

REVIEWS

Is Pharmacy a Knowledge-Based Profession?

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An increasingly important question for the pharmacy educator is the relationship between pharmacy knowledge and professionalism. There is a substantial body of literature on the theory of knowledge and it is useful to apply this to the profession of pharmacy. This review examines the types of knowledge and skill used by the pharmacist, with particular reference to tacit knowledge which cannot be codified. This leads into a discussion of practice-based pharmacy knowledge and the link between pharmaceutical science and practice. The final section of the paper considers the challenge of making knowledge work in practice. This includes a discussion of the production of knowledge within the context of application. The theoretical question posed by this review, "Is pharmacy a knowledge-based profession?" highlights challenging areas of debate for the pharmacy educator.

Keywords: pharmacy profession, practice, knowledge

INTRODUCTION

Pharmacists have a unique knowledge base and the following statement provides some insight into the breadth and depth of that knowledge:

Pharmacists through their education and training can consider (and conceptualise) a drug molecule, together with its formulation and delivery as a medicine. They have an in-depth knowledge of pharmacology and therapeutics, physicochemical properties of drugs and excipients, biopharmacy and pharmacokinetics, adverse drug reactions and drug interactions. It is this complex, varied and integrated expert knowledge that qualifies them, and them alone, to make professional judgements relating to medicines.¹

While most pharmacists would agree with the preceding statement, pharmacy clearly is not always a well-understood profession. A study that examined attitudes of the general public to the expanding role of the community pharmacist revealed a range of consumer attitudes.² For example there was support for community pharmacist involvement in non-dispensing-related roles such as public health, but less support for services that would require access to selected information from medical records. Another study on consumers' perceptions of community pharmacy in Portugal found that participants displayed superficial and contradictory ideas about the actual functions of a pharmacist.³ One of the key challenges for the pharmacy profession is how to demonstrate

the potential benefit of having pharmacists' input their knowledge into patient care.

This lack of understanding about the role of the pharmacist raises a potentially fruitful question: "Is pharmacy a knowledge-based profession?" Alternatively, the question could be stated: "Is the unique contribution of the pharmacist based on what they know rather than on what they do?" This area of inquiry is particularly relevant for the pharmacy educator for a number of important reasons.

The pharmacy curriculum is a full and comprehensive menu of subjects that span both the traditional pharmaceutical sciences and practice-related studies. The pragmatic question for the pharmacy educator centers on how this breadth and depth of knowledge can be applied in a meaningful way in the practice setting. The contribution of the pharmacist to patient care is beyond the mechanical and technical supply function associated with dispensing, but this strengthening view from within the profession challenges the educator to design and deliver a curriculum that is relevant to this aspiration. To argue that pharmacy is a knowledge-based profession implies that this knowledge somehow has to be mobilized and applied. Again, this has significant implications for the educator to ensure that the future practitioner can communicate effectively and assert their unique position within a clinical setting.

The knowledge-based nature of the pharmacy profession also presents a challenge for the educator as to the importance of research activity and the discovery of new knowledge. This has implications in the preparation of future pharmacists with the skills and confidence necessary to undertake research as part of their practice. As the profession increasingly recognizes the place of continuing

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professional development (CPD), the importance of ongoing knowledge acquisition and knowledge application in practice is an integral part of any CPD program. As the pharmacy educator is involved in developing future practitioners who can work within an ethos of professionalism and CPD, the status of pharmacy as a knowledge-based profession becomes increasingly significant.

The aim of this review is to highlight the way in which knowledge and professionalism are intertwined. Having stated some of the possible reasons why this area is important for the pharmacy educator, the main focus of this review is a closer examination of the types of knowledge used by the pharmacist. A useful starting point is to look briefly at some of the key areas associated with knowledge and professionalism.

