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Measuring attitudes and knowledge of evidence-based practice in the Qatar nursing workforce: A quantitative cross-sectional analysis of barriers to empowerment

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ABSTRACT

Objectives: To explore the prevailing attitudes and knowledge of evidence-based practice (EBP), and to compare the relationship between EBP attitudes and knowledge, amongst nurses in Qatar's public health system.

Study design: A quantitative cross-sectional survey evaluating EBP-related attitudes and knowledge amongst a sample of 400 registered nurses at Hamad General Hospital (HGH), Qatar's largest public hospital.

Methods: Data was collected via a questionnaire, distributed to participants who were randomly selected using a hospital nursing staff directory. Descriptive analysis, Shapiro-Wilk Test for normality, Spearman's Rank Correlation Coefficient analysis (to evaluate significance of correlation exhibited between demographic and professional variables), Mann-Whitney U tests and Kruskal-Wallis tests were used to analyse the data.

Results: Significant, positive correlation was found between EBP attitude and knowledge scores, indicating a complementary pattern in which EBP perceptions develop. Age was also found to have a significant, positive correlation with EBP attitude, though no other experience indicators provided significant outcomes. Application of EBP knowledge was found to increase with level of education and varied by clinical specialty, suggesting that both academic background and current professional practice exert influence on perceptions and familiarity with EBP.

Conclusion: The results offer valuable insight on EBP attitudes and knowledge in HGH's nursing workforce, indicating where EBP perceptions and preparedness may differ within. This study is a pivotal first step in understanding the status quo in Qatar's health system as it pertains to EBP, from which future research can help develop tailored development strategies for EBP implementation, leading to quality improvement in health outcomes.

Keywords: Evidence-based practice; knowledge; attitudes; nursing; empowerment; Qatar

LIST OF ABBREVIATIONS

- ANOVA - Analysis of Variance
- EBP - Evidence-Based Practice
- EBQ - Evidence-Based Practice Questionnaire
- GCC - Gulf Cooperation Council
- HGH - Hamad General Hospital
- HMC - Hamad Medical Corporation
- IAS - India & Subcontinent
- MENA - Middle East & North Africa
- SCH - Supreme Council of Health
- USA - United States of America

GLOSSARY

Attitudes: [In the context of this study] The extent to which evidence-based practice (EBP) is welcomed and perceived to be a valued and appropriate approach to health care, as defined by one evaluated dimension: attitudes towards EBP in current practice.

Charge Nurse: The job title used at Hamad General Hospital (HGH) to define supervisory nurses, responsible for overseeing work shifts.

Empowerment: The process of providing control and autonomy to an individual, so that they have the appropriate skills, resources and authority to achieve personal and professional goals or outcomes (Manojlovich, 2007).

Evidence-based practice: The direct and systematic application of the best available evidence within individual patient care; a continual process of perpetual improvement of clinical knowledge and decision-making (Sackett (1997).

Head Nurse: The job title used at Hamad General Hospital (HGH) to define supervisory nurses, responsible for managing the nurses within a defined clinical department.

Higher Secondary: A high-level, vocational secondary school curriculum, i.e. part of secondary school, as opposed to post-secondary.

India and Subcontinent (IAS): A region that, for the purposes of this study, explicitly includes Bangladesh, India, Nepal and Pakistan.

Knowledge: [In the context of this study] An awareness of and ability to apply evidence-based information and practices into clinical practice, as quantified through two evaluated dimensions: application of EBP in current practice and self-perceived competency in key EBP skills.

Middle East and North Africa (MENA): A region that, for the purposes of this study, explicitly includes Egypt, Iran, Jordan, Kuwait, Palestine, Somalia, Sudan, Tunisia and Yemen.

Patient-centred care: A holistic approach to health care which promotes the consolidation of personal, professional, clinical and organization relationships towards ensuring medical decisions that are tailored to the patient (Epstein & Street, 2011).

Postsecondary Diploma: A level of education that encompasses all diplomas and qualifications obtained subsequent to secondary education (up to, but not including, graduate-level) with the explicit omission of bachelor's degree.

