



This is the author's version of work that was submitted and accepted for publication in the following source:

Mills, J., Field, J. & Cant, R. (2011). Factors affecting evidence translation for general practice nurses. *International Journal of Nursing Practice*, 17(5), 455-463.

This definitive version of this work is available at: Wiley Online Library

<http://onlinelibrary.wiley.com/doi/10.1111/j.1440-172X.2011.01962.x/pdf>

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Factors affecting Evidence Translation for General Practice Nurses

Short title: General practice nurses and evidence translation

ABSTRACT

This paper explores the domains of influence affecting practice nurses' ability to find, evaluate and use clinical evidence. A cross-sectional survey of general practice nurses (n=590) in Victoria, Australia in 2008 provided data for a principal components analysis. The research replicates a study undertaken in the United Kingdom using the Developing Evidence-Based Practice Questionnaire. Five domains of influence on nurses' translation of evidence were identified: skills in finding/ reviewing evidence; barriers to finding/reviewing evidence; knowledge from published sources; knowledge from other sources; and barriers or facilitators to change. Each domain was interpreted as underlying the relationship of nurses with evidence-based practice and was comparable to the original study's findings when subjected to factor analysis. Findings from this study demonstrate that the Developing Evidence-Based Practice Questionnaire – Au is a valid and useful instrument in determining the influences on practice nurses' ability to effect knowledge translation and conduct practice based on evidence. Given these findings, a new model is proposed that explains the influence of a number of domains on Australian general practice nurses' translation of knowledge into practice.

Keywords

Developing Evidence-Based Practice Questionnaire, evidence-based nursing, nursing informatics, practice nurse, primary nursing care

INTRODUCTION

A developing ideology of evidence-based practice in nursing has resulted in the rapid generation of evidence summaries aimed at changing clinical practice. Nursing culture however, has not yet adapted to the point where nurses engage in routinely translating

evidence-based knowledge into practice.¹⁻⁴ Understanding the reasons why this is so remains a focus for many researchers⁵⁻⁷ who endeavour to develop a theoretical explanation for this phenomenon.⁸

This paper reports an in-depth component analysis of a previously reported Australian study that used a survey instrument originally developed to explore nurses' use of evidence in the United Kingdom (UK).⁶ Our study surveyed nurses who work in general medical practices (practice nurses) in Victoria, Australia.⁹ The overall aim of the study was threefold. It set out to examine the sources of practice knowledge among Australian general practice nurses; the barriers and or facilitators to evidence utilisation among these nurses; and their skills in obtaining evidence. Data was subjected to further analysis using the method of principal component analysis (PCA) to identify relationship patterns among variables and explain these in terms of a smaller number of components.

Background

In Australia, the provision of primary care services rests largely with general medical practitioners who employ practice nurses in their clinics administered using a small business model. Over the past five years the role of the general practice nurse in Australia has expanded and new funding models are now being implemented that develop the autonomy of this role.¹⁰ The questionnaire used in this study is based on the Developing Evidence-based Practice Questionnaire (DEPQ)¹¹, which was amended to add demographic detail and re-named the DEPQ-Au. A total of 1,800 Victorian practice nurses were surveyed using the DEPQ-Au instrument with a response rate of 33% (n=590). Findings showed that participants' use of evidence in clinical practice was characterised by:

- a perceived lack of time to access knowledge for practice
- the use of in-service education and training opportunities as the main source of evidence for practice
- engagement in experiential learning and interactions with clients, peers, medical practitioners and specialist nurses as important sources of knowledge for practice
- a low self-assessment of participants' skills in sourcing and translating evidence into practice

Application of evidence in practice is increasingly referred to as knowledge translation.¹² Knowledge translation describes the transfer of evidence, generated through research or

derived from other sources, into practice through its integration with nurses' clinical expertise.¹³ In the discipline of nursing, other sources of evidence include expert opinion, clinical experience, patients, clients and carers as well as the local context and environment.¹⁴ This study was directed towards identifying the sources of evidence predominantly used by Australian practice nurses to ground their practice. The rationale for this approach is to establish what Australian general practice nurses perceive to be evidence for practice as a beginning point, before considering how to make research evidence for more accessible and useful to them. Identifying and appreciating both the context and culture of nursing practice in the process of change management is critical to achieving knowledge translation.^{7, 8, 10}

METHODS

Sample and survey

A cross-sectional paper based survey was used to collect data. In collaboration with General Practice Victoria (GPV), multiple survey packs were distributed to 30 divisional program officers with a request to issue these to practice nurses. Each pack contained a questionnaire, explanatory statement and a reply-paid addressed envelope. Consent was implied by return of the anonymous questionnaire. From GPV records listing 1800 general practice nurses, the response rate was 33% (n=590). The required sample size was calculated as 286 for a 95% confidence level (a 5% margin of error)¹⁵ with the final sample exceeding this number.

The DEPQ¹¹ was originally chosen because it captures data about current practices in relation to implementing evidence based nursing and the influence of the context of practice. Construct validity of original DEPQ, the extent to which it measures the domains it was supposed to measure, was established through reliability testing and factor analysis applied to two data sets with the same 10 factors identified that describe nurses' approach to evidence-based practice. An expert panel considered the DEPQ to ask questions relevant to Australian practice nurses.

The questionnaire consists of 49 main questions each with five-point response scales scored between 1-5, based on frequency (never/seldom/sometimes/frequently/always) or agreement (agree strongly/agree/neither agree nor disagree/disagree/strongly disagree). The overall Cronbach alpha coefficient for the DEPQ in the original testing with hospital nurses (n= 598) and community nurses (n=689) in the UK was 0.87,¹¹ exceeding the expected Cronbach alpha: > 0.7).¹⁶ The instrument's sub-scales are: bases of practice knowledge,

barriers to finding and reviewing evidence, barriers to changing practice on the basis of evidence, facilitation and support in changing practice, and self assessment of skills. Each of these was reliable ($\alpha \geq 0.7$). The question items are shown in Table 2. Additional questions about participants' age, years working as a general practice nurse, educational qualifications and geographical location by postcode were also included.

Ethical considerations

The University Standing Committee on Ethics in Research Involving Humans granted ethics approval for the study. The primary researcher gained permission to use the original instrument. The research team did not know the identity of potential participants and no identifiers were used in the conduct of the survey.

Data analysis

Survey data were analysed using SPSS version 15¹⁷ to calculate descriptive and parametric statistics. To examine construct validity of the instrument with the current sample of nurses, several techniques were used. A PCA was conducted to measure construct validity, guided by the methods of Pallant, examining correlations between variables.¹⁶ PCA is useful to explore inter-relationships between variables and to account for the variability in a pattern of correlations so that any underlying domains may be identified and used to explain a concept, or practice. Construct validity of the DEPQ-Au was further examined by conducting reliability testing using the Kronbach alpha coefficient. The overall internal consistency of the questionnaire was confirmed with a Cronbach Alpha coefficient of 0.91 for 49 items.¹⁶ Inter-item correlation was used to confirm relationships between identified sub-scale items, and these were interpreted as valid descriptions of evidence based practice resources or concepts.

Guidelines on the factorability of scales suggest 10 cases for each item are required to generate reliable correlation coefficients and there should be adequate strength (>0.3) of inter- item correlations.¹⁶ These conditions were met (49 scale items; 590 participants). Kaiser's criteria (eigenvalue > 1), a factor loading of 0.3 and a parallel analysis were applied to determine the final rotated solution.

RESULTS

Australian general practice nurse characteristics

The study sample is broadly representative of the Australian practice nurse population as a whole. Table 1 compares participants' demographic characteristics to findings from the *National Practice Nurse Survey Report 2007*.¹⁸

Table 1: Characteristics of participating general practice nurses (n=590) and comparison to total population of Australian general practice nurses

Insert Table 1 here

Principal components

Using original survey data, correlations were calculated with a sample of the items to check for linearity. Any missing data were replaced by the group mean to give a sample of 590. Three key criteria were met. There were many variables with coefficients of ≥ 0.3 ; a Kaiser-Myer-Olkin Measure of Sampling Adequacy of 0.88 exceeded a recommended value: 0.6 and Bartlett's Test of Sphericity was $<.001$ (significant at <0.05), supporting the factorability of the correlation matrix.¹⁹

PCA revealed 12 components with eigenvalues exceeding 1.0 that explained between 2.1% and 21.2% of the variance. The results of a parallel analysis showed nine components with eigenvalues exceeding the corresponding criterion values for a randomly generated data matrix of the same size: 49 variables by 590 participants.²⁰ Nine components were thus retained and they explained 58.5% of the overall variance. The PCA was able to reduce 49 items to explain the underlying dimensions as nine components (Table 2).

