Effectiveness Of Nursing Educational Program Upon The Nurses Practices Concerning Electrocardiographic Procedural Errors In Missan Governorate.

تأثير البرنامج التثقيفي التمريضي على ممارسات الملاك التمريضي إزاء الأخطاء في إجراء تخطيط القلب الكهربائي في محافظة ميسان

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الخلاصة:

هدف الدراسة ييم تأثير   التمريضي التثقيفي على ممارسات الملاك التمريضي   الأخطاء في إجراء تخطيط القلب الكهربائي في محافظة ميسان.

طريقة البحث : اجريت   شبه   جريبية   في محافظة ميسان   لغاية   حزيران

تم اختيار عينة عشوائي   ( )   العينة   ( )

مجموعتين   المنفذ عليها البرنامج التعليمي   ( )   ( )   لقياس تأثير   التعليمي   التمريضي   ستمارة رصد للممارسات التمريضية

متعلقة بتحضير المريض لجهاز تخطيط القلب الكهربائي وموضع الأقطاب الطرفية والصدرية والإجراءات التمريضية   ( )

تحديد   اداة القياس   ( )   مصداقية   عرضها   (الكفاية

النسبية   فيشر   المئوية،   ( )   المعياري ( )

ليفين   لإيجاد   بين

النتائج   معنوية عالية   بين   الرئيسية

لها   الممارسات التمريضي

الاستنتاج:استنتجت الدراسة بان هناك   تأثير ايجابي   التمريضي   إجراء تخطيط القلب الكهربائي

التوصيات تشجيع الملاك التمريضي وتحفيزه   تدريبية والمؤتمرات التي تقام من قبل المختصين في تخطيط القلب الذين لديهم الخبرة الكبيرة في مجال تعليم تخطيط القلبُ لتلبية حاجاتهم   لممارساتهم.

Abstract:

Objective: To evaluate the effectiveness of an educational programme on the practices of the nursing staff concerning the electrocardiographic procedural errors in Missan governorate.

Methodology: An experimental design was carried out at Qalat Salih general hospital from 3rd February, 2013 to 26th of June, 2013. The program and instruments were constructed by the researcher for the purpose of the study. Random sample comprised of (60) nurses was divided into two groups, study group consisted of (30) nurses exposed to the nursing educational program and control group consisted of (30) nurses were not exposed to the program. The measurement of effectiveness of nursing educational program through the observational checklist includes (30) items concerning nurses' practice in preparation the ECG machine, location of limb leads and precordial electrodes placement and nursing intervention. Reliability of instrument was determined through the use of test and retest and the instrument validity was determined through a panel of experts. The analysis of the data was used descriptive statistics (frequencies, percentages, weighted and the arithmetic mean and standard deviation) and statistical inferential (sufficiently relative test, Fisher test, chi square and Levin test) In order to find the differences between the study group and the control group

Results: The study findings indicated that there were highly significant differences between pre and post tests in the study group in overall main domains related to nurses' practice

Conclusion: The study concluded that the effectiveness of educational program regarding nurses' practice concerning the electrocardiographic procedural errors is a positive and clear

Recommendation: The nurses staff can be encouraged and motivation for being participated in the special training programs and conference with leading ECG specialists who have long experience in teaching ECG procedure to fulfill the nurses needs concerning defects and limitation in their practices.

Keywords: nursing; education; program; practice; electrocardiographic.

INTRODUCTION

Electrocardiogram (ECG) Is a graphical display of the electrical activity of the heart, is one of the essential biological signals for the monitoring and diagnosis of heart diseases [1]

According to the emergency physician (EP) examines the electrocardiogram (ECG) looking for evidence of normalcy and for signs of ischemia, dysrhythmia, and many other variations of normal, such as are described in this issue. An underappreciated cause of ECG abnormality is electrode misconnection and misplacement. This occurs when the ECG electrode is mistakenly connected to the wrong part of the body (electrode misconnection, as can occur most commonly with the limb electrodes, I, II, III, aVR, aVL, and aVF) or is placed improperly on the body (electrode misplacement, such as can occur most easily with the precordial electrodes, V1–V6)[2]

Kligfield etal.(2007) stated   that   the standard 12-lead ECG, a common source of misplacement error is failure to identify the correct intercostal space resulting in V2 often being placed too superiorly in the second or third intercostal space)[3].

