Assessment of Nurses' Practices Concerning Blood Pressure Measurements

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ABSTRACT

Background and Aim- Blood Pressure Measurement (BPM) is considered a generic skill required in nursing, by a range of health professionals, for effective health assessment. The study aimed to assess nurses' techniques regarding correct way of measurement of blood pressure.

Methods and Materials- A cross-sectional study was conducted on (241) nurses obtained accidently from different wards or units in three teaching hospitals in Mosul City/Iraq during a period "20th of novmber 2017 to 20th of January / 2018". The instruments depended in the study was Global scale of World Health Organization (WHO) that was developed to contain (19) items of two options (Don't do=0 ; Do=1). Observational method was depended by the researchers to collect the data and fulfill the scale while the nurse measured the patient's blood pressure.

Results- The study found that practice level of BP measuring was less than acceptable (42.11%).

Conclusion and Recommendation- The study concluded that whenever, the patient's complaint is critical, the nurse technique of BP measurement ameliorates**.** It emphasizes on continuous education of all nurses regarding this nursing procedure to check and validate the health status of the patients in order to reduce potential adverse effect.

Key Wards; Nurse, Blood Pressure Measurement.

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Introduction:

Blood Pressure (BP) measurement by the use of sphygmomanometer and auscultation of brachial artery by stethoscope is the most widespread way of measurement in daily clinical practice [Toolkit, 2010]. Measuring arterial blood pressure provided important information about the overall health status of the patient, for example, the systolic pressure provides a data base about the condition of the heart, arteries and the arterioles. The diastolic pressure indicates vessel resistance, the difference between the systolic and diastolic pressure provides information about cardiac output [Crosley et al, 2013]. Accurate blood pressure measurement is indispensable for successful detection and management of hypertension. The fact of the matter is that errors in measuring blood pressure can contribute to inaccurate diagnoses and treatment for millions of people each year. Clinical studies show that "35−60%" of healthcare professionals in the United States measure blood pressure incorrectly. A history of inaccurately measured high or low blood pressure can affect a patient's eligibility for, or cost of, health, life, or long-term care insurance [Da Silva, 2010]. Although nursing professionals are the most familiar with this type of

measurement, studies show the performance of the procedure incorrectly. Errors or omission of basic care during BP measurement are documented in national and international studies for over two decades [Ducci, 2004]. These errors may be related to unfamiliarity or outdated knowledge of the technique of BP measurement, which, often, has been studied by the nurses for the last time at the undergraduate level [Grieve et al, 1999]. The accuracy of blood pressure (BP) measurement is important; systematic small errors can mislabel BP status in many persons [Da Silva, 2010]. Obviously, improving the accuracy of blood pressure measurement is a simple step toward enhancing care and reducing the clinical and financial toll that measurement error can have on patients and healthcare professionals [Karen and Ako, 2010]. Measuring BP using a manual method is a highly developed skill requiring considerable practice in order to achieve competence [Kokkinakis et al, 2011].

This study aimed to assess nurses' techniques regarding correct way of measurement of blood pressure by the use of sphygmomanometer.

Methods and Materials:

A cross-sectional study was conducted on (241) nurses obtained convenience from the *Internal medical* ward, *Surgical ward*, *Emergency department*, *Intensive Care Unit "I.C.U.", Maternity, Artificial Kidney* and *Operation room* in *AL-Salam, Ibn-Sina and AL-Jamhury Teaching Hospitals* in Mosul City during a period "20th of novmber 2017 to 20th of January / 2018" The instruments depended in the study was Global scale of World Health Organization (WHO) that was adopted to contain (19) items. Observational method was depended by the researchers to collect the data and fulfill the scale while the nurse measure the patients' blood pressure. The scale was validated through comments and

recommendations of (6) experts in nursing and checked for reliability through two inter-rater or observer to indicate Cronbach's Coefficient Correlation - on (11) nurse who excluded from the final sample of the study (r= 0.83). The assessment options were two (Don't do=0 ; Do=1).

