ORIGINAL ARTICLE

Oman Medical Journal [2019], Vol. 34, No. 6: 521-527

Nurses' Knowledge, Attitudes, and Implementation of Evidence-based Practice in Oman: A Multi-institutional, Cross-sectional Study

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ARTICLE INFO

Article history:
Received: 3 December 2018
Accepted: 14 March 2019

Online:
DOI 10.5001/omj.2019.95

Keywords:
Evidence-Based Practice; Attitudes; Knowledge; Nurses; Oman.

ABSTRACT

Objectives: Little attention has been paid to the study of evidence-based practice (EBP) among nurses in Oman. Our aim was to explore knowledge, practice, and attitudes towards EBP among nurses working in Oman. ***Methods***: This multi-institutional cross-sectional study utilized the self-reported EBP Questionnaire with a random sample of 262 nurses working in three different health care settings in Al Dakhliyah governorate, Oman (local hospitals, primary health centers and polyclinics, and schools). ***Results:*** A total of 202 nurses (response rate: 77.1%) completed the questionnaire. The mean age was 32.4±4.7 years. Most respondents were females (92.5%), Omani (79.1%), and holders of a diploma in nursing (73.5%) with a mean clinical experience of 10.9±4.2 years. Attitudes towards EBP showed the highest mean score of 5.5±1.2 followed by knowledge (4.9±0.8) and practice (4.7±1.2). Significant positive correlations were identified between the total years of nursing experience and knowledge (r_s = 0.145, n = 198, p = 0.041), practice (r_s = 0.172, n = 198, p = 0.015), and attitudes (r_s = 0.158, n = 197, p = 0.026) mean scores. No significant difference in EBP scores was found among the three clinical settings. ***Conclusion:*** Although attitudes towards EBP were positive, knowledge and implementation of EBP were low. This study serves as a baseline assessment for future evaluations and provides a basis for the implementation of strategies to promote EBP utilization among nurses in three different health care settings in Oman.

Evidence-based practice (EBP) is a problem-solving approach to the delivery of healthcare that integrates scientific research with clinician expertise and patient preferences and values.[1] Standardization of clinical practices and patient care is one of the main objectives of EBP through the adoption of best practices.[2] The Institute of Medicine (USA) considers EBP the cornerstone for improving the quality and safety of patient's care.[3] Furthermore, it recognizes EBP as an essential competency that should be mastered by all healthcare professionals. The importance of EBP lies in that it facilitates the delivery of effective, efficient, and safe patient care.[1,2] There is a focused and systemic effort to integrate EBP into every patient encounter among all clinical settings.[2] Multiple strategies have been utilized to promote EBP among healthcare professionals with varying degrees of success in increasing knowledge of and shifting attitudes towards EBP. Such strategies include journal clubs, mentorship programs, and training in scientific research.[2,4]

Over the past decade, several studies have examined nurses' adoption of EBP. Upton and Upton[5] developed the first validated tool to measure nurses' day-to-day use of EBP. This has paved the way for a more comprehensive examination of EBP utilization in nursing practice around the world. Although a global movement has been initiated to promote EBP adoption in clinical settings, nurses continue to face individual and organizational barriers for implementation.[4,6] In a recent study from Nepal, 93% of nurses had not received any training in EBP.[7] Furthermore, asking colleagues and peers was the primary method of obtaining information and answers to clinical questions in

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nearly three quarters (73%) of nurses in one study.[8] Across the globe, nurses share a number of challenges preventing the use of evidence in clinical practice which includes insufficient time to implement new ideas, unsupportive supervisors/senior staff, lack of resources, lack of skills to appraise research, and perceived limited autonomy to change practice.[4–9]

