Nurses' Knowledge Regarding Chest Tube Management in Tertiary Level Hospital of Chitwan, Nepal

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ABSTRACT

Background: A chest tube insertion is a common procedure in which chest tube is inserted through the side of the chest into the pleural space in order to drain the pleural cavity of air, blood, pus or lymph. Nurses' having sufficient knowledge and experience contributes to the acceleration of the recovery process of the patients and the reduction of potentially fatal complications. This study focuses to assess nurses' knowledge regarding care of patients undergoing chest tube and to find some relevant associations.

Methodology: A descriptive analytical study was carried out among 88 nurses selected using convenience sampling technique who were working in Intensive Care Units, Surgical and Operational Departments of B.P. Koirala Memorial Cancer Hospital. The data were collected by using Self-administered questionnaire. Statistical evaluation was calculated using IBM SPSS v20 program. Descriptive statistics (mean, standard deviation, frequency, percentage, etc.) and inferential statistics (chi square test) were calculated in the evaluation of the data.

Results: Findings of the present study showed that more than half (56.8%) nurses had moderate knowledge regarding management of patients with chest tube. While 40.9% and 2.3% nurses had good and poor knowledge, respectively. There was no significant association between level of knowledge regarding chest tube management and selected socio-demographic variables such as age(p=0.195), education(p=0.323), job experience(p=0.487), guidelines (p= 0.316). Many nurses (40%) relied on peer discussions as their source of knowledge which reveals a gap, as informal sharing cannot substitute structured, evidence-based training programs. Formal training regarding chest tube management was not received by any participants. Only 27.3% participants had read the necessary guidelines.

Conclusion: The majority of the studied nurses had moderate knowledge regarding management of patient with chest tube without getting sufficient training opportunity. Nurses' knowledge was mostly based on unreliable sources rather than evidence-based guidelines or sources.

Keywords: Chest Tubes; Knowledge; Nursing Staff; Evidence-Based Nursing

Background

The insertion of a chest tube is a standard surgical procedure utilized for draining fluid, blood, or air from the pleural cavity.[1] Chest tube management includes the actions to keep the tube functioning properly, which is the prime role of nurses while caring of patients with chest tube drainage.[2]

Although chest tube application is relatively simple compared to other major surgical procedures, it also brings serious complications between insertion and removal.[3] The insertion of a chest tube in a patient using the aseptic technique is the physician's responsibility. However, as long as the chest tube is kept inserted, the nurses' responsibilities include monitoring the drainage bottle and suction level, recording the quantity and content of drainage, administering wound care and follow-up of pain, and providing information and support to the patient.[4,5]

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Care of chest drain and management appear complicated but a good understanding of the basic aspects related to drain insertion and system function is important to improve outcomes for patient and reduce the risk of complications.[6] Nurses' having sufficient knowledge and experience in the care of patients with chest tubes contributes to the acceleration of the recovery process of the patients, the reduction of potentially fatal complications, shorten hospital stay and reduction of the cost.[7]

In Semi urban hospital Nigeria, only 26.2% of studied nurses had a good knowledge of care of chest drains.[8] Similar studies done globally found moderate to poor knowledge levels in nurses caring chest tube, results of which indicated the lack of evidence-based nursing care and insufficient training.[9] Similarly, chest tube training program should be mandatory for newly employed nurses.[10]

Thus, this study was aimed to determine the level of knowledge of nurses about the care of patients with chest tubes and to find association between nurses' knowledge and selected socio-demographic variables.

Methodology

This descriptive analytical study was conducted among the nurses working in the intensive care units, surgical and operative departments of B.P Koirala Memorial Cancer Hospital where chest tube management are frequently performed. The research questions were:

- What is the level of knowledge among nurses regarding chest tube management?
- Is there any association between nurses' demographic characteristics and their level of knowledge regarding chest tube management?

A conceptual framework has been shown in Figure 1.

