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Effectiveness of Learning Package on Knowledge of Electrocardiogram Interpretation among Staff Nurses

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Running Title: Electrocardiogram interpretation and staff nurses

Abstract: ***Objective: ECG monitoring is an important nursing skill and is essential in the management of patients with cardiovascular disease. Appropriate ECG interpretation skills are required to deliver prompt and correct treatment. In emergencies, the nurse is expected to interpret the rhythm accurately and respond immediately. Lack of knowledge of ECG interpretation limits treatment and affects clinical outcomes. Hence, the study was aimed to determine the effectiveness of the learning package on knowledge of ECG interpretation among staff nurses. Materials and methods: Quasi - experimental study was performed on 60 staff nurses working in medical, surgical, and cardiac intensive care units of selected hospitals at Kolhapur. The effectiveness of a learning package on ECG interpretation was evaluated through a structured knowledge tool using pre - test - post - test design. Improvement in knowledge score was determined through the qualitative and evaluative approach. Results: A significant improvement was found between pre - test and post - test score ($P=2.2e^{-16}$). A significant association was observed between gender and pre - test score (P=0.049) whereas, in post test scores experience showed a significant association (P=0.015). Conclusion: The learning package was effective in improving ECG interpretation knowledge in staff nurses and can be used as an effective method to train nurses in Kolhapur.***

Keywords: Cardiovascular disease, demography, electrocardiography, emergencies, intensive care units

1. Introduction

Cardiovascular disease is the world's most leading cause of death, accounting for 31% deaths globally and 28.1% in India. [1, 2] In Maharashtra alone cardiovascular disease has been reported to cause 30.46% deaths. [3] For diagnosis of cardiac disease an Electrocardiogram (ECG) is used. [4, 5] ECG interpretation is a complex task. Among the various professionals in a healthcare setting, nurses are usually the first responders in an emergency. Therefore, basic skills are essential to interpret ECG rhythms and decision making. [4]

ECG interpretation skills are seen to vary in physicians and nurses. [6] Previous reports have shown an unsatisfactory practice with ECG interpretation among nurses. [7] Inappropriate interpretation knowledge causes delayed diagnosis followed by delayed admission which impose an unpleasant burden on patients and hospitals. [4–8] Studies had shown that intervention can increase the knowledge of ECG interpretation among nurses. [4, 8, 9] The present study, first of its kind in Kolhapur, aimed to determine the effectiveness of a learning package on knowledge of ECG interpretation among staff nurses in Kolhapur.

2. Materials and Methods

A Quasi - experimental study was performed during January - February 2019 on 60 staff nurses working in medical, surgical, and cardiac intensive care units of selected hospitals at Kolhapur. Participants of both gender, present at the time of data collection and willing to participate in the study were included. Those who were absent at the time of data collection were excluded. The study was performed after the clearance of the institutional ethical committee (DYPMCK: 171/20, 21/10/2018) and local authorities. The structured knowledge questionnaire (tool) on ECG interpretation was designed after extensive literature reviews and expert discussion. Items in the tool were analyzed according to Gilbert's classification. [10] The learning package for ECG interpretation was developed through expert consultation and literature review. Both, the tool and learning package were validated by 15 experts from medical surgical nursing, MD medicine, and statistics. The reliability of the tool and learning package was determined using the split - half method through Karl Pearson's coefficient of correlation formula and Spearman's Prophecy Browns methods. Pre - experimental and post - intervention data (intervention being learning package) were collected to determine the improvement in knowledge of ECG interpretation by using the tool. Pre - experimental knowledge evaluation was conducted by providing study participants the tool and arbitrarily grading the response as: good knowledge (23 - 33), average knowledge (12 - 22) and poor knowledge (0 - 11) based on correct answers. A learning package was provided to the study participants at the end of the pre - experimental evaluation. Post - interventional knowledge score was evaluated on the 7th day of administration of the learning package. Responses were graded similar to the pre - experimental evaluation. The time allotted to respond for each set up was 30 minutes.

A pilot study was conducted in a randomly selected hospital at Kolhapur on 10 willing participants (nursing staff). The tool was distributed to participants and the results were recorded for pre - and post - intervention response.

The difference in pre and post - test score were compared using Wilcoxon - Sign - Rank test. A chi - square test was used to find an association between test scores and sociodemographic variables. $P<0.05$ was considered as statistically significant.

3. Results

The tool consisted of a questionnaire related to socio - demography and ECG interpretation. According to Gilbert's classification difficult index on item analysis of the tool revealed the number of difficult questions was 7 whereas, good and poor questions were 22, and 6 respectively. No marginal questions were present in the tool. Discrimination index indicated that the number of excellent, good, marginal, and poor questions was 13, 16, 0, and 6, respectively. Item analysis was performed on 35 items, among which the final tool contained 33 questions. The description of the questionnaire is shown in Table 1.