KNOWLEDGE AND PROFESSIONALISM

To ask the broad question: “Is pharmacy a profession?” is fraught with many difficulties and opens complex arguments that surround the sociological theories of the role of professions in society. A simplistic trait analysis can be applied to the pharmacy profession, but according to Dingwall and Wilson,⁴ there is no consensus on what the basic traits of a profession are. Some of the professional traits outlined by Traulsen and Bissell⁵ in their review of theories of professions and the pharmacist include:

- Professional authority over the lay person
- Sanction by the community of the power and privilege of professionals
- Confidential nature of the professional-client relationship
- Shared ethical values regulating the profession
- Theoretical knowledge underlying the practice of the professional
- The existence of a professional culture that is passed on to new entrants to the profession

By definition, all professions are knowledge based as this is one of the distinguishing features of a professional group. For example, the teacher of chemistry has subject-specific knowledge, pedagogical knowledge on how to teach the subject effectively, and a vast array of general practical knowledge in order to fulfil their role as a teacher. It is apparent when teachers are using their knowledge as this can be observed and measured in the classroom. In contrast, what a pharmacist does in everyday practice can not be analyzed in such a way as to determine whether pharmacy is a knowledge-based profession. A superficial analysis of what a pharmacist does in everyday practice can offer many counter arguments to their claim to professional status. For example, some pharmacists arguably operate at a technician level and do not

achieve the autonomy commensurate with their level of knowledge and training.

There are 2 key ideas associated with knowledge and professionalism. The first idea is the inaccessible nature of professional work without the appropriate training and experience. The second idea is that the knowledge associated with a profession cannot be standardized and rationalized, or as Abbot described, “commodified.”⁶

One of the problems associated with the analysis of the pharmacy profession in relation to knowledge is that practicing pharmacists’ primary responsibilities are still the supply and dispensing of medication. With the exception of the clinical check of the prescription for accuracy and appropriateness, these tasks can be completed by a technician. This reality contradicts the idea that the knowledge required for the work of a dispensing pharmacist is inaccessible. However, there are unrecognized roles of the pharmacist that resonate with this first argument. For example, the ability of a pharmacist to recognize a patient’s symptoms or to offer prescribing advice to other healthcare professionals would require” a more inaccessible body of knowledge.

It is important not to use the terms *knowledge* and *information* interchangeably. Information has a more functional meaning and refers to facts that can be recorded, catalogued, and retrieved. By contrast, knowledge requires complex assimilation, cross referencing, and analysis of many different types of information.

The second idea that knowledge cannot be commodified is more difficult to defend in an age where specialist knowledge is more widely available. In many cases, patients have a very detailed understanding of their condition. For example in the United Kingdom there is the established use of the term *expert patient* by the Department of Health.⁷ However, while the expert patient may have accessed specialist information it is unlikely that they will have the global therapeutic overview that is grounded in the specialized and integrated knowledge of a pharmacist. Thus, it would seem justifiable to argue that pharmaceutical knowledge cannot be commodified and packaged as information. With the relatively recent inclusion of patient information leaflets with prescribed medication, pharmacists are often approached by patients with questions about the sometimes worrisome content of such information leaflets. It is very difficult for a lay person to assess the practical significance of a catalogue of information on side effects stated by the manufacturer without the associated knowledge of pharmacology and risk-benefit analysis.

Technological advances have rationalized the profession to such an extent that the McDonaldisation theory proposed by Ritzer⁸ can be applied to the deskilling of

pharmacists and the general commodification of knowledge. This theory suggests that the pharmacist to some extent can be bypassed by providing the patient with standardized detailed information about their medication. To counterbalance this theory, it is necessary to look more closely at the types of knowledge used by pharmacists and the specialist skills that they employ.

PHARMACY KNOWLEDGE AND SKILL

Skill can refer to the capacity to accomplish a task, and may be kept analytically separate from the substantive knowledge connected with the task itself.⁹ While knowledge and skill are often compartmentalized and seen separately, the term skill cannot be totally separated from knowledge. Traditionally, pharmacists utilized their scientific knowledge to develop the skills necessary to formulate, compound, and dispense medicines. As this is no longer the role of the pharmacist, the pharmacist arguably has been “deskilled” and does not have specialist skills. However, as is true of some other professions, the skills used are tacit in that they cannot be completely connected to systematic theory or defined by a clear structure or protocol. It was Polanyi that made a case for tacit art that is based on experience rather than formal theory. Polanyi argued that in any activity there are 2 different dimensions of knowledge that are mutually exclusive.¹⁰ Focal knowledge is about an object or phenomenon in focus. Tacit knowledge is knowledge used as a tool to handle or improve what is in focus.