Qatar 2030 National Vision: A framework for national strategies and implementation plans toward the common aim of developing Qatar into an advanced society capable of sustaining its development and providing a high standard of living for its entire people (GSDP, 2007).

Southeast Asia: A region that, for the purposes of this study, explicitly includes Indonesia and The Philippines.

Staff Nurse: The job title used at Hamad General Hospital (HGH) to define front-end nurses allocated to individual patients.

Waiver of Signed Informed Consent: A document mandated by Hamad Medical Corporation (HMC) ethics committee for research conducted through surveys or questionnaire, waiving the requirement for participants to return a signed waiver to the researcher (in such studies where it would be the only link between participant and data). This ensures complete anonymity of responses (Appendix B).

BACKGROUND

Beginning in the latter half of the 20th century, the modern Western model of healthcare has exhibited a shift in its approach to patient care, placing increasing responsibility in the hands of nurses who are now recognized as autonomous clinicians in their own right, supporting patient care through an independent scope of practice with increased decision-making authority (Brown et al, 2009; Gerrish et al, 2007). Such a transformation has been heralded for its positive impact on patient outcomes, not only in terms of clinical or medical outcomes, but equally of psychosocial outcomes – knowledge, behavioural and physiologic improvements that collectively deliver a more holistic and positive patient experience (Penz & Bassendowski, 2006).

Central to the requisite capacity-building facilitating this transition is the application of evidence-based practice (EBP): a cornerstone of modern Western medicine, and the root of knowledge that drives healthcare decisions (Beyea & Slattery, 2006). By bringing healthcare decisions closer to ground level and offering a more holistic, patient-centred approach to diagnostics and treatment, the transformation of the nursing profession exhibited in many Western nations through the application of EBP has led to marked improvements in health outcomes and patient experience (Gerrish et al, 2007; Penz & Bassendowski, 2006).

The implementation of EBP in nursing is an initiative largely driven by pragmatism. Growing populations have placed an increasing burden on physicians, calling into question their collective ability to deliver their services sustainably (Colwill et al, 2008; Kinfu et al, 2009). A move towards a system that disseminates authority can alleviate workload from physicians who often find themselves at the root of every decision (Gerrish et al, 2007). Collectively, these driving forces have given rise to the concept of empowerment within the nursing profession – a core prerequisite to enabling such a transformation towards a more autonomous, evidence-based model (Manojlovich, 2007).

Implementation of EBP, however, is not without its challenges. Healthcare decisions are not clearly determined through medical reasoning alone, requiring clinical evidence to be packed within a holistic approach (Morrison, 2005). A relatively-contemporary holistic model of patient-centred care adds a degree of complexity to decision-making, factoring a diverse range of evidence into the formula. In turn, this requires analysis of a broad range of evidence and operation within a multi-disciplinary, patient-centred team (Jacobs et al, 2012). The implication for nurses is that, as a frontline practitioner, the requisite ability to compile, analyze and disseminate evidence must be coupled with a capacity to drive decisions from the bottom-up (Sevin et al, 2009).

In this regard empowerment and EBP form a proverbial chicken-and-egg scenario, whereby both require each other in order to be effectively applied: the ability to apply EBP promotes the very empowerment and autonomy required in order to effectively apply EBP (Beyea and Slattery, 2006; Nagy et al, 2001).

Despite these challenges, the potential for EBP in improving health outcomes and, in the case of its application through nurses, improving the overall patient experience is becoming increasingly clear. As the frontline interface between the patient and the health system, nurses hold a critical position in healthcare delivery. Not only are they the administrator of a plethora of front-end patient services, but equally the voice and face of healthcare, and are likely to impact patient perceptions more than any other facet of healthcare (Kitson et al, 2011). Indeed, the duality of empowerment and EBP serves to emphasize the importance of administering a holistic transformation of the nursing workforce, ensuring they are equipped not only with the appropriate scientific skills, but also the requisite psychosocial skills to contribute appropriately in the healthcare decision process (Newhouse et al, 2005; Sevin et al, 2009). Hence, nurses' attitudes towards EBP are as important as their knowledge of it. One without the other will not allow for a true application of the practice in to the realm of nursing, which in turn will impede the centralization of patient experience around the patient (Sevin et al, 2009).

