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Research Article

Assessment of Nurses' Knowledge Regarding Nursing Preparations for Ultrasonography Examinations in General Hospitals at Port Said City

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Abstract

Background and Objective: The nurses' responsibility is incredibly relevant for the outstanding standard and results of sonography investigations that help the therapeutic physician to make a correct medical decision. To assess nurses' knowledge regarding nursing preparations for ultrasonography examinations among hospitalized patients in general hospitals at Port Said City.

Materials and Methods: About 92 nurses recruited from the different internal departments, General and Al Nasr Hospitals at Port Said city, Egypt. The data were collected using structured questionnaire sheet which was consisted of 20 questions related to socio-demographic data and nursing preparations knowledge to nurses' knowledge about nursing preparations for an ultrasonography examinations among hospitalized patients.

Results: All registered nurses working in different mentioned Departments had an unsatisfactory level of knowledge about nursing preparations for ultrasonography examinations moreover; it was also found that no statistically significant relationship between nurses' knowledge and their socio-demographic data were detected.

Conclusion: The level of satisfaction about level of nurses' knowledge about patients' preparations for ultrasound was very low as 78 nurses (84.8%) had wrong answers of the questionnaire about patient preparation for an ultrasound.

Key words: Nursing preparations, sonography investigations, hospitalized patients, ultrasonography examinations, registered nurses

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Data Availability: All relevant data are within the paper and its supporting information files.

INTRODUCTION

An Ultrasound (US) (also known as sonography or ultrasonography) is a diagnostic procedure that transmits high-frequency sound waves, inaudible to the human ear, through body tissues. The echoes are recorded and transformed into video or photographic images of the internal structures of the body¹⁻³.

Knowledge regarding common radiological procedures risks and how to express these risks to patients are the responsibility needed to be accomplished by physicians and healthcare providers. Knowledge gaps of hospital physicians on radiation dose and risk are evident from published research. Also, patients are not fully informed of the radiation risks associated with radiological tests⁴.

Poor knowledge among registered nurses regarding nursing ultrasonography preparations, with most clinicians significantly underestimating the relative exposure associated with common radiological investigations has been reported previously^{5,6}. while, some researches have reported that radiation training and educational programs may play an important role in improving the knowledge and awareness of nurses regarding patient's preparations for ultrasound examinations^{4,7,8}.

Over the last 20 years, nurses need to face the necessity to be highly qualified professionals with forever updated competencies and practical skills. Learning on the Internet by the "e-learning" method, to a great extent changed the way by which nurses can get information and be involved in educational activities designed to ensure their continuing medical education⁹.

Nursing sector is a particular field in which quality of contents and type of methodology should be respected with specific requirements and high-level standards¹⁰.

In the late years, postgraduate nursing education is moving into a new era driven by the three interlinked ways to achieve professionalization, increasing accountability and the critical need of excellence¹¹.

Ultrasound exams require special preparation in certain conditions. It is important that patients follow the preparation guidelines so the sonographer can obtain the best possible images¹². Nurses are an essential member of any health care team and in many cases the first-line of care. They are the eyes and ears for physicians and must balance a vast array of medical skills with compassion, multi-tasking and collaborating with other health professionals¹³. So, The nurses have important roles in patient preparations for an ultrasound, therefore this research was done to assess nurses'

knowledge regarding nursing patients' preparations for an ultrasonography examinations at Port Said Hospitals.

MATERIALS AND METHODS

The study was conducted at the General and Al Nasr Hospitals, Port Said city, Egypt. The study was designed as a descriptive study. About 92 nurses recruited in the different internal departments in two hospitals. Questionnaire for the assessment of the nurses' knowledge about nursing patients' preparations for ultrasound examinations was given to each nurse. The duration of research project was December 1, 2017 to October 30, 2018. Informed consent was obtained from each nurse prior to inclusion in the study and after full explanation of the aim and importance of the study. They answered a questionnaire containing 20 items. The questioner was designed to contain two parts (Appendix I).

