

The effect of Designed Protocol about Physical Restraint on Critical Care Nurses' Performance

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Abstract: Worldwide, there was great attention on the indiscriminate application and misuse of physical restraint (PR) usage. This was the incentive for health care organizations across the countries to relook at the policy and practices concerning restraints in an effort to declare protection of the patients' safety and health while maintaining their dignity, well-being, and rights. However, there were no available protocols or policies concerning PR use in the selected ICUs. Hence it is worthwhile to understand the nurses' knowledge and practice of PR use in local context. **Material and Methods:** a quasi-experimental research design was used on sixty nurses in ICUs at Mansoura Emergency hospital. Two tools were used for data collection: knowledge questionnaire, and observation checklist. The protocol was designed based on the recent related literature. **Results** revealed marked deficiencies in nurses' knowledge and practices before the protocol; with significant improvements at the post and follow-up protocol implementation. **Conclusion:** Nursing knowledge and practice about PR in the studied setting was somewhat acceptable that be reflected in improving the quality of care delivered to the patients, and decreasing complications of malpractice regarding PR

Keywords: protocol, physical restraint, critical care nurses, knowledge, practice.

I. INTRODUCTION

Most critically ill patients are at high risk for developing alteration in their level of consciousness by way of confusion, delirium and agitation during their ICU stay which associated with increased morbidity and mortality rates (Barr et al., 2013). Consequently, patients with these alterations become easily confused about their surroundings, trying to extracting all the treatment lines and catheters. Furthermore, those patients were trying to jump out of the bed, despite elevation of bed rails (Abdeljawad & Majd, 2016; Clark, 2010).

Therefore, application of physical restraint (PR) is deemed appropriate in this situation when the patient's action can lead to treatment interference (El-sol & Mohammed, 2018). Physical restraint is defined as any procedure or method that bound the patient from accessing to his body or moving freely (Bleijlevens et al., 2016). Even if, PRs have become an acceptable standard of practice for managing safety and behavior control in ICUs, empirical evidence does not support these notions (Cospers et al., 2015; Hevener, Rickabaugh, & Marsh, 2016). Instead, it raises many ethical and practical concerns (Azizpour, Moosazadeh, & Esmaceli, 2017). A range of serious adverse effects and consequences, such as physical and psychological problems have been reported in many studies (Balci & Arslan, 2018; Gu, Wang, Deng, & Weng, 2018; Huang, Lin, Huang, & Kuo, 2014). Therefore it should be used only as a last option when other methods have failed (Bader, 2013; Langley, Schmollgruber, & Egan 2011).

Due to nature of critical care nurses (CCNs) ' work, they spend significant time alongside their patients. So, they are often the key decision maker in application of PR. However, they still hold misconception about the use of PR (Bleijlevens et al., 2016). As has been previously reported in the literature, CCNs have an average knowledge and poor skills in light of international guidelines and protocols regarding to restraint. This shows the importance of design protocol to equip the nurses with necessary skills pertaining to restraint use which reflect on nurses' manner for delivery of health services and help to create restraint free environment (Byrnes et al., 2009; Lin, Liao, Yu, Chu, & Ho, 2018).

II. AIM OF THE STUDY

The aim of this study was to evaluate the effect of a designed physical restraint protocol on critical care nurses' knowledge and practices at Mansoura Emergency Hospital.

RESEARCH HYPOTHESIS

The mean post knowledge and practice scores of critical care nurses who exposed to the designed physical restraint protocol would be higher than their pre mean knowledge and practice scores.

III. SUBJECTS AND METHOD

RESEARCH DESIGN AND SETTING:

Quasi experimental research design was used to conduct this study. This study was conducted in the three ICUs affiliated to Mansoura Emergency Hospital. Each unit has capacity of 10 beds except the last one with 4 bed capacity. These units receive mainly traumatic patients. These units are well equipped with advanced technology and manpower needed as mechanical ventilators, cardiac monitors, oxygen and suction machine. The nurse patient ratio is nearly 1:2 in these units.

