



Embracing a culture in conducting research requires more than nurses' enthusiasm

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SUMMARY

Aims: This study explored the perceptions of clinical nurses about their research knowledge and experiences to highlight any gaps in nurse education in supporting research activities in healthcare organisations.

Background: Nurses' research activities have been encouraged by moving hospital-based nurse education into higher education institutions whereby there is a stronger emphasis on teaching and developing nursing research at both undergraduate and post graduate levels. They were further encouraged by the introduction of advanced nurse practitioner roles, in the hope to increase opportunities for research participation. Whilst nurses' research activities have been explored in many countries, nurses in Singapore where there is a strong emphasis on evidence-based practice have not been investigated.

Methods: A mixed-methods exploratory descriptive design, using a questionnaire based on open and closed questions was employed to obtain the views of clinical nurses about their capacity and organisational support in conducting research. The questionnaires were distributed to convenient samples who attended one of the 4 research seminars held on separate occasions between July and August 2011 in Singapore.

Results: A total of 146 nurses were recruited. Whilst nurses demonstrated strong enthusiasm in conducting research, this characteristic feature was not adequate for them to embrace a research culture in organisations. Active participation as co-investigators was not possible in healthcare organisations where skewed distribution of resources towards medical and nurse researchers was perceived.

Conclusions: The results suggest a need for a significant shift in focus on educational training from imparting research contents to providing opportunities to experience the research process. Organisational support in terms of protected time and financial support ought to be in place for nursing research experience. The findings also demonstrated that in places where organisational support was available, awareness of research opportunities such as educational and organisational support needed to be strengthened. This in turn would enable more nurses particularly those who provide direct patient care to conduct research within the context of the competing nursing practice demands.

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Introduction

The increased emphasis on evidence-based practice in healthcare has led to a move of hospital-based nurse education into higher education institutions. Research was introduced in the nursing curriculum to increase awareness of research and capacity building to promote research output (Meyer et al., 2003; Department of Health, 2005; Woodward et al., 2007). Such strong emphasis on teaching and developing research in nursing programmes was at both undergraduate and post graduate levels, and was apparent in many parts of the world. Within clinical practice, nurses' input in generating research evidence has also been encouraged by the introduction of

advanced nurse practitioner roles (Woodward et al., 2007). Despite these efforts to increase opportunities for research participation, there has been a general lack of research to guide practice (Thompson et al., 2001) in the West whereby, insufficient research dissemination was reported (Clifford, 2004). At the same time Woodward et al. (2007) observed complex organisational issues which contributed to skill deficits in interpreting and analysing research. Similarly, in the East, research participation and utilisation amongst nurses were observed to be low (Oh, 2008; Tan et al., 2012; Tsai, 2000). The general perception of barriers which attributed to this was related to administrative issues; such as the lack of funding and protected time for research (Oh, 2008; Tan et al., 2012; Tsai, 2000).

To join the world in the evidence-based movement, Singapore has also been proactive in building a research culture. The concept of evidence-based practice in nursing was enthusiastically introduced as soon as it gained ground in the West. This was evidenced by many seminars since the new millennium (Loke, 2001) and also, by the migrating of nursing education to diploma and degree levels

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through the establishment of polytechnics and the Alice Centre in the local university. However, the success of the research culture in the country remains unexplored. The efficacy of building a research culture needs to be established for ascertaining the effectiveness of promoting research in the nursing curriculum. This would enable some insight into its successful transference to nursing practice. Therefore, this study was conducted to explore clinical nurses' perceptions of their research knowledge and their experiences of nursing research activities to determine, if they saw themselves as being able to conduct research in practice. In essence, this study seeks to highlight any gaps in research provision within educational institutions and health organisations so that these can be addressed.