The State of Qatar, where nurses are still largely subservient to physicians, is a perfect case study in the application of EBP in nursing practice. The Supreme Council of Health (SCH) of Qatar has made clear its desire for a paradigm shift towards a Western model of healthcare, explicitly stating that the application of EBP as an initiative it wishes to pursue (GSDP, 2011). However, there currently exists a significant gap between where Qatar's health system is, and where it would like to be (Al Ishaq, 2009; Nehring, 2003), particularly in terms of nurse's scopes of practice. Currently, Qatar is entrenched in a more traditional model of healthcare, where nurses serve largely as administrators of care as defined by physicians (and other clinicians) preceding them in linear chains of command – a stark contrast to more modern models seen in the UK and USA, where nurses perform a central function in a holistic, inter-disciplinary and cross-professional health service (Gerrish et al, 2007).

The current nursing workforce in Qatar is not explicitly equipped with the knowledge, practical tools and psychosocial competencies that define the preparedness for such a professional transformation, which encourages – and indeed requires – independent critical analysis or dissemination of knowledge (Penz & Bassendowski, 2006). Such work norms are often so deeply-rooted, that premature application of practices such as EBP can prove disastrous, if staff are not adequately primed for them – EBP itself must be viewed as an objective with clearly-defined educational and empowerment prerequisites (Kitson et al, 2011). As such, a clearer picture of the status quo – in terms of current knowledge and attitudes – must be obtained before attempting an initiative of this nature, in order to understand the contextual barriers to EBP implementation that must be overcome (Nagy et al, 2001; Upton & Upton, 2006).

Assessing the prevailing attitudes and knowledge of EBP in Qatar's nursing workforce will serve as a pivotal first step in implementing EBP and the development of empowerment strategies, by shedding light not only on awareness of the practice itself, but also the extent to which nurses in Qatar's health system feel empowered to apply such working practices. The assessment of knowledge and attitudes will provide guidance of a strategy that

will be more appropriate for EBP application. A structured, strategic approach to such an initiative towards the implementation of EPB can have a significant impact on public health through marked improvements in the efficiency of health service delivery and patient care outcomes (Newhouse et al, 2005; Safriet, 1992). Hence, this study will serve to build a foundation on which Qatar can build and reform its health system towards its greater vision, by exploring the prevailing attitudes and knowledge of EBP within its nursing workforce: What is the relationship between existing EBP knowledge and attitudes – does one translate to the other? What are the key demographic and professional variables that affect EBP attitudes and knowledge within Qatar's diverse and multicultural nursing workforce?

METHODOLOGY

Cross-sectional analysis was applied using the Upton & Upton (2006) Clinical Effectiveness and Evidence Based Practice Questionnaire (EBPQ) (Appendix D) for data collection. This is a validated questionnaire, with a Cronbach's $\alpha = 0.87$, used extensively in past research to evaluate EBP knowledge and attitudes in healthcare settings (Brown et al, 2009; Rice et al, 2010; Upton & Upton, 2006). Using a seven-point Likert scale, the EBPQ evaluates three dimensions of EBP application: (1) knowledge of EBP principles, based on the frequency of their application in current practice, (2) attitudes towards the use of evidence in current practice, and (3) a self-evaluation of key EBP knowledge and skills. Several inclusions were required in the demographic/personal information section of the EBPQ in order to capture pertinent data: nationality; country from which nursing qualification was received; years of nursing experience (both in Qatar and in total); highest level of education obtained; year of education completion; country from which education was obtained.