SPSS program (Version-19) was depended to describe and analyze the findings of the study through ANOVA test "to indicate the difference in PB measurement in respect to each variable of the nurses undertaken" and Post-hoc test – LSD: Least Significant Differences – in order to indicate where were the differences regarding to subgroups of each variable showed

statistical significant differences. The probability level depended in the present study was (P.<0.05).

Results:

Table -1: Demographic Characteristics of the Sample:

Variable	Frequency	Percentage
Age:		
25 – 29 years	106	**44%**
30 – 34 years	34	14.1%
35 – 39 years	21	8.7%
40 – 44 years	34	14.1%
45 – 49 years	46	19.1%
Gender:		
Male	144	**60%**
Female	97	40%
Educational level:		
Preparatory vocational graduate	90	**37.3%**
Nursing institute	90	**37.3%**
Nursing college	61	25.4%
Tenure " Years of work in nursing field"		
Less than five years	97	**40.2%**
5 – 10 years	71	29.5%
More than ten years	73	30.3%
Ward:		
Cardiac care Unit "CCU"	37	15.4%
Maternity ward	39	16.2%
Surgical ward	41	**17%**
Emergency department	33	13.7%
Operation room	33	13.7%
Artificial kidney ward	21	8.7%
Medical ward	37	15.4%

Table -2: Association between BP Measurement Techniques regarding to Nursing Educational Levels by using ANOVA:

	Sum of Squares	df	Mean of Square	F.	Sig.
Between Groups	38.985	2	19.492		
Within Groups	905.696	238	3.805	5.122	0.007
Total	944.680	240			

Table -3: Post-hoc Test (LSD) for the Differences of BP Measurement Techniques among Educational Levels of Nurses.

(1) Graduate	(J) Graduate	Mean Differences (1-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Secondary	Institute	0.867*	0.291	0.003	0.29	1.44
	College	0.771*	0.324	0.018	0.13	1.41
Institute	Secondary	- 0.867*	0.291	0.003	- 1.44	- 0.29
	College	- 0.096	0.324	0.767	- 0.73	0.54
College	Secondary	- 0.771*	0.324	0.018	-1.41	- 0.13
	Institute	0.96	0.291	0.767	- 0.45	0.73

The mean difference is significant at the 0.05 level.

Table -4: Association between BP Measurement Techniques regarding to the Tenure 'Years of Work in Nursing Field' by using ANOVA:

	Sum of Squares	df	Mean of Square	F.	Sig.
Between Groups	28.837	2	14.418		
Within Groups	915.844	238	3.848	3.747	0.025
Total	944.680	241			

Table -5: Post-hoc Test (LSD) for the Differences of BP Measurement Techniques among Tenure Groups "Years of Working in Nursing Field".

(1) Working	(2) Working	Mean Differences (1-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
< 5 years	5 – 10 years	- 0.269	0.308	0.380	- 0.87	0.33
	> 10 years	0.599*	0.304	0.050	0.00	1.20
5 – 10 years	< 5 years	0.269	0.306	0.380	- 0.33	0.87
	> 10 years	0.868*	0.327	0.008	0.22	1.51
> 10 years	< 5 years	- 0.599*	0.304	0.050	- 0.120	0.00
	5 – 10 years	- 0.868*	0.327	0.008	- 0.151	- 0.22

The mean difference is significant at the 0.05 level.

Table -6: Association between BP Measurement Techniques in respect to Place of Work (Ward) of Nurses by using ANOVA:

	Sum of Squares	df	Mean of Square	F.	Sig.
Between Groups	123.512	6	20.585		
Within Groups	821.169	234	3.509	5.866	0.000
Total	944.680	240			

Table -7: Post-hoc Test (LSD) for the Differences of BP Measurement in respect to Place of Work (Ward) of Nurses.