Background/Literature

The available literature suggests that nurses lack the knowledge and skills to undertake research and view it as a separate activity from professional practice which involves emotional and personal investment (Clarke and Proctor, 1999; Hicks, 1995, 1996; Clifford and Murray, 2001; Kuuppelomaki and Tuomi, 2003; Tan et al., 2012). As a result some nurses demonstrated a lack of interest in applying research knowledge and skills to practical application. Indeed, many Finnish nurses have conducted research only because it was part of their academic pursuit (Kuuppelomaki and Tuomi, 2003). Additionally there was a large volume of literature about getting research into practice, but a limited amount of evidence of nurses undertaking research (Woodward et al., 2007). Nevertheless, some nurses were found to be motivated to conduct research to address clinical problems for quality patient care (Tanner and Hale, 2002; Tsai, 2000). Unfortunately, nurses generally felt unsupported by managers and by medical doctors to conduct research (Bradshaw, 2001; Clifford and Murray, 2001; Kuuppelomaki and Tuomi, 2003; Roxburgh, 2006; Tanner and Hale, 2002). Motivation and support were in nurses' opinions crucial influencing factors for undertaking research activities (Bradshaw, 2001; Clifford and Murray, 2001; Kuuppelomaki and Tuomi, 2003; Roxburgh, 2006; Tanner and Hale, 2002). Hence, many nurses attributed their lack of participation not only to their lack of skills, but also to the lack of collegial support, interest and time (Kuuppelomaki and Tuomi, 2003; Roxburgh, 2006; Tan et al., 2012).

Gender issues were also identified as a reason for the lack in research activities amongst nurses, whereby the majority were female (Hicks, 1996). In other cases, political dynamics were found to have adversely affected practitioners' level of research activities (Coghlan and Casey, 2001; Meyer et al., 2003). For example, nurses who were actively involved in research were perceived as 'outsiders' of the organisation (Meyer et al., 2003). Another barrier to nurses' active research participation was nurses' perceived lack of appreciation for nurses' research which took a qualitative approach (Redwood, 2005).

The integration of theory and practice in nursing research was documented by Jolley (2002) who asserted that research should not be confined to academia but needed to be integral to professional development. However, Cooke et al. (2002) outlined barriers due to infrastructure difficulties and Adamsen et al. (2003) highlighted variances in the nursing curriculum in research training. Gill (2004) also cites difficulties in integrating research into nursing and McNicholl et al. (2008) suggested a paradigm shift in organisation culture to promote research. Additionally, Rycroft-Malone (2008) stated that unless there was a culture change the analytical research skills would not lead to use of research evidence. Joyce (2009) suggests that education has some accountability in ensuring that research theory and practice were aligned and Jones (2010) added the requirement of time allocation as necessary to enable research to flourish.

The small amount of available literature provided an insight into nurses' ability and experiences in undertaking research by outlining their lack of skills and knowledge in research as an explanation for

their low level research activities. Nurses perceived the lack of support by organisations and medical doctors further inhibited their interest and motivation to undertake research. It is therefore important to determine if the issues and problems were similarly faced by nurses in Singapore so that measures could be adopted to negate these aspects.

Methodology/Methods

This study employed a mixed-method exploratory descriptive design, using a questionnaire based on open and closed questions to measure nurses' demographic data, their perception of research knowledge, skills and experiences and values of research activities and organisational support offered. The questionnaire was developed based on the literature review. Changes to some sentences were made (Table 1) after the questionnaire was reviewed by 10 clinical nurses in Singapore and later piloted amongst 10 nurse lecturers and 5 clinical nurses. The questionnaires were then distributed, completed and returned in 4 research seminars focusing on research methods conducted by the first author on separate occasions between July and August 2011 in Singapore. The study was approved by the University ethics committee of the first author. Respondents had the opportunity to decline participation and the questionnaire provided guidelines on the way to access research support in the local context.

Nurses from both educational settings and clinical practice attended one of these 4 research seminars and this resulted in 211 nurses as potential research participants. One hundred and eighty-eight of seminar attendees participated in the study making a response rate of 89.1%. Of those returned, 63 were answered by nurse lecturers and 2 were incomplete by nurses in practice. These (n=65) were discounted leaving 146 questionnaires usable and analysed.