Despite the importance of EBP in improving the quality and safety of patient's care,[1,2,9] little attention has been paid to the study of EBP among nurses in Oman. Ammouri et al,[10] examined the practices, attitudes, and knowledge associated with EBP among 414 nurses working in four tertiary (referral) governmental hospitals in Muscat, Oman. Findings from this study indicated that nurses viewed EBP positively, but reported low levels of EBP knowledge and practice.[10] However, no studies have been carried out in primary and secondary care settings in Oman. Furthermore, examining the state of EBP in the different health care settings may yield insight into barriers to EBP utilization, provide baseline data for benchmarking, and facilitate planning for nursing EBP promotion/improvement initiatives by policy-makers.[8]

Therefore, the aims of the present study were: (1) to identify the knowledge, attitudes, and practices of nurses working in three different health care settings: local hospitals, primary health care centers and polyclinics (these are clinics that provide specialized care covering a number of chronic conditions, such as diabetes and hypertension), and schools; (2) to identify any significant differences in nurses' knowledge, practices, and attitudes related to EBP based on the clinical setting (local hospitals vs. health centers and polyclinics vs. schools); and (3) to examine associations between specific demographic and professional characteristics such as age, gender, marital status, nationality, educational attainment, job designation/role, years of work experience in the Omani Ministry of Health (MOH) institutions, and total years of nursing experience and perceived EBP knowledge, practice and attitudes.

METHODS

The study employed a descriptive cross-sectional design using a reliable and valid self-administered questionnaire. The study was conducted on staff nurses working in three different governmental clinical settings in Al Dakhliyah governorate (one of 11 administrative regions), Oman, from 16–20 July 2017. The sample population comprised of staff nurses from five local hospitals (n = 348), four polyclinics and 21 primary health care centers (n = 321), and school nursing services (n = 109), giving a total number of 778 potential participants at the time of data collection.

The calculated sample size was 262 (33.7% of the total population) with a 95% confidence level and a 5% margin of error. Stratified random sampling was employed based on clinical settings. Study participants were selected randomly, with the number of nurses invited to participate from each setting proportional to the total number of nurses working in their respective clinical settings. Consent forms and study questionnaires were then sent to the nurse-in-charge at the participating health institutions with the names of the invited participants.

Study participants completed two questionnaires to collect the demographic characteristics and data related to EBP. The demographic data questionnaire was designed by the authors for this study and included eight variables: age, gender, nationality, marital status, educational attainment, current job designation/role, total years of experience, and duration since joining the MOH.

The English version of the self-administered Evidence-Based Practice Questionnaire (EBPQ) developed by Upton et al,[5] was used to describe nurses' day-to-day use of EBP. The EBPQ contains 24-items comprising three distinct subscales: EBP practice (six items), knowledge/skills (14 items), and attitudes (four items). All items were rated on a Likert-type scale from one to seven, with a higher score representing a more positive response (i.e., a more positive attitude or greater use and knowledge of EBP). In the original study,[5] the EBPQ had a good overall internal consistency with Cronbach's alpha of 0.87 (0.79 for the knowledge/skills subscale, 0.85 for the practice subscale, and 0.79 for the attitudes subscale). Construct validity was measured using correlation coefficients ranging from 0.3 to 0.4 indicating a positive moderate relationship.

In the present study, Cronbach's alpha scores for the three subscales were 0.93 for the knowledge/skills of EBP subscale, 0.59 for the practice subscale, and 0.89 for the attitudes towards EBP subscale. The whole questionnaire had a good internal consistency with a Cronbach's alpha score of 0.89. Overall, the

reliability scores from this cohort were similar to those reported by Upton et al[5] in their questionnaire development study except for a lower score on the knowledge subscale.

Ethical approval was obtained from the Research and Ethical Review and Approval Committee, Al Dakhliyah Governorate, MOH, Oman (DGHS/R&S/PROPOSAL_APPROVED/2515/2017). Informed consent was obtained from invited participants prior to the administration of the questionnaire, and the study was conducted in accordance with the Declaration of Helsinki.

