namely interviews (n = 9, 53%), questionnaires (n = 1), the think-aloud method (n = 2, 12%), focus groups (n = 1) or observations (n = 1). The three further studies combined interviews with either focus group discussions, a survey or non-participant observations.

Only one paper had the explicit aim of identifying the use of NTS by community pharmacists, with the remaining papers describing behaviours that align with one or more NTS by the community pharmacist. Some studies reported on more than one NTS. Twelve papers reported on the decision making of community pharmacists (76%), with a further eight discussing the leadership skills of the pharmacist (41%). Task management was described in five studies (24%), situation awareness in four (24%), and communication and teamwork in three studies (18%). The studies and the corresponding NTS reported are outlined in Table 1, and the elements extracted from these papers and the corresponding NTS are shown in Table 2.

Situation awareness
A commonly referenced definition of situation awareness describes it as ‘the perception of the elements in the environment within a volume of time and space, the comprehension of their meaning and the projection of their status in the near future’. These three levels correspond with the elements identified in the studies describing the situation awareness skill in community pharmacists. Altogether, four studies identified situation awareness as an NTS used by community pharmacists, from which the three elements extracted were: being aware; recognising; and anticipating. In their interview study, Irwin and Weidmann described situation awareness in pharmacy practice as consisting of the perception of the surroundings, awareness and monitoring of staff actions and patient behaviour, and anticipating events in the pharmacy. They highlighted examples of each; for example, observing activity at the counter, or listening in to conversations around the dispensary, were categorised as perceiving the surroundings. Meanwhile, recognising potential problems, based on previous experience with a specific patient or certain cues, were categorised as recognition. Finally, pharmacists disclosed that they would anticipate certain situations escalating based on varying factors such as patient behaviours, or potential dispensing problems, and these were labelled under anticipation. Situation awareness was also highlighted as a skill that was used by pharmacists when dealing with aggressive patients in the pharmacy. Pharmacists stated that they could anticipate certain situations escalating, based on a patient’s behaviour towards staff members.

Lea et al. observed pharmacists utilising their situation awareness, described by the authors as an element of multi-tasking, to supervise conversations occurring within the pharmacy team, in addition to consultations with patients. Additionally, Lea et al. witnessed pharmacists identifying potential safety issues and remedying them before any consequences occurred (e.g. fridge medicines left on dispensing bench), highlighting the importance of recognising potentially hazardous situations.

Decision making
Twelve studies explored community pharmacists’ decision making skills, with three elements extracted to describe decision making for community pharmacists. These skills included having a questioning/information-gathering strategy, making well-informed decisions and implementing decisions with confidence.

Firstly, four studies highlighted the importance of community pharmacists utilising questioning or information gathering
## Table 2 NTS, elements identified and corresponding studies