Table 1: Rotated component matrix showing nine components (n=590)†

Insert Table 2 here

Four components emerged on the various bases of practice knowledge (Nos. 2,6,7,8), and one each for 'self-assessed skills', 'barriers to finding and reviewing evidence', 'barriers to changing practice', 'facilitation and support in changing practice', and 'availability of

information and time to implement it'. The internal consistency of each component was examined to determine the reliability as independent entities (Table 3).

Table 2: Characteristics of components when treated as scales

Insert Table 3 here

The resulting Cronbach alpha coefficients ranged from 0.69 to 0.91 and inter-item correlation coefficients (between items in each component of a scale) ranged from 0.27 to 0.47, with eight showing moderate to high correlations (ie. 0.30 to 1.0) indicating each is a reliable scale. The research team members examined all the items in each scale and decided on a relevant domain name (descriptor). In the following section we show how each of these scales operate as a domain of practice.

Domains of influence for nurses

As this is an exploratory analysis, the nine components identified (see Table 3) were bundled to construct a model, with the four practice knowledge components being combined. This aims to explain five key domains that influence general practice nurses' ability to effect knowledge translation (Figure 1).

Figure 1: Domains influencing Australian general practice nurses' translation of knowledge into practice

Insert Figure 1 here

The priority need identified in the model is skill development in finding, reviewing and using evidence with the aim of expanding the knowledge base of general practice nurses. The first domain shown in the model '*skills in finding reviewing and using evidence*' was the highest loading component accounting for 21% of the variance. Domain two '*barriers to finding and reviewing evidence*' is a combination of components four and five. Barriers considered significant by participants are clearly related to the low level of knowledge and skills apparent in the first domain. Domain three '*knowledge from published sources*' includes component two and prioritises articles published in research, nursing and medical journals as important sources of knowledge for practice. In some ways this domain is at odds with the need for skill development in finding, reviewing and using evidence identified in

domain one, however it could indicate awareness among general practice nurses that these are the types of resources that should be used as a source of evidence for knowledge translation. Domain four '*knowledge from other sources*' is a combination of components six, seven and eight and relates to tacit knowledge practice nurse's gain from interacting with other people in the course of their work along with inherent knowledge developed during their professional career. Within this domain, knowledge based on interactions with the interdisciplinary general practice team was considered a very important influence on the translation of knowledge into practice. Domain five is a combination of components three and nine and addresses the implementation of change processes related to the translation into practice of knowledge based on evidence. General practice culture was not identified as receptive to change; however, for those who attempted to implement change based on evidence, nursing colleagues and nursing managers were identified as important supports. In combination with a lack of confidence among general practice nurses to bring about change, the current culture of general practice creates a barrier to knowledge translation. A series of overlapping circles depict the inter-related components that explain Australian general practice nurses' assimilation of knowledge for skill development in finding, reviewing and using evidence in their practice.

DISCUSSION

Australian practice nurse results fall into nine components that broadly represent domains of influence identical to those of nurses in the UK.⁶ Direct comparisons of data are limited because a number of statistical decisions and variance detail went unreported in the original study. Furthermore, the UK study uses two data sets including hospital and primary care nurses. Our sample comprised nurses who work in a specific area of primary care – general practice. Although this analysis of principal components is exploratory, we believe that the results are applicable to the general practice nurse population in Australia and may be no different from other groups of registered nurses internationally. Results clearly show that both internal (personal) factors such as nurses' skills and knowledge and also external (organizational) factors are perceived as influential in the successful translation of knowledge into clinical practice.

Developing general practice nurses' knowledge and skills to effect knowledge translation

Findings from this analysis are important because they identify key areas for investment by policy makers, managers and educators of Australian practice nurses. Of significance is how the need to develop the skills of Australian general practice nurses in finding, reviewing and using evidence underpins four of the five domains. This central concern illustrates a process whereby general practice nurses compensate for reduced access to the development of theoretical knowledge by relying on tacit knowledge in their work. Because there are many barriers to finding and reviewing research evidence (including their own skill levels in being able to fully utilise knowledge from published sources), general practice nurses are highly reliant on knowledge from other sources such as experience, intuition, collegial interactions, and inherent knowledge accrued during their 'training'. In making decisions about implementing changes to practice, they therefore use a mixture of theoretical and tacit knowledge that leans toward the tacit.