The demographic characteristics of participants were summarized using descriptive statistics (i.e., frequencies, percentages, means, and standard deviations). Preliminary analyses were performed to assess statistical assumptions of normality, linearity, monotonicity, relevancy, and homoscedasticity. One-way analysis of variance, Kruskal-Wallis, and correlation coefficients were used to examine the relationship between demographic/professional variables and EBPQ subscales and to identify any significant differences in EBP mean scores between the three clinical settings. The alpha level was set at 0.05. All analyses were performed using SPSS Statistics (IBM Corp. Released 2011. IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp.).

RESULTS

A total of 202 nurses participated in the study with a response rate of 77.1%. Sixty nurses (22.9%) declined to participate, and no questionnaires were excluded from the analysis. The mean age of respondents was 32.4±4.7 years (range = 23–52 years), most were staff nurses (92.0%), and the average duration of clinical experience was 10.9±4.2 years. The majority of participants were female (92.5%), married (92.0%), and Omani (79.1%). Around three quarter of respondents (73.5%, n = 147) held a diploma in nursing, while 53 (26.5%) held higher academic degrees (17.5% held a bachelor's degree, 8.5% post-basic diploma, and 0.5% a master's degree) in nursing. Table 1 presents the respondents' demographic characteristics.

Overall, attitudes towards EBP showed the highest mean score (5.5±1.2) followed by knowledge/skills (4.9±0.8) and practice (4.7±1.2) subscales [Table 2]. Responses to each EBPQ items were considered negative if scores were between one and four. The percentage of respondents with negative responses were recorded and then rank-

Table 1: Demographic characteristics of study participants.

Variables	n	Percentage, %
Clinical setting (n = 202)		
Local hospitals	96	47.5
Primary health centers and polyclinics	86	42.6
School nursing services	20	9.9
Age, mean ± SD (range), years (n = 188)	32.4 ± 4.7 (23–52)	
Age, years, (n = 188)		
23–28	40	21.3
29–34	90	47.9
35–40	52	27.7
≥ 41	6	3.2
Gender (n = 201)		
Female	186	92.5
Male	15	7.5
Marital status (n = 199)		
Single	16	8.0
Married	183	92.0
Highest educational degree (n = 200)		
Diploma in nursing	147	73.5
Post-basic diploma	17	8.5
Bachelor's degree	35	17.5
Master's degree	1	0.5
Designation/role (n = 200)		
Staff nurse	184	92.0
Nurse-in-charge	7	3.5
Head of nursing	2	1.0
Others	7	3.5
Nationality (n = 201)		
Omani	159	79.1
Filipino	22	10.9
Indian	19	9.5
Tunisian	1	0.5
MOH experience, mean ± SD (range), years (n = 198)	9.9 ± 4.5 (1–20)	
1–5	36	18.2
6–10	72	36.4
11–15	68	34.3
16–20	22	11.1
Experience mean ± SD (range), years (n = 199)	10.9 ± 4.2 (1–28)	
1–5	16	8.0
6–10	83	41.7
11–15	73	36.7
16–20	24	12.1
≥ 21	3	1.5

SD: standard deviation; MOH: Ministry of Health.

Table 2: Mean scores and standard deviations of EBPQ subscales.