Between 0.4% and 4% of all 12-lead electrocardiograms (ECGs) are recorded using incorrect electrode positions. Electrode misplacement can cause a misdiagnosis either by concealing a pathology or, on the contrary, by emulating a pathology. Irrespective of this fact, ECG textbooks contain little or no information regarding the effects of electrode misplacement. Moreover, current pedagogic tools, which include physical mannequins, do not allow for the free positioning of electrodes to demonstrate these effects) [4]. The objective of our study is to evaluate the effectiveness of nursing educational program on the nurses practices of the nursing staff concerning electrocardiographic procedural errors in Missan governorate

METHODOLOGY

A descriptive design study   was carried out during the period from 3rd February, 2013 to 26 June, 2013. A random sample comprised of (60) nurses was divided into two groups, study group consisted of (30) nurses exposed to the nursing educational program and control group consisted of (30) nurses were not exposed to the program.

The selection of present sample based on special criteria which include; (1)Nurses that should have at least one year of experience or more.(2)Nurses who worked in the morning and night shift.(3)Nurses who worked in the medical department (Medical ward, Emergency department , ECG unit). The nursing educational program was designed to provide nurse's information related to preparation the ECG machine; Location limb leads and precordial electrodes placement. ; Nursing interventions during the ECG application, and identification of any change in ECG related to procedure errors. The study instrument was observation chick list of nurses' practice developed by the researcher for the purpose of this study .It was consisted of two parts: Self-administered questionnaire sheet related to demographic characteristics of the nurses, and observational checklist for nurses' practice regarding (ECG implementation, nursing intervention).

It was developed to evaluate nurses' practice for nurses carried out during the morning and afternoon shift. An observational checklist of nurses' practice was consisted of (30) items and divided into three parts: first, Principles performed by nurses related to preparation the

ECG machine. It was consisted of nine items. Second, Principle performed by nurses related to location limb leads and precordial electrodes placement. It was consisted of ten items. Third, Principle of the ECG application. It was consisted of eleven items. These items were rated according to the liker scale (always (3); sometimes (2) and never (1)) the levels of scale which were scored as a total of three episodes of events were observed for each respondent .Practices as mean of data collection (3) or (2). Correct practices out of (3) episodes were rated as sometimes and uncorrected practices were rated as never. Observational checklist were used for pre education and post education immediately. The control group were given observational checklist of nurses' practice at the same time that be given to the study group. Scores of the response were categorized according to the following high high (75-100): 4; high low (50-74):3; low high (25-49):2: low low (0-24):1.

The data of present study were analyzed through the application of two statistical approaches. A descriptive statistical approach that includes frequency, percentage, $\bar{x} \mp S.D.=$ Arithmetic Mean ($\bar{x}$) and Std. Dev. (S.D.), and an Inferential statistical approach that includes Chi-Square test, t. test, Fisher Exact Probability test (F.E.P.T.), Levine's test and ANOVA. Results were determined as highly significant at (P<0.01) significant at (P<0.05) and non-significant at (P>0.05).

RESULTS:
Table (1): Distribution of the Study Samples (Study and Control) According to Demographic Data

Variables	Groups	Study			Control		
		Freq.	%	Cum. %	Freq.	%	Cum. %
Age Groups	20 – 24	3	10	10	3	10	10
	25 – 29	9	30	40	6	20	30
	30 – 34	10	33.3	73.3	6	20	50
	35 – 39	2	6.7	80	5	16.7	66.7
	40 >	6	20	100	10	33.3	100
	$\bar{x} \mp S.D.$	2.97$\mp$1.273			3.43$\mp$1.406		
Gender	Male	18	60	60	17	56.7	56.7
	Female	12	40	100	13	43.3	100
Education level	Nursing Institute	16	53.3	53.3	18	60	60
	Secondary Nursing School	14	46.7	100	11	36.7	96.7
	Other	---	---	---	1	3.3	100
Years of Experience	5	3	10	10	3	10	10
	6 – 10	9	30	40	9	30	40
	11 – 15	7	23.3	63.3	5	16.7	56.7
	16 – 20	4	13.3	76.7	4	13.3	70
	21 – 25	5	16.7	93.3	3	10	80
	26 – 30	2	6.7	100	6	20	100
Expert Years in medical/surgical department	None	3	10	10	8	26.7	26.7
	1 – 5	20	66.7	76.7	10	33.3	60
	6 – 10	4	13.3	90	9	30	90
	Above 10	3	10	100	3	10	100
Training Courses in Nursing	None	7	23.3	23.3	13	43.3	43.3
	1 – 3	7	23.3	46.7	6	20	63.3
	4 – 6	5	16.7	63.3	4	13.3	76.7
	7 – 9	4	13.3	76.7	4	13.3	90
	10 – 12	4	13.3	90	2	6.7	96.7