SAMPLE

The current study was carried out on a convenience sample composed of 60 critical care nurses who had clinical experience for one year or more in ICUs with different levels of education and involved in providing direct care for physically restrained patients in previously mentioned setting.

INSTRUMENTS

Two tools were formulated to collect data pertinent to the study. **Tool I** was developed by the primary investigator based on extensive literature review to assess CCNs' knowledge regarding PR. It includes 40 questions in the form of 20 multiple choice questions, and 20 true/false. The administered questions covers knowledge regarding definition, indications, purposes, decision making, ethical and legal issues alternatives, precautions, preparation, application and complications. Each correct response was given a score of "one" and incorrect response was given a score of "zero". The scoring system categorized as following; scores $\geq 85\%$ were considered as satisfactory level and scores $< 85\%$ were considered as unsatisfactory level.

Tool II observational checklist of nurse's practice of PR was developed by the researcher and used to fit this study guided through reviews literatures. It is used to observe and evaluate CCNs practice about PR. It classified into five main domains as the following; assessments, preparation, application, maintenance care and documentation. Nurses' practice was evaluated on a two point scale (0="Not done", 1="Done"). The total score $\geq 75\%$ was considered satisfactory, while score $< 75\%$ was considered unsatisfactory.

The tools were tested for its content validity by panel of 7 experts in the field of critical care. Alpha Cronbach's test was used to measure the overall reliability of the developing tools with values 0.959 and 0.977 respectively which indicates high reliability. A pilot study was carried on seven participants (10 %) to test feasibility, objectivity, understandability of the questionnaire before introducing it to the study sample and estimate the time needed for each sheet. The participants were excluded from the main study group. Based on outcome of the pilot study, necessary adjustments have been made accordingly.

ETHICAL CONSIDERATIONS

An official permission to conduct the study was obtained from the research ethical committee of Faculty of Nursing, Mansoura University and the hospital administrative authority. Participation in this study was voluntary; subjects were

informed about the purpose, nature, benefits and procedure of the study. Written consents were obtained from the participants. Confidentiality and anonymity of each participant was assured through coding of all data.

DATA COLLECTION

Once official permissions were obtained, the researcher visited the target hospital and interviewed hospital's administrative authority to illustrate the study purpose and procedure, and seek his permission to conduct the study. Then, the researcher distributed pretest questionnaire and observed the nurses' practice during the different shifts. Based on analysis of the collected data and reviewing of the pertinent literatures, the researcher designed a protocol to review core components of PR which; determining whether the patient's pattern of behavior exist the need for restraint use, addresses factors affecting on patient's behavior and intervention to improve these factors, identifies alternative measures before the application of restraint, the application of restraint and the maintenance care of restrained patient. The PR protocol was delivered for 10 weeks, three session / week. The researcher used simple, brief and clear words.

Each nurse received leaflet that contained all previous data to support her learning and practicing. Upon completion of the protocol, the researcher used tool I & II for evaluation and used these tools again after two months. Comparison between pre, post and follow up test findings was done by the researchers to evaluate the effectiveness of physical restraint protocol.

DATA ANALYSIS

Upon completion of data collection, data were tabulated and analyzed using IBM-SPSS software, version 21. Qualitative data were expressed as frequency and percentage. Quantitative data were initially tested for normality using Kolmogorov-Smirnov and Shapiro-Wilk's test with data being normally distributed if $p > 0.050$. Quantitative data were expressed as mean \pm standard deviation (SD) if normally distributed or median and interquartile range (IQR) if not. ANOVA Test was used if data were normally distributed in the three readings

IV. RESULTS

This study emerged enormous amount of results concerning to the designed physical restraint protocol. For the purpose of this paper, only some of the results will be displayed.

From table (1), it can be observed that, slightly more than half of the studied nurses (51.7%) had bachelor degree. As well, majority of them were married (81.7%). In addition more than one third (46.7%) of them had experience less than five years in ICU and all of them didn't receive special education, or training program/ workshops about PR.