| NTS                        | Elements                          | Studies                                                                 |
|---------------------------|-----------------------------------|-------------------------------------------------------------------------|
| Situation awareness       | Being aware                        | Irwin, Laing and Mearns\[29\]                                         |
|                           |                                   | Irwin and Weidmann\[20\]                                              |
|                           |                                   | Lea, Corlett and Rodgers\[34\]                                       |
|                           | Recognising                       | Irwin and Weidmann\[20\]                                              |
|                           | Anticipating                      | Lea, Corlett and Rodgers\[34\]                                       |
|                           | Decision making                   | Irwin and Weidmann\[20\]                                              |
|                           | Making well informed decisions    | Cooper, Bissell and Wingfield\[23\]                                   |
|                           |                                   | Croft, Gilligan, Rasiah, Levett-Jones and Schneider\[24\]             |
|                           |                                   | Gregory, Whyte and Austin\[26\]                                       |
|                           |                                   | Hanna and Hughes\[27\]                                                |
|                           |                                   | Hanna and Hughes\[28\]                                                |
|                           |                                   | Irwin, Laing and Mearns\[29\]                                         |
|                           |                                   | Irwin and Weidmann\[20\]                                              |
|                           | Information gathering/questioning | Akhtar and Rutter\[21\]                                              |
|                           | strategies                        | Cassie, Duncan, Gibb, Power, Young, Newlands and Watson\[22\]        |
|                           | Implementing decisions with       | Croft, Gilligan, Rasiah, Levett-Jones and Schneider\[24\]             |
|                           | confidence                        | Sinopoulou, Summerfield and Rutter\[32\]                             |
| Leadership                | Managing conflicts and difficult   | Gregory, Whyte and Austin\[26\]                                       |
|                           | situations                        | Gregory and Austin\[27\]                                              |
|                           | Authority                         | Moja, Minghetti, Vercellesi, Iapichino, Anania, Laccisaglia and Bruno\[35\] |
|                           |                                   | Irwin, Laing and Mearns\[33\]                                         |
|                           |                                   | Irwin and Weidmann\[20\]                                              |
|                           | Accountability                    | Magola, Willis and Schaefheute\[30\]                                 |
|                           | Supporting                        | Lea, Corlett and Rodgers\[34\]                                       |
| Teamwork and              | Coordination                      | Irwin, Laing and Mearns\[33\]                                         |
| communication             |                                   | Irwin and Weidmann\[20\]                                              |
|                           | Information Sharing               | Barnes, Bullock, Allan and Hodson\[11\]                              |
| Task management           | Delegating                        | Lea, Corlett and Rodgers\[34\]                                       |
|                           |                                   | Lea, Corlett and Rodgers\[34\]                                       |
|                           | Dealing with interruptions        | Irwin, Laing and Mearns\[33\]                                         |
|                           | Time management                   | Irwin and Weidmann\[20\]                                              |
|                           | Resource management               | Irwin and Weidmann\[20\]                                              |

These studies all investigated the process by which community pharmacists obtained the information required to make a decision. Three of these studies\[16, 17, 26\] reported an over-reliance of pharmacists on the use of mnemonics (e.g. WWHAM – Who is the patient, What are the symptoms, How long have the symptoms been present, Action taken, Medication being taken). The fourth\[19\] listed a number of sources that pharmacists could gather information from (e.g. patient medication records, medicine information leaflets), that could aid them with making decisions.

A further eight studies\[6, 18, 20–25\] in addition to two previously mentioned studies\[19, 24\] emphasised potentially important considerations that the pharmacist should take into account when making a decision, to ensure the decision that is made is well informed. The issues that could have an influence on community pharmacists included ethical concerns\[19\] legal matters\[20, 21\] evidence-based practice\[22, 26\] patient aggression\[20, 23\] patient preference\[24\] and clinical issues\[6, 24\]. These studies highlighted negative, or missing elements of a community pharmacist’s decision-making, and suggested that, in order for a pharmacist to make an informed decision, they must consider all these aspects.

Lastly, Magola et al.\[24\] reported that community pharmacists, specifically newly qualified pharmacists, found difficulty with finding confidence when implementing a decision. This could also be considered an important element of decision making for community pharmacists.

### Leadership

Eight studies examined aspects of a community pharmacist’s leadership skills. Altogether, four elements were extracted from these studies, namely managing conflicts and difficult situations, having authority in the pharmacy, taking accountability for actions and providing support to others.

Three papers highlighted a community pharmacist’s role in dealing with conflicts and difficult situations\[20, 21, 28\]. These could be conflicts between the pharmacist and patients\[23\] or conflicts within the pharmacy team\[6, 22\]. Additionally, part of the leadership skill of a community
pharmacist is to not only attain authority within the team,[6] but also with patients, especially those who exhibit aggressive behaviour.[29] Behavioural methods were highlighted as one way of asserting authority by Irwin et al.,[29] and examples of which could be the posture taken by the pharmacist or the tone and volume of their voice. Furthermore, Magola et al.[28] identified that an element of leadership that newly qualified pharmacists sometimes struggle with, is taking charge and accountability, and that these pharmacists lacked training prior to registration in this area. Leadership was also a skill identified by community pharmacists for further training and development.[26] The final element of leadership extracted, as Lea et al.[26] identified, was being a support to others. This was discovered by the regular interruptions they faced by other staff members to aid with clinical and non-clinical questions and issues, with other staff relying on them for support.