	Above 13	3	10	100	1	3.3	100

Freq.=Frequencies, %=Percentages, Cum. = cumulative percents, C.S. : Comparison Significant, $\bar{x} \mp S.D$ =Arithmetic Mean (and Std. Dev. (S.D.)., P=P-value, ,FEPT=Fisher Exact Probability Test , ^{2}-test=Chi- Squire Test, N.S.= Non Significant , = more Than or Equal , = Less Than.

Findings of table 1 revealed that the majority 10 (33.3%) of nurses in the study group are within the age group (30 - 34) while 6 (20%) of nurses in the control group and 18 (60%) of nurses in the study group were males and 17(56.7%) of nurses in the control group were males.

Concerning to the educational level, most of nurses 16(53.3%) in the study group and 18(60%) in the control group are nursing Institute. In relation to the years of expert in the medical department 20(66.7%) of nurses in the study 10(33.3%) of nurses in the control groups had expert (1-5) years in the medical department .Concerning training courses, 7(23.3%) of nurses in the study group and 13(43.3%) of nurses in the control groups not sharing in training courses in nursing .

Table (2): Relative sufficiency for Study and Control Groups (Pre) for Domains Related to Nurses' Practice.

Overall Main Domains	Practice	No.	Pre– Study			As s.	pre – Control			As s.	P. value	C.S.
			M.S.	S.D.	R.S.%		M.S.	S.D.	R.S.%			
Domains Related To Nurses Practice	Preparation for the ECG Machine	30	0.33	0.193	32.59	F	0.32	0.208	31.85	F	0.900	NS
	Location Limb Leads and precordial Electrodes Placement	30	0.40	0.172	39.96	F	0.46	0.201	45.67	F	0.288	NS
	Nursing Interventions	30	0.33	0.159	33.03	F	0.39	0.249	38.79	F	0.281	NS
Overall Domains	Overall Questions Related To Nurses Practice:	30	0.38	0.155	37.67	F	0.39	0.170	39.00	F	0.774	NS

M.S. =Mean of score , SD = Standard Deviation ,R.S%=Relative Sufficiency , Ass.= assessment. C.S. : Comparison Significant , No.= Number of Sample ,NS : Non Significant at   P >0.05 , F : Failure .

Table -2- shows that there is no significant differences between study and control groups in all domains related to nurses' practices at pre test when analyzed by student (t-test)

Table (3): Comparison Between Study and Control (Post test) Concerning Practice of Nurses

Overall Main Domains	Practice	No.	Post – Study			Ass	Post – Control			Ass	P$_{-value}$	C.S.
			M.S.	S.D.	R.S.%		M.S	S.D.	R.S.%			
Domains Related To Nurses Practice	Preparation for the ECG Machine	30	0.87	0.100	87.41	S	0.42	0.181	41.85	F	0.000	HS
	Location Limb Leads and precordial Electrodes Placement	30	0.96	0.072	96.33	S	0.51	0.227	51.33	S	0.000	HS
	Nursing Interventions	30	0.77	0.143	76.97	S	0.39	0.223	39.09	F	0.000	HS
Overall Domains	Overall Questions Related To Nurses Practice:	30	0.87	0.078	86.56	S	0.44	0.162	44.00	F	0.000	HS

M.S. =Mean of score , SD = Standard Deviation ,R.S%=Relative Sufficiency , Ass.= assessment. ,C.S. : Comparison Significant , No.= Number of Sample , S :Significant at P <0.05 , Hs : Highly Significant at P< 0.01, F : Failure ; S : Success

Table 3 shows that there is highly significant differences between study and control groups at post-test in all domains related to nurses ' practice when analyzed by student t-test