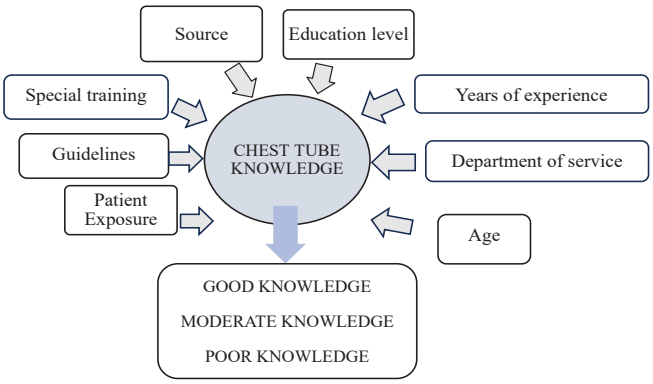

Fig. 1 : Conceptual framework

The sample comprised 88 (out of 102) nurses working in the intensive care, high dependency, operative, post operative, cabin, thoracic surgery and emergency departments of hospital who were available and accepted to participate in the study. The sample calculations were made using Cochran's and Finite Population Correction formula. Convenient sampling was used to recruit.

A self-administered questionnaire tool was prepared by researchers reviewing the literature and experts' opinion through tool validity for data collection. The form consisted of two parts. The first part collated information on the socio-demographic characteristics of nurses and the second part collated information on the nurses' knowledge levels regarding the management of patients with chest tubes. There were 30 expressions in the second part questionnaire form measuring the knowledge levels of nurses. For these expressions, each true response was evaluated as 1 point and false and unknown responses were evaluated as 0 points. The total points were calculated by adding the points taken from all the true responses. With regard to the number of points from these knowledge questions, the minimum was 0 and the maximum was 30. Total obtained score were converted to percentage. The nurses who correctly replied to less than half of the questions were classified as having poor knowledge level, those who correctly replied to 50-80% of the questions were classified as having moderate knowledge level, and those who correctly replied to 80-100% of the questions were classified as having good knowledge level.

Questionnaire were distributed without disrupting duty hours and patient care. Informed consent was obtained from all the participants.

Ethical considerations: Ethical approval was obtained from the Institutional Review Committee of B.P. Koirala Memorial Cancer Hospital. Confidentiality and anonymity were maintained throughout the study.

Data Analysis: Statistical evaluation of the data obtained in the study was calculated using IBM SPSS v20 program. Descriptive statistics (mean, standard deviation, number, percentage, etc.) were calculated in the evaluation of the data. While looking for the association between the knowledge level and socio

demographic variables, Pearson's Chisquare and likelihood ratio (G^2 test) were calculated. The level of significance was taken as $p < 0.05$.

Results

The socio-demographic and working characteristics of the nurses are displayed in Table 2 and 3. Although not specified in table, majority of nurses (40%) nurses stated that they obtained information about the management of patients with chest tubes from their peer discussion with colleagues. Similarly, 28%, 27%, and 5% obtained knowledge from the nursing school, clinical practice experience, and hospital protocol, respectively. While none of the nurses stated formal training as their source of knowledge on chest tube patient management.

Table 1: Association between Level of Knowledge of Nurses and Selected Socio-demographic Variables

Variables		Knowledge level			P value
		Good	Moderate	Poor	
Age	20-30 years	28	30	2	.195
	31-40 years	8	18	0	
	41-50 years	0	2	0	
Educational Level	Diploma	9	7	1	0.323
	Graduate	27	41	1	
	Postgraduate	0	2	0	
Job position	Staff Nurse	35	44	2	0.437
	Senior Staff Nurse	1	4	0	
	Nursing Officer	0	2	0	
Department of Service	Thoracic surgery	6	9	0	0.482
	OT[1]	10	11	0	
	ICU[2]	8	6	0	
	Post Op[3]	4	6	0	
	HDU[4]	1	7	1	
	Cabin	4	5	1	
	Emergency	3	6	0	
Read chest tube care guidelines or manual	Yes	8	16	0	0.316
	No	28	34	2	
Duration of Nursing services in years	1-5	15	21	2	0.487
	6-10	16	17	0	
	11-15	4	8	0	
	>15	1	4	0	