The study was undertaken at Hamad General Hospital (HGH) in Doha, Qatar – the largest of seven hospitals within Hamad Medical Corporation's (HMC) network – where approximately 2620 registered nurses are employed (Bener & Al Mazroei, 2010; SCH, 2011). A sample of 400 registered nurses in Qatar with at least one year of experience working within the local health system were selected using systematic sampling from the HGH staff directory. Questionnaires were distributed in unsealed blank envelopes via administration staff in each clinical department, along with instructions to return it anonymously in the provided envelopes to a centralized drop box in the hospital.

The individual values of the scored responses within each dimension were summed to yield an overall score for each dimension per respondent; the three dimensional scores were further summed to give a total score for each respondent. This data is on an ordinal scale with total score of 42, 28 and 98 respectively.

The data collected have been quantified in a range of descriptive statistics: the frequency and distribution of demographic and professional criteria; the mean and standard deviation of respondents' age and years of experience; non-response rates; mean and standard deviation of scored responses at the individual, dimensional and overall levels. In order to evaluate the significance of the results, the following statistical tests have been applied:

1. **Shapiro-Wilk Test** – To determine the normality of the sample distributions and, in turn, the appropriate subsequent statistical tests to apply.
2. **Spearman's Rank Correlation Coefficient analysis** – To evaluate the correlation, and the significance of correlation, between each dimension score (and compared to the overall score); to evaluate the aforementioned scores amongst different demographic and professional variables.
3. **Kruskal-Wallis test** – To determine whether significant differences are exhibited between the scores of demographic and professional variables, where more than 2 groups are under comparison, e.g. staff nurse, charge nurse and head nurse.
4. **Mann-Whitney U test** – To determine whether significant differences are exhibited between the scores of demographic and professional variables, where 2 groups are under comparison, e.g. male vs. female.

Ethics approval was obtained from both from the University of Liverpool Ethics Committee and the HMC Clinical Research department; in compliance with the latter, a Waiver of Signed Informed Consent was provided to each participant. Likewise, to clearly communicate the purpose, protocol and voluntary nature of the study, a Participant Information Sheet was included.

RESULTS

For each set of tests applied, only significant results are provided below. Neither gender, geographic variables nor profession exhibited any significant differences in EBP knowledge and attitudes.

All three sets of dimensional scores positively correlated with each other, indicating that, as knowledge of EBP (in terms of current application and skills) increases, attitudes towards EBP becomes more positive (Table 1). Similarly, a positive correlation was observed between dimension 2 scores (EBP attitudes) and age, indicating that as age increases, attitudes towards EBP become more positive – a peculiar result, when contrasted with the non-significant results of work experience with the same dimension.

Of the dimensional and total scores between different levels of education, only dimension 1 (EBP application) yielded significant results; this suggests an increased capacity for EBP application as education level increases.

While a significant difference between total score and clinical speciality ($H = 26.588$, $p = 0.014$) was found, further examination revealed that only Urology ($M = 161$) differed significantly in its total score when compared to the rest of the sample ($M = 124$) ($U = 41.5$, $p < 0.001$) (Table 2). Taking this result at face value, it could be said that Urology in particular exhibits greater knowledge and more positive attitudes to EBP than the other nurse specialties; however, the small sample size for Urology ($n = 6$) – coupled with an absence of supporting rationale – necessitates closer examination of this result.

Similarly, a significant difference between dimension 1 (EBP application) score and clinical speciality ($H = 30.214$, $p = 0.004$) was found and, upon further examination, it was revealed that two clinical specialties in particular differed significantly in its total score when compared to the rest of the sample ($M = 30$):

1. Urology ($M = 42$), $U = 24$, $p < 0.001$
2. Emergency/Trauma ($M = 32.5$) $U = 629$, $p = 0.041$

In turn subgroups were separately compared with all other clinical specialty subgroups individually; Tables 2 and 3 summarizes the significant results of these tests for Urology and Emergency/Trauma, respectively.