Table (2) highlights that there were constant mean knowledge values for all the studied nurses in all sub items regarding PR which indicate for general improvements in mean knowledge scores immediately after protocol implementation as compared to before and after two months from protocol implementation. In addition, the same table indicates that there were statistical significance differences between all the three pairs with mean knowledge score being statistically significantly higher in immediate > two months after > before where P value for all sub items was < 0.0005

Table (1) Personal and background information of the studied nurses (N=60)

Personal data	Frequency (N=60)	Percentage
Sample		
Qualifications:		
o B.Sc. Nurses	31	51.7%
o Technical institute of Nursing	13	21.7%
o Diploma Secondary Nursing School	16	26.7%
Marital status		
o Single	8	13.3%
o Married	49	81.7%
o Divorced	3	5.0%

Years of experience		
o <5 years	28	46.7%
o 5 – 10 years	7	11.7%
o >10 years	25	41.7%
Receiving special education or training programs / workshops about PR		
o Yes	0	0%
o No	60	100%

Table (2): Total and subtotal mean knowledge scores regarding physical restraint domains among studied subjects (N=60)

PR Knowledge domains	Mean ± SD			Significance test		
	Before	Immediately after	2M after	P1	P2	P3
General information	1.57 ± 0.85	10*	6.12 ± 0.69	<0.0005	<0.0005	<0.0005
Legal and ethical issues	0.63 ± 0.66	6*	4.7 ± 0.88	<0.0005	<0.0005	<0.0005
Specific information related PR practices	2.98 ± 0.85	24*	6.35 ± 0.66	<0.0005	<0.0005	<0.0005
Total	5.32±2.80	40	17.20±2.40			

*Constant value for all cases. P value for all domains was <0.0005 (Friedman’s test) P1: comparing before and immediately after protocol implementation, P2: comparing before and two months after protocol implementation, P3: comparing immediately after and two months after protocol implementation

Table (3) presents that there were statistical significance differences between all the three pairs with mean practice score being statistically significantly higher in immediate > two months after > before implementation of protocol where P value for four domains (assessment, preparation, application and post care) at <0.0005. Moreover, the same table displays that there were constant mean practice values for all the studied nurses regarding documentation domain which indicate for general improvements in mean practice scores immediately after protocol implementation as compared to before and after two months from protocol implementation.

Table (3) Total and subtotal mean practice scores regarding physical restraint domains among studied subjects (N=60)

PR Practice domains / Study period	Mean ± SD			Significance test		
	Before	Immediately after	2M after	P1	P2	P3
Assessment	4 ± 0.74	8.3 ± 0.95	6.58 ± 1.1	<0.0005	<0.0005	<0.0005
Preparation	1.3 ± 0.5	5.45 ± 0.9	4 ± 1.07	<0.0005	<0.0005	<0.0005
Application	3.98 ± 0.97	6.5 ± 0.75	5.48 ± 0.87	<0.0005	<0.0005	<0.0005
Post care	0.23 ± 0.65	5.27 ± 0.95	2.92 ± 2.16	<0.0005	<0.0005	<0.0005
Documentation	0*	2.5 ± 2.98	1.3 ± 2.49	0.0002	0.225	0.301
Total	9.80± 3.12	29.35±7.40	21.02± 8.20			

*Constant value for all cases. P value for all domains was <0.0005 (Friedman’s test) , P1: comparing before and immediately after protocol implementation, P2: comparing before and two months after protocol implementation, P3: comparing immediately after and two months after protocol implementation

It is apparent from table (4); there was statistically significant correlation between practice immediately and 2M after implementation of PR protocol ($r = 0.399$ at $P = 0.002$). While, there was no significant statistical correlation existed between other scores.