The tacit skill of the pharmacist can be demonstrated in the area of responding to symptoms. While there have been many attempts to formalize this process with the use of protocols and algorithms, all of these processes have a limited value compared to an experienced pharmacist using his knowledge and skill to determine whether the symptoms presented are self-limiting or require referral to another healthcare professional. By contrast, focal knowledge would involve a detailed knowledge of a specific product, and while this is helpful when responding to symptoms, it has much more limited value. The use of tacit knowledge can also be applied to the pharmacist who is making an ethical decision over whether to dispense a prescription-only medicine without a prescription in an emergency, or the reporting of suspected misuse of drugs by a client or colleague. The knowledge involved in making these complex decisions cannot always be verbalized and is based on experience rather than formal theory.

The use of tacit knowledge by pharmacists is well documented through terms such as *reflective practice*. For example, the viewpoint has been stated that for pharmacy to demonstrate its unique and indispensable contribution to quality healthcare, pharmacy curricula would

teach reflective practice, and be more problem based.¹¹ There have been many changes in pharmacy curricula, but it is unclear whether perceptions of the profession of pharmacy have changed accordingly.¹² These views highlight the responsibility of the educator and the challenge of bridging the gap between theoretical and practice-based knowledge.

Tacit knowledge, therefore, cannot be codified and can only be transmitted by focused training or more often gained through personal experience. It is this type of knowledge that is more concerned with “know how” rather than “know what.” One of the problems associated with tacit knowledge is that it becomes embedded deeply in the professional culture or organization and becomes difficult to transfer.

There have been attempts to classify different bodies of professional knowledge by their epistemological roots. The professions can be divided into classes depending on whether the cognitive base is primarily descriptive or prescriptive. Descriptive forms of knowledge include scientific knowledge and claims technical authority. Prescriptive knowledge is based on normative values and includes such areas as law, religion, and ethics, and claims moral authority. Halliday, in his study of the legal profession, recognized that this tool was too simplistic as different professions can contain both scientific and normative disciplines.¹³ Halliday used the term *syncretic* to describe the situation where a mixed form of knowledge is evident. Pharmacy is a profession to which this term could be applied. The descriptive knowledge that is the basis of a scientific profession cannot be separated from the prescriptive knowledge of law, ethics, and social and behavioural science. Contemporary pharmacy practice demands a practitioner who has problem-solving capability and is able to exercise both technical and moral authority. This leads us to look in more detail at the practice-based knowledge of the pharmacist.

PRACTICE-BASED PHARMACY KNOWLEDGE

Jamous and Peloille used the term indeterminacy/technicality (I/T) ratio where indeterminacy requires judgement and technicality alludes to a more algorithmic approach.¹⁴ For example, a minister of religion may have a high I/T ratio because he uses a lot of indeterminate knowledge that is for the most part inaccessible to the general public, but uses little technical knowledge. Conversely, the pharmacist may be seen as having a high technical knowledge with little indeterminate knowledge, giving pharmacists a much lower I/T ratio. If the indeterminate knowledge of pharmacists is perceived to be low, then from a public perspective, their expected input is

minimal. Conversely, if pharmacists can apply their technical knowledge to individual unpredictable human situations in unique ways that benefit the patients, their I/T ratio is raised and the profession moves further away from the McDonaldisation theory.

In their discourse exploring changes in the mode of knowledge production in contemporary society, Gibbons et al distinguish between Mode 1 knowledge, generated within a disciplinary, primarily cognitive context, and Mode 2 knowledge created within a broader, transdisciplinary social and economic context.¹⁵ This work recognizes the problems associated with describing the new production of knowledge (Mode 2) in terms of the old, and the problems associated with the use of language to describe what is happening in the production of knowledge. It is useful to look at the attributes of Mode 2 knowledge and apply this framework to the pharmacy profession and how the pharmacist may contribute to the production of knowledge.

To look at the way that knowledge is used in practice, it is useful to look more closely at the theory of knowledge production. Nowotny, Scott, and Gibbons developed their theory of knowledge production in “Re-thinking Science: Knowledge and the Public in an Age of Uncertainty.”¹⁶ This work looks at the dynamic relationship between science and society and the need for constant two-way communication rather than one-way traffic between the 2 camps. This notion follows on from the distinction of Mode 2 knowledge production and focuses more on the need for a forum and a framework for rethinking science. This area is especially helpful when considering the question of pharmacy and its claim of being a knowledge-based profession. Scientific knowledge, while at the core of the education of a pharmacist, sometimes can be viewed as somehow less relevant than the clinical patient-centred practice component of the curriculum. As with all professional degree programs, pharmacy education is constantly evolving in the light of new practice developments. In recent years, the undergraduate curriculum in some schools of pharmacy has lost some of the scientific content to accommodate more clinical practice and social science teaching. This can lead to both conflict and an artificial demarcation between traditional pharmaceutical science and pharmacy practice. The ideal curriculum integrates pharmaceutical science and clinical practice and encourages dialogue and a search for commonality between the disciplines. The argument within “Re-thinking Science” is that there must be cross border links between science and society and the construction of a social contract between these 2 areas. This is particularly relevant in the development of pharmacy education.

Pharmacists who have moved away from the tasks of filling prescriptions by increased use of technicians are more likely to exercise and develop their indeterminate knowledge. For example, when a hospital clinical pharmacist looks at a specific therapeutic problem surrounding the administration of medication to a patient who is unable to swallow, the pharmacist will need to draw on experience and intuition that are beyond the scope of the published knowledge base. Similarly, an industrial pharmacist working in research will draw on indeterminate knowledge in his approach to empirical problems. This suggests that the development of pharmacy as a profession will depend more on the pharmacist “knowing how” as opposed to “knowing what.”

Scribner describes the use of “skilled practical thinking” as thinking that is embedded in the larger purposive activities of daily life that involves little formal knowledge.¹⁷ Clearly, the knowledge and skills used in this type of thinking are developed and learned through experience. One characteristic of this type of thinking is that it is flexible and in contrast to using an algorithmic, mechanical procedure to solve a problem. Formal knowledge that is combined with this type of thinking is a powerful and unique tool for problem solving. When looking at the issue of how pharmacists use their knowledge in practice, it is important to define examples where pharmacists use skilled practical thinking. A typical scenario is the way that a pharmacist may use “common sense” strategies to improve patient compliance. For example, formal knowledge of respiratory disease is of little use when the presenting patient has arthritis and is unable to manipulate her inhaler device without an appropriate practical compliance aid. The use of seemingly simple strategies when linked with formal knowledge is a potent force for improving patient care.

Skilled practical thinking assumes many of the different types of knowledge already discussed and implies a foundation of formal pharmaceutical knowledge as opposed to pharmaceutical information. This type of thinking also suggests that there is a significant amount of indeterminate tacit knowledge. A significant issue resulting from the question: “Is pharmacy a knowledge-based profession?” is how to unlock focal and tacit knowledge. If there is general underuse of knowledge within the pharmacy profession, then the status of the profession will remain in question. Many of the tasks and functions performed by the pharmacist are being replaced by other personnel or automation. The question of pharmacy being a knowledge-based profession is especially critical in a work environment where pharmacists appear overqualified for what they do in everyday practice. The next section examines how knowledge can be made to work in practice.

MAKING KNOWLEDGE WORK

To make knowledge work in practice there are 2 areas that need to be considered:

- The process of conveyance of knowledge and how professional knowledge can benefit the end user of a medicinal product.
- The area of knowledge production and how this important activity relates to the practicing professional.

