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ORIGINAL ARTICLE

Assessment of Nurse's Knowledge Regarding Management of Chest Tube Drainage at a Public Tertiary Care Hospital - an analytical approach

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ABSTRACT

Background: Chest tube insertion is a commonly performed surgical procedure in hospital practice, which is indicated in chest trauma, pneumothorax, or for use for draining of air, blood, or pus. Nurses play a role in the care of patients, like dealing with critical patients and resuscitation, so they should know about the management of chest tube drainage.
Aim: To evaluate the knowledge, nursing role, and intervention of chest tube drainage.
Methodology: The study design of a cross-sectional analytical study conducted in a saidu group of teaching hospitals from May 2021 to September 2021 had a sample size of 70 while using a convenient sampling technique for data collection of nurses working in the intensive care unit. Data was collected through a valid and reliable adopted questionnaire. The Chi-square test, independent sample t-test, and ANOVA were used to analyze the data.
Results*:* Female participants (54.3%) were higher than male participants (45.7%), while the major age group was 26–30 (38.6%). The maximum nurse's knowledge regarding chest tubes was poor (81.4%), followed by an average score (18.6%), and good was nil. In nurses' roles, the majority were poor (65.7%), while (34.3%) were average and good (nil). In nursing intervention, 68.6% were poor, the average was 31.4%, and none was good. As a result of an independent t-test, the male participants had scored higher in all three sections of the questionnaire than the female participants.
Conclusion: The study concluded through ANNOVA that knowledge is highly significant (p-value 0.000) with qualification while not significant (p-value 0.225, 0.394, 0.799) with departments.
Keywords: Assessment, Chest tube, Drain, Knowledge, Management, Nurses

INTRODUCTION

The lungs are a vital organ of the body located in the pleural cavity and covered by a double membrane structure called the pleura. The potential space between the two membranes (parietal and visceral) is called intra-pleural space. Many lung pathologies disrupt intra-pleural space, thereby collapsing the lungs and compromising the normal process of respiration. Certain lung conditions, like chest trauma, pneumothorax, empyema, chylothorax, and hydrothorax, warrant the insertion of a chest tube to drain air, blood, pus, or lymph from the pleural cavity and to restore proper ventilation[1-4]. Chest tube insertion is a commonly performed surgical procedure in hospital practice[5,6].

Approximately 150,000 deaths occur from trauma each year in Europe of which 60% were having chest injuries[4,7,8]. On a global scale, every minute nine people die from traumatic injuries, while chest trauma contributes 25% of traumatic deaths[9]. Approximately one million patients are hospitalized each year for pneumonia in the US, among them 50,000 died from its complications. Spontaneous pneumothorax is still a significant global problem occurring in healthy subjects with a prevalence of 18.28/100,000 per year for men and 1.2-6/100,000 for women[10].

Nurses are the backbone of the healthcare system and their work is crucial and plays a vital role for the human being to be served [11,12]. Nurses required specialized education and training programs to bring competencies to the field of practice. This study is purely designed to assess the existing knowledge of nurses regarding chest tube and drainage system. The purpose of the study is to assess the knowledge of nurses regarding chest tube and drainage systems at public tertiary care hospital of Swat, KPK.

METHODOLOGY

A cross-sectional analytical study design was used for this study. The study setting was the intensive care unit of saidu group of Teaching Hospitals (SGTH) in Swat Khyber Pukhtankhwa. The study was conducted from May 2021 to September 2021, having a sample size of 70 that was calculated through a 95% confidence interval and a margin of error of 5% while using the convenient sampling technique. Nurses who are working in the medical and surgical intensive care units and pulmonology units of SGTH and are willing to be participants in the study voluntarily were the inclusion criteria for this study. Nurses who were not present or on maternity or study leave were excluded from the study.

Ethical Consideration: The study was approved from the Ethical Review Committee. A prior permission was taken from the administration of saidu group of teaching hospital for data collection. First the aim and objectives of the study was explained to all the study participants, and an informed consent were designed to signed by the nurses who was the participant of this study which contained that their participation will be voluntary, their data will kept confidential and only be used for data analysis, the participant have the right to withdraw anytime from the this project and there will be no direct benefit received by nurses from the study for the participants.

