THE EFFECT OF AN EDUCATIONAL INTERVENTION ON NURSES KNOWLEDGE, ATTITUDE, INTENTION, PRACTICE AND INCIDENCE RATE OF PHYSICAL RESTRAINT USE

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ABSTRACT

The literature indicates that the use of physical restraint exposes patients and staff to negative effects, including death. The benefits of minimising the use of physical restraint influence nurses, clients, families, and the care settings. Therefore, teaching nursing staff to develop the correct knowledge, skills, and attitudes regarding physical restraint has become necessary. Data on the rate and patterns of physical restraint use in healthcare settings such as hospitals are sparse in Malaysia. In addition, in the local context, there is very little literature about physical restraint use and nurses. Therefore, this study aims to evaluate the effect of educational intervention on nurses' knowledge, attitude, intention, practice and incidence rate of physical restraint use. The educational intervention, which included a one-day session on minimising physical restraint use in hospitals and on proper restraint use as a last resort, was presented to 245 nurses. An incidence survey technique was used in 22 wards to assess the incidence rate of physical restraint use. A quasi-experimental design was used to evaluate the effect of educational intervention on nurses' knowledge, attitude, intention, practice and incidence rate of physical restraint in 12 wards of the hospital with a self-reported questionnaire and a restraint order form. Of all patients (n=39,693), 3.39% were restrained over 16 months. The most common reasons to use physical restraint in psychiatric and non-psychiatric wards were that the patient was 'uncooperative with fasting before ECT' (19% of 'restrained days') and that the patient was 'trying to pull out tubes/ catheters (44.9% of 'restrained days'), respectively. The results showed that there was a significant increase in the mean knowledge scores, mean attitude scores, and mean practice scores of nurses in the post-intervention phase compared with the pre-intervention phase. In addition, there was a significant decrease in the mean intention score of nurses to use physical restraint after intervention. In the pre-intervention phase, the only significant predictor of practice was attitude (β= -0.17, P<0.004). However, attitude (β= 0.19, P<0.03) and

intention (β= -0.19, P<0.01) were significant predictors of practice improvement in the post-intervention phase. Nevertheless, in the pre- and post-intervention phases, no association was found between knowledge and the intention and practice of nurses towards physical restraint. After educational intervention, the highest incidence decline rate was found in neurology/neurosurgery wards (5.98%), followed by psychiatric wards (5.47%). The result of two proportions z-test revealed that there was a statistically significant difference in the proportion of restrained patients and the incidence rate of physical restraint use in all wards except geriatric-rehabilitation wards between the pre- and post-intervention phases. In general, there was a statistically significant decrease in the incidence rate of physical restraint use in the 12 wards of the hospital after intervention (Z= 5.129, P< 0.001). Regarding patterns of physical restraint use in the pre- and post-intervention phases, some differences, such as the proper use of alternatives, reduced physical restraint period per incident, and using least restrictive physical restraint type were observed in patterns after educational intervention.