Table (4): Correlation between knowledge and practice scores among studied subjects (N=60)

	Knowledge before	Knowledge immediately	Knowledge two months after	Practice before	Practice immediately	Practice two months
Knowledge before	-----	-----	r 0.031 P 0.815	r 0.145 P 0.269	r 0.229 P 0.078	r 0.201 P 0.124
Knowledge immediately after	-----	-----	-----	-----	-----	-----
Knowledge two months after	$r_s = 0.031$ P = 0.815	-----	-----	r 0.223 P 0.086	r 0.033 P 0.802	r 0.052 P 0.696
Practice before	$r_s 0.145$ P 0.269	-----	r 0.223 P 0.086	-----	r 0.186 P 0.156	r 0.178 P 0.173
Practice immediately after	r 0.229 P 0.078	-----	r 0.033 P 0.802	r 0.186 P 0.156	-----	r 0.399 P 0.002
Practice two months after	r 0.201 P 0.124	-----	r 0.052 P 0.696	r 0.178 P 0.173	r 0.399 P 0.002	-----

r_s = Spearman’s correlation coefficient, p value by Spearman’s correlation.

V. DISCUSSION

The focus of this study was designing physical restraint protocol for critical care nurses at Mansoura Emergency Hospital. The analysis of data in the current study exhibited an obvious improvement in general level of knowledge and practice of participants regarding PR after implementation of the protocol (100%, 75.6%) and after two months (63.3%, 54.8%) from protocol implementation with statistically significant differences. This finding coincides with majority of educational studies in this field **Chang et al. (2016)**; **Nasrate, Shamlawi, & Darawad (2017)**; **Taha and Ali (2013)**; **Younis and Ahmed (2017)**. The current study involved a sample of 60 nurses, majority of them were females with mean age (31.8 ± 6.8) years, half of them had bachelor degree and one third of them had experience less than five years in ICU. This might be attributed to a newly bachelor nursing graduates were appointed in ICUs. This was also the case in other studies conducted by **Demir, (2007)**; **Heinze, Dassen, & Grittner, (2012)**; **Seliman, Morsy, Sultan, Elshamy & Ahmed, (2015)**; **Hoosinrezaee, & Nouhi, (2015)** who revealed in their studies that most of the participants were young (25–30 years old).

A noteworthy result of this study concerns insufficient training courses or program related to PR, nearly, all of participants in this study had never received any education, or training about PR. In our point of view, this may back to exclusion of restraint from nursing curriculum. Another possible explanation might be related to unavailability of regulations or policy to be used as a nursing guide that oblige nurses to use intuition and heuristics to make decisions in place of searching for research evidence. This finding was congruent with **Nasrate et al. (2017)** who stated that 57.5% of nurses didn't have previous training about PR. On the same side, **Chang et al. (2016)** who pointed out nearly 73% of the participants in their study had never participated in in-service education related to PR.

The current study revealed that there was statistically significant correlation between practice immediately and two months after protocol implementation. While, there was no significant statistical correlation existed between other scores. This means that the nurses preserve their practice level which is considered as good indicator for the effectiveness of the designed protocol. This finding was supported by **Taha and Ali (2013)** who stated that the studied nurses were retained their knowledge and practice with no decline throughout the follow-up. Also, this result was constant with **Hoosinrezaee et al. (2015)** who found significant improvement in nurses’ practice after six weeks from implementation of the educational program.

Finally, it seems logically to say, providing good nursing care is the elusive goal of any health care organization. Implementation of the protocol is the corner stone of nursing care for physically restrained patients. It was found that implementation of physical restraint protocol is very important which indicated an improvement in nurses' knowledge, practices and skills in ICUs and this may be reflected also an improvement of physically restrained patients' health outcomes.

VI. CONCLUSION

The designed protocol can significantly improve nurses' knowledge and practice concerning PR of critically ill patients. This success is attributed to that the protocol is based on needs assessment and integrates updated technology. However, the findings should be interpreted cautiously because of limitations of the study being quasi experimental rather than non-randomized design.

From this result, hospitals administration can recommend to make the following; create policy regarding the use of PR to avoid complications arising from using and to eliminate conflict over whether to use it, provide orientation program about PR for novice nurses to improve their related knowledge and practice about it and establish of an accurate documentation system

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