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Use of physical restraints on patients: Knowledge, attitude and practice of Indian nurses

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Abstract
Context: Critically ill patients are in the increasing possibility of developing altered level of consciousness which may lead to removal of attached life support systems. It is essential for nurses to understand patient's emotional aspects when restraints are applied and nurses should be adequately knowledgeable about its use.
Aims: The current study was conducted to assess the knowledge, attitude and practice of critical care nurses on the use of physical restraints.
Methods: A cross-sectional analytical survey design was adopted in the current study. Physical Restraint Questionnaire developed by Janelli *et al*. was used to collect data from 137 staff nurses from various Intensive Care Units of a tertiary care institute.
Statistical analysis used: Mann Whitney U-test, Kruskal-Wallis test and Spearman's rank correlation were used for statistical analysis.
Results: Among the participants, 61.07% belonged to the age group of 30-39 years, 65.7% were female nurses and 66.42% were educated upto undergraduate degree in nursing. The mean scores of all ICU nurses on knowledge, attitude and practice scores regarding use of physical restraints were 8.80±1.23, 24.43±3.03 and 36.32±3.84 respectively. Female nurses have better practice score (*P*-0.033), and nurses with more working experience have higher practice score (*P*-0.012). There was no statistically significant correlation between the nurses' knowledge and attitude on use of physical restraints with their practice scores.
Conclusion: The nurses' level of knowledge and attitude did not influence their practice on physical restraint. This signifies the need to develop and monitor use of proper protocol regarding physical restraints.

Keywords: physical restraints; intensive care unit nurses; knowledge, attitude and practice on physical restraint; patient safety; physical restraint monitoring

Introduction

"First, do no harm" is deeply embedded in medical education and clinical practice with patient's well-being as the most significant goal. Various approaches have been adopted to protect patients from injury.[1-2] Physical restraints (PR) are described as devices attached to or near a patient's body to limit free movement in acute care settings to prevent patient interference with therapies including pulling of ventilator tubes, nasogastric tube and catheters, prevent falls, or others. PR usage accounts for 2-7.5% in general hospitals[3], while it was found to be fairly common (56%) in Intensive Care Units (ICU) [4]

However, PR could be considered a form of assault or even false imprisonment by the patients or their family. There are conceivably several negative consequences correlated with practicing physical restraints, including physical (increased risk of infection, pressure ulcer, exacerbation of existing condition, death by strangulation, etc.) and psychosocial problems(emotional reactions, agitation, anger, embarrassment, agitation, declined social function, etc.) [5-6]. The food and drug administration (FDA) reported that at least 100 deaths happen yearly in the USA from the inappropriate practice of physical restraints [7].

To prevent any of these complications, nurses should use PR only as the last resort after other alternatives have failed, following the prescribed standard of care. Notwithstanding their ambiguous nature, use of PR is still commonly practiced without proper regulations in many hospitals [8-9].

It has been observed that, nurses from various countries had different attitudes toward physical restraint application, with most of them regarding usage as appropriate and that inadequate staffing increased frequency of restraint uses [2, 10-12]. Nurses are the essential decision-makers in the utilization of physical restraints to patients. Hence, assessing nurses' knowledge and skills concerning physical restraints, cultivating positive views, and exercising right application of physical restraints all need prompt attention to implement safer care for patients [13, 14].

Literature review related to PR and monitoring protocols are limited and dominated mostly by overseas literature. The study was conducted to assess the knowledge, attitude and practice of ICU nurses regarding PR, so that area specific issues can be addressed and hospital policies regarding PR protocol can be updated based on evidence from our study.

Materials and Methods

A cross-sectional analytical survey was conducted to assess the knowledge, attitude and practice of ICU nurses on the

use of physical restraints. Data collection period was one week and eligible population (regular nurses working in 19 intensive care units of JIPMER) was 182. Using total enumeration method, 137 nurses who were present in different shifts from nineteen adult ICU's of a tertiary care institute were included in the study. Data collection period was one week and each participants answered the questionnaire within 15 minutes at the beginning of their shift. The reasons for non-participation were due to busy work schedules, absence or long leave.