These seemingly-higher scores in EBP application may indicate that both Urology and Emergency/Trauma nurses both feel they are currently applying EBP principles in their work more than the other specialties; between Urology and Emergency/Trauma specifically, the results indicate the former has a significantly higher score than the latter. Again, caution must be exercised when interpreting results with such a small sample size. Indeed, while the recurrence of Urology being singled out as significantly different may suggest a general trend in the field, there is little to explain the significance of Emergency/Trauma in this test. Further examination would be required to draw reliable conclusions.

DISCUSSION

The competency of a population in terms of EBP principles (in this case, nurses in Qatar's health system) cannot be objectively ascertained from the EBPQ; there is no threshold score at which one could be defined as competent in, or ready to implement, EBP. Indeed, this is not the intent of the EBPQ, which gathers inherently subjective information from the respondents regarding perceptions of their own abilities, knowledge and attitudes relating to EBP (Upton & Upton, 2006).

Moreover, while Hamad General Hospital is certainly the largest single health care centre in Qatar, it is but one of seven in the publically-funded Hamad Medical Corporation network, accounting for just over 50% of its nursing workforce (SCH, 2011). As such, these results cannot be generalized to all of Qatar's health system, as sought in the objectives; resources limitation prevented a more extensive methodology, thus limiting the applicability of results to GHG specifically.

This study is not an attempt to quantify nursing workforce competency in the realm of EBP. Rather, an understanding of the conditions that affect preparedness to accept and embrace evidence as a core tenet of nursing practice is sought. There is a clear distinction to be underlined here: prevailing knowledge and attitudes, as opposed to aptitude, are being assessed, with a long-term outlook towards the latter. In this regard, the results have yielded valuable insight, presenting trends amongst variables that significantly affect the self-perceived attitudes and knowledge of EBP. Though not a direct indication of competency, such perceptions have proven a catalyst for successful EBP implementation and, as such, can help the development of frameworks with the intent of maximising such initiatives (Majid et al, 2011; Nagy et al, 2001).

The strong correlation observed between all three dimensional scores sheds light on the patterns of development of EBP perceptions. The results suggest that one who has knowledge of EBP is also likely to have a positive attitude towards EBP. That said, this does not confirm the direction of causation: whether positive attitudes enable development of knowledge, or if acquisition of knowledge promotes improved attitudes cannot be concluded from this study alone. It does, however, suggest that the reported EBP application (dimension 1), attitudes (dimension 2) and skills (dimension 3) all progress in tandem. This dimensional score correlation exhibited corroborates what has been revealed through past research, extending its collective relevance to a unique cultural context, and supporting a holistic approach to EBP development. In this regard, the concept of empowerment as a central tenet of EBP cannot be understated, as it does just that: provides the 'hard' tools (knowledge) with which to carry out EBP, and the 'soft' capacity-building (attitudes) through which nurses feel confident and enabled to work accordingly (Thompson et al, 2004). Such an understanding of progression patterns of the EBP dimensions explored in this study is important, as it can help to define the mechanisms by which EBP development is applied.

Nevertheless, what is clear is that (a) both good knowledge and positives attitudes are requisite to empower nurses and, in turn, drive a comprehensive implementation of EBP (Brown et al, 2009; Upton and Upton, 2005), and (b) these dimensions are strongly correlated. Hence, these results support a multidimensional approach to EBP implementation that will promote the level of empowerment required in the nursing workforce. Consequently, an appropriate psychosocial environment is created in which autonomy, initiative and subsequently EBP can be encouraged (Manojlovich, 2007; Wilson et al, 2002).

That the results yielded a positive correlation between EBP attitudes and age is surprising in its contrast with previous research: both Akinbo et al (2009) and Jette et al (2003), while in the field of physical therapy, found younger respondents more receptive to EBP and exhibiting more positive attitudes; though significance was not determined, Lehman (2007) found nurse attitude scores to decline with increasing age. Such results, however, must be interpreted with caution. Qatar offers a unique context in its amalgamation of nurses from a variety of educational, professional and cultural backgrounds into a single system, and the aforementioned results could be reflective of this mosaic. That is, in the absence of a continuum from education to profession (whereby professional settings are reflective of the education system in the same setting) comfort with new concepts such as EBP may align with age. However, if this were the case, years of experience would be expected to correlate accordingly, which it does not; nor does it with nationality.