ABSTRAK

Tinjauan literatur menunjukkan bahawa kegunaan sekatan fizikal mendedahkan pesakit dan kakitangan kepada kesan-kesan negatif, termasuk kematian. Manfaat-manfaat yang boleh diperoleh daripada mengurangkan kegunaan sekatan fizikal mempengaruhi jururawat, pesakit, keluarga, dan persekitaran jagaan. Justeru itu, sudah menjadi wajib untuk mendidik jururawat demi membudayakan pengetahuan, kemahiran, dan sikap yang wajar berkenaan sekatan fizikal. Terdapat kekurangan data tentang kadar dan corak kegunaan sekatan fizikal di persekitaran jagaan kesihatan seperti hospital-hospital in Malaysia. Tambahan pula, di konteks tempatan, terdapat kekurangan literatur tentang kegunaan sekatan fizikal dan peranan jururawat. Oleh sebab itu, kajian ini bertujuan menilai kesan intervensi pendidikan terhadap segi pengetahuan, sikap, niat, dan amalan jururawat, serta kadar insiden kegunaan sekatan fizikal. Intervensi pendidikan ini melibatkan 245 orang jururawat yang menghadiri sesi sehari mengenai pengurangan kegunaan sekatan fizikal di hospital dan tentang kegunaan sekatan yang wajar sebagai pilihan terakhir. Teknik kaji selidik insiden telah digunakan di 22 unit wad untuk menilai kadar insiden kegunaan sekatan fizikal. Kajian kuasi-eksperimental telah digunakan untuk menilai kesan intervensi pendidikan terhadap segi pengetahuan, sikap, niat, dan amalan jururawat, serta kadar insiden kegunaan sekatan fizikal di 12 unit wad hospital, melalui borang soal selidik yang diisi sendiri (*self-reported questionnaire*) dan borang pesanan sekatan (*restraint order form*). Antara semua pesakit (n = 39,693), seramai 3.39% telah disekat dalam tempoh 16 bulan. Sebab utama untuk kegunaan sekatan fizikal di wad psikiatri dan wad bukan psikiatri adalah kerana pesakit ‘tidak bekerjasama dengan puasa sebelum ECT’ (19% dari ‘hari sekatan’) dan kerana pesakit ‘cuba mengeluarkan tiub/kateter’ (44.9% dari ‘hari sekatan’). Dapatan kajian menunjukkan bahawa terdapat peningkatan signifikan untuk skor purata pengetahuan, sikap, dan amalan jururawat dalam fasa pos-intervensi berbanding dengan fasa pra-

intervensi. Di samping itu, selepas intervensi tersebut, terdapat penurunan signifikan untuk skor purata niat jururawat menggunakan sekatan fizikal. Dalam fasa pra-intervensi, sikap merupakan satu-satunya peramal signifikan untuk amalan ($\beta = -0.17$, $P < 0.004$), manakala dalam fasa pos-intervensi, sikap ($\beta = 0.19$, $P < 0.03$) dan niat ($\beta = -0.19$, $P < 0.01$) menjadi peramal signifikan untuk amalan. Namun demikian, dalam fasa-fasa pra- dan pos-intervensi, tiada hubungan antara pengetahuan dan niat atau amalan jururawat terhadap sekatan fizikal. Selepas intervensi pendidikan, penurunan kadar insiden yang tertinggi adalah di wad neurologi dan pembedahan neuro (5.98%), diikuti wad psikiatri (5.47%). Hasil daripada ujian-z dua pihak menunjukkan bahawa, dari fasa pra-intervensi ke fasa pos-intervensi, terdapat perbezaan signifikan antara perkadaran pesakit yang disekat dan kadar insiden kegunaan sekatan fizikal di semua wad kecuali wad pemulihan geriatrik. Secara umum, terdapat perbezaan yang signifikan dalam kadar insiden kegunaan sekatan fizikal di 12 wad hospital dari fasa pra-intervensi ke fasa pos-intervensi ($Z = 5.129$, $P < 0.001$). Berkenaan dengan corak kegunaan sekatan fizikal dalam fasa-fasa pra- dan pos-intervensi, terdapat perbezaan yang diperhatikan selepas intervensi pendidikan, seperti kegunaan kaedah alternatif yang wajar.