In this regard the Australian nurses are not dissimilar to nurses in other countries. The literature reports numerous studies of evidence translation that likewise focus on nurses' lack of confidence and competence in appraising evidence for practice as being a key barrier.²¹ In the United Kingdom, Rolfe *et al*²² discuss how clinical nurses prefer to base their practice on previous personal experience or the experience of trusted colleagues as opposed to research reports. Waters *et al*²¹ suggests that Australian registered nurses are supportive of the need for evidence based practice but not confident in the skills required. While in Canada, Ferguson²³ identifies that even in newly graduated nurses (who would be expected to possess these skills), nurse leadership and support is necessary for the successful integration of evidence into practice. Again in the United Kingdom, Thompson *et al*²⁴ concur with Ferguson about the negative influence context of practice can have on registered nurses successfully effecting knowledge transfer.

Newhouse¹³ argues that a lack of previous experience with research is a significant barrier to the adoption of evidence based practice, suggesting a mentor program as a possible strategy to help nurses successfully collect and synthesize evidence with a view to effecting knowledge translation. Particular roles required in the process of knowledge translation include mediating the values, preferences, and working practices of multiple stakeholders, and negotiating organisational complexity and managing staff boundaries. Given that Australian practice nurses often work in isolation from other nurses, or in a context where

there is no designated leadership role in a nursing team our expectation that they could fulfil these roles may be too high.

French²⁵ suggests that organisational factors might be more important than an individuals' personal reasons for not facilitating the uptake of research outcomes. Participants in this study reported a number of external barriers to assessing and implementing evidence at the point of care (Table 2; Barriers and facilitators to change: item 23-37), which supports this argument. Organisational barriers included lack of work time, not knowing where to find organizational and research reports and protocols as well as issues of inter-professional staff support for a change in nursing practice.

Together the domains of influence identified in this study raise the importance of practice nurses developing skills in finding, reviewing and using evidence in their work while negotiating the barriers to changing practice. Given that most nurses in this study had obtained their nursing qualification more than 10 years before the survey was conducted, and thus may not therefore have received education on evidence-based practice, professional development programs that address finding and reviewing evidence for practice and its application in primary care settings are indicated. The question that needs to be answered is: how can these programs be widely implemented for nurses who often work in sole and /or part-time positions? Supported learning via a mentoring program was found valuable by Newhouse *et al*¹³ for registered nurses and has the potential to provide a model for practice nurses with a resultant increase in knowledge translation. Improving practice nurses' access to research reports in the form of peer reviewed journal articles and evidence summaries is another important recommendation from this study. Resources such as Joanna Briggs Institute²⁶ reviews and evidence summaries, and electronic databases of peer reviewed journals are not always readily available to general practice nurses who work in private practice as opposed to government health care agencies and universities.

As we move forward into a future where the concept of evidence underpins the standards of practice expected of a registered nurse, an instrument that can be used reliably and productively as an outcome measure for initiatives that develop knowledge and skills in this area is a necessity. The PCA conducted in this study is useful to explore a range of items and questions and group them into a smaller number to make a coherent story. The current data set met all requirements for this procedure and the DEPQ-Au was found to be a reliable indicator for the domains of general practice nurses' application of evidence-based practice resources. However further study is needed to determine the status of the derived scales and to match the concepts with additional instruments to determine how well they measure the

experience of Australian general practice nurses. Findings from this study demonstrate that DEPQ-Au is appropriate for ‘before and after’ intervention studies where the aim is to evaluate the impact of evidence based practice knowledge and skill development. Moreover, the data derived from the widespread use of the DEPQ-Au can provide a basis for shaping policy around knowledge translation that melds theory, culture and context. Gerrish *et al*¹¹ argue that the generalisability of the DEBQ questionnaire is valid for hospital and community nurses in England but acknowledge that its validity in other countries remained at that time to be demonstrated. Our analysis confirms that the DEPQ-Au can achieve comparable findings and is a valid and reliable instrument for use with Australian nurses.⁹

CONCLUSION

The modelling of domains of influence presented in this study has local, national and international implications as it supports the establishment of continuing professional development programs on the topic of evidence based practice for nurses regardless of their clinical setting. Similarities in findings between the UK and Australia indicate that barriers to bringing evidence to the point of care are comparable in developed countries. For educators who are planning to implement programs that will raise an awareness of the sources of evidence for practice, use of the DEPQ-Au will enable the recognition of current forms of evidence accessed by nurses as a starting point. Identifying effective practices to promote knowledge translation may then see the consolidation of evidence based nursing practice as a reality, as well as an aspiration.