Items	n	Score, mean ± SD	Response patterns, n (% responding 1–4)	Priority item rank
Knowledge		4.9 ± 0.8		
Research skills	201	4.2 ± 1.3	116 (57.7)	1
IT skills	199	4.9 ± 1.2	70 (35.2)	6
Monitoring and reviewing practice skills	198	5.0 ± 1.0	55 (27.8)	11
Converting information needs into a question	198	4.5 ± 1.2	101 (51.0)	2
Awareness of information types and sources	201	4.6 ± 1.1	92 (45.8)	3
Able to identify gaps in own practice	198	4.9 ± 1.1	66 (33.3)	7
Knowledge of how to retrieve evidence	198	4.7 ± 1.0	86 (43.4)	4
Ability to critically appraise	200	4.7 ± 1.2	83 (41.5)	5
Ability to determine the validity of material	201	4.9 ± 1.1	64 (31.8)	8
Able to determine usefulness of material	201	5.0 ± 1.2	60 (29.9)	9
Apply information to individual cases	200	5.1 ± 1.1	57 (28.5)	10
Sharing ideas/information with colleagues	200	5.5 ± 1.2	50 (25.0)	12
Dissemination of new ideas with colleagues	199	5.3 ± 1.1	45 (22.6)	13
Ability to review own practice	201	5.4 ± 1.1	41 (20.4)	14
Practice		4.7 ± 1.2		
Formulate clear question	199	4.3±1.2	114 (57.3)	2
Track down relevant evidence	200	4.3 ± 1.3	108 (54.0)	3
Critically appraise literature	196	3.8 ± 1.4	123 (62.8)	1
Integrate the evidence with expertise	200	4.9 ± 1.3	70 (35.0)	4
Evaluate outcomes of practice	200	5.4 ± 1.3	58 (29.0)	5
Share information with colleagues	200	5.4 ± 1.3	50 (25.0)	6
Attitudes		5.5 ± 1.2		
Workload	197	5.3 ± 1.4	60 (30.5)	1
Resent questioning versus welcome questioning about clinical practice	199	5.6 ± 1.4	46 (23.1)	2
EBP waste of time	199	5.6 ± 1.6	41 (20.6)	3
Stick to old ways versus change	199	5.7 ± 1.3	33 (16.6)	4

EBPQ: evidence-based practice questionnaire; SD: standard deviation; IT: information technology.

ordered with one representing the highest priority for intervention to identify items within each subscale with the highest priority in terms of learning needs. The top five items for the knowledge subscale were: (1) research skills, (2) converting information needs into questions, (3) awareness of information types and sources, (4) knowledge on retrieving evidence, and (5) critical appraisal. For the practice subscale, the top priority items were critical appraisal and formulating questions around clinical problems. The top item for the attitudes subscale was 'time in a work schedule for research'.

Table 3 shows mean scores and standard deviations of EBPQ subscales based on clinical settings. School nursing had the highest mean score for the knowledge (5.3±0.8) and practice subscales (5.0±1.1), while primary health centers/polyclinics had the highest mean score for the attitude subscale (5.6±1.1). However, no statistically significant differences were identified on knowledge, practice, and attitudes between the three clinical settings [Table 3].

A bivariate correlation analysis was performed to examine the relationship between EBP knowledge, practice, and attitudes mean scores and nurses' demographic and professional characteristics [Table 4]. There was a significant positive correlation between nurses' age and attitudes mean scores (r_s = 0.168, n = 188, p = 0.022). Older nurses had better EBP attitudes mean scores compared with younger nurses. However, age was not correlated with EBPQ knowledge and practice subscales. Furthermore, significant positive correlations, although weak, were observed between total years

Table 3: Mean scores and standard deviations of EBPQ subscales by clinical setting.

Clinical setting	EBPQ subscales (mean ± SD)		
	Knowledge	Practice	Attitudes
Local hospitals (n = 96)	4.8 ± 0.8	4.6 ± 1.5	5.5 ± 1.2
Primary health centers and polyclinics (n = 85)	4.9 ± 0.8	4.7 ± 0.9	5.6 ± 1.1
School nursing services (n = 20)	5.3 ± 0.8	5.0 ± 1.1	5.35 ± 1.31
Significance	[a]F = 2.819, p = 0.062	[b]χ^2 = 5.36, df = 2, p = 0.069	[b]χ^2 = 1.66, df = 2, p = 0.436

EBPQ: evidence-based practice questionnaire; SD: standard deviation.
[a]One-way analysis of variance. [b]Kruskal-Wallis test.

Table 4: Relationships between nurses' demographic and professional variables and their scores on the EBPQ subscales.