[1]Operation Theatre, [2] Intensive Care Unit, [3] Post operative Unit, [4]High Dependency Unit

The mean score obtained from the total knowledge questions was 23.90±3.34, and the median score was 24. It was observed that 56.8 % (50) of the nurses scored between 50-80% (15-24 points) from the knowledge questions. While 40.9% (36) and 2.3% (2) of the nurses scored >80% (24-30 points) and <50% (<15 points) respectively from knowledge questions. (Figure 2).

There was no statistically significant association between knowledge level and selected socio-demographic variables such as age, education level, job position, department of work, exposure to chest tube patients, duration of service, training received, guidelines and source of knowledge. (p value≥0.05)

Table 2: Socio-demographic Variables of the Participants (Age, Gender, Ethnicity and Religion)

Variables	Frequency (n)	Percentage (%)
Age 20-30 years 31-40 years 41-50 years Mean± SD= 29.76±4.594 Range= 20-50	 60 26 2	 68.2 29.5 2.3
Gender Male Female	 0 88	 0 100
Ethnicity Brahmin/Chhetri Janjati Muslim Madhesi Dalit	 52 25 1 4 6	 59.1 28.4 1.1 4.5 6.8
Religion Hindu Muslim Buddhist Christian	 83 1 4 0	 94.3 1.1 4.4 0
Marital status Married Unmarried	 54 34	 61.4 38.6

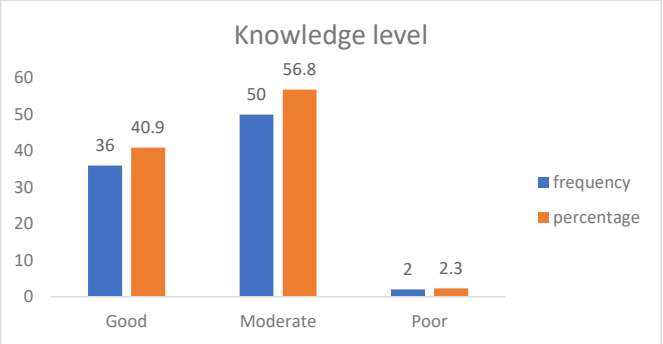

Fig. 2 : Total level of Knowledge of Nurses about Chest tube Management

Table 3: Socio-demographic Variables of the Participants (Educational level, Job position, Department of Services, Duration of Nursing Services, Special training, Guidelines)

Variables	Frequency (n)	Percentage (%)
Educational level		
PCL Nursing/Diploma	17	19.3
Graduate (BN/B.Sc.Nursing)	69	78.4
Post Graduate (M.Sc.Nursing)	2	2.3
Job position		
Staff Nurse	81	92
Senior Staff Nurse	5	5.7
Nursing officer	2	2.3
Department of services		
Thoracic surgery	15	17
OT	21	23.9
ICU	14	15.9
Post op	10	11.4
HDU	9	10.2
Cabin	10	11.4
Emergency	9	10.2
Duration of nursing services		
1-5 years	38	43.2
1-10 years	33	37.5
10-15 years	12	13.6
>15 years	5	5.7
Mean± SD= 6.943±4.915		
Received Special training on chest tube management		
Yes	0	0
No	88	100
Read guidelines or manual in your work place		
Yes	24	27.3
No	64	72.7

Discussion

In this study, the knowledge level of nurses about chest tube management were tried to be determined and the results were discussed in the light of literature.