The outcome variable studied were knowledge, attitude and practice scores on use of physical restraint. The covariates include age, gender, education, duration of work experience, name of ICU and previous exposure to the topic.

Physical Restraint Questionnaire by Janelli *et al* (1991) [15] was used to collect data from the participants. The knowledge section of the questionnaire comprises of 11 statements, the attitude section have 12 items reflecting nurses attitude and the practice section have 14 items. The validity and reliability of the questionnaire were established in previous studies as Cronbach's alphas of the knowledge, attitude and practice sections were 0.75, 0.79 and 0.77, respectively [16]. The content validity index score of the questionnaire was 86% [17]. The score for the knowledge section was calculated as follows: correct answers were given a score of one and incorrect or undecided answers zero; thus, the possible score range for each participant is 0-11. The second section is a four-point Likert scale that consists of 12 items and measures attitudes of nursing staff regarding the use of physical restraints; "I strongly agree" is four points, "I agree" is three points, "I don't agree" is two points and "I strongly disagree" is one point. The scoring range of this section is 12-48; the highest score represent positive and the lowest score represent negative attitude. The third section includes 14 items which measure practices of the nursing staff regarding the use of physical restraints. The tenth item is a negatively worded item and is reverse scored. This section have a three point Likert scale where, "never" is one point, "sometimes" is two points and "always" is three points. Scores range between 14 and 42 and higher scores represent excellent physical restraints practices whereas lower scores indicate unsuitable practices.

Ethical considerations

The study was approved by Nursing Research Monitoring Committee and Institutional Ethics committee (JIP/IEC/2019/025). The procedures followed were in accordance with the ethical standards of institution as well as the Declaration of Helsinki revised in 2013. Participation in the study was voluntary and informed consent was taken from each participants before enrolment. The participants were also ensured of anonymity and confidentiality of their data.

Statistical analysis

Data analysis was done using Statistical Package for Social Science (IBM SPSS Version 25). The scores of all the participants on each domain- knowledge, attitude and practice were expressed as mean with standard deviation. The participants' response to each questions were presented as frequency and percentage. When tested for normality using Kolmogorov-Smirnov and Shapiro-Wilk tests, the knowledge, attitude and practice scores did not follow normal distribution; so Mann Whitney U-test and Kruskal-Wallis test were used for comparison of the scores between their socio-demographic variables. Correlation between the nurses' knowledge and attitude on use of physical restraints with their practice scores was assessed using Spearman's rank correlation method.

P-value<0.05 was considered as statistically significant.

Results

Among the nurses, 61.33% were between the ages of 30-39 yrs. 65.7% of the nurses were females and, B.Sc nursing was the educational qualification for 66.42% of nurses. 59.7% nurses were having 5-10 years of clinical experience and 89.05% had an ICU experience of 1-5 years. The maximum number of participants were from Emergency ICU (13.1%) and only 5.11% of the participants had previous exposure (in-service education) to the research topic.

The mean score of participants' knowledge on use of physical restraints was 8.80±1.23. Similarly, the attitude and practice scores were 24.43±3.03 and 36.32±3.84 respectively. (Table 1)

Table 2 shows that, the participants relatively had good knowledge on all items. However, for the question of 'Good alternatives to restraints do not exist', 43% of the participants agreed, which necessitate the need for continuing education on PR use and its effects.

Regarding attitude of the nurses, Table 3 showed that majority of the items nurses reported fair to moderate attitude on use of restraints in critical care units. The response from the participants indicated the need for sensitising nurses on right use of physical restraints as for the item, 'It makes me feel bad if the patient gets more upset after restraints are applied, 56.2% of the participants disagreed. Similarly for the item 'I believe that restraint increases the risk of strangulation', 51.1% of the participants disagreed. Majority of the participants had scored well in the practice domain. (Table 4)

Table 5 showed that there was no statistically significant difference in the knowledge and attitude score between all the variables. However, statistically significant difference was noted in the practice score with respect to gender and total working experience in hospital; Female nurses had better practice score regarding use of physical restraint (*P*-0.033) and nurses with longest working experience had the highest practice score regarding use of physical restraint (*P*-0.012).