Variables	EBPQ subscale					
	Knowledge		Practice		Attitudes	
	r_s	p-value	r_s	p-value	r_s	p-value
Age	0.113	0.124	0.105	0.152	0.168	0.022
Gender	0.084	0.239	0.099	0.162	0.027	0.702
Marital status	0.023	0.749	- 0.026	0.711	0.043	0.546
Nationality	0.054	0.449	- 0.028	0.695	0.098	0.169
Education level	0.094	0.187	0.056	0.433	0.090	0.205
Designation/role	- 0.019	0.794	0.058	0.412	- 0.021	0.766
Years of experience in MOH institutions	0.090	0.211	0.135	0.058	0.138	0.054
Total years of experience	0.145	0.041	0.172	0.015	0.158	0.026

EBPQ: evidence-based practice questionnaire; MOH: Ministry of Health. r_s = Spearman's rank correlation coefficient.

of nursing experience and knowledge (r_s = 0.145, n = 198, p = 0.041), practice (r_s = 0.172, n = 198, p = 0.015), and attitudes (r_s = 0.158, n = 197, p = 0.026) mean scores, indicating that nurses with greater years of work experience tended to have better EBP knowledge, implementation, and attitudes. No correlation was found between mean scores for EBPQ subscales and gender, marital status (married vs. single), nationality (Omani vs. non-Omani), education level (diploma vs. higher academic degrees), designation/role (staff nurse vs. other designations), and years of work experience in MOH institutions.

DISCUSSION

To the best of our knowledge, this is the first study to assess the state of EBP in primary care nursing in Oman. Results from this study reveal that EBP is viewed favorably by nurses working in three different care settings. Furthermore, although nurses appeared to be inclined to apply EBP in the clinical setting, their knowledge and implementation of EBP were low, a finding that is consistent with previous research.[6,7,10–13] As in other settings,[10,12,13] these results indicate that there is a mismatch between nurses' attitudes towards EBP and their ability to integrate EBP into clinical practice.

Although studies assessing the adoption of evidence-based nursing show marked heterogeneity in clinical settings evaluated, nurses' EBP knowledge, attitudes, and practice appear to be homogeneous.[9] In general, although nurses report a positive attitude towards EBP, their level of knowledge and implementation of EBP are limited.[6,7,10–13] In a recent study from Iran, for example, while nurses demonstrated a moderately positive attitude towards EBP, they reported low levels of EBP knowledge/skills and practice.[12] Furthermore, a study from Saudi Arabia found high levels of knowledge and attitudes towards EBP among nurses working in two specialist tertiary hospitals but integrating EBP into clinical practice was low.[14]

In light of these data, stakeholders across the nursing education continuum, healthcare policy planners, and hospital administrators/managers

in Oman should consider the implementation of primary care nursing EBP training programs at the undergraduate education and workplace levels.[9,15] These include integrating EBP training into nursing education curricula/postgraduate programs and establishing EBP training workshops and research mentorship programs at the workplace. Such programs should prioritize competencies/items, identified in this and previous studies, with the highest learning needs.[6,10,11,13] Previous research has confirmed the effectiveness of some initiatives aimed at increasing EBP knowledge/skills[16] and implementation.[4]

Although differences in EBP mean scores were observed between the three care settings examined in this study, they did not reach statistical significance. This may indicate that nurses' perceptions and utilization of EBP are similar across the different health care settings in Oman. Therefore, future EBP educational interventions aimed at improving EBP utilization should not only target nurses working in health care centers but also those working in other care settings including school nursing services.

Research skills (57.7%) followed by converting information needs into questions (51.0%), awareness of information types and sources (45.8%), skills to retrieve evidence (43.4%), and critical appraisal (41.5%) were identified as the greatest perceived deficits in knowledge and skills [Table 2]. Similar responses were also observed in previous studies.[6,13] One reason for this could be that the majority of the study participants held a diploma (73.5%) or a post-basic/advanced diploma (8.5%) while only 17.5% possessed a bachelor's degree, a finding that is representative of the general nursing workforce in Oman.[10,17] Partly because of brief and concise educational programs that mainly focus on 'technical' training, diploma in nursing degrees do not adequately emphasize research methods and literature appraisal/EBP training compared to the prolonged bachelor in nursing programs. This explanation is supported by previous research; nurses with higher professional qualifications were more able to implement EBP in routine daily practice.[15] Furthermore, bachelor-level professional education has reported being associated with fewer barriers to the adoption of EBP among nurses working in tertiary referral hospitals in Oman.[10] These findings highlight the importance of diploma-to-bachelor bridging programs that have been recently implemented.[18] Another option is to provide working nurses with the opportunity to pursue higher academic and professional qualifications in Oman and abroad.[17]

'Making time in a work schedule for research' was reported as the top priority item for the attitudes subscale among study participants. This is consistent with several previous studies that specifically examined barriers to EBP implementation.[10,13,15] More than half of the nurses in one study reported that perceived lack of time at their workplaces to be a major barrier to accessing and reviewing literature.[15] Nurses who reported higher workloads were more likely to view the adoption of EBP negatively.[13] As suggested by previous reports, it is recommended that health planners and policy decision-makers in Oman consider making changes to nurses' work schedules to provide them with adequate time to obtain further training in EBP and critically review the literature.[10,15]

Nurses with a longer duration of work experience tended to have better EBP knowledge, practice and attitudes, a finding reported by previous studies.[5,10–12,15] Results from these studies altogether suggest that nurses with greater nursing experience are likely to be more confident in implementing EBP, possibly as a function of (or in response to) greater exposure to EBP methods and training as part of continuous professional education.[19] This is supported by the findings of Ferguson and Day,[20] who reported that new nurses were less confident in utilizing EBP in their clinical practice due to their limited experiential knowledge. Based on results from this and previous studies, future EBP educational interventions and programs should target those with less clinical nursing experience.

This study needs to be considered in light of certain limitations. First, the study used a self-reported, although validated, questionnaire to evaluate EBP utilization among nurses, which may have introduced recall bias. Second, the study was based in one region of Oman, Al Dakhliyah governorate, which may limit the generalizability of study findings to other regions. Furthermore, the study setting was limited to governmental institutions. Therefore, results from this study cannot necessarily be generalized to nurses employed in private sector medical facilities who tend to be graduates of overseas universities/nursing colleges.[17] Third, internal consistency for the practice subscale of the EBPQ in this study was

lower, while acceptable, than that reported in the original validation study.[5] Fourth, given the cross-sectional design, the associations detected in this study may not necessarily be causal. Despite the aforementioned limitations, this study provides novel insights into nurses' perceptions and attitudes towards EBP in three different health care settings in Oman.

CONCLUSION

This study presents the first evaluation of the state of EBP in three health care settings in Oman. Although nurses' attitudes towards EBP appeared to be positive overall, their knowledge and implementation of EBP were low. Years of clinical experience was the only variable that was correlated with all three EBP subscales. Information from this study serves as a baseline assessment for future comparative/evaluation studies and provides a basis for implementing initiatives and strategies aimed at promoting the utilization of EBP among nurses in different health care settings in Oman. Future EBP educational initiatives and policy changes aimed at promoting EBP in primary care nursing should focus on aspects identified in this study with the highest priority for intervention, including research skills, critical appraisal, and workload pressure. Given that this study did not specifically explore barriers to EBP, future research should perhaps examine barriers to the adoption of EBP among nurses utilizing previously validated tools such as the EBPQ.[21]

Disclosure

The authors declared no conflict of interest. No funding was received for this study.

Acknowledgements

The authors are grateful for the nurses who willingly gave their time and participated in this study. We also would like to thank Dr. Susan Vendeland for reviewing prior drafts of this manuscript.

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