Age is not a qualitative trait in itself but rather a reflection or predictor of age-related qualities. For example, negative attitudes may have more to do with changes in education curricula over time. EBP being a relatively-new concept, it is more likely to be embedded in more contemporary curricula and, as such, younger students are likely to have more familiarity and positive views towards it (Penz and Bassendowski, 2006). This does not help to explain the results of this study, and that the years since educated and the years of work experience yielded no significant correlation only further confuses the result. Indeed, it is difficult to discern from these results the true effect of age on EBP attitudes, whether legitimate causation or confounding.

Attempting to draw a conclusion on these results highlights the conflict beautifully: at face value, the conclusion could be made that, as age increases, attitudes towards EBP become more positive. In terms of informing development initiatives in Qatar, that could be extended to target older nurses with more experience; however, experience itself was found to have no correlation with attitudes. Given this paradox, more investigation on the relationship between experience indicators and EBP attitudes is certainly required.

Interestingly, only dimension 1 (EBP application) was found to be significantly different across the four levels of highest education. Moreover, between paired levels of highest education, the only test which failed to yield a significant result was between postsecondary diplomas and bachelor's degrees. The latter technically being a postsecondary diploma itself – albeit at the high end of the spectrum of undergraduate education – suggests that these two levels may effectively fall under a broader category of 'undergraduate education', nested between higher secondary and postgraduate education. In doing so, a continuum of improving EBP application is observed as education levels increase, indicative of increasing knowledge and awareness of EBP as one becomes more educated.

Given the curriculum background of most respondents – that is, from non-Western education systems – it is expected that the distinctions between the three levels in terms of their knowledge of EBP would be contrasting. Compared to Western education models, the regions predominantly reported are lagging in their inclusion of EBP principles in their curricula (Short et al, 2010; Thompson et al, 2004). The novelty of EBP in these contexts makes it more likely to have significant gradations, as observed. Postgraduate education exhibited a highly significant difference which is expected of a novel principle (i.e. to be applied at the higher levels); as the principle becomes more commonplace and central to a profession, the gradations would potentially decline, since EBP would be increasingly embedded across all nursing curricula.

As one of two key variables from which distinctions on EBP knowledge and attitudes has been observed, this result provides valuable insight in terms of training, development and empowerment. Linking it to the correlation between dimensions, it can be inferred that those with higher education are not only more likely to be currently applying EBP principles in their work, but in turn more receptive to the development of the other dimensions of EBP. It is difficult to speculate what the relationship is between clinical speciality and EBP attitudes and knowledge, for two reasons. Firstly, the subsamples (of each speciality) varied in size considerably – for example, Multi-Specialty yielded only one response. This wasn't an isolated case, as seven of the fourteen groups had ten responses or less. Moreover, both that were found to be significantly different groups (Emergency/Trauma and Multi-Specialty) had samples sizes below ten. Secondly, with only two specialities showing significant difference and both their sample sizes being so

small, the results must not be interpreted hastily.

Urology in particular exhibited very high scores – indeed, the highest possible scores were reported for each Urology respondent for across all dimensions. Coupled with a small sample size, it is curious that every respondent answered both maximally and identically to one another, indicative of bias or collusion in data collection. Emergency/Trauma nurses were more diverse in their responses and, subsequently, less significant by comparison. Given the aforementioned limitations of sample size and concerns over the integrity of the data, the results for these seemingly-significant variables can, at most, be a weak indication of a possible relationship between nursing attitudes, knowledge and clinical speciality, with a strong recommendation for more research. Indeed, in the absence of a larger data set or literature support for a causal association between Urology and Emergency/Trauma nurses and heightened EBP knowledge and attitudes, a firm conclusion cannot be drawn.

CONCLUSIONS

While the EBPQ is not an objective measure of EBP competency, it can still be a valuable tool in benchmarking EBP attitudes and knowledge in order to evaluate the effectiveness of development initiatives, or simply to evaluate workplace preparedness for EBP. Certainly, there is little doubt that perceptions – particularly relating to one's own abilities – facilitate the implementation of EBP and other strategic initiatives (Brown et al, 2009).