**Task management**

Four elements were identified as part of task management, including delegating, dealing with interruptions, management of time and resources management. Three papers discussed delegation.[2, 24, 27] While Barnes et al.[2] found that 92% of pharmacists reported confidence in delegation, Lea et al.[27] found that some pharmacists held negative views on delegation, and pharmacists highlighted that delegation was not a skill that for which they had received sufficient training. This finding was also shared by Magola et al.[24] who found that newly qualified pharmacists delegated less frequently as they feared it could make them appear incompetent.

Both Irwin et al.[29] and Lea et al.[27] found that part of the community pharmacists’ task management involved dealing with interruptions, which could be from the patient or from other staff members. However, both could potentially affect safety, and the pharmacist should have a way to deal with them.

Finally, Irwin and Weidmann[6] identified resource and time management as essential elements of task management. The pharmacists interviewed in this study highlighted the importance of completing the work that was required, and this needed both time management, and an organisation of resources (e.g. medicine stocks, staff rota).

**Teamwork and communication**

Community pharmacists are both members of the pharmacy team, as well as members of the wider primary care team, which also includes general practitioners (GPs) amongst other community-based health care professionals. This review reports on papers discussing pharmacists’ teamwork and communication with regards to the former team, as they are primarily who a pharmacist will interact with daily, and work within the same physical vicinity. Irwin and Weidmann[6] identified two elements concerning teamwork when identifying the NTS of community pharmacists, namely: co-ordination; and information sharing (communication). Teamwork was highlighted as a crucial aspect of running a pharmacy efficiently. Irwin and Weidmann[6] highlighted the difficulty of identifying how pharmacists understand teamwork within a community pharmacy, due to their perception of the leadership role they play within the team. They also highlighted that all members of a pharmacy believed in information sharing to be important as this ensured all staff were aware of what was happening within the pharmacy. Magola et al.[24] identified that teamwork, and specifically coordination between team members, was sometimes poor for newly qualified pharmacists due to difficulties in managing the relationships of other staff members around them. They highlighted that this was at times due to lack of clear roles and responsibilities of staff members, but additionally the changing role of the newly qualified pharmacists, who must assume a different role within a team after becoming a pharmacist.

**Discussion**

The NTS of community pharmacist is an area of work where individual skills have seen considerable focus, and in this review, we identified 16 elements, within five NTS to describe the use of NTS by community pharmacists in practice. This review presents the elements and skills identified in a hierarchical framework, with three elements within situation awareness and decision-making, a further four elements within leadership and task management and finally two elements within teamwork and communication. While altogether seventeen studies were included in this review, only three of the studies refer to NTS directly and only one explicitly aimed to identify the NTS of community pharmacists. The remaining 14 studies only referred to one or more individual NTS as part of their findings.

A potential limitation of this review is the reliance on the NTS identified in other domains as the underlying framework for the search strategy. As a result, some NTS exclusive to community pharmacy may have been inadvertently excluded. This review has identified that some individual NTS have received greater attention than other NTS within the published literature. However, this does not necessarily mean that these NTS are more important to community pharmacists, and future work should aim to ascertain whether there are further NTS important to community pharmacy that are yet to be reported, and to gain validity by engaging with subject matter experts in the field. A further potential limitation is the use of one co-author to screen the titles returned from the searches conducted, with a second co-author only involved in determining whether to include studies in instances of doubt. This also applies with the data extraction, where a second co-author verified the data extracted from the included studies.

Importantly, it can be seen that there is an overlap between the NTS used in community pharmacy and the NTS used in other domains within healthcare (e.g. anaesthesia[32] and scrub nursing[33]), and in wider high-risk environments (e.g. aviation[34]). However, as identified in the introduction, differences become evident at the level of how these skills are applied in practice, where due to the unique context of community pharmacy, each of the skills is applied differently. For example, dealing with interruptions does not feature in NOTSS, a framework for surgeons’ NTS, however it was included from the studies analysed in this review. This does not mean that these elements do not apply in different settings, but each domain must identify and prioritise how each of the skills is applied in unique to their practice.