Table 1: Characteristics of participating general practice nurses (n=590) and comparison to total population of Australian general practice nurses

		Response	National PN Workforce
		%	%
Sex	Female	99.5	
	Male	0.5	

Age range	20-29 years	6	5
	30-39 years	18	17
	40-49 years	41	40
	50-59 years	30	35
	60+ years	5	4
Work hours	Full-time	21	24.5
	Part-time	79	75.5
Level of nursing qualification	Nursing qualification	50.5	
	Nursing diploma	14.1	
	Baccalaureate degree	34.1	
	Masters/doctoral degree	1.2	
RRMA (geographic) Classification	Urban (1-2)	51	40.5
	Regional (3)	11	16.1
	Rural/Remote (4-7)	38	53.5
Years as practice nurse	2 years or less	32.2	20.1
	2 to 5 years	25.4	40.2
	6 to 10 years	24.6	19.6
	More than 10 years	15.9	20.1

Table 2: Survey questions and rotated component matrix showing nine components (n=590)†

Item	Component								
	1	2	3	4	5	6	7	8	9
q1. Knowledge based - Information that I learn about each patient/client as an individual						.374		.358	
q2. Knowledge based - My intuitions about what seems to be 'right' for the patient/client						.709			
q3. Knowledge based - My personal experience of caring for patients/clients over time						.663			
q4. Knowledge based - What has worked for me for years						.765			
q5. Knowledge based - The ways that I have always done it						.734			
q6. Knowledge based - Information my fellow practitioners share							.669		
q7. Knowledge based - Information senior clinical nurses share, e.g. clinical nurse specialists, nurse practitioners							.598		
q8. Knowledge based - What doctors discuss with me							.755		
q9. Knowledge based - New treatments and medications that I learn about when doctors prescribe them for patients							.660		
q10. Knowledge based - Medications and treatments I gain from pharmaceutical or equipment company representatives		.551							
q11. Knowledge based - Information I get from product literature		.576							
q12. Knowledge based - Information I learn in my training								.601	
q13. Knowledge based - Information I get from attending in-service training/conferences		.337						.620	
q14. Knowledge based - Information I get from local policy and protocols		.448						.578	
q15. Knowledge based - Information I get from national policy initiatives/guidelines		.481						.519	
q16. Knowledge based - Information I get from local audit reports		.605						.313	
q17. Knowledge based - Articles published in medical journals		.768							
q18. Knowledge based - Articles published in nursing journals		.773							
q19. Knowledge based - Articles published in research journals		.785							
q20. Knowledge based - Information in textbooks		.601							
q21. Knowledge based - Information I get from the internet		.542							
q22. Knowledge based - Information I get from the media (e.g. magazines, TV)		.651					.309		
q23. Barriers to finding & reviewing research - I do not know how to find appropriate research reports	.437			.374	.403				
q24. Barriers to finding & reviewing research - I do not know how to find organisational information (guidelines, protocols, etc.)	.345				.633				
q25. Barriers to finding & reviewing research - I do not have sufficient time to find research reports					.632				
q26. Barriers to finding & reviewing research - I do not have sufficient time to find organisational information (guidelines/protocols etc.)					.763				
q27. Barriers to finding & reviewing research - Research reports are not easy to find				.374	.542				
q28. Barriers to finding & reviewing research - Organisational information (protocols, guidelines etc.) is not easy to find					.743				
q29. Barriers to finding & reviewing research - I find it difficult to understand research reports				.745					

q30. Barriers to finding & reviewing research - I do not feel confident in judging the quality of research reports				.798	
q31. Barriers to finding & reviewing research - I find it difficult to identify the implications of research findings for my own practice				.751	
q32. Barriers to finding & reviewing research - I find it difficult to identify the implications of organisational information for my own practice				.609	.340
q33. Barriers to changing practice - I do not feel confident about beginning to change my practice	.300			.516	
q34. Barriers to changing practice - The culture of my team is not receptive to changing practice				.698	
q35. Barriers to changing practice - I lack the authority in the work place to change practice				.755	
q36. Barriers to changing practice - There are insufficient resources (e.g. equipment) to change practice				.723	
q37. Barriers to changing practice - There is insufficient time at work to implement changes in practice				.615	
q38. Facilitators to changing - Nursing colleagues are supportive of my changing practice					.751
q39. Facilitators to changing - Nurse managers are supportive of my changing practice					.754
q40. Facilitators to changing - Doctors with whom I work are supportive of my changing practice			.573		.355
q41. Facilitators to changing - Practice managers are supportive of my changing practice			.585		.471
q44. Skills rating - Finding research 'evidence'	.767				
q45. Skills rating - Finding organisational information	.745				
q46. Skills rating - Using the library to locate information	.736				
q47. Skills rating - Using the internet to search for information	.730				
q48. Skills rating - Reviewing research 'evidence'	.778				
q49. Skills rating - Reviewing organisational information	.797				
q50. Skills rating - Using research evidence to change practice	.757				
q51. Skills rating - Using organisational information (policies/guidelines etc.) to change practice	.694				

Extraction Method: Principal Component Analysis; Rotation method: Varimax with Kaiser Normalization.

†All correlations <0.3 were concealed; 49 items in total- Items 42,43 are not reported as these were demographic data.

Table 3: Reliability of the nine components when treated as scales

Component number	Component descriptor	No. of items in scale	Scale Mean/SD	Reliability (Cronbach alpha)	Inter-item correlation
1	Skills in finding, reviewing and using evidence	11	33.57±7.37	.91	.46
2	Knowledge from published sources	12	38.13±7.10	.88	.39
3	Barriers to changing practice	7	23.80±4.90	.82	.40
4	Barriers to finding & reviewing evidence	7	21.70±4.82	.86	.46
5	Availability of information & time to implement	8	24.94±5.31	.84	.39
6	Knowledge from personal experience	6	20.23±2.90	.69	.27
7	Knowledge from collegial communications	4	15.20±2.26	.72	.40
8	Knowledge from formal reports/training	6	22.34±3.42	.76	.39
9	Facilitation & support in changing practice	4	14.52±7.37	.78	.47

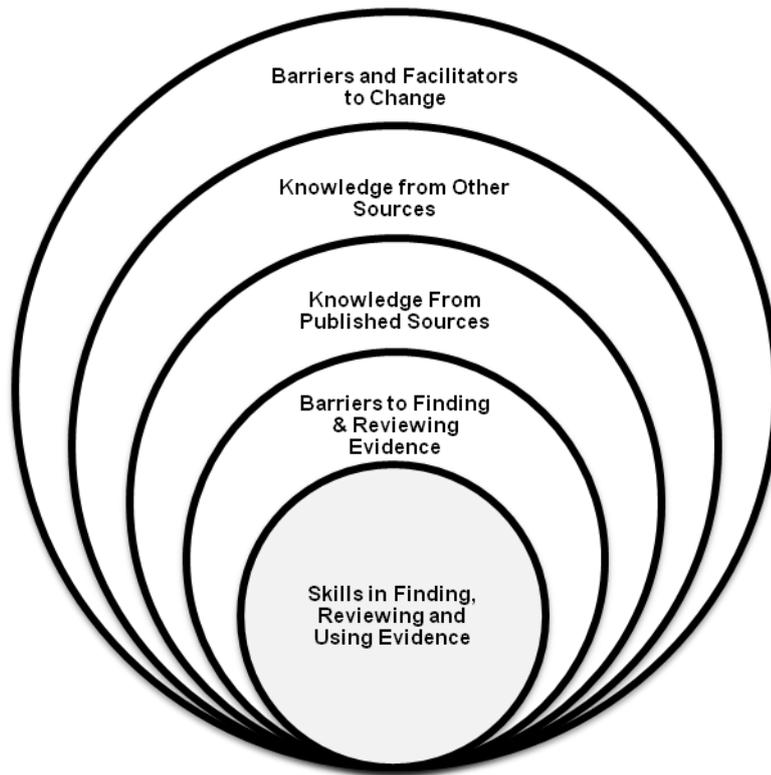


Figure 1: Domains influencing Australian general practice nurses' translation of knowledge into practice

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