Data collection procedure and Instrument: The instrument used for the data collection was constructed by Dr. Saba Abbas Ahmed (Prof. Adult Nursing Department, College of Nursing/University of Baghdad)[1]. The instrument was already validated and had the reliability of a chronbach (0.78). The questionnaire consists of 4 parts in which the first part is demographic (age, qualification, marital status, and experience); the second part was related to knowledge regarding the basics of chest tube drainage (18 multiple choice questions), and the third and fourth parts (15 true-false items each) were knowledge related to practices and nursing intervention. Data was collected through a convenient sampling technique.

Dana Analysis Procedures: Data was entered and analyzed in SPSS version 21.0. Descriptive statistics including frequency and percentages were calculated for categorical variables while mean and standard deviation were calculated for continuous variables. Chi-Square test, independent sample t-test, and ANOVA were

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used for the association with different demographic variables like (Qualification, experience).

RESULTS

Demographic characteristics: A total of 70 nurses have participated in this project. In which majority of the participants were female 38(54.3%), and male 32(45.7%). The participant's age group of 26-30 was more 27(38.6%), then 31-35 26(37.1%), and 36-40 years 11(15.7%). Majority of the participant qualification was 2 years Post-Rn n-28 (40%), while 3 years diploma nurses were 26(37.1%) and 4 years BSN was 16(22.9%). In this study the nurses who's experience were 6-10 years were in majority 33(47.1%), then experience of 3-5 years 19(27.1%) and 11-15 years were 13(18.6%) (Table 1).

Table 1: Demographic data of the study (n=30)

Socio-demographic characteristic		Frequency	%age
Gender of the participants	Male	32	45.7
	Female	38	54.3
Age of the participants	20-25	2	2.9
	26-30	27	38.6
	31-35	26	37.1
	36-40	11	15.7
	40 and above	4	5.7
Qualification	Diploma	26	37.1
	Generic BSN	16	22.9
	Post RN	28	40.0
Experience of the participants	1-2 Years	3	4.3
	3-5 Years	19	27.1
	6-10 Years	33	47.1
	11-15 Years	13	18.6
	16 Years and Above	2	2.9
Current working departments	Surgical department	36	51.4
	Critical care unit (CCU)	24	34.3
	Pulmonology	10	14.3
Attended previous session on chest tube		NO	100%

Mean percentage score of nurses' knowledge and practice related to chest tube drainage: The mean nurse's knowledge score in (Section-01) had concluded that 81.40% were fall in the category of poor knowledge level, 18.60% scored average, while none obtain a good knowledge score. In (Section-02) the mean knowledge score of nurses had a result of 65.70% were poor, 34.30% were average, while none of them obtained a good knowledge score. In (Section-03) similarly, 68.60% scored poor knowledge, 31.40% scored average, while none obtained a good knowledge score (Figure 1).

Mean score and other statistical description: The mean score that was obtained by the participants in the three sections of the questionnaire was in section-01 out of the total score of 18 participants obtained a mean score of (7.95) as shown in (Table-02), which falls in the category of poor knowledge score ≥ 59%. Similarly, in section-02 the obtained mean knowledge score which is related to practice is 7.6 as shown in Table 2 out of the total[15], which also fall in the category of poor knowledge score ≥ 59%. Furthermore, in Section-03 the obtained mean score of the participants was 7.5 as shown in Table 2 out of the total of 15. Which is also falls in the category of poor knowledge score ≥ 59% (Table 2).

Association of knowledge score with the demographic characteristic:

Association with Gender: The association of knowledge score was also analyzed with the demographic characteristics of the participants. According to the findings of the study, the Male participants had scored higher in all three sections of the questionnaire than female participants as shown in Table 3. Male obtained a mean score of (8.9, 8.5, 8.8), while females obtained mean scores of (7.1, 6.8, 6.3) (Table 3).

Association with Qualification: The association of knowledge score was analyzed with the qualification of the participants and the findings had revealed the result of the highly significant value of (0.000) as showed in Table 4 in all three sections of the questionnaire, the p-value of 0.05 was considered a significant value.

Association with working departments: The participants from the three departments had participated and the finding's association of knowledge score with the working departments were founded non-significant with a p-value of (0.225, 0.394, 0.799) (Table 5). The p-value of 0.05 was considered a significant value.

Association with Experience: The association was also analyzed with the experience of the participants and the results had shown a non-significant association with a p-value of 0.67, 0.031 and 0.269 as showed in (Table 6). The only association was founded with section-2 of the questionnaire which is a part of Nursing practice with a p-value of 0.03. The p-value of 0.05 was considered a significant value.

Table 2: Mean score and statistical description

		Section-01	Section-02	Section-03
N-70	Valid	70	70	70
	Missing	0	0	0
Mean		7.9571	7.6429	7.5000
Std. Error of Mean		.32074	.21346	.25880
Median		8.5000	8.0000	7.5000
Std. Deviation		2.68347	1.78590	2.16527
Range		9.00	7.00	8.00
Minimum		2.00	3.00	3.00
Maximum		11.00	10.00	11.00

Table 3: Independent sample t-test association with gender

	Gender of Participant	N	Mean	Std. Deviation	Std. Error Mean
Section-01	Male	32	8.9375	1.77687	.31411
	Female	38	7.1316	3.04179	.49344
Section-02	Male	32	8.5938	1.13192	.20010
	Female	38	6.8421	1.85307	.30061
Section-03	Male	32	8.8438	1.56801	.27719
	Female	38	6.3684	1.95104	.31650

Table 4: ANOVA association with Qualification

		Sum of Squares	df	Mean Square	F	Sig.
Section-01	Between Groups	118.423	2	59.211	10.483	.000
	Within Groups	378.448	67	5.648		
	Total	496.871	69			
Section-02	Between Groups	54.016	2	27.008	10.897	.000
	Within Groups	166.056	67	2.478		
	Total	220.071	69			
Section-03	Between Groups	94.387	2	47.193	13.801	.000
	Within Groups	229.113	67	3.420		
	Total	323.500	69			

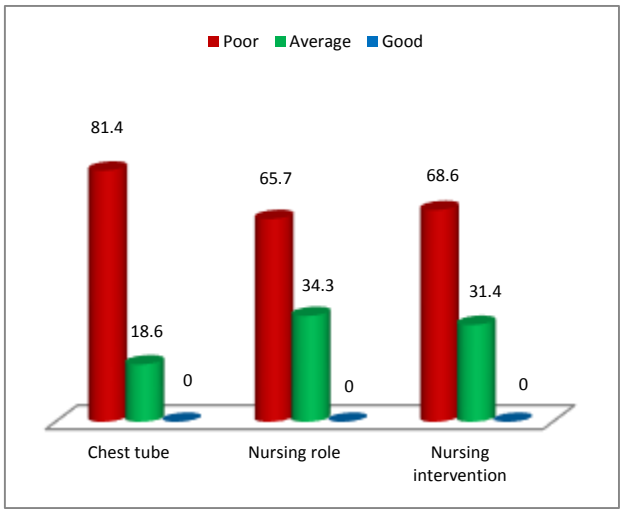
Table 5: ANOVA association with working department

		Sum of Squares	df	Mean Square	F	Sig.
Section-01	Between Groups	21.638	2	10.819	1.525	.225
	Within Groups	475.233	67	7.093		
	Total	496.871	69			
Section-02	Between Groups	6.041	2	3.020	.946	.394
	Within Groups	214.031	67	3.194		
	Total	220.071	69			
Section-03	Between Groups	3.136	2	1.568	.328	.722
	Within Groups	320.364	67	4.782		
	Total	323.500	69			

Table 6: ANOVA association with experience

		Sum of Squares	df	Mean Square	F	Sig.
Section-01	Between Groups	17.399	4	4.350	.590	.671
	Within Groups	479.472	65	7.376		
	Total	496.871	69			
Section-02	Between Groups	32.705	4	8.176	2.836	.031
	Within Groups	187.366	65	2.883		
	Total	220.071	69			
Section-03	Between Groups	24.441	4	6.110	1.328	.269
	Within Groups	299.059	65	4.601		
	Total	323.500	69			

Figure 1: Mean score knowledge of Nurses regarding chest tube drainage, nursing role and nursing intervention



DISCUSSION

Demographic characteristics: According to the findings of the current study the gender composition is 45.70% were female, while 54.30% were male. These findings were similar to the results of a study in which 57% of the participants were female and 44% were male[13]. The findings were contradictory to the results of a study in which 100% of the participants were male[10]. The maximum participants 38.6% were from the age group of 26-30, followed by 37.1% participants of the age group of 31-35, 15.7% of 36-40. These findings were comparable to the result of a study in which the majority of the participants 48.7% were from the age group of 26-30years[5]. The qualification of the participants revealed that the majority 30% of the participants were holding a Post-RN degree, 37.1% were having a Diploma in Nursing, and 22% were BSN graduates. These findings show the strength of the study that Nurses from all three educational categories had participated. These findings are contradictory to the findings of a study in which 70% of participants were holding a Diploma in Nursing and 30% have only technical education[3]. Middle-of-the-road 47.1% of the participant's experience was from the group of 6-10 years, 27.1% had 3-5 years, and 18.6% was having an experience of 11-15 years. A similar study had shown that the majority of the participants 67.1% were having an experience of 2-5 years, 32.9% were from an experience category of 5-10 years[14].

In the current study, nurses were selected from three different departments, of which maximum of the participants 51.4% were from the surgical department, 34.3% from critical care units, and 14.3% were from pulmonology departments. These findings were comparable to the findings of a study in which the participants from three departments were selected in the equal percentage of 33.3% each[15]. Similarly, another study's findings show the majority 40.9% participated from intensive care units, 31.8% were from wards, and only 4.5% were from theater[16]. Moreover, none of the participants had participated in a study before on chest tube drainage.

Mean knowledge score: The mean score that was obtained by the participants in the three sections of the questionnaire was in section-01 (7.95/18) which falls in the category of poor knowledge score ≥ 59%. Section-02, (7.6/15) also falls in the category of poor knowledge score ≥ 59. Section-03, (7.5/15), falls in the category of poor knowledge score ≥ 59%.

These findings were parallel to the findings of a study in which the mean knowledge score was 19.73, which was ≥ 59%[17]. Similarly, in another study, the results were not different and the score was ≥ 59%[18]. While in the mean percentage score nurses poorly scored in all three sections of the questionnaire related to knowledge and practice. 81.40% poorly scored in the first section, 65.70% poorly scored in the second section, 68.60% poor scored in the third section, and the rest fell in the average category. While none of them obtained a good knowledge score. These findings were comparable to the findings of a study in which more than 90% of the study participants obtain unsatisfactory knowledge scores in all sections of the questionnaire[15].

Association of knowledge score with demographic characteristics: The association of knowledge score was analyzed with different demographics characteristics like gender, qualification, experience, and working departments. According to the gender of the participants, males scored higher in all three sections than females with a mean score of (Male-8.9, 8.6, 8.8), while (Female-7.1, 6.8, 6.3).

These findings were comparable to the findings of a study in which all the participants were female and scored ≥ 59%. Likewise, the association with the qualification of the participants was founded highly significant with a p-value of (0.000) in all three sections of the questionnaire. These findings were similar to the findings of a study in which there is a highly significant association with the qualification of the participants[10]. The rest of the demographic characteristics did not show any significant association with knowledge scores. the association with the

working departments was non-significant with a p-value of (0.22, 0.39, 0,72) in all three sections.

These findings were parallel to the findings of a study in which there is a non-significant association with the working departments[19]. Furthermore, there was a non-significant association with the experience of the participants with a p-value of (0.59, 2.8, 1.3). these findings were comparable to the results of a study in which there is a non-significant association with the experience of the qualification of the participants with a p-value of (0.566)[14].

RECOMMENDATIONS

- Guidelines and protocols to be followed by the nurses and evaluation can be ensured by the management and administration.
- Seminars, workshops, and other educational sessions can help the nurses to keep their knowledge updated.
- A similar study can be conducted by the researcher with a large sample size in different organizations.
- Interventional studies can be beneficial for nurses to improve their knowledge and find out the mean difference in pre and post-test scores.

CONCLUSION

In the current study 32(45.30%) were male and 38(54.70%) were female participants. majority of the students were from the age group 26-30 (38.60%) followed by an age group of 31-35(37.10%). According to the qualification of the participants 40% were Post-RN degree holders, 37.10% were diploma holders in nursing, and only 22.90% were having BS-Nursing degrees.

Furthermore, the majority 47.10% of participants fell in the experience group of 6-10 years. According to study findings in the first section of the questionnaire, 81.40% of participants showed Poor knowledge, 2nd section 65.70% showed poor knowledge, while in the 3rd section 68.60% showed poor knowledge regarding management of chest tube drainages. Additionally, none of the participants had obtained a good knowledge score. Moreover, there was no association founded with demographics, the only association that was founded highly significant was with the Qualification of the participants.

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No conflict of interest: As author and behalf of co-author I declared that there is no conflict of interest.

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