The methods used in the studies included in this review point towards the exploratory nature of this area of research thus far. However, potential issues should be highlighted. Only one study had the explicit aim to identify the NTS of community pharmacists[6] using both scripted questions and the Critical Incident Technique (CIT). CIT requires an individual to recall a challenging incident with the interviewer asking probing questions to elicit more information on how the participant acted.[35] Further work should be conducted using multiple methods explicitly aiming to identify whether further NTS are important within a community pharmacy context. For example, non-participant observations could be acutely suitable to complement the mainly interview-based studies conducted so far in this area, to avoid any potential self-reporting bias related to interviews.[34] This is particularly important when investigating NTS, as
it has been reported that at times experts may perform certain tasks ‘automatically’, and so they may find difficulty in communicating these skills.\cite{6,7}

It is important to note the difficulty with categorising elements within separate NTS categories, due to the interdependence of some of these elements and skills. This issue has been highlighted in other sectors too, where it has been acknowledged that a balance must be struck between achieving maximum mutual exclusivity between the different skill categories and elements, and at times, recognising the interconnectedness of some of the skills and elements.\cite{8} For example, within the framework developed for surgeons (i.e. NOTSS) coping with pressure is categorised as an element of the leadership skill, whereas in the scrub nursing version (i.e. SPLINTS) this element is included as part of task management. This was also observed in this review, where there were several instances when elements could be placed under different NTS categories. One example of this is delegation, which was placed under the task management, however it could have also been categorised within the leadership skill category. In this review, it was decided that the elements would be best placed based on the context of the study from which they were included. Additionally, while in this review communication and teamwork were grouped together, some studies have removed communication as a skill in their research into NTS within their domains, citing that they believed communication is inherent to all other NTS, and could not be examined or investigated on its own.\cite{8}

This is important to consider in future research of NTS within the community pharmacy domain.

Based on the results of this review, it is apparent that there is merit in pursuing further work directly investigating the topic of NTS within community pharmacy. Other domains within healthcare have produced behavioural marker systems to assess the NTS of their professionals, such as anaesthetists,\cite{9} scrub nurses\cite{9} and surgeons.\cite{8}

A behavioural marker system is a structured method of observing and evaluating NTS. A behavioural marker system combines the skills and elements required in a specific role, with a rating scale to allow for assessment when observing individuals.\cite{8} Additionally, examples of good and poor behaviours for each element are included to assist the observer when rating.\cite{8} In order to begin developing the NTS of community pharmacists, a behavioural marker system should be developed specific to this context.

The 16 elements identified thus far, as part of five NTS, require further validation before becoming part of any behavioural marker system. To the authors’ knowledge, this is the first review focusing on the use of NTS by community pharmacists. NTS have been shown to be fundamental in other domains within healthcare, and this review supports the notion that they are important in a community pharmacy context as well. Other domains have recognised that NTS failures have contributed to the occurrence of patient safety incidents. This review is an important first step to recognising the work conducted so far on this important topic within a pharmacy context and setting a foundation for future exploration of this topic in pharmacy.

Further research should be conducted aimed at identifying NTS used in routine work, to complement existing studies identifying NTS use when dealing with critical incidents.\cite{6,21,22} In order to develop the NTS of community pharmacists, a validated framework should be produced that contains the NTS used by pharmacists, in addition to the elements and examples of good and bad behaviours that are specific to community pharmacy. This framework could aid discussions around NTS within community pharmacy by presenting common terminology and providing a valid assessment tool for aiding the assessment of NTS of a community pharmacist.

**Conclusion**

This review has identified five NTS and 16 elements from 17 studies, that are important for a community pharmacist to possess. The NTS identified in other areas of healthcare have also been shown to be important within community pharmacy practice, however how the skills are applied differs in their unique expression in this context. Community pharmacists and researchers alike can use this framework as a foundation for investigating and targeting interventions relating to the use of NTS within pharmacy to improve patient safety.

**Supplementary Material**

Supplementary data are available at International journal of Pharmacy Practice online.

**Author Contributions**

A.A., D.L.P. and D.M.A. conceptualized the review, and agreed upon the search terms. A.A. conducted the searches and extracted studies to be included in the review, which were confirmed by D.L.P. A.A. drafted the manuscript with contribution from D.L.P. and D.M.A. All authors have read and approved the manuscript.

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**Conflict of Interest**

None declared.

**Data Availability Statement**

The data underlying this article are available in the article and in its online supplementary material.

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International Journal of Pharmacy Practice, 2021, Vol. XX, No. XX

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