Consequently, this study serves as a precursor to competency evaluation or other, more objective and extensive analyses of EBP in the Qatar workforce. Moreover, it is not merely a valued precursor, but rather an essential one. There is an end-goal in sight with EBP both in terms of the clinical protocols that it installs and quality improvement of outcomes, for which competency assessment may be required; however, there is a balance to be struck between process and outcomes when developing such strategies, and at this infant stage of EBP in Qatar, the process must still be considered.

While this study perhaps cannot state outright whether nurses at HGH – let alone Qatar – are prepared to embrace and apply EBP in their respective clinical practices, it offers insight into not only where they're at, but also in what factors may cause differentiation in preparedness which, in turn, will help to tailor strategies to maximise outcomes of quality improvement (Leufer and Cleary-Holdforth, 2009; Glasziou and Haynes, 2005; Wolf et al, 2008). The true strength in this approach is that it delivers the prerequisites for application of EBP, which in turn fosters empowerment in a positive feedback cycle of continuous improvement (Nagy et al, 2001). Furthermore, it is recommended that, subsequent to using these results towards developing a framework, these results are used to benchmark EBP attitudes and knowledge and serve as a gauge for progress in empowering the nursing workforce; a re-evaluation 2 years in from the implementation of a development strategy would permit a comparative analysis towards evaluating the progress towards the stated goals. With the Qatar 2030 vision seeking to bring the nation's health system on par with the world's best (GSDP, 2008), a successful implementation of EBP into their nursing workforce will go a long way to empowering them to contribute to this ambitious vision.

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		Dimension 2: EBP Attitudes	Dimension 3: EBP Skills
Dimension 1: EBP Application	Correlation coefficient	0.321	0.471
	Significance (2-tailed)	<0.001	<0.001
Dimension 2: EBP Attitudes	Correlation coefficient	-	0.299
	Significance (2-tailed)	-	<0.001

Table 1: Spearman's Rank Correlation Coefficient analysis results for all three scored dimensions

Comparison Subgroup	Dimension 1 (EBP Application) Score				Total Score			
	Median Scores		U	p	Median Scores		U	p
	Urology	Comparison Group			Urology	Comparison Group		
Critical care	42	30	6	<0.001	161	129	10	<0.001
Emergency/Trauma	42	32.5	3	0.004	161	127	2	0.004
General Practice	42	30	6	<0.001	161	125	5	<0.001
Haematology	42	32	0	0.001	161	121.5	0	0.001
Long-term care	42	30	0	0.003	161	133	1	0.010
Multi-specialty	42	21	0	0.014	161	101	NS	NS
Neurosurgery	42	32.5	3	0.002	161	131.5	5	0.006
Oncology	42	27	0	<0.001	161	122.5	0	<0.001
Orthopaedics	42	28.5	0	0.001	161	128.5	1.5	0.002
Paediatrics	42	29	0	<0.001	161	116	4	<0.001
Post-op	42	33	0	0.001	161	132	2.5	0.002
Radiology	42	28	0	0.004	161	119	0	0.010
Surgical	42	29.5	6	<0.001	161	126.5	8.5	<0.001

Table 2: Mann-Whitney Test results comparing dimension 1 (EBP Application) and total scores between urology specialty and other reported clinical specialities. 'NS' denotes a non-significant result.

Comparison Subgroup	Dimension 1 (EBP Application) Score			
	Median Scores		U	p
	Emergency/Trauma	Comparison Group		
General Practice	32.5	30	79	0.04
Oncology	32.5	27	48	0.005
Paediatrics	32.5	29	90.5	0.02
Surgical	32.5	29.5	108	0.038
Urology	32.5	42	3	0.004

Table 3: Mann-Whitney Test results comparing the dimension 1 (EBP Application) scores between Emergency/Trauma specialty and other reported clinical specialities. 'NS' denotes a non-significant result.