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CHAPTER 1: INTRODUCTION

1.1 Introduction

Physical restraint was seen as a reasonable method to control and manage combative and disruptive behaviours in many healthcare organizations for a number of years ((Brush & Capezuti, 2001; Evans, Wood, & Lambert, 2002; Martin & Mathisen, 2005). Although the efficacy and safety of physical restraint were not supported by evidence, this practice has a long history of use (Janelli, Stamps, & Delles, 2006). Today, using physical restraint in healthcare settings is a controversial practice. The dilemma for nurses who are engaged in the decision-making process of using restraints continues due to the many negative outcomes of this procedure. Physical restraint offends patients' authority and autonomy. It can cause physical injuries (Bromberg & Vogel, as cited in Kim et al, 2008; Mohr, Petti, & Mohr, 2003) even death (Berzlanovich, Schopfer, & Keil, 2012, Food and Drug Administration, 2015), psychological complications (Mion, Frengley, Jakovcic, & Marino, 1989 as cited in Bai, Ip, Woo, Kwok, Chui, Ho, 2014 ; Mohr et al, 2003) and have deleterious social effects (Ohio department of health, 2007). Use of physical restraint also influences the patient's milieu and distracts nursing staff from other therapeutic procedures (Mohr et al, 2003). Only when all other alternatives fail to prevent patients from harming themselves or others can physical restraint be seen as a justifiable last resort (Mayer, 2005). In spite of the many possible risks, the use of physical restraints continues to be relatively high (Huang, Huang, Lin, & Kuo, 2014; Meyer, Köpke, Haastert, & Mühlhauser, 2009) and many patients have experienced physical, psychological and social trauma due to the inflicting of physical restraints.

Although nurses usually use physical restraints to restrict patients from injuring themselves or others, the resulting trauma and even death caused by the practice has

raised concerns (Paterson & Duxbury, 2007). During the past 20 years, different protocols have been designed and applied for the discontinuation of physical restraints in developed countries (Ludwick, Meehan, Zeller, & O'Toole, 2008). The lack of physical restraint education programmes and holistic patient care has been reported as reasons for the extensive uses of physical restraint in hospitals (Demir, 2007; Park & Tang, 2007). An efficient educational programme can correct knowledge gaps and negative attitudes regarding the use of physical restraint and can reduce the rate or inappropriate use of physical restraint (Demir, 2007; Huizing, Hamers, Gulpers, & Berger, 2009; Janelli, et al, 2006).

1.2 Background to the Study

The Centres for Medicare and Medicaid Services (CMS) have defined physical restraint as "any manual method, physical or mechanical device, material or equipment attached or adjacent to the patient's body that he or she cannot remove and that restricts freedom of movement or normal access to one's body" (Centres for Medicare and Medicaid Services, 2012, p.2). The use of physical restraint may have originated from efforts to prevent harm coming to prisoners and to manage violent behaviour in prisons and mental institutions (Brower, 1991). Later, physical restraint was applied in hospitals to prevent patients from harming themselves or others (Kayser- Jones, 1992).

In the 1980s, results of studies regarding physical restraint use in general medical surgical wards revealed a rate of 6% to 13%, with higher rates (18% to 22%) for patients aged 65 years old or older (Frengley & Mion, 1986). In later studies, Evans et al. (2002) reported a rate of 7–17% of physical restraint use in general hospitals and Minnick, Mion, Johnson, Catrambone, & Leipzig (2007) indicated that the use of physical restraint was fairly common (56%) in intensive care units. Ludwick et al.

(2008) reported that a minimum of 27,000 persons had been restrained every day in 40 acute care hospitals in the United States.

Physical restraint is an arguable procedure because it is a questionable ethical and legal issue that affects the autonomy and dignity of patients (Farina-Lopez et al., 2014). The use of physical restraint not only has an effect on the autonomy and dignity of patients but it also involves severe safety issues for staff, as well as the patients being restrained. Paterson and Duxbury (2007) recommended that the use of physical restraints should be reduced because of the consequent increase in the rate of patient assaults on staff. Increased awareness of the consequences of physical restraint use helps to establish nurses' clinical reasoning process (Mohr, 2010). It seems that most nurses do not have positive feelings about the use of physical restraint so they feel there is a conflict between patients' autonomy and nursing care when they feel restraint is necessary (Chuang & Huang, 2007). However, restraint continues to be used in all settings in spite of standards of care and clinical protocols for physical restraint usage (Centres for Medicare and Medicaid Services [CMS], 2012). Nurses apply physical restraint to prevent falls or patients' interference with treatment and medical devices (Agens, 2010; Benbenbishty, Adam, & Endacott, 2010; Lane & Harrington, 2011), and to manage and control cognitive impairment disorders and behavioural disturbances symptoms, such as agitation, aggression and confusion (Dawkins, 1998 as cited in Hererra, 2011; Gastmans, & Milisen, 2006). Paterson and Duxbury (2007) stated, "If restraint as an intervention is to be considered valid from a pragmatic perspective it must be able to demonstrate that it works" (p. 537). However, many studies have found that there is no evidence that the use of physical restraint prevents patients' harm in many cases (Capezuti, Strumpf, Evans, Grisso, & Maislin, 1998; Goethals, Dierckx de Casterlé, & Gastmans, 2012; Neufeld, Libow, Foley, Cohen, & Breuer, 1999). However, it has been linked to increased falls, pressure ulcers, suffocation, negative