(1) Ward (2) ward	Mean Differences (1-J)	Std. Error	Sig.	95% Confidence Interval	
				Lower Bound	Upper Bound
CCU Maternity	1.344*	0.430	0.002	0.50	2.19
Surgical	1.558*	0.425	0.000	0.72	2.39
Emergency	1.337*	0.449	0.003	0.45	2.22
Operation	2.065*	0.449	0.000	1.18	2.95
Artificial Kidney	2.692*	0.512	0.000	1.68	3.70
Medical	1.351*	0.436	0.002	0.49	2.21
Maternity CCU	- 1.344*	0.430	0.002	- 2.19	- 0.50
Surgical	0.213	0.419	0.611	- 0.61	1.04
Emergency	- 0.007	0.443	0.987	- 0.88	0.87
Operation	0.720	0.443	0.105	- 0.15	1.59
Artificial Kidney	1.348*	0.507	0.008	0.35	2.35
Medical	0.007	0.430	0.987	- 0.84	0.85
Surgical CCU	- 1.558*	0.425	0.000	- 2.39	- 0.72
Maternity	- 0.213	0.419	0.611	- 1.04	0.61
Emergency	- 0.220	0.438	0.616	- 1.08	0.64
Operation	0.507	0.438	0.248	- 0.36	1.37
Artificial Kidney	1.135*	0.503	0.025	0.14	2.13
Medical	- 0.206	0.425	0.628	- 1.04	0.63
Emergency CCU	- 1.337*	0.449	0.003	- 2.22	- 0.45
Maternity	0.007	0.433	0.987	- 0.87	0.88
Surgical	0.220	0.438	0.616	- 0.64	1.08
Operation	0.727	0.461	0.116	- 0.18	1.64
Artificial Kidney	1.355*	0.523	0.010	0.32	2.39
Medical	- 0.205	0.449	0.975	- 0.87	0.90
Operation CCU	- 2.065*	0.449	0.000	- 2.95	- 1.18
Maternity	- 0.720	0.443	0.105	- 1.59	0.15
Surgical	- 0.507	0.438	0.248	- 1.37	0.36
Emergency	- 0.727	0.461	0.116	- 1.64	0.18
Artificial Kidney	0.628	0.523	0.231	- 0.40	1.66
Medical	- 0.713	0.449	0.113	- 1.60	0.17
Artificial Kidney CCU	- 2.692*	0.512	0.000	- 3.70	- 1.68
Maternity	- 1.348*	0.507	0.008	- 2.35	- 0.35
Surgical	- 1.135*	0.503	0.025	- 2.13	- 0.14
Emergency	- 1.135*	0.523	0.010	- 2.39	- 0.32
Operation	- 0.628	0.523	0.231	- 1.66	0.40
Medical	- 1.341*	0.512	0.009	- 2.35	- 0.33
Medical CCU	- 1.351*	0.436	0.002	- 2.21	- 0.49
Maternity	- 0.007	0.430	0.987	- 0.85	0.84
Surgical	0.206	0.425	0.628	- 0.63	1.04
Emergency	- 0.014	0.449	0.975	- 0.90	0.87
Operation	0.713	0.449	0.113	- 0.17	1.60
Artificial Kidney	1.341*	0.512	0.009	0.33	2.35

The mean difference is significant at the 0.05 level.

Discussion

The nurse routinely obtains a base line measurement of vital signs at initial contact with a client to provide a means for comparison with subsequent vital signs values. This skill routinely includes temperature measurement, palpating the radial pulse and auscultation an upper extremity blood pressure. Routinely, the blood pressure for an acutely ill patient should be taken every "15" minutes to one - two hours and the blood pressure of more stabilized patients should be taken every "4 to 8" hours to once a day [Karen and Ako, 2010]. Otherwise, Nurses' blood pressure readings are better predictors of early target organ damage in hypertension than doctors' readings also, The Nursing and Midwifery Council (2009) Record keeping guidance for nurses and midwives states that "Good record keeping is an integral part of nursing and midwifery practice, and is essential to the provision of safe and effective care." (The Nursing and Midwifery Council, 2009)

Surprisingly, even a small difference in measurement can have a considerable impact on the incidence of cardiovascular events and life expectancy. It is estimated that a "1" mm/Hg rise in blood pressure above normal on average reduces life expectancy by one year. Overestimating blood pressure could expose individuals unnecessarily to potential adverse side effects and increase healthcare costs. On the other hand, measuring blood pressure "5" mm/Hg too low in the range of "90−95" mm/Hg will miss many million people with hypertension [Karen and Ako, 2010].