Table 6 showed no statistically significant correlation between the nurses' knowledge and attitude on use of physical restraints with their practice scores.

Table 1: The mean scores of participants' knowledge, attitude and practice on the use of physical restraints N=137

Domain	Mean ±SD	Minimum-Maximum score	Possible score range
Knowledge	8.80 ±1.23	5-11	0-11
Attitude	24.43 ±3.03	18-33	12-48
Practices	36.32 ±3.84	26-42	14-42

SD: Standard deviation

Table 2: Selected items on the participants' knowledge score regarding use of physical restraints (N=137)

Statements	Agree n (%)	Disagree n (%)
1. Physical restraints (safety vests, garments) are to be used, a member of the patient family is required to sign a consent form.	114(83.2)	23(16.8)
2. A restraint should be released every 2hr if the patient is awake.	118(86.1)	19(13.9)
3. When a patient is restrained, there may be an increase in skin break down	129(94.2)	8(5.8)
4 When a patient is restrained in bed, the restraint should not be attached to the side rails.	116(84.7)	21(15.3)
5. A patient should never be restrained while lying flat in bed because of the danger of choking.	95(69.3)	42(30.7)
6. Good alternatives to restraints do not exist.	59(43)	78(57)

n (%): number and percentage of participants who had given the particular response

Table 3: Selected items on the participants' attitude score regarding use of physical restraints (N=137)

Statements	Strongly agree n (%)	Agree n (%)	Disagree n (%)	Strongly disagree n (%)
1. If I were the patient, I would feel that I should have the right to refuse or resist the placing of restraint on me.	5 (3.7)	22(16)	63(46)	47(34.3)
2. I feel guilty placing a patient in restraints	15(10.9)	65(47.5)	48(35)	9(6.6)
3. I feel that the main reason restraints are used is that the hospital is short staffed.	21(15.3)	23(16.8)	54(49.4)	39(28.5)
4. I feel embarrassed when the family enters the room of a patient who is restrained and they have not been notified.	10(7.3)	56(40.9)	55(40.1)	16(11.7)
5. It makes me feel bad if the patient gets more upset after restraints are applied.	2 (1.5)	42(30.6)	77(56.2)	16(11.7)
6. It is important to apply the restraint to assure legal protection for myself and my centre.	4(2.9)	60(43.8)	61(44.6)	12(8.8)
7. I feel placing a patient in restraint can decrease nursing care time	24(17 5)	66(48.2)	34(24.8)	13(9.5)
8. I believe that restraint increases the risk of strangulation.	7(5.1)	48(35)	70(51.1)	12(8.8)
9. I believe that restraints lead to a reduction in the number of patients who fall.	3(2.2)	16(11.7)	83(60.6)	35(25.5)

n (%): number and percentage of participants who had given the particular response

Table 4: Participant's practice score on use of physical restraints (N=137)