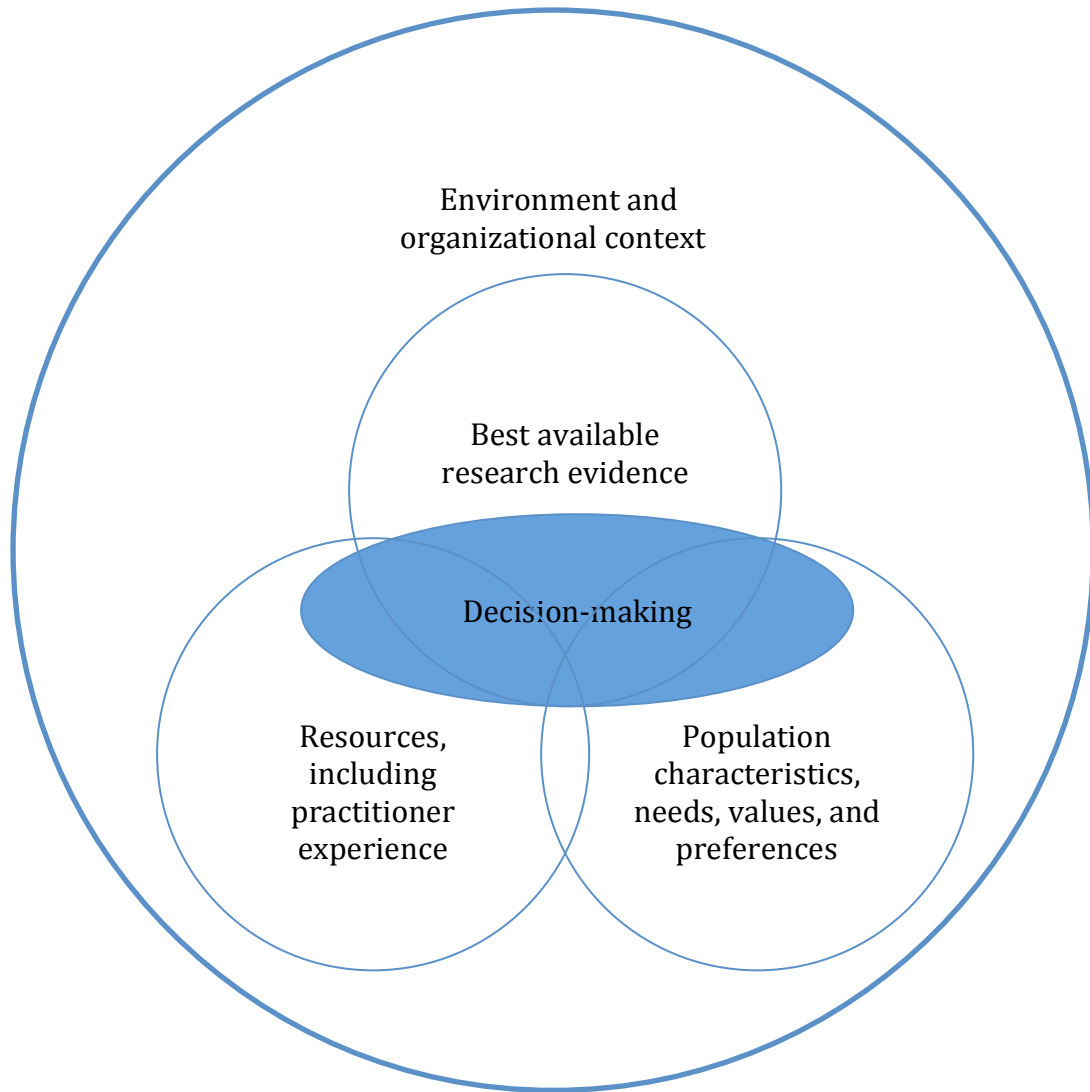


Figure 1: A generalized model for a holistic evidence-based approach to clinical practice (adapted from Jacobs et al, 2012)