For responses to the closed questions, descriptive statistical analysis was performed to provide insight to respondents' demographic data, research profile and views on research activities in relation to organisational support. For responses derived from open-questions on views regarding research activities in relation to organisational support, an interpretative phenomenological approach was utilised to make sense of nurses' experience in conducting research. Balls (2009) suggests that nurses connect to a phenomenological approach because of its emphasis on the distinctiveness of the individual's real life experiences. In terms of this research it offers the researchers the opportunity to interpret respondents' experiences using a Heideggerian hermeneutic approach (Heidegger, 1962) rather than simply describing the data using Husserlian bracketing (Husserl, 1963). This hermeneutic interpretative approach allowed themes to emerge from the respondents' narratives and interpreted by utilising the

Table 1
Changes to questions to address content validity.

Initial statements in questionnaire	Revised questions
<i>Research knowledge</i> I have knowledge of	I know...
<i>Research preparation</i> Absence of question	Obtaining research paper from: Employer libraries/search engines subscribed by employers
I am prepared to self fund to gain access of research papers	"I am willing to pay for access to research papers"
<i>Research experiences and skills</i> "I need to acquire more skills for conducting Research"	"I need to learn more skills for conducting Research"
<i>Research and nursing</i> "I am able to Integrate research activities with clinical and nursing procedures"	"I am able to Incorporate research activities with nursing routines"

researchers own knowledge of research. Hence the analysis was informed by the respondents narratives, by the researchers' knowledge and by other authors related to the fields of healthcare and health education.

Data/Results

Respondent Profile

The mean age of the respondents was 34 (Table 2). All were in full time employment, and the majority provided direct patient care in tertiary teaching hospitals or large district hospitals. Nurses were therefore working in environment where evidence-based practice was emphasised.

All 146 nurses held a diploma in nursing or a certificate in nursing. Many nurses including those who had a certificate in nursing also held a higher degree. Otherwise, nurses had planned to pursue one (n = 30, 20.5%). This observation suggested some forms of research exposure in nurses' educational experience.

Respondents Research Knowledge and Skills

Consistent with the above findings, many claimed to have knowledge of quantitative and qualitative approaches whilst very few nurses claimed knowledge of mixed-methods approach which is a useful nursing research method (Table 3). Also, whilst some nurses claimed to have knowledge of all three research approaches at the same time, a few claimed no knowledge of any.

Indeed, many nurses wished to increase their research knowledge, with one expressing that she needs "...support to understand research terminologies". Many had voiced their need to acquire skills to conduct research. Some respondents indicated that a reluctance to undertake research was due to a lack of confidence and knowledge, as evidenced in these quotes: "*reluctant to undertake research, not confident, lack of understanding*" and hence desired for support, as expressed by one nurse "...an experienced research facilitator to guide through research."

Respondents were keen to acquire research knowledge and skills through reading research papers on patient care and nursing practice (Table 4). Many nurses claimed to have accessed research papers from the various online sources. However, some remained unaware

Table 3

Research knowledge.

Research knowledge: Closed questions with yes/no answers	Respondents (n = 146)	Percent
"I know..."	YES	
<i>Research methodologies</i>		
Quantitative	117	80.1
Qualitative	113	77.4
Mixed-methods	92	63.0
Quantitative + qualitative + mixed-methods	72	49.3
None	12	8.2
<i>Research methods</i>		
<i>Quantitative</i>		
Randomised controlled trial	97	66.4
Surveys	131	89.7
Case	41	28.1
Case, series	17	11.6
Cohort, prospective or longitudinal	58	39.7
Case control or retrospective	49	33.6
<i>Qualitative</i>		
Semi structured interview	44	30.1
In-depth interviews	41	28.1
Participant observation	71	48.6
Non-participant observation	29	19.9
Published documentation (text analysis)	49	33.6
Anecdotal records and diaries	26	17.8
<i>Sampling</i>		
Probability sampling methods	111	76.0
Non-probability sampling	99	67.8
<i>Data analytic procedure</i>		
Quantitative methods	74	50.7
Qualitative methods	60	21.4
"I need more knowledge for conducting Research"	124	84.9

that a support system was in place for free access by employers and educational settings. This was despite the fact that the support system had been made available in many of these settings since the late 1990s. Logically, the lack of such knowledge would mean that nurses have limited access. However, this might not be the case, because many claimed to be willing to pay for access, or otherwise, would seek colleagues for papers.

Table 2

Characteristics of participants.

	Respondents (n = 146)	Percent
<i>Gender</i>		
Female	135	92.5
Male	11	7.5
<i>Age</i>		
20–29	64	43.8
30–39	48	32.9
40–49	21	14.4
50–59	13	8.9
<i>Education (highest degree)</i>		
First degree	67	45.9
Master's degree	3	2.1
PhD	1	0.7
<i>Nursing roles</i>		
Enrolled nurses	4	2.7
Staff nurses	71	48.6
Senior staff nurses	46	31.5
Nurse clinicians	8	5.5
Advance practice nurse	2	1.4
Managers/directors	15	10.3
<i>Affiliation</i>		
Large acute teaching hospitals	82	56.2
District hospitals (restructured/private)	36	24.7
Private hospitals	20	13.6
Clinics (primary care)	7	4.8
Nursing homes/care homes	1	0.7

Table 4

Research preparation.

Research preparation: Closed questions with yes/no answer	Respondents (n = 146)	Percent
"I engage in activities such as..."	YES	
Reading research papers on patient care and nursing practice	126	86.3
Discussing research papers with colleagues	33	22.6
<i>Obtaining research paper from</i>		
Colleagues	34	23.3
Local libraries	23	15.8
Academic search engines	101	69.2
Google and Yahoo	82	56.2
Employer libraries/search engines subscribed by employers	31	21.2
<i>Obtaining free access to research paper</i>		
From colleagues	23	15.8
From employer	51	34.9
From educational institution where I was/am a student	57	39.0
"I am aware of free access of research papers by employers"	109	74.7
"I am aware of free access of research papers by educational settings"	109	74.7
"I am willing to pay for access to research papers"	47	32.2

Respondents' Experience in Conducting Research

A small number of nurses had engaged in research, through helping medical and nursing colleagues (Table 5). The research methods exposed to nurses were either survey-based research or randomised controlled trials, knowledge of which more nurses had claimed (Table 3). More nurses also claimed experience in the qualitative paradigm based on participant observation and documentation based on text analysis (Table 5), and more of them indeed have knowledge of the two (Table 3).

When asked about data analyses, few claimed knowledge of both quantitative and qualitative methods (Table 3). This suggested that nurses' research experience seldom went beyond data collection. Evidently, whilst many were involved with data collection, few were involved in data analysis (Table 5). This finding is consistent with the qualitative finding in which nurses felt that they were expected to have adequate knowledge to identify research questions. However, they were not exposed to opportunities to develop their skills to conduct research in order to follow through their research questions:

"...expected to have research ideas knowledge but no one briefs us how to conduct it, so can lose interest... no one explains how to do it".

Therefore, many nurses felt that research opportunities are confined to the medical professionals. As expressed by one respondent, it was common for doctors to do research for they had the resources and privilege:

"More doctors do research, they can afford their own research team. Data collection tends to be undertaken by nurses during their nursing duty shift".

Respondents' Perception of the Focus and Nature of Support in Research Activities

Based on earlier findings, nurses' research activities were limited to helping colleagues in data collection and occasionally, analysis. Independent nursing research was made possible in academic pursuit (Table 5). Albeit in the current situation, many saw opportunities to conduct research in practice. In fact many claimed ability to incorporate research with nursing routines and saw the value of research in developing them into valuable team members in improving patient care (Table 6).

Qualitative data revealed nurses' view on how the provision of clear guidelines and transparency between researchers, institutions and patients involved, would ultimately benefit patients. Whilst there was a strong felt need for nursing research to improve patient care, the research support was perceived as skewed towards medical research. As pointed out, there is, *"more support to medical research rather than nursing research"*. Nurses felt that there was a lack of appreciation of nurses undertaking research: *"Furthermore the management might not find the need for such activities"*. Yet, nurses generally felt that the ability to conduct research is dependent upon, *"supportive managers and doctors sharing their knowledge and ideas..."*. Consequently, this introduced a negative outlook towards nursing research, it was felt that, *"... the doctor is not supportive of research activities"*. When organisational support was not felt, nurses became disillusioned of the value of conducting research in nursing. As one respondent expressed *"...it makes no difference if I do research or not"*, it was generally felt by nurses that conducting research was *"...more about meeting department goals in meeting key performance indicators than contributing to improvement in nursing practice"*.

Respondents' Perception of Opportunities

Many nurses felt the lack of protected time to conduct research except one. Comments from respondents generally conveyed that, *"...clinical service comes first so problems in allocation of time for*

Table 5
Research experiences and skills.

Research experiences and skills: Closed questions with yes no answer	Respondents (n = 146)	Percent
"I have used..."	YES	
<i>Research methods</i>		
<i>Quantitative</i>		
Randomised controlled trial	43	29.5
Surveys	87	59.6
Case	13	8.9
Case, series	6	4.1
Cohort, prospective or longitudinal	10	6.8
Case control or retrospective		
<i>Qualitative</i>		
Semi structured interview	14	9.6
In-depth interviews	9	6.2
Participant observation	24	16.4
Non-participant observation	7	4.8
Published documentation (text analysis)	20	13.7
Anecdotal records and diaries	1	0.7
"I conducted research..."	YES	
To help colleagues with data collection		
Medical	35	24
Nurse	75	51.4
Allied health	15	10.3
To help colleagues with data analysis		
Medical	7	4.8
Nurse	34	23.3
Allied health	10	6.8
As part of my job	62	42.5
In the pursuit of a higher degree	50	34.2
For career development	38	26
To be able to present a paper in conferences	19	13
"I need to learn more skills for conducting Research"	YES	
	124	84.9

research, impacts on ability to undertake good research." Another exclaimed that it was *"difficult to multitask between paid work and non paid research work and family. It is meant for people who are 100% working everyday as nurse researcher"*. Hence some suggested the *"...need for it to be written into job descriptions"*.

Apparently, nurses felt that research was seen as an addendum to normal practice and should be undertaken in their own time. As articulated by one respondent *"Research is done as an extra activity"*, and by another, *"Time for research viewed as a privilege"*. Nurses generally felt that the absence of protected time was an irresolvable problem for research activities due to a lack of research knowledge at nursing managerial level.

Table 6
Nurses' view on research opportunities, its value and organisational support.

Research opportunities, its value and organisational support		
1. Closed questions with yes no answer	Respondents (n = 146)	Percent
2. Open questions for elaboration	YES	
<i>Research and nursing</i>		
"There are research opportunities in my area of practice"	95	65.1
"I am able to incorporate research activities with nursing routines"	80	54.8
<i>Value of research activities</i>		
"Conducting research helps me in developing into a valuable healthcare member"	107	73.3
"Conducting research can help with improving patient care"	67	45
<i>Issues surrounding research</i>		
"There is protected time to conduct research"	109	74.6
"I have adequate support from managers and medical doctors to conduct research"	81	55.5
"I am aware that funding are available for research activities"	100	68.5

Whilst one respondent commented “...not all managers are research savvy...”. Another added that “...protected time and adequate funding are to be approved by managers”.

In this regard, barriers compounding opportunities for conducting research were alluded to; issues of manpower shortages, family commitments, shift patterns, and research activity compromising work. In fact, respondents highlighted these problems as “...difficulties bringing people together staff undertake research when working shift”. Whilst nurses' perceived inadequate support, others felt unsupported by their line managers and medical doctors in their research activities, many were unaware of available funding to support research activities and so unknowingly reduced their potential opportunities for conducting research.

Discussion

Adamsen et al. (2003) highlighted variances in the nursing curriculum in research training leading to “...the majority of nurses who today work in clinical practice do not have formal or reliable research-related qualifications” (Adamsen et al., 2003, p444). This seems to be the case with the Singapore nurses, who had been educated to at least diploma level and were likely to have been exposed to a research component in their nursing education. This was verified by a larger number claiming knowledge in the various approaches to research and simultaneously expressing the lack of and the need to increase knowledge and skills in using the different research methodologies and methods.

This suggested variability in nursing research knowledge and skills with many not having the confidence to conduct research independently, reflecting the findings in previous work (Clarke and Proctor, 1999; Hicks, 1995, 1996; Clifford and Murray, 2001; Kuuppelomaki and Tuomi, 2003; Tan et al., 2012). In this regard, it is pertinent to evaluate the research component of the existing nursing curriculum and rethink how imparting of research knowledge could be extended to experiential learning of the knowledge for its useful application in real clinical situations. Otherwise, as demonstrated in this study, many nurses although enthusiastic about conducting research were confined to helping colleagues in collecting and analysing data.

One important point is these colleagues comprised the non-nursing professionals as well as nurses. This suggested that some nurses were actively conducting research. This seems to contradict the findings about nurses not conducting research. Nevertheless, such contradictory findings were not difficult to explain. As evidenced in this study, many nurses conducted research because of an academic pursuit. Conducting research was a compulsory endeavour in any nursing programme; it was likely that nurses at some point would be involved in independent nursing research activities. This then explained why many nurses were involved in research of nursing colleagues as data collectors instead of co-researchers. Given the purpose of such research, the activities would come to a halt when one's academic journey was completed. In this regard, it is even more critical to re-examine the way the nursing curriculum is delivered in terms of research knowledge and skills. It is important to highlight that research should not only be confined to academia but should also be integral to professional development (Jolley, 2002). To enable this, research knowledge and skills implanted in the nursing curriculum needed to be followed through in healthcare institutions where nurses are employed. As such, any understanding of the research process instilled in education can be continuously experienced in real situational work contexts so their knowledge and skills can be improved and enhanced.

Whilst mapping the quantitative data with the qualitative, the findings revealed that nurses had little experience in conducting independent research and wished to do so. Nurses generally recognised research activity potentials, believing that it aided professional development which in turn could lead to improvements in the quality of

patient care. Nurses qualified this by discussing critical elements of inclusiveness towards gaining knowledge and recognition to increase knowledge research activities. Hence, in contrast to previous research studies (Clifford and Murray, 2001; Kuuppelomaki and Tuomi, 2003), nurses not only had a strong interest in research but also an enthusiasm for it.

Yet at the same time findings from this study concur with previous work that research is regarded as a difficult process for nurses and was basically a rare opportunity for many (Clarke and Proctor, 1999; Hicks, 1995, 1996; Clifford and Murray, 2001; Kuuppelomaki and Tuomi, 2003). Findings in this study specifically demonstrated that there was willingness and strong enthusiasm from nurses to participate in research activity but organisational culture and the requirements of practice infrastructure inhibited its development. Hence, even though respondents embraced the importance of undertaking research for gaining evidence to keep up-to-date to support practice, they highlighted awareness of the need for organisational support, information and collaboration. The overall responses indicated the lack of research opportunities as contributing factors; specifically highlighting skewed support in terms of time allocations which benefited medical doctors and a limited but select number of full time nurse researchers. This finding coincides with the gender issues raised by Hicks (1996), based on the fact that the medical profession remained to be dominated by males in Singapore. For this reason, research remains mainly in the realm of male which further highlights inequitable access to funding and organisational support.

When the lack of time as a barrier is so overwhelming for undertaking research, there is an urgent need for an infrastructural revision to enable nursing research. As highlighted by Jones (2010) the concept of nursing time requires consideration when nurses are asked to undertake competing tasks, in this case, between bedside nursing and research because “Knowledge of what nurses do and how they do it is essential...” (Jones, 2010, p188). Otherwise, the illusion as the consensual perception that research was meant for full time researchers as gleaned from this study might become a reality. Evidently, in the current organisation culture in which there are limited internal resources, nurses were further compromised by their lack of knowledge of external sources available from various research funding streams. These compounding factors need consideration because knowledge of external funding sources increases nurses' opportunities for conducting research, enhances their research experience, and promotes the organisational research culture.

The sample of nurses, in this study, demonstrated enthusiasm for research in their zeal for higher education and their involvement in research activities. They saw this as leading them to becoming valuable team members to improve patient care. This high level of enthusiasm for research was evident by the nurses' participation in the research seminar, at their own cost and time, as well as in their willingness to participate in the current research. The high enthusiasm for research as the characteristic feature of the participants in this study might not be that of every nurse in Singapore.

The critical argument demonstrates that even though these nurses held a strong enthusiasm for research, this did not help in breaking down the barriers of organisational constraints. In this regard, unless the organisational-cultural barriers are reviewed, the development of analytical research skills will not necessarily lead to evidential usage (Rycroft-Malone, 2008). Other than having introduced research as part of the nursing curricula, there is a need for education which has the ability to impact upon the organisational culture to start driving leadership and organisational effectiveness forward (Joyce, 2009). These changes would be influential in enabling nurses to conduct clinical research so that it becomes part of normal practice in clinical nursing. This would in turn, enable nurses to draw upon research support from employers and colleagues in both nursing and non-nursing disciplines naturally without the need of any conscious effort. In essence, problematic issues are not isolated to nurses in Singapore, but are a worldwide phenomenon which requires a paradigm shift in organisational culture. If this shift does not occur McNicholl et al.

(2008) suggest that evidence based practice cannot flourish and there will continue to be limited research input by nurses as direct care givers to inform practice.

Conclusions

By employing a mixed-methods approach, the emerging themes from the qualitative data were mapped against the quantitative findings. This provided some valuable and interesting insights into nurses' views on the barriers affecting their ability to undertake research and the need for organisational culture and infrastructure changes. Issues revolved around time constraints and the lack of organisational support which restricted nurses' ability to engage in research as co-investigators. This in turn impacted upon their ability to transfer their knowledge and skills in collaborative research. Whilst, the findings cannot be generalised to the entire clinical nursing population in the country, the sample provides a representative account of nurses' experiences in the research process in Singapore. Evidently, research knowledge especially in terms of research terminologies, methodologies and methods were not severely lacking amongst many of these nurses. For this reason, barriers to nurses conducting research cannot be attributed to the lack of fundamental research knowledge and skills alone. The complexities of the research process are compounded by the complexities of practice working responsibilities in the clinical environment and these factors need to be addressed to negate barriers and to allay fears amongst nurses in undertaking research.

Whilst nurses might be enthusiastic about conducting research as they saw the importance and value of research in nurse professional development and nursing practice for improved patient care, they faced frustrations in terms of organisational culture and infrastructure and suggested that management address these deficits and provide and encourage research opportunities. The findings in this study are disturbing given the fact that the concept of evidence-based practice was introduced in the country a decade ago (Loke, 2001), presumably, evidence based practice would have been embraced by nurses with no boundary. Also, since the majority of the participants in this study were employees of large teaching hospitals, large district and private hospitals where clinical practice is research driven, support for embracing the research culture should have been easily accessible by nurses to advance nursing practice. In view of these findings, there ought to be a significant need for a strong emphasis on educational training about transferring research knowledge and skills into practice settings. This is critical as the learning experience about research in higher education should continue into nurses' continuing employment. This calls for an urgent review of the existing nursing curriculum as well as an organisational culture and infrastructure so that acquired research knowledge and skills can be utilised by newly developed enthusiastic researchers. The findings also demonstrated that in places where organisational support was available, awareness of such opportunities for access to educational and organisational support needed to be made equitable and transparent. This in turn would enable more nurses especially those who are highly enthusiastic about conducting research, to be able to do so within the context of the competing nursing practice demands.

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