Table 1: Description of questionnaire

Parts	Questions regarding	Total number of questions
A	Demography	7
B	Basic of ECG	15
	Components of ECG interpretation	14
	Procedure	4

The learning package consisted of information about ECG such as introduction, meaning, and definition, clinical uses, basics of ECG, and nursing implication of ECG. The pilot study proved that the tool and learning package was reliable and consistent, the reliability of the tool was computed as R=0.76.

The average age of 60 participants was 27.86±4.56 years, ranging from 21 to 40 years. Majority of the participants were females (n=33). Detailed demography of the participants is given in Table 2.

Table 2: Frequency Distribution of Socio - Demographic Variables

Socio - demographic Variable	Frequency (%)
Age (years)	
21 - 25	26 (43.33)
26 - 30	18 (30)
31 - 35	9 (15)
36 - 40	7 (11.67)
Gender	
Male	27 (45)
Female	33 (55)
Education	
GNM	46 (76.67)
Basic B. Sc. nursing	12 (20)
Post Basic B. Sc. nursing	2 (3.33)
Experience (Months)	
0 - 2	24 (40)
2 - 4	15 (25)
4 - 6	21 (35)
Area of Work	
Causality	10 (16.67)
CICU	14 (23.33)
MICU	25 (41.67)
SICU	11 (18.33)
Present Working Area	
Causality	7 (11.67)
CICU	6 (10)
ICU	47 (78.33)

GNM - general nursing and midwifery, B. sc. - Bachelor of Science, CICU - cardiac intensive care unit, MICU - medical intensive care unit, SICU - surgical intensive care unit, ICU - intensive care unit, % - percentage

In the pre - test scores, 77% of the participants had average knowledge score (n=46) whereas 5 % had good knowledge score (n=3) and 18% had poor knowledge scores (n=8). Post - intervention, good knowledge score increased from 5% to 27%, average knowledge score was seen in 73% subject (n=33), and no poor knowledge score was observed (Figure 1).

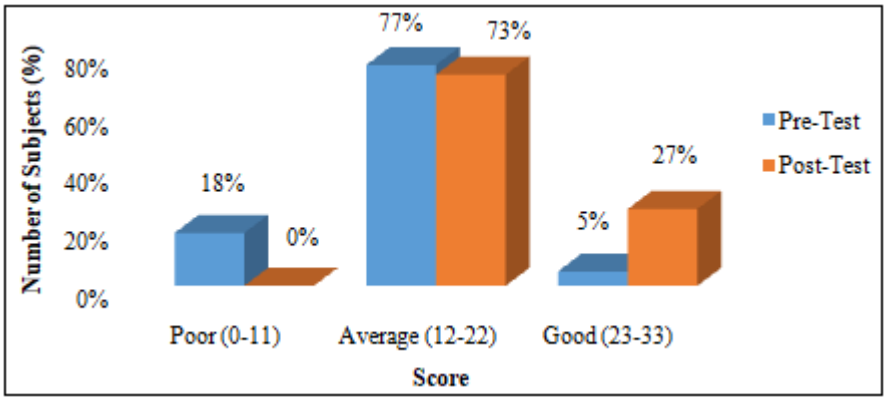

Figure 1: Distribution of pre - and post - test score

A significant difference was found between pre and post - test scores ($P=2.2e^{-16}$). A significant association was observed between gender and pre - test score ($P=0.049$) whereas experience was associated with post - test scores ($P=0.015$).

4. Discussion

Cardiovascular disease is the most common cause for mortality in world, including India and Maharashtra. [1–3] Twelve - lead ECG is the primary method of initial screening in cardiovascular emergencies and its correct interpretation requires skills. [11] The nurse is among the first responders in a medical emergency and expected to make independent decisions in the absence of a physician. In order to make decisions, nurses should be able to recognize ECG rhythm for which relevant knowledge and expert skills are essential. [4] Various reported literature showed unsatisfactory ECG interpretation knowledge among nurses. [5, 7, 12, 13]

The present study is the first of its kind in Kolhapur. It aimed to determine the effectiveness of a learning package on knowledge of ECG interpretation among staff nurses in Kolhapur and to evaluate correlation between socio - demographical variables of the subjects and their scores.

A significant improvement was observed between pre - test and post - test scores. A significant association between gender and pre - test, and experience and post - test scores was seen.

An expert validated learning package used in knowledge improvement was distributed to the participants at the beginning of the study. Information retention through the learning package was impressive as evident by the improvement in the post - test conducted after 7 days. These findings are in agreement with the studies of Ibrahim R et al. and Sabry Shehab et al. [14, 15] A significant association was observed between gender with pertest. However, this association was absent in the post test. This shows that the learning package was able to bridge this learning gap. Experience was seen to be associated with the post - test scores. This could be because of the ability to relate and interpret better with practical experience. Similarly, the study of Sheilini MJ. [11] Studies have proved that various intervention modalities such as teaching, workshop, and self - directed learning can influence nurses' knowledge. [6, 16, 17] Similarly, in this study learning package was used (self - directed learning), showed significant improved ECG interpretation knowledge.

The limitation of the study was the small sample size. Generalization could be better if the large sample size is used, also an experimental study including control and experimental group with various other interventional modalities are the further recommendation of the study.

5. Conclusion

The learning package was effective in improving ECG interpretation knowledge. Hence, it can be used to improve ECG interpretation for all nurses in Kolhapur. Pre - test knowledge varied with gender while post - test knowledge varied with experience.

6. Ethical Approval

Ethical approval for this study was obtained from Institutional Ethics Committee DY Patil Medical College, Kolhapur (DYPMCK: 171/20, 21/10/2018).

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Conflict of interest: None to declare

Authors Contribution

Study conception and design: Husain K. Nadaf & Suchitrarani Rathod
Data collection: Husain K. Nadaf
Data analysis and interpretation: Husain K. Nadaf & Suchitrarani Rathod
Drafting of the article: Husain K. Nadaf
Critical revision of the article: Husain K. Nadaf & Suchitrarani Rathod

References

[1] WHO. Cardiovascular Disease [Internet].2017. Available from: https: //www.who. int/news - room/fact - sheets/detail/cardiovascular - diseases - (cvds).
[2] Prabhakaran D, Singh K, Roth GA, Banerjee A, Pagidipati NJ, Huffman MD. Cardiovascular Diseases in India Compared With the United States. J Am Coll Cardiol 2018; 72 (1): 79 - 95.
[3] Indian Council Of Medical Research Public Health Foundation Of India Institute For Health Metrics And Evaluation. India: Health of the Nation's States - The India State - Level Disease Burden Initiative [Internet].2017. Available from: https: //www.healthdata. org/sites/default/files/files/policy_report/2017/India_ Health_of_the_Nation%27s_States_Report_2017. pdf
[4] Tahboub O, Yılmaz Ü. Nurses' Knowledge and Practices of Electrocardiogram Interpretation. International Cardiovascular Research Journal 2019; 13 (3): 80–84.
[5] Fisch C. Evolution of the clinical electrocardiogram. J Am Coll Cardiol 1989; 14 (5): 1127–1138.
[6] K. Sasikala. Effect of Structured Teaching Programme on Knowledge, Interpretation of Electrocardiogram (ECG) Among Critical Care Nurses, at Selected Wards of Sri Ramakrishna Hospital, Coimbatore. International Journal of Cardiovascular Nursing 2019; 5 (1): 53–61.
[7] Malk R, Hassan H. Evaluation of Nurses Practice Regarding Electrocardiogram Procedure. Sumerianz Journal of Medical and Healthcare 2018; 1 (1): 24–30.
[8] Zhang H, Hsu LL. The effectiveness of an education program on nurses' knowledge of electrocardiogram interpretation. Int Emerg Nurs 2013; 21 (4): 247–251.

[9] Ahmed A, AL - Husaunawy. Evaluation of Nurses Knowledge and Practice of Electrocardiogram Toward Adolescent Patient. IOSR Journal of Nursing and Health Science 2015; 4 (5): 10–16.
[10] Gilbert S. Principles of educational and psychological measurement and evaluation.4th ed. CA: Wadsworth Publishing; 1996.
[11] Sheilini M, Devi E. Effectiveness of educational intervention on ECG monitoring and interpretation among nursing students. IOSR Journal of Dental and Medical Sciences 2014; 13 (12): 1–5.
[12] Doğan HD, Melek M. Determination of the Abilities of Nurses in Diagnosing the ECG Findings About Emergency Heart Diseases and Deciding the Appropriate Treatment Approaches. Turkish Journal of Cardiovascular Nursing 2012; 3 (1): 1 - 10.
[13] Mousa AM, Owaid HA, Ahmed RS, Zedaan HA, Shalal SH. Nurses' Knowledge Concerning Early Interventions for Patients with Ventricular Tachycardia at Baghdad Teaching Hospitals. Kufa Journal for Nursing Sciences 2016; 6 (2): 8–15.
[14] Ibrahim R, Abd - Allah K, Arafa O, Mohammed S. Effect of nursing care standards on nurses' performance in caring for patients with cardiac arrhythmias. Egyptian Nursing Journal 2017; 14 (3): 251–258.
[15] SabryShehab M, HelmyEmam NM, Ali MR. Effect of an Educational Program of Electrocardiogram Interpretation on Medical and Maternity Nurses' Knowledge and Skills. IOSR Journal of Nursing and Health Science 2019; 8 (4): 69–78.
[16] Lamb MJ, Henderson MC. Comparison of two methods for teaching advanced arrhythmias to nurses. Journal of Continuing Education in Nursing 1993; 24 (5): 221–226.
[17] Mahler SA, Wolcott CJ, Swoboda TK, Wang H, Arnold TC. Techniques for teaching electrocardiogram interpretation: self - directed learning is less effective than a workshop or lecture. Med Educ.2011; 45 (4): 347 - 353.