psycho-sociological outcomes and even death (Berzlanovich et al., 2012; Duke & Mitchell as cited in Janelli et al., 2006; Food and Drug Administration, 2015). Also, previous studies have reported no relationship between reduced rate of pulled-out tubes and catheters and the use of physical restraints (Mion, Minnick, Leipzig, Catrambone, & Johnson, 2007). Overall, few studies have reported on the patterns of physical restraint use – such as reasons for restraint, types of restraint and frequency of restraint assessment – in detail (Choi & Song, 2003; Turgay, Sari, & Genc, 2009).

Nursing staff play a central role in the managing process with regard to physical restraint used in hospitals. They usually begin the decision-making process and advise physicians regarding the need to give instructions for the commencement or removal of a physical restraint (Werner & Mendelsson, 2001). Earlier, nurses commonly decided on the use and removal of physical restraint based on clinical judgment. However, this changed as a result of the many negative consequences of using physical restraint, including death and strangulation. Then, many healthcare organizations began to ask hospitals to take action to reduce the use of physical restraint and even to increase the monitoring of restrained patients (Joint Commission on Accreditation of Health Care Organization, 2000). The best approach to improve knowledge and attitudes towards the use of physical restraint is through educational interventions (Suen et al., 2006). Studies have declared that restraint minimization programmes promote client safety and physical restraint reduction in acute and long-term centres (Amato, Salter & Mion, 2006). The knowledge, attitudes and intentions of nurses towards physical restraint use are essential factors that may contribute to this practice (De Roza, 2004; Werner & Mendelsson, 2001).

Several studies have demonstrated that the knowledge of nurses regarding the proper use of physical restraint is not satisfactory (Huang, Chuang, & Chiang, 2009; Pellfolk, Gustafson, Bucht, & Karlsson, 2010; Suen et al., 2006). Furthermore, some studies

showed that nurses have mixed-feelings about physical restraint use (Chuang & Huang, 2007; Lai, 2007; Suen et al., 2006). On the one hand, it seems that some nurses had a positive attitude towards physical restraint (Myers, Nikoletti, & Hill, 2001), while others still had a negative attitude towards its use (Suen et al., 2006). Moreover, a study by Hamers et al. (2008) indicated that nurses from different countries reported different attitudes towards physical restraint use. In Malaysia, Lian (2003) discovered that most nurses perceived physical restraint in terms of a protective, preventive, supportive and therapeutic device. In the study by Huang, Ma, & Chen (2003) in Taiwan, 74% of nursing staff announced that physical restraint is their first choice to solve some patients' problems and only 45 percent explained that they may prefer to think about using alternatives before employing physical restraint. Although there are many alternatives before using physical restraint to manage patients' problems, even psychiatric one, most studies have assessed the consequences of physical restraints use on the clients rather than emphasize on helpful effects of alternatives. However, it is essential to create a desire to search and learn about other methods (alternatives) for nurses.

There are some research studies that demonstrate the effectiveness of education interventions on the knowledge, attitude, and practice of nurses towards physical restