

## Patient Early Mobilization: A Malaysia's Study of Nursing Practices

Leong YL\*,  
Abdul Rahman Rasnah and  
Chong MC

Department of Nursing Science, Faculty of Medicine, University Malaya, 50603 Kuala Lumpur, Wilayah Persekutuan Kuala Lumpur, Malaysia

\*Corresponding author: Leong YL

✉ leongyeeleng@yahoo.com  
mcchong@um.edu.my

Department of Nursing Science, Faculty of Medicine, University Malaya, 50603 Kuala Lumpur, Wilayah Persekutuan Kuala Lumpur, Malaysia.

Tel: +60379492806

**Citation:** Leong YL, Rasnah AR, Chong MC (2017) Patient Early Mobilization: A Malaysia's Study of Nursing Practices. J Intensive & Crit Care Vol. 3 No. 3: 29.

### Abstract

**Background:** The practices of early mobilization on mechanical ventilated patient is associated to decrease length of stay in intensive care unit, decrease ventilator associated pneumonia, prevent deep vein thrombosis and skin breakdown. However, in Malaysia, little is known about nurses' practices and barriers of early mobilization in intensive care unit.

**Objective:** The objective of this study is to assess nurses' practices regarding early mobilization among mechanical ventilated patient.

**Methods:** Descriptive cross-sectional survey was used to assess current nurses' practices and barriers on patient early mobilization among in intensive care unit of a teaching hospital in Malaysia. A convenient sampling approach was used. A participant self-administer checklist was distributed to assess the practices.

**Results:** Researcher found that majority (n=99, 75%) of the nurses mobilized their mechanically ventilated patient 3 times or more per shift. There was no association between nurses' EM practice demographic data.

**Conclusion:** Majority of the ICU nurses had met the minimal practice of mobilizing patient at least 3 times or more per shift work.

**Keywords:** Critical care; Early mobilization; Intensive care; Ventilated patient; Practice; Positioning

**Received:** May 31, 2017; **Accepted:** June 14, 2017; **Published:** June 21, 2017

## Introduction

### Implication for clinical practice

- Knowledge of early patient mobilization needs to be taught to physician, nurses and all involving healthcare provider.
- The timing to initiate EM needs to be clear and it can only be done with a standard guideline or protocol.
- In view of important in communication and collaboration between nurses, physician and physical therapist to prevent delay of initiate EM, a group discussion for patient condition shall be implied.

## Background and Literature Review

Early mobilization was defined as any activities beyond range of motions that initiated within 2 days of mechanical ventilation and continue during the ICU stay by health care provider [1].

Early mobilizations (EM) are basically classified into passive and active. As for passive exercise, early mobilization is provided by nurses as early as the first or second day of mechanical ventilation. There were basic turning and positioning patient from supine to right or left lateral, fowler and prone [2]. Limb physiotherapy will then prescribed by the physician and done with the help of physiotherapist and nurses. As new technologies set in, nurses and physiotherapist are more encouraged to mobilise mechanically ventilated patient with portable ventilator, lifting machine, walker or ergometer [3].

Passive mobilization (PM) was range of motion that provided by health care provider to the patient who is unable to cooperate with command. PM in this study referred to PM that was done on mechanically ventilated patient. PM was usually done by nurses for mechanically ventilated patient such as positioning patient from supine to left lateral, right lateral and prone or lifting patient with and sit patient up with bed on fowler or high fowler positions, perform suctioning with physiotherapist and

changing pampers [4]. The Semi-Fowler's position is the position of a patient who is lying on bed in a supine position with the head of the bed at approximately 30 to 45 degrees [3]. In recent years, with the help of new technologies such as ergometer, it helped to deliver a standardised knee and hip flexion to the patient [5,6]. The BCP was defined as having the patient's head of bed elevated to 70" and the foot of bed at a -75" angle, as if the patient is sitting in a chair. 1 h 4 times per day was suggested as it is associated with decrease in VAP incident [7].

Active mobilization (AM) of mechanically ventilated patient was referring to, instruction given to patient; ambulate beyond range of motion with or without assistance. It was like asking patient to perform functional exercise, sitting up on bed, and move from bed to chair, cycling on bed, dangling, tilting up or ambulating [8-10]. All were done either with or without assistance. In this study, AM was refer to active mobilization for mechanically ventilated patient. Study had done on bed cycling has shown positive effect on patient physical function, feasibility and safety [11].

Patient's early mobilization helped to improve physiological wellness of ventilated patient by the increase of tidal volume and respiratory rate due to positional changes [12], preserve muscle strength and mass by improving blood flow, enhance insulin activity and glucose uptake in muscle and stimulating production of anti-inflammatory cytokines [5,13].

Systemic reviews had shown early mobilization improved outcomes of mechanically ventilated patient [1,14] and decreases mechanical ventilation associate weakness [15]. The benefits of early mobilization include reduction in length of stay in ICU and hospital as well as improvements in strength and functional status [16,17]. Early mobilization was usually started according to protocol [3,17,18] and after patient's cardio-respiratory and neurological stabilization [3]. Many protocols were published separately and created [19,20]. However there was no protocol being used for as common as ventilator bundle in Malaysia's intensive care unit (ICU). This had become part of the barrier for nurses to assess patient to initiate early mobilization.

According to Malaysia Registry of Intensive Care (MRIC) report 2013, the total number of admissions in 2013 was 38,780 out of which 1344 (3.5%) were readmissions. The number of cases analysed was 37,436, an increase of 10.5% over the year 2012 [21]. About 77% of patients received invasive ventilation with an average duration of 4.5 days. The average duration of ICU hospital stay was 4.7 and 14.4 days respectively. The rising number of ICU admissions and number of patient on mechanical ventilator also raised challenge to our ICU nurses. A quality intensive nursing care with early mobilization programme [22,23] will bring better outcomes for ICU patient [24] and thus shorten patient's ICU length of stay [15].

Many studies of early mobilization among ventilated patient had been published regarding the benefits [25], physiological responses, safety, nurses driven, physical therapist driven, protocols and guidelines. However, to the best of effort of researcher, only minimal studies were found in Malaysia. Early mobilization was commonly practicing in for cardiothoracic

patient especially in CICU department of Malaysia heart Institute. Mobilization such as walking with ventilator is common among post-operative cardiothoracic patient but it is less common or seldom seen in general ICU patient. Meanwhile early mobilization like positioning, turning, sitting patient out of chair, encourage patient on ventilator to do functional exercises (oral suction by themselves or lifting buttock while changing pampers) [15] are normal practices in Malaysia intensive care nursing. However, these were done following guideline as part of the ventilator bundle [26] and no specific guideline for patient early mobilization.

Nurses play an important role as a patient advocator [19,27], collaborator and executives in nursing practice for mechanically ventilated patient over 24 h a day. In Malaysia, nurses still need to rely on physician's order before refer patient for physiotherapy same goes to some other country [28]. It was either due to hospital's policy in government sector or patient financial and safety concerned that physicians are held responsibility to, in private hospital. Hence, as a collaborator, nurse needs to be knowledgeable, communicate and advocate smartly for patient's need [29]. It was through collaboration with multiple disciplines, it offered the opportunity to share and expand each other's ideas from the points of view of other disciplines. This prevented a focus from being too narrow and allows a broadening of viewpoint such as for mechanically ventilated patient to start active mobilization like walking with assistance. Through collaborating with other disciplines, one can obtained a built-in consultation system and establish a firm patient mobilization guideline and protocol [30]. Whereas, as an executive, a nurse need to take responsibility to monitor mechanically ventilated patient while in mobilization activities with physiotherapist.

On the other hand, researcher only found a few studies did on nurses' drive patient early mobilization [12,27,31]. Nurse's knowledge and attitude determine the current practice for patient mobilization. Besides, few studies have been carried out pertaining to the barrier of patient early mobilization in intensive care unit (ICU) and protocol intervention [2] with multimodal intervention program for nurses [27]. It was important for charge nurse to identify any eligible ICU patient for early mobilization every day. The role of the nurse was to monitor vital signs (Heart rate, blood pressure, oxygen saturation) and to ensure that patient's ETT tubes, and all invasive lines were secured during mobilization. Hence, it was important for more research on this area.

A study had been carried out on nurses and physical therapist on practice of EM. This study found that physical therapist mobilized their critically ill patient to higher level compare to nurses, i.e., walking with ventilator [32]. However, in Malaysia, most of the ICU did not have its own physical therapist. Physical therapist may just come to attend chest physiotherapy and limb physiotherapy for certain ICU patients with only physician order. Hence, the only available will be nurses. At such, nurses' role in patient early mobilization was very important.

Only one study [33] was found in Malaysia, a cross-sectional self-administered survey involving 107 ICU nurses in the Intensive Care Unit of Hospital Raja Permaisuri Bainun, Ipoh. Majority

(82.9%) of the nurses felt that they were still inadequately trained to mobilize the critically ill patients in ICU although all of them recognised the importance of EM. High proportion of nurses felt that EM should only be initiated when patient was ready to be transferred from the ICU. However this study does not mention what types of early mobilization practicing that makes researcher find important to fill the lacking with current research.

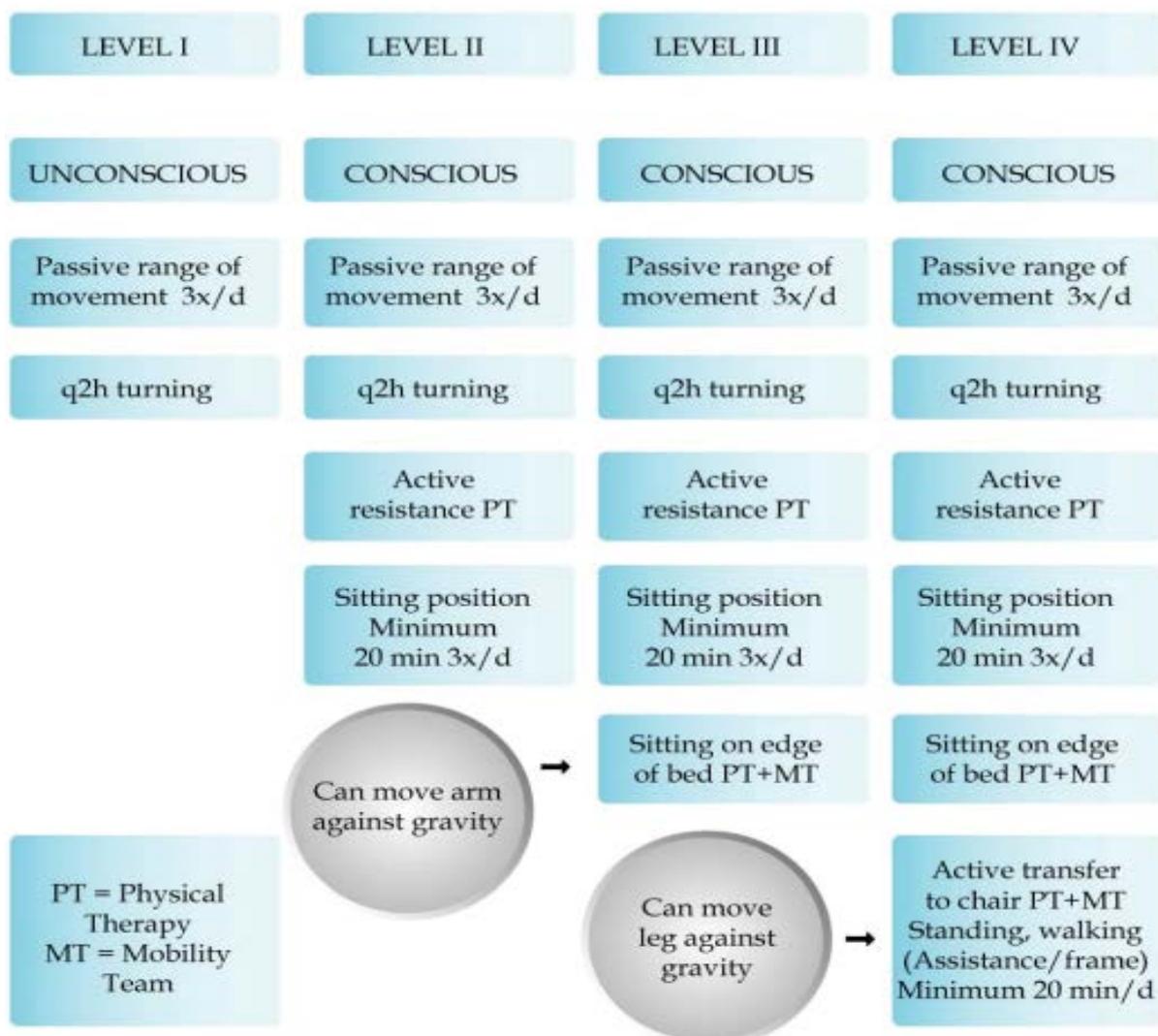
According to Malaysia Society of Intensive care (MSIC), there was an early mobilization protocols for patients in the Intensive Care Unit which was created under Anaesthesia Programme of Malaysia government and MSIC. Inside the protocol, the principles of early mobilization are clearly defined and mobility protocol was clearly listed [34]. Although there was a protocol created in Malaysia (Figure 1), nurses in UMMC and one of the government hospitals [33] did not apply or might not even train to apply. Through personal survey, ward sisters were unaware

there was a protocol for early mobilization of ICU patient in Malaysia. Hence, we can clearly see that communication and collaboration between physician, nurses, and physiotherapists in Malaysia still remain a gap in between.

In this study, we aimed assess current nurses' practices toward patient early mobilization in intensive care unit. A research question was: "what are the current nursing practices of patient early mobilization in ICU?"

## Methods

The study was conducted among a group of nurses working in adult critical care units in a teaching hospital. The chosen one was University Malaya Medical Centre (UMMC), a 1200-bed referral centre. It was known as a teaching hospital that is utilised for clinical and practical teaching or experience for all health care professionals. It was a descriptive cross-sectional survey.



**Figure 1** Levels of starting patient's early mobilization. Passive range of motion therapy (PROM) started on day (Level 1). As patients demonstrated consciousness and increased strength, they were moved to the next level. Physical therapy (PT) would be first attempted at level II. For level activity II and above, referral to physiotherapy is advisable as the aim of rehabilitation is towards functional recovery [34].

Universal sampling was chosen because it represent the whole nurse population and each of the ward in general ICU, Neuro ICU and Cardiac-thoracic ICU. It was feasible to take all population when the sample size was small. A total number of 186 nurses in general ICU (106 nurses), Neuro ICU (44 nurses) and CICU (36 nurses).

In order to perform pilot study, 30 nurses were taken from the population. Hence, 156 nurses were left of the main study. Inclusion Criteria were: 1. Staff nurse who has been working in intensive care unit above 3 months. 2. Staff nurse who is assigned to in charge on mechanically ventilated patient with endotracheal tube. Exclusion Criteria were: 1. Staff nurse who is not at work during the data collection period and those on leave. 2. Staff nurse who has not pass probation period.

Research instrument in this study comprised of 3 components which were glossary of the study terms, demographic data, and participant observational checklist. Face validity was conducted by expert panels comprised of 2 expert nursing lecturers in critical care setting, 1 expert nursing lecturer from others area from nursing academic department, and 2 nursing sister in ICU of UMMC to review the questionnaire to ensure the quality and relevance of the content. Necessary modification was done by above panels so that the instrument component are deemed fit for the main study.

A self-administer checklist of types of mobilization based on current known literature [3] around ICU mobility for nurses was used to assess nurses' practices. According to Malaysia Society of Intensive care (MSIC), there was an early mobilization protocol for patient of intensive care unit. Base on the protocol, the minimum level of mobilization will be 2 hourly turning and passive range of motion 3 times per day. Hence, research in one shift work of 7 h, minimum turning would be 3 times. Researcher thus set the cut-off point of 3times per shift for patient mobilization. Nurses' practices are divided into two groups which were 3times or more per shift, and less than 3 times per shift.

## Analysis

One hundred thirty two survey checklist was distributed and 132 nurses completed mobilization practice and barriers survey (n=132, a response rate of 100%). It comprised ICU (n=71), CICU (n=25), and Neuro ICU (n=36). Data analysis was using SPSS version 22. The results were scored and analysed. Descriptive statistics and normality test were used. Twenty six of the target participants did not met the inclusion criteria. Hence, they were not recruited into the study.

## Ethical Consideration

This study has been carried out in accordance to the code of ethics of the World Medical Association (Declaration of Helsinki). Informed consent was obtained with participation inform consent form. There were no identifier in research instrument to ensure participant remain anonymity.

## Results

Most of the respondents were from ICU (n=71, 53.8%). Majority (91.7%) of the respondents were female. The average age was around mid-20's (M=26.8 SD=4.3) years. One hundred twenty one (91.7%) nurses were Malay. Only (n=26, 19.7%) nurses obtained post basic certificate. The average years of experience for all respondents were (M=5.2 SD=4.0). More than half (n=89, 67%) of the nurse to patient ratio were 1:1. Most of the respondents were on the evening shift (n=55, 41.7%). More than half (n=95, 72%) nurses reported that they have not gone through patient mobilization training (**Table 1**).

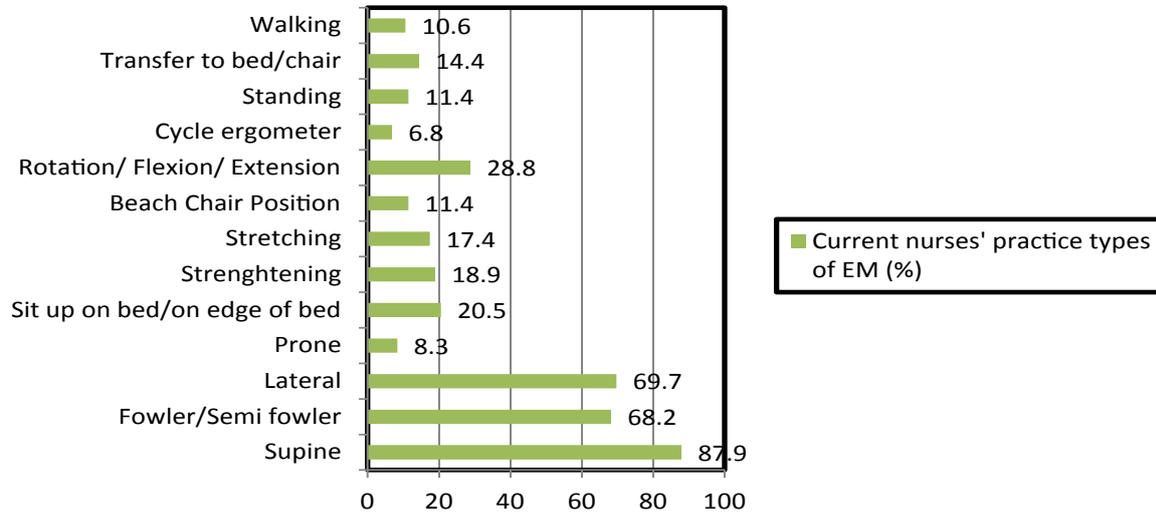
Almost half of the nurses (n=63, 47.7%) reported they only performed passive range of motion (ROM) to mechanically ventilated patients. Thirty nurses (22.7%) reported on performing both active and passive mobilization for their patients and some nurses (n=39, 29.5%) reported only provide active ROM for their patient.

In view of in bed mobilization, there were 10 types of mobilizations provided to the mechanically ventilated patient (**Figure 2**) in ICU, CICU and Neuro ICU. The 10 types of in bed mobilization majority reported were supine (n=116, 87.9%), lateral (n=92, 69.7%), fowler/semi fowler (n=90, 68.2%), rotation/flexion/extension, sit up on bed, strengthening, stretching, beach chair position, prone, and cycle ergometer (n=9, 6.8%). Whereas for out bed mobilization, transfer patient from bed to bed and bed to chair were reported as (n=19, 14.4%) more often compared to standing (n=15, 11.4%) and walking (n=14, 10.6%). Almost all of the nurses

**Table 1** Demographic characteristics.

Characteristics	n (%)	Mean (SD)
<b>Ward</b>		
ICU	71 (53.8%)	
CICU	25 (18.9%)	
Neuro ICU	36 (27.3%)	
<b>Gender</b>		
Female	121 (91.7%)	
Male	11 (8.3%)	
<b>Age (years)</b>		26.8 (4.3)
<b>Race</b>		
Malay	121 (91.7%)	
Non-Malay	11 (8.3%)	
<b>Highest education level</b>		
Diploma	106 (80.3%)	
Post basic	26 (19.7%)	
<b>Experience (years)</b>		5.2 (4.0)
<b>Nurse to patient ratio</b>		
1:1	89 (67.4%)	
1:2	38 (28.8%)	
1:3	5 (3.8%)	
<b>Shift Schedule</b>		
Morning	44 (33.3%)	
Evening	55 (41.7%)	
Night	33 (25.0%)	
<b>Patient Mobilization training</b>		
Yes	37 (28.0%)	
No	95 (72.0%)	

### Current nurses' practice types of EM



**Figure 2** Nurses reported types of mobilization for mechanical ventilated patient (n=132, % reporting practice applied).

(n=131, 99.2%) reported implementing in bed mobilization and only minimal (n=19, 14.4%) reported implementing out bed mobilization to their patient.

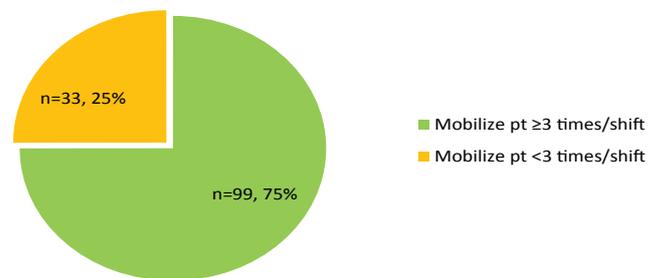
Majority of nurses (n=99, 75.0%) reported mobilizing patient 3 times and above (per shift). Only small (n=33, 25.0%) number of nurses reported mobilize patient less than 3 times (**Figure 3**).

### Discussion

Most of the nurses reported that they have not gone through patient early mobilization training which was consistent with the results reported by Koo et al. [35]. It was doubtful whether non-mobilization trained nurses able to provide optimum care for patient early mobilization. Researcher think that possibly the nurse who reported had some informal mobilization training before such in clinical practice with peers and colleagues where they have been in charge of taking of their own patient.

In this study, researcher found that most of the nurses were mobilizing their mechanically ventilated patient 3 times or more per shift work which was consistent to other studies [36,37]. It means that in one shift work of 7 h, they are practicing 2 hourly mobilization according to protocol. As for types of mobilization, majority reported implementing in-bed mobilization either active, passive or both. With given reference to the guideline of ventilator bundle in the wards, researcher found that more than half of the nurses compliant with one of the requirement of positioning patient head of bed 30 degree incline (semi fowler/ fowler) [38] which is similar to the previous reported paper [26]. Whereas, for out-bed mobilization, researcher found that it was still minimally practiced for mechanically ventilated patient which was same as others studies [39,40]. Such delays could be also related to lack of doctors' order for physical therapy service, or lacking of manpower for the nurses to initiate [40].

### Nurses' Early Mobilization Practice



**Figure 3** Pie chart shown frequency of nurse's practice on patient early mobilization.

The types of mobilization which were practicing in critical care units were supine, fowler/semi fowler, lateral, prone, sit up on bed/edge of bed, strengthening, stretching, beach chair position, rotation/flexion/extension of limbs, cycle ergometer, standing, transfer to (chair/bed) and walking. All of the above were divided into in bed mobilization and out bed mobilization. No tilt table mobilization reported in throughout data collection period which have been suggested from previous study [20].

In this survey, researcher could not find any association between nurses' demographic data and nurses' EM practice which was consistent with one of the studies [36], no association between nurse to patient ratio and nurses' practice. It was difference compare to others study as some studies showed that nurses' education level, mobilization training [41], nurses experience associate with EM practices. Perhaps patient conditions that have not taken into record for this study might be a detrimental co-factor.

## Conclusion and Implication for Practice

In view of the lacking patient mobilization training among nurses, researcher suggest all big health institution with critical care unit to make a specialised in house mobilization team to take primary in charge for patient mobilization. A protocol for patient mobilization should be implemented in the ICU unit. Nurses need to be trained to identify patient classification and readiness for early mobilization to enhance patient mobility programme collaboration with physician and physical therapist. It is important to identify the mobilization practice pattern and

needs in different disciplinary of ICU will lay a better foundation for protocols and guideline development for practice. This survey also highlighted to health care organizations to see the important of adherence and reinforcement doctors, nurses, and physical therapist to follow the practices of protocol and guideline accordingly.

## Acknowledgement

The authors wish to thank all nurses who participated in the study and Madam Surindar Kaur for constructive opinion in editing the participant self-report checklist and research setting.

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