Statements	Always n (%)	Sometimes n (%)	Never n (%)
1..I try alternative nursing measures before restraining the patient	80 (58.39)	55 (40.14)	2 (1.46)
2. When I restrain a patient, I make this decision only with a physician's order	79 (57.66)	49 (35.77)	9 (6.57)
3.When I feel that the patient does not need to be restrained, I make this suggestion to the doctor	93 (67.88)	42 (30.66)	2 (1.46)
4. I answer the call for the patient who is restrained as soon as possible	114 (83.21)	22 (16.06)	1 (0.73)
5. I check the restraints at least every 2h to make sure they are in the proper position	111 (81.02)	25 (18.25)	1 (0.73)
6. I inspect the skin of the patient for abrasions or skin tears if I bathe a patient who is restrained	124 (90.51)	13 (9.49)	0
7. I tell family members why the restraint is being applied	123 (89.78)	1 (10.22)4	0
8. I explain the patients why the restraint is applied.	107 (78.10)	29 (21.17)	1 (0.73)
9. I tell the patient when the restraint(s) will be removed	102 (74.45)	33 (24.09)	2 (1.46)
10. More patients are restrained when we are short of staff than when we are fully staffed	68 (49.63)	44 (32.12)	25 (18.25)
11. In our unit, staff members work together to discover ways to control the behaviour of patients other than by using physical restraints	50 (36.50)	63 (45.98)	24 (17.52)
12. I frequently assess if the restraint should be removed	91 (66.42)	44 (32.12)	2 (1.460
13. When physical restraints are applied, I record on the Kardex the type of restraint used, the reason for adopting it, the time the application commenced, and the related nursing care required	49 (35.77)	54 (39.41)	34 (24.82
14.I frequently evaluate and record the effect of physical restraint when applied to a patient	74 (54.74)	46 (33.58)	16 (11.68)

n (%): number and percentage of participants who had given the particular response

Table 5: Comparison of participants' knowledge, attitude and practice regarding use of physical restraint between their socio-demographic variables N=137

Description	n	Knowledge			Attitude			Practice		
		Median (IQR)		*P*-Value	Median (IQR)		*P*-Value	Median (IQR)		*P*-value
Age (in years)[1]										
20-29	45	9	(8.00,10.00)	0.448	24	(22.00,27.00)	0.176	38	(35.50,40.00)	0.106
30-39	84	9	(8.00,10.00)		24	(23.00,26.00)		37	(34.00,39.00)	
40-49	7	9	(8.25,10.00)		25	(24.25,26.75)		37	(33.25,40.50)	
50-59	1	8	(8.00,8.00)		18	(18.00,18.00)		40	(40.00,40.00)	
Gender[2]										
Female	90	9	(8.00,10.00)	0.197	25	(23.00,27.00)	0.750	37	(34.00,39.25)	0.033*
Male	47	9	(8.00,10.00)		23	(21.00,26.00)		36	(34.00,39.00)	
Education[1]										
GNM	23	9	(8.00,10.00)	0.596	24	(22.00,25.00)	0.578	39	(36.00,40.00)	0.061
B.Sc	91	9	(8.00,10.00)		25	(23.00,27.00)		37	(34.00,39.00)	
PbB.Sc	5	9	(7.00,10.00)		23	(22.00,25.00)		37	(32.50,39.50)	

M.Sc	18	9	(8.00,10.00)		24	(22.00,26.00)		37	(35.00,39.50)	
Total experience (in years)[1]										
1-5	32	9	(7.25,10.00)	0.876	25	(23.00,27.00)	0.157	38	(37.00,40.00)	0.012*
6-10	82	9	(8.00,10.00)		24	(22.00,26.00)		37	(33.00,39.00)	
11-15	16	9	(8.00,9.00)		25	(23.00,26.00)		37	(31.25,39.75)	
16-20	5	8	(8.00,9.50)		25	(23.50,31.50)		38	(33.00,41.00)	
21-25	2	9	(8.00,10.00)		21	(18.00,24.00)		39	(38.00,40.00)	
ICU experience (in years)[2]										
1-5	122	9	(8.00,10.00)	0.772	25	(22.75,26.00)	0.469	37	(34.00,39.00)	0.088
6-10	15	9	(8.00,10.00)		24	(22.00,26.00)		34	(30.00,38.00)	
Previous Exposure[2]										
Yes	7	9	(8.00,9.00)	0.354	24	(22.00,24.00)	0.242	36	(35.00,40.00)	0.918
No	130	9	(8.00,10.00)		25	(22.00,25.00)		37	(34.00,39.00)	

N-Total number of sample; n-Number of samples in each class interval; IQR-Interquartile range
GNM-General nursing and midwifery; B.Sc-Bachelor of Science; PbB.Sc-Post basic Bachelor of Science;
M.Sc-Master of Science; ICU-Intensive care unit
[1]Kruskal-Wallis Test; [2]Mann-Whitney U Test; *****p<0.05

Table 6: Correlation of the level of ICU nurses' knowledge and attitude regarding use of physical restraints on their practice N-137

		Knowledge score	Attitude score
Practice score Median(IQR): 37(34,39)	Median (IQR)	9 (8,10)	24 (22,26)
	ρ*	0.03	0.15
	P-value	0.73	0.07
	95% CI	-0.14 to 0.20	-0.02 to 0.32

IQR-Interquartile range; CI-Confidence interval; *Spearman's rank correlation coefficient

Discussion

This study assessed the critical care unit nurses' knowledge, attitude and practice regarding the use of physical restraints on patients. More often the use of physical restraints is indicated when patient become aggressive due to underlying medical disorder including delirium, delusions, dementia and other psychiatric disorder, however it should be considered as last resort when other approaches including reassuring of the patients is not effective. The nurses working in critical care units must be more sensitive about the use of restraints as it causes psychological damage to the patients [10, 12, 18-20].

Nurses' knowledge on use of physical restraints

The study results showed that majority of the participants had good knowledge as the mean score of the participants was 8.80 ±1.23 with a score range of 5-11, similar to the findings by Janelli *et al*. and Hasanne *et al*. [15, 19] However, some studies found contrasting results, that nurses have inadequate knowledge about the use of PR. [5, 21] The participants have scored relatively well except for the item of 'Good alternatives to restraints do not exist', for which 43% of the participants agreed. Few other studies also reported similar results that nurses do not have knowledge about types of restraints, the diverse alternatives than immediately using PR. [5, 16, 20-22] Thus, one of the most important topics during restraint minimization programmes would be introducing and focusing on physical restraint alternatives.

The authors reported in this study that nurses who have recieved job induction training on hospital protocols including use of physical restraints had better knowledge than who did not. All the nurses with 6-10 years of total experience have either good or average score. Nurses with increased ICU experience also had better knowledge. This goes in line with findings where it was reported that nurses in a more senior position and longer experience tend to have better knowledge about restraints [5, 18].

Nurses' attitude on use of physical restraints

Nurses need to be sensitive towards clinical situations where restraints are required for the patients to avoid accidental pulling of medical equipment connected with patients. In this study, nurses' attitude towards use of physical restraints was not good for many of the patient oriented items, as nurses disagreed to some of the items including- 'It makes me feel bad if the patient gets more upset after restraints are applied' and 'I believe that restraint increases the risk of strangulation'. The similar findings were reported in few other studies, which reported inadequate attitude level of nurse towards use of physical restraints on patients.[5,20,23] Wang *et al*. also found that nurses have neutral attitude towards use of PR, which they suggested might be due to less inclusion of ethical issues regarding PR in nursing education [23].

Nurses' practice on use of physical restraints

The high average for nursing practice regarding PR may have resulted from their accumulated training and clinical experience. The practice responses also aligned well with the knowledge responses. For example, 57% of nurses stated that good alternatives to restraints do not exist in the knowledge section; in the practice response, 58.39% of the nurses also stated that they try alternative nursing measures before restraining the resident. In contrast, Suen *et al*. reported that eventhough 83% do not know that skin breakdown may be one of the possible outcomes in the knowledge section, over 97% of the staff mentioned that they always inspect the skin of the resident for abrasions or skin tears while bathing patients. The authors inferred that what the staff believe and what they do may not always be the same [5]. The differences in the knowledge-practice scores might also indicate that nurses may be influenced or instructed by their colleagues or more experienced nurses.

The practice item with the most contrasting answer is related to documentation and monitoring- 'When physical restraints are applied, I record on the Kardex the type of restraint used, the reason for adopting it, the time the

application commenced, and the related nursing care required'. Findings from similar study also shows that nurses perform poorly regarding documentation, considering their high average practice score [24]. Only 35.77% of the nurses reported always recording the reason for using PR, the time of use and related nursing care; while 24.82% have never maintained such record. Wang *et al*. also found that only 60.5% of the nurses 'often' or 'always' recorded the time the physical restraint began and the reason for using it. [23] More than half of the nurses indicated that they never recorded PR in the findings by Azab *et al*. [16] currently, there is no standard regulation regarding PR usage and therefore no specific recommendation on monitoring and charting. Decision making regarding initiation and termination of use have to be improved as well, based on specific guideline.

Factors affecting knowledge, attitude and practice on use of physical restraints

The present study recorded no statistically significant difference in the knowledge and attitude scores between all the variables, which is supported by findings from Kaya *et al*. [20] However, findings from other studies showed that nurses with higher educational status, [5, 15, 22, 23] nurses who had received related in-service training [23] and female nurses[19] reported better knowledge scores on use of physical restraints. Senior nurses tend to have a more positive attitudes towards the use of physical restraint compared with nurses in other positions. [19, 23] The practices score was influenced by gender, [19, 23] in-service training [23] and years of experience [21].

In the current study, the nurses who received higher level of nursing education and previous exposure to in-service training had worse practice scores regarding physical restraint; However, the difference between the groups was not statistically significant (Table 5). The fact that educational status and previous exposure did not have positive effect on the knowledge, attitude and practice scores, could indicate that education solely did not improve the use of physical restraints, but regular monitoring and ensuring adherence to the restraint protocol using restraint chart in every shift for individual patients may be required.

The lack of correlation between the nurses' knowledge and attitude on use of physical restraints with their practice scores, was in line with findings of Khalil *et al*. and Azab S *et al*. [16, 21] Further regression analysis was not done due to the negligible correlation between participants' knowledge and attitude scores with their practice scores regarding use of physical restraints. On the other hand, previous studies found that there was a positive correlation between knowledge and attitude with practice of the nurses towards use of physical restraint. [5, 12] Eskandari *et al*. entered these variables into multiple linear regression model to determine predictor of nurses' practice, but the predictor variables accounted only for 0.6% of the variances. The accomplished small variance indicated that it was not a strongly correlated model, eventhough statistical significance was noticed. The lack of statistically significant correlation shows that the level of knowledge and attitude did not necessarily influence the nurses' practice on physical restraint.

Limitations and Recommendation

In this study, we have included only ICU nurses of one tertiary care center, which limits the external validity of the results. Large multi-center studies including different units can be conducted to further study the factors affecting nurses' knowledge, attitude and practice on use of physical restraint. Association of the scores with factors like number of beds, actual nurse patient ratio, different shifts, type of physical restraint as well as chemical restraint, can be done in future studies. Additionally, the nurses' responses to the self-report questionnaire might not reflect their actual practice regarding physical restraint. Observational studies can be conducted including actual nurses' practices as well as routine examination of complications in the areas under restraint, which will add to objectivity of the study.

Conclusion

Nurses were having adequate knowledge and practice on use of physical restraints. Their unfavourable attitude necessitates better sensitization programmes and formulation of physical restraint guidelines, especially before posting the nurses in critical care settings. It is strongly recommended to develop proper protocol for monitoring, charting and providing nursing care for patients with PR. Proper practice for PR can be included as an important quality indicator for hospitals and nursing excellence, which will also lessen the unnecessary use of PR.

Conflicts of Interest

The authors declare no conflict of interest in this study.

Study Highlights

What is the current knowledge?

- Physical restraints are frequently used for limiting patient's mobility in Intensive Care Units
- Use of physical restraints can have positive as well as negative consequences if not applied properly.
- Studies in different countries shows varying results, some of which are lack of knowledge and unsafe practices regarding physical restraints.

What is new here?

- ICU nurses in India have good knowledge and practice, but unfavourable attitude towards use of physical restraint.
- Nurses' practice on physical restraint is neither influenced by their knowledge nor their attitude towards it.
- It is strongly recommended to develop better protocol for monitoring, charting and providing nursing care for patients with physical restraint

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