Nursing, probably on the basis of tradition and past necessities, is concerned more with procedural knowledge than scientific knowledge such as in measurement of PB with sphygmomanometer [Grieve et al, 1999]. In the present study, there was significant statistical differences in nurses' techniques of BP measurement in regard to their educational level (Table-2), while it appeared that preparatory vocational nursing school graduates had an acceptable level of practice better than institutional and collegial educational levels (Table-4). This appeared to be contradicted with logical phenomenon, for, less educated persons can reflect better practice than those who had better education. In our health facilities, this can be due to many factors; firstly- preparatory vocational nursing students integrate or join nursing and carry out nursing procedures better than other nursing certificates, for they prepared to carry out manual tasks, secondly- the preparatory vocational nursing school students were supervised during training in hospitals by nursing staff from the practical nursing field, so, they had been built students to acquire nursing procedure more efficiently, while, those who supervised and trained institutional and collegial students were from academic nursing schools and almost of them were far away from nursing practice and professionalism and they are better theoretically than practically, thirdly- the instructions from Ministry of Health which put the responsibility of BP measurement on physicians made almost of nursing staff kept themselves far away from this procedure and lastly their techniques became weak, while almost vocational nursing school graduates practiced BP techniques in their private work and fourthly- the inappropriate relationships between some of nursing staff (institutional and collegial graduates) and physicians made them opposed physicians' orders or instructions in many cases to assist him/her in carrying out such measurements like BP measurement. A Brazilian study involving physicians, nurses and nursing auxiliaries, about knowledge related to theoretical and practical contents on blood pressure measurement showed that nursing auxiliaries possessed the lowest knowledge [Da Silva et al, 2010].

Logically, whenever the duration of practicing any work increases, the workers

will be more knowledgeable and highly skillful, this is obvious in the present study which shows significant statistical differrences in respect to duration of work (Tables-4;5). From another side, place of work (ward) indicate significant statistical differences in association with (table-6). Nurses in CCU and artificial kidney ward show significant statistical differences in their BP measurement techniques in comparison with the nurses techniques in other wards (table-7), whereas, nurses in CCU show better techniques than those in other wards, this can be because patients in CCU were of critical cases and need checking BP all over the day, for the adverse consequences and the rapid alterations their conditions had emerged, thereore, nurses should be good knowledgable and highly skillful in measuring BP. Silva and colleages (2011) and Silva and colleges (2007) ascertained

Conclusions

Whenever, educational level is highest, skills or performance become better, increased tenure improves the skills or

Recommendations

Encourage nurses to join advanced or higher educational specialist levels in nursing and emphasis on training and

that the nurses who work in the intensive care units (ICU) need a highly qualified and differentiate knowledge of the techniques and handling of the devices available there, so they can provide safe care, as well as train their team regarding the correct procedure, for the main feature of the patient in the ICU is the severity of his health condition, requiring direct care, specialized and continuous, from the nursing team (Ducci et al, 2004) in the opposite direction, nurses in artificial kidney unite and operation ward presented the worse techniques, this can be because there was medical and nursing team in the operation ward and the responsibility was shared among them, but leadership was by surgeon or physician and the nurse was for assistance only, while in artificial kidney unit, the nurse was overworked by dialysis in addition to persistent low nurse/ patient ratio all over the day and week.

techniques and whenever the patient's complaint is critical, the nurse techniques of BP measurement ameliorate.

practicing the necessary nursing procedures with continuous education of all nurses must be took place.

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