Table (4): Effectiveness of Demographical Characteristics and Some Related Variables Distributions for an Overall Assessments of the Main Domains Related to Nurses (Practice) for the Study and Control Groups at Pre-Post Tests

Samples & Periods	Main Domains	Age Groups	Gender	Education level	Years of Experience	Expert years in medical\ department	Training Courses in Nursing
Pre – Study	Percentile of Practice	HS	HS	HS	HS	HS	HS
Post – Study	Percentile of Practice	HS	NS	HS	HS	HS	HS
Pre – Control	Percentile of Practice	HS	S	HS	HS	HS	HS

Post – Control	Percentile of Practice	HS	NS	HS	HS	HS	HS

NS : Non Significant at P>0.05 ; S : Significant at P<0.05 ; HS : Highly Significant at P<0.01

Table -4- shows that there is highly significant difference between the nurses practice of the study group with their age ; years of experiences and level of education related to the all main domain of the nurses' practice in medical department pre post tests when analyzed by Leven's test and ANOVA.

DISCUSSION

The results of present study revealed that the majority of nurses in the study group 18(60%) and in the control group (56.7%) were males. Relative to their educational status, most of the nurses in the study group (53.3%) and in the control group (60%) were nursing institute**,** The researcher believed that nurses with diploma degree were considered the major proportion of staff nurses in health organization. Our study revealed that the majority of the nurses in the study group (30%) and control group (30%) were (6-10) years experiences in the job, Our study revealed that the majority of the nurses in the study group (66.7%)and control group (33.3%) were (1-5) years expert in the medical department. This result indicated that the most of them had spent (1-5) years as an evidence for their employment history in the medical department, the study showed that the (23.3%) of nurses in study group and (43.3%) of nurses in control group did not had training courses in nursing, while all of the nurses in the study group and control group did not attend any training session or conferences regarding knowledge and practice related to ECG (table 1). The study agrees with [5] which reported that critical care nurses provide care to patients who are critically ill with cardiac issues and problems requiring 12-lead electrocardiographic (ECG) monitoring and interpretation. Critical care nurses need to learn how to identify ischemia, injury, and infarction in the 12-lead ECG of their patients and be able to apply the correct treatment for these changes. The first 12-lead ECG series teaches the critical care nurses the different types of myocardial infarction (MI) using case studies in the critical care settings. The goal of this session is to increase the knowledge and competence of critical care nurses in 12-lead ECG interpretations and application. This session is for beginning critical care nurses who want to learn how to read 12-lead ECGs.

We found through the observation of practice for (60) nurses in medical department did not given a score to efficiency of the observed in pre-test due to all of the nurses in study and control groups did not follow principles of Electrocardiographic procedure. (table-2).

Our study shows presented highly significant differences in study group at pre- post tests for domains related to nurses' practice in the all items include [Nurses' Practice in preparation the ECG machine,(R.S.% (pre 32.59% -post; 87.41%) Location of limb leads and precordial electrodes Placement: (R.S. % (pre 39.96% -post 96.33%) , Nursing intervention the ECG application(R.S.% (pre 33.03% -post 76.97%) at (P < 0.05) (table-3). This study supported by [6] stated that despite its importance and frequent occurrence, electrode misplacement is not well documented in current cardiology textbooks.

This study also revealed that there were highly significant differences about nurses' practice at post test between study and control groups of items (preparation for the ECG

machine, location limb leads and precordial electrodes placement , nursing intervention (table 3). This findings was in agreement with the finding obtained from [6]which stated that the experiment, ECG knowledge levels of participants were measured by repeated tests (pretest, posttest I and posttest II) and data were analyzed with repeated measures of variances and covariance, the results demonstrating that videoconferencing contributed significantly to the improvement of ECG skills of the participants. In addition, a questionnaire was given to students along with posttest II, and the result of which indicated overwhelming satisfaction with videoconference based lecture. Researcher confirmed that the educational program help the nurse to develop skills and information about ECG procedural.

As a result of the data analysis, there is found association between the nurses practice of the study group with their age related to main domain   in medical department pre post tests (table-4).

This findings agrees with study of Karaman,(2011) stated that the nurses should be provided with continued training through online learning alternatives, regardless of age, working experience or area of residence[7]

The researcher believed that the findings of this study indicated that these practice in pre –test and posttest do not improve the relevant knowledge and practice correlated with age of nurses in the medical department.

Through the course of the data analysis, it has been noted that there was highly significant relation between nurses' practices of the study group with their years of experiences related to main domain   in medical department pre posttests (table-4).

These results revealed that the nurses work in medical department regardless working experiences were adequate practices and nurses in the medical department, the nurses become perform principles of ECG procedure in typical method.

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Along these lines, Kathy etal., (2004) reported that Graduate nurses experience stress transitioning from student to practicing professional nurse, moving from a familiar educational environment into the workforce, where expectations are to rapidly function as a competent nurse. This study identified the stresses and challenges experienced by cohorts of graduate nurses working in 6 acute care hospitals, during specific timed data periods, to better understand factors that may influence graduate nurse retention. Results report graduate nurses do not feel skilled, comfortable, and confident for as long as 1 year after being hired, highlighting the need for healthcare organizations to provide extended orientation and support programs to facilitate successful entry into practice [8]

The results in (table-4) revealed that there is highly significant association between the level of education with nurses' practices in the study group to the all main domain (Percentile of Practice) in pre test

Board, (2012) reported that all nurses must have an adequate orientation and must be prepared to take on new responsibilities. Nurses are also responsible for keeping their knowledge and skills up to date [9]

The researcher confirmed that the findings provides an evidence that the advanced practice nurses and expert staff nurses are in a position to improve the way patients' electrocardiograms (ECG) procedural so that the researcher recommended published practice standards the best practices for ECG procedural error .

CONCLUSION

1- The ECG course will provide the necessary knowledge and skills to enable the participant to understand and interpret complex of ECG errors.
2- The differences between pre, posttests indicated that the effectiveness of educational program regarding nurses' practice concerning Electrocardiographic procedural errors.

RECOMMENDATIONS:

Available of scientific nursing journal or books in arabic and emphases of the importance motivation the nurses to important this knowledge in the ECG related to the electrocardiographic procedural errors

REFERENCES:

1- Sornmo, L. and Laguna, P. : **Bioelectrical Signal Processing in Cardiac and Neurological Applications**, Elsevier Academic Press, London, 2005.
2- Harrigan, R. Electrode misconnection, misplacement, and artifact. **Emerg Med Clin** North **Am Journal** .2006; VOL.24: P.P.227-235
3- Kligfield P, Gettes LS, Bailey JJ, Childers R, Deal BJ Hancock EW, :Recommendations for the Standardization and Interpretation of the Electrocardiogram Part I: The Electrocardiogram and Its Technology A Scientific Statement From the American Heart Association Electrocardiography and Arrhythmias Committee, Council on Clinical Cardiology; the American College of Cardiology Foundation; and the Heart Rhythm Society Endorsed by the International Society for Computerized Electrocardiology. **Am. Coll .Cardio Journal** . 2007; Vol.10; No.49:P.P.1127-1109

4- Bond,R. ; Finlay,D. ; Chris D. Nugent, Moore,G. ; Guldenring,D. MEn :A simulation tool for visualizing and studying the effects of electrode misplacement on the 12-lead electrocardiogram. **Journal of Electrocardiology**. 2010 ;Vol.44;No.4:P.P.439-444

5- Sheehan,T ; Tamera G,. :12 leads EKG Boot Camp Series :Using Case Studies to Interpret ,Injury and infarction .**American Association of Critical Care Nurses**. a grant from GE Healthcare. This webcast was captured at the 2011 NTI held in Chicago, IL.

6- Alinier,G. ; Gordon,R ; Hawood,C ; Hunt,W. : 12-Lead ECG training: The way forward. **Nurse Education Today Journal** .2006; Vol. 26; Issue 1: PP. 87–92

7- Karaman, S. :Nurses' perceptions of online continuing **education.BMC Medical Education** 2011, Vol.**11**: P.86
8- Kathy, C.; Regina, F.; FAAN; Krugman, AOCN Mary; Propst, FAAN Jennifer : The Graduate Nurse Experience. **Journal of Nursing Administration** 2004;Vol. 34;No.6:P.P.303-311
9- Board, W.: **Your Nurse Practice Act and the Disciplinary Process A Handbook for nurses** Second edition **Developed in collaboration with the Nursing** Care Quality Assurance Commission. Washington State Nurses Association ,2012