One of the criticisms leveled at the knowledge of a professional is that it is so deeply embedded within the individual and culture of the profession that it is very difficult to convey. For pharmacists, with their extensive training, governments will increasingly ask the question: "How can this formal scientific knowledge be used to benefit the health of the nation?" Clearly, pharmacists have a responsibility to use their knowledge both in communication with other healthcare professionals and directly with members of the public.

An important characteristic of the new production of knowledge discussed earlier is that it is within the context of application. This notion supports the value of research within a practice setting by the experienced practitioner. Once a practitioner makes the move to a traditional academic environment the "cutting edge" of her practice skills are somehow dissipated and they are no longer within the context of application. This is a significant challenge faced by the pharmacist that aims to bring practice skills into a non-clinical setting. The increasing demand for pharmacy practice research and evidence-based medicine for best practice suggests a clear role for the pharmacist in the production of knowledge. Another attribute of this type of knowledge is that it is beyond the scope of a single discipline and has a distinct but evolving framework. In essence, the knowledge is dynamic and can be described as "problem-solving capability on the move."¹⁵ Within the healthcare sector, there is an increased emphasis on multidisciplinary working and this is reflected in the increasing amount of interprofessional education within the pharmacy curriculum. The production of useful pharmacy knowledge cannot be conducted in isolation, but requires the input of several stakeholders and transcends the contribution of a single profession. Potentially, the greatest contribution of any clinical pharmacist is achieving optimum medication management. This approach involves adopting a problem-solving style to individual cases and mobilizing both health and social care agencies. The process of working with other professionals may result in the emergence of new working knowledge.

Heterogeneity and organizational diversity are other features of this new knowledge production. Different sites of learning need to be established with strong networks of

communication within a community of practice. The new knowledge production requires the participants to be more reflexive and socially accountable. Where the main focus of work is medicine as a social object, it becomes increasingly important for the pharmacist to maintain strong links with the social scientist and the wider concerns of the public. The pharmacist as a practice researcher within a multidisciplinary team fits well into this framework of production of knowledge.

In terms of knowledge production, the pharmacist is ideally positioned to engage in a working dialogue between science and society. An example is the pharmacist's contribution to public health. This public health role highlights the pharmacist as a producer and facilitator of health education in the community and is a role that stems directly from a knowledge-based profession.

CONCLUSION

Is pharmacy a knowledge-based profession? This review has focused more on the place and utilization of pharmacy knowledge, which is inextricably linked with professionalism. The initial question could be restated: Is the pharmacy profession knowledge based? This avenue of inquiry and emphasis on knowledge opens important and challenging issues for the pharmacy educator.

One of the key challenges is linking professionalism to pharmacy knowledge. This involves the educator in continually reinforcing the importance of CPD and lifelong learning. The inculcation of values that highlight the importance of professional knowledge is an ever more important area of work for the pharmacy educator. Another challenge that arises from the discussion of tacit knowledge centers on the approach to curriculum development and delivery. In order to develop practitioners who are socially aware and able to solve practical problems, there is an increasing place for problem-based learning and teaching within a practice setting. The closer integration of science and practice is another area that needs to be considered by educators as they consider the place of practice-based knowledge. The production of future pharmacists who can clearly communicate the value of their unique pharmaceutical knowledge is increasingly significant for all those involved in pharmacy education. The notion of knowledge production taking place within an ongoing dynamic relationship between science and society underlines the value of a research agenda that takes place within a practice setting.

This review draws attention to the different types of knowledge that could be potentially used by the pharmacist. Pharmaceutical knowledge is one of the unique key attributes of the pharmacy profession, and without this being more fully utilized, the status of the profession may be called into question.

The use of a cognitive lens highlights knowledge as a potential strength in terms of professional identity but also suggests a case for pharmacy being an underutilized knowledge-based profession. Pharmacists have a certain moral professional identity as they are the gatekeepers to safe drug usage and required to use their knowledge responsibly within the healthcare system. Arguably, because the knowledge and work of pharmacists relates to medicine in the widest context, the profession has the potential to make a massive impact on society.

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