- **Part I:** It included items related to socio-demographic characteristics of the studied nurses as work areas, gender, age, years of experience, sources of nurses' knowledge and qualification
- **Part II:** It included questions related to nurses' knowledge about nursing patients' preparations for an ultrasound (definition, risks and patients' preparations ultrasound)

The researcher visited the selected settings on daily basis during the morning and afternoon shifts. The average number of nurses who answered the questionnaire was 6-8 nurses per day. Nurses' knowledge and information regarding answering the nurses' questionnaire required about 15-20 min. The researcher was available to answer any questions or explanations, to check each questionnaire after its completion and to be sure that there were no missed items. The obtained data were converted into numeric data and the percentage and frequency were calculated.

The level of satisfaction of the nurses' knowledge about nursing patients' preparations for ultrasonography examinations was calculated by 75% to correct answers of the questionnaire.

Statistical analysis: A statistical package program was used to evaluate the data obtained from the study. Descriptive statistical methods (frequency and proportion) were used in the evaluation of research data. After data were collected, they were coded and transformed into specially designed format so

as to be suitable for computer feeding. All entered data were verified for any errors. The statistical package for social sciences (SPSS) was utilized for statistical analysis and tabulation. The following statistical measures were used.

Descriptive measures included: Frequency and percentage, the statistical analysis used were chi-square test to compare between total score of knowledge and socio-demographic characteristics, statistical significance was considered at $p < 0.05$. The results were calculated at the 95% confidence interval, $p < 0.05$ significance level and $p < 0.01$ advanced significance level.

RESULTS

Table 1 shows sociodemographic data of studied nurses. About one third of the nurses (30.4%) worked in the female general surgery area. As regard to gender the majority of the studied nurses were females (94%). About 47.8% of the study sample' age was ranged between 20 and 30 years. As regards

to their qualification, more than half of the studied sample (57.6%) was secondary nursing school degree. Concerning years of experience, (57.6%) of the studied sample had a total of 5 and less than ten years of experience.

Table 2 shows percentage distribution of nurses in relation to their knowledge regarding the ultrasound, more than two third of studied nurses had satisfactory level of knowledge regarding risk of ultrasound, thyroid ultrasound preparations, breast ultrasound preparation and aortic ultrasound preparation, respectively (83.7, 72.8, 68.5, 71.7%). While the knowledge about the definition was 0% unsatisfactory level for all nurses.

Statistically significant relationship were found between two groups of knowledge regarding the ultrasound where $X^2 = 172.9$ at $p < 0.05$.

Table 3 shows percentage distribution of nurses in relation to their knowledge regarding nursing preparation of different body systems. The two third of studied nurses had unsatisfactory level of knowledge about different body

Table 1: Socio-emographic data of studied nurses

Variables	(n = 92)	Frequency	Percentage
Departments	ICU female	7	7.6
	ICU male	6	6.5
	General surgery female	28	30.4
	General surgery male	21	22.8
	Internal medicine female	6	6.5
	Internal medicine male	6	6.5
	Orthopaedic female	2	2.2
	Orthopaedic male	2	2.2
	Pediatric	1	1.1
	Urinary	13	14.1
Gender	(M/F)	(5/87)	(5.4/94)
Age	-20	7	7.6
	20≤30	44	47.8
	30≤40	32	34.8
	40≤50	5	5.4
	+50	4	4.3
Years of experience	-1	7	7.6
	5≤10	53	57.6
	10≤20	28	30.4
	+20	4	4.3
	Did you learn patients, preparations for ultrasound in your study	Yes	78
	No	14	15.2
Source of knowledge about patient, preparation about ultrasound	Nursing study	24	26.1
	Hospital experience	34	37.0
	Nursing study and Hospital experience	11	12.0
	Nursing study, Hospital experience and Training course	2	2.2
	Training course	1	1.1
	Hospital experience and Training course	1	1.1
	Others	5	5.4
Qualifications	Secondary nursing school	53	57.6
	Nursing technical institute	25	27.2
	Nursing college	14	15.2

systems (92%). While, the majority of the studied nurses had unsatisfactory level of knowledge regarding nursing instructions pre, during and post nursing instructions for ultrasound. Highly statistically significant relationship were found between two groups of knowledge regarding nursing instructions where $X^2 = 8.005$ at $p < 0.05$, as shown in Table 4.

Table 5 shows nurses, total score of knowledge regarding ultrasound. All studied had unsatisfactory

level of knowledge regarding the ultrasound and different body systems. Only 1.08% of studied nurse had satisfactory level of knowledge regarding nursing instructions.

Table 6 shows relationship between nurses total score of knowledge and socio-demographic data. There is no relationship between all studied nurses total score of knowledge and socio-demographic data where all the studied nurses had unsatisfactory total score of knowledge.

Table 2: Percentage distribution of nurses in relation to their knowledge regarding the ultrasound

Nurses knowledge about	N (N = 92)				X ²	p-value
	Satisfactory		Unsatisfactory			
	N	%	N	%		
Definition	0	0.0	92	100.0	172.9	0.000**
Risk of ultrasound	77	83.7	15	16.3		
Thyroid ultrasound preparations	67	72.8	11	27.2		
Breast ultrasound preparation	63	68.5	29	31.5		
Aortic ultrasound preparation	66	71.7	26	28.3		
Total score	0	0.0	92	100.0		

*Statistically significant, N.B. Satisfactory level for nurses, knowledge = Score of 75%

Table 3: Percentage distribution of nurses in relation to their knowledge regarding preparation of different body systems

Nurses knowledge about	N (N = 92)				X ²	p-value
	Satisfactory		Unsatisfactory			
	N	%	N	%		
Patients, preparations of abdomen for ultrasound risk of ultrasound	0	0	92	100	-	-
Patients, preparations of renal system for ultrasound	0	0	92	100		
Ultrasound through the anus	0	0	92	100		
Special contraindication of abdominal ultrasound	0	0	92	100		
Interfering factors for ultrasound	0	0	92	100		
Total score	0	0	92	100		

No statistics are computed because level of satisfaction is a constant

Table 4: Percentage distribution of nurses in relation to their knowledge regarding nursing instructions

Nurses knowledge about	N (N = 92)				X ²	p-value
	Satisfactory		Unsatisfactory			
	N	%	N	%		
Pre-test nursing instructions	12	13.00	80	87.0	8.005	0.018**
During us instructions	11	12.00	81	88.0		
Post-instructions	2	2.20	90	97.8		
Total score	1	1.08	91	98.91		

Table 5: Nurses total score of knowledge regarding ultrasound

Total score of knowledge regarding	N (N = 92)				X ²	p-value
	Satisfactory		Unsatisfactory			
	N	%	N	%		
The ultrasound	0	0.00	92	100.0	2.007	0.367 ^{ns}
Different body systems	0	0.00	92	100.0		
Nursing instructions	1	1.08	91	98.91		
Total score	1	1.08	91	98.91		

Table 6: Relationship between nurses total score of knowledge and sociodemographic data

Sociodemographic data	N = 92				r-value	p-value
	Satisfactory		Unsatisfactory			
	N	%	N	%		
Departments						
ICU female	-	-	7	7.6	-0.117	0.266
General surgery female	-	-	6	6.5		
General surgery male	-	-	28	30.4		
Internal medicine female	-	-	21	22.8		
Internal medicine male	-	-	6	6.5		
Orthopaedic female	-	-	6	6.5		
Orthopaedic male	1	1.1	1	1.1		
Pediatric	-	-	2	2.2		
Gender						
Male	-	-	5	5.4	-0.025	0.812
Female	1	1.1	86	93.5		
Age						
≤20	-	-	7	7.6	0.073	0.490
20≤30	1	1.1	43	46.7		
30≤40	-	-	32	34.8		
40≤50	-	-	5	5.4		
50+	-	-	4	4.3		
Years of experience						
≤1	-	-	7	7.6	0.056	0.597
5≤10	1	1.1	52	56.5		
10≤20	-	-	28	30.4		
20+	-	-	4	4.3		
Sources of knowledge about nursing patient's Preparation for ultrasound						
Nursing study	-	-	24	26.1	0.145	0.204
Hospital experience	-	-	34	37.0		
Nursing study and Hospital experience	1	1.1	10	10.9		
Nursing study, Hospital experience and Training course	-	-	2	2.2		
Training course	-	-	1	1.1		
Hospital experience and Training course	-	-	1	1.1		
Others	-	-	5	5.4		
Qualifications						
Secondary nursing school	-	-	53	57.6	-0.087	0.410
Nursing technical institute	-	-	25	27.2		
Nursing College	1	1.1	13	14.1		

DISCUSSION

Ultrasound is now becoming an important issue of medical practice where ultrasound images help in the diagnosis of a wide range of diseases and conditions. Ultrasound showed images of soft tissue structures, such as the liver, gallbladder, kidney, heart, female reproductive organs and even of fetuses still in the womb. Ultrasound can also check for blood vessels blockages¹²⁻¹⁵.

Evaluation is the first phase of the nursing process which helps the nurses to identify the nursing diagnoses, determine intervention for implementing and also it would be able to evaluate interventions and the efficiency of results. The inclusion of these skills and techniques in their training programs is a must and may need to be retrained during their period of employment^{13,16,17}.

The result of the present study revealed that more than half of the studied nurses was Secondary Nursing School graduates, most of them were at the age group 20 years and less than 30 years and have an experience more than 5 years. This result may be due to that most of nursing faculties occupied in administrative duties, so the number of graduates up until now are not enough to cover all units as a bedside nurse. This result goes in line with Exchange Trades Funds (ETF) that stated that the majority of the nursing manpower in Egypt are graduates from diploma school¹⁸.

The results of present study that the majority of studied nurses had statistically significant satisfactory level of knowledge regarding the risk of ultrasound, thyroid, breast and aortic ultrasound preparation except for definition of ultrasonography it might be due to the majority of them had year of experience from 5 to less than 20 and got their

knowledge from nursing study and hospital experiences. On the same line, the ability of clinical decision making can make an important effect on the quality of care rather than other options and it provides the right chance for nurses and in consequence, the experienced nurses can solve the problems unquestionably¹⁷.

The finding of the present study showed that the majority of studied nurses had lacking in the basic knowledge about different body systems preparations. This can be due to there is no continuous educational courses and they forgot acquired knowledge from their nursing study and there is no supervision, but several studies reported that, the preparation for ultrasound will depend on the type of ultrasound procedure his or her doctor has ordered¹⁹⁻²¹.

The doctor, nurse or receptionist will give the patient complete instructions prior to the exam. It is additionally crucial that the registered nurses offer the correct instructions concerning pretest, during and posttest tomography for the patient without any Interfering Factors influencing the outstanding results in tomography, moreover the most common role of nurses explanation all nursing preparations which important to achieve the fulfillment of tomography examinations^{19,22,23}.

The results of the present study revealed that all studied nurses did not know the interfering risk for ultrasound in this aspect, the previous studies illustrated that nurse must be alert about using ultrasound to help guide. As frontline care providers, nurses are always under pressure to provide more efficient and cost-effective healthcare. Technological advances have led to rapid growth in point-of-care ultrasonography. Appropriate use of this technology coupled with robust training solutions will empower nurses and extend the scope of practice of advanced-practice nurses. This broader responsibility and added skill set will radically improve frontline healthcare delivery and efficiency. The list of topics relevant to nurse training is long and will continue to evolve and expand^{14,24,25}. First-attempt success rates are improved from 67-92% with ultrasound assistance⁵. In addition, both care providers and caregivers of young children expressed greater satisfaction following the use of ultrasound to determine bladder volume prior to urethral catheterization⁴. Finally, there was no statistically significant relationship between nurses sociodemographic data and their knowledge about ultrasound preparation. While the authors showed that nurses and other health care members who have undergone ultrasound training and have learned to incorporate this important procedure into their daily practice have expressed satisfaction with its use. In some cases, ultrasonography can also decrease the overuse of expensive sterile equipment and save valuable nursing

time. Moreover, the use of ultrasound in nursing practice can improve patient care and outcomes^{19,22,26-28}.

CONCLUSION

All the studied nurses had unsatisfactory knowledge regarding nursing patients' preparation for ultrasound and there is no statistically significant relationship between the sociodemographic data and their nurses' knowledge about nursing patient preparation for ultrasound at the General and AlNasr Hospitals. So, the authors recommended to prepare an educational program to improve the nurses' knowledge about nursing patients' preparations for Ultrasound.

SIGNIFICANCE STATEMENT

This study discovered that there is both unsatisfactory level of knowledge among all studied nurses regarding ultrasonography preparations and no statistical significant relationship between nurses' knowledge and their socio-demographic characteristics. The study recommended improving the nurses knowledge about nursing ultrasonography preparations and encouraging nurses to attend national and international congresses, seminars, symposiums and workshop about nursing ultrasonography preparations that can be beneficial for reaching to standard level of nursing care this study will help the researchers to uncover the critical areas of continuing nursing education program and nursing curriculum development that many researchers were not able to explore. Thus a new theory on developing a system of periodical nursing evaluation to determine strategies of upgrading their knowledge and enhancing their performance may be arrived at.

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REFERENCES

1. Newnham, J.P., D.A. Doherty, G.E. Kendall, S.R. Zubrick, L.L. Landau and F.J. Stanley, 2004. Effects of repeated prenatal ultrasound examinations on childhood outcome up to 8 years of age: Follow-up of a randomised controlled trial. *Lancet*, 364: 2038-2044.
2. Fowlkes, J.B. and C.K. Holland, 2000. Mechanical bioeffects from diagnostic ultrasound: AIUM consensus statements. American Institute of Ultrasound in Medicine. *J. Ultrasound Med.*, 19: 69-72.

3. NCRPM., 2002. Exposure criteria for medical diagnostic ultrasound, II: Criteria based on all known mechanisms. NCRP., Bethesda, MD NCRP Report 2002, pp: 140.
4. Krille, L., G.P. Hammer, H. Merzenich and H. Zeeb, 2010. Systematic review on physician's knowledge about radiation doses and radiation risks of computed tomography. *Eur. J. Radiol.*, 76: 36-41.
5. Shiralkar, S., A. Rennie, M. Snow, R.B. Galland, M.H. Lewis and K. Gower-Thomas, 2003. Doctors' knowledge of radiation exposure: Questionnaire study. *Br. Med. J.*, 327: 371-372.
6. Bosanquet, D.C., G. Green, A.J. Bosanquet, R.B. Galland, K. Gower-Thomas and M.H. Lewis, 2011. Doctors' knowledge of radiation-A two-centre study and historical comparison. *Clin. Radiol.*, 66: 748-751.
7. Jacob, K., G. Vivian and J.R. Steel, 2004. X-ray dose training: Are we exposed to enough? *Clin. Radiol.*, 59: 928-934.
8. Soye, J.A. and A. Paterson, 2008. A survey of awareness of radiation dose among health professionals in Northern Ireland. *Br. J. Radiol.*, 81: 725-729.
9. Avramescu, E.T., M. Marius and A. Camen, 2016. Care management: On line-based approaches to nurse education in ultrasound imaging. Proceedings of the 10th International Conference E-Learning, July 1-3, 2016, Funchal, Madeira, pp: 53-60.
10. Swanwick, T., 2008. See one, do one, then what? Faculty development in postgraduate medical education. *Postgraduate Med. J.*, 84: 339-343.
11. Lahti, M., H. Hatonen and M. Valimaki, 2014. Impact of e-learning on nurse's and student nurses knowledge, skills and satisfaction: A systematic review and meta-analysis. *Int. J. Nurs. Stud.*, 51: 136-149.
12. Ultrasound School Info, 2015. Do nurses need ultrasound training? Find out How Nurses use Ultrasound for Essential Health Procedures. <https://www.ultrasound-schools-info.com/nurses-ultrasound-training/>
13. Wake Med., 2015. Preparing for ultrasound, imaging procedure. Wake Med Cary Hospital, Wake Med Health and Hospitals, <http://www.wakemed.org>
14. Galway, C., 2015. Patient preparation for radiology examinations. pp: 6. <https://www.galwayclinic.com/>
15. American College of Radiology, 2015. Ultrasound abdomen. Radiological Society of North America via radiologyinfo.org
16. The Star Online, 2011. The importance of ultrasound-Health. The Star Online 2013, <https://www.thestar.com.my/lifestyle/health/2011/02/02/the-importance-of-ultrasound/>
17. Adam, A., A. Dixon, J. Gillard, C. Schaefer-Prokop and R. Grainger, 2014. Grainger & Allison's Diagnostic Radiology. Volume 2, 6th Edn., Churchill Livingstone Elsevier, Philadelphia, ISBN: 978-0702042959.
18. ETF., 2013. Youth employment challenges and policy responses in the Arab mediterranean countries. <https://www.etf.europa.eu/en/publications-and-resources/publications/youth-employment-challenges-and-policy-responses-arab>
19. Mayo Clinic, 2015. Test and procedure ultrasound. Ultrasound How You Prepare-Mayo Clinic.
20. RadiologyInfo.org., 2014. Ultrasound: What is general ultrasound imaging? <http://www.radiologyinfo.org>
21. Pejmankhah, S., 2014. Evaluate nurses' self-assessment and educational needs in term of physical examination of patients in hospitals of birjand university of medical sciences. *Procedia Social Behav. Sci.*, 141: 597-601.
22. Bahl, A., A.V. Pandurangadu, J. Tucker and M. Bagan, 2016. A randomized controlled trial assessing the use of ultrasound for nurse-performed IV placement in difficult access ED patients. *Am. J. Emerg. Med.*, 34: 1950-1954.
23. Baumann, B.M., K. McCans, S.A. Stahmer, M.B. Leonard, J. Shults and W.C. Holmes, 2007. Caregiver and health care provider satisfaction with volumetric bladder ultrasound. *Acad. Emerg. Med.*, 14: 903-907.
24. Parry, M.F., B. Grant and M. Sestovic, 2013. Successful reduction in catheter-associated urinary tract infections: Focus on nurse-directed catheter removal. *Am. J. Infect. Control*, 41: 1178-1181.
25. Savitsky, E., 2011. Maximizing the potential of point of care ultrasonography. White Paper 2011. Pelagique LLC., Santa Monica, CA.
26. Sampathkumar, P., J.W. Barth, M. Johnson, N. Marosek and M. Johnson, 2016. Mayo Clinic reduces catheter-associated urinary tract infections through a bundled 6-C approach. *Joint Commission J. Qual. Patient Saf.*, 42: 254-261.
27. Yatim, J., K.S. Wong, M.L. Ling, S.B. Tan, K.Y. Tan and M. Hockenberry, 2016. A nurse driven process for timely removal of urinary catheters. *Int. J. Urol. Nurs.*, 10: 167-172.
28. Gupta, S.S., P.K. Irukulla, M.A. Shenoy, V. Nyemba, D. Yacoub and Y. Kupfer, 2017. Successful strategy to decrease indwelling catheter utilization rates in an academic medical intensive care unit. *Am. J. Infect. Control*, 45: 1349-1355.