Chest drains have remained a common, simple and effective tool for managing chest trauma and pleural pathologies.[11] Nursing care of patients connected to chest drains can either be pre-procedural or postprocedural. Pre-procedural care involves ensuring that informed consent is obtained and giving additional relevant information to the patient, gathering the correct materials for tube thoracostomy and assisting the procedure. Postprocedural care entails monitoring vital signs, maintaining a closed system, assessing and charting drainage, protecting the water seal drainage system, assisting patients during change of position and assisting in removing tube after it has served its function.[12]

The present finding revealed that nearly two- third (68.2%) of the participants were between 20-30 years. This result was likely because younger nurses are more often engaged in bedside care, whereas senior nurses focus on administrative responsibilities. This contrasts with Mohammed et.al which mentioned that, more than three quarters of their studied nurses were less than 25 years.[13]

In terms of gender, present study shows all participants were female, reflecting the historical context in Nepal where nursing education was exclusively female-dominated until recent years. So the profession of nursing in Nepal was mostly feminine. This result mirror the study by Elsayed et. al. who also found that the majority of participants were female.[14]

Regarding educational qualifications, more than three-quarters (78.4%) were graduate nurses, which is consistent with Shaker et al., who reported a similar pattern of high educational attainment.[15] In terms of work experience, 43.2% of nurses had 1–5 years of working experience, supported by Lit et al., who emphasized that ongoing in-service education is crucial regardless of experience level.[16]

When department of service was considered, 23.9% of nurses were from operative units. This result differed from Mathew et al., where most nurses worked in intensive care, suggesting contextual differences in staff deployment.[17] Exposure to chest tube patient care was high, with 63.3% reporting multiple experiences with chest tube patient management, consistent with Kesieme et al., who indicated the importance of repeated exposure to patient care in improving surgical outcomes.[8]

A notable finding of this study was that many nurses (40%) relied on peer discussions as their source of knowledge. While this reflects a culture of teamwork, it also highlights a critical gap - informal discussions cannot replace structured, evidence-based training. As emphasized by Magner et al., in-hospital training is the most effective way to ensure accurate and consistent knowledge in chest tube care. Importantly, in present study, none of the participants had attended formal training on chest tube care, supported by Lit et al., who also found limited access to structured

educational opportunities. The absence of formal trainings or workshops means that knowledge is often inconsistent, leaving nurses underprepared for safe and standardized practice. Therefore, the results strongly underscore the urgent need for regular, well-designed training programs and hospital protocols to strengthen nursing competence and improve patient outcomes.[5,10,16]

Deficiencies were noted in key knowledge areas: nearly one-fourth (23.9%) could not identify normal intrapulmonary pressure, many (45.5%) responded incorrectly on standard suction pressure, and more than half (55.7%) were unaware of expected drainage volume within 24 hours. Additionally, 39.8% lacked knowledge of safe chest tube removal technique. These gaps can be attributed to the absence of standardized training and clinical guidelines or protocols.

Overall, 56.8% of nurses demonstrated moderate knowledge, 40.9% had good knowledge, and only 2.3% showed poor knowledge. This result is in line with Magner et al. who found that 88% of nurses had sufficient or moderate knowledge of chest drain care. This result is also supported by other studies.[5,18]

But contrasts with Tufail et al. who reported that all studied sample had unsatisfactory knowledge regarding chest tube. This result is also disagreed by other studies.[8,19–22]

nurses who have a work experience of <10 years, low-rank nurses and those working in the female medical ward; however, the relationship were not statistically significant ($P > 0.05$

Importantly, no significant association was found between knowledge and demographic variables such as age, educational qualifications, job position, department of service, exposure to trainings, number of times cases handled, read guidelines. (p value ≥ 0.05) This indicates that the knowledge gaps were common across all groups of nurses and were mainly due to the lack of training and clear guidelines, rather than individual factors.

Conclusion

This study revealed that most nurses had a moderate level of knowledge regarding chest tube management, and few had poor knowledge. Knowledge was mainly acquired through informal sources such as peer discussions rather than structured training or evidence-based guidelines. No significant association was observed between knowledge levels and demographic variables.

Recommendations

To improve patient safety and outcomes, in-service training programs, development of standardized protocols, and provision of educational materials or guidelines on chest tube care are strongly recommended. Further research including large and more diverse samples are definitely beneficial to evaluate both knowledge and actual clinical practice, in current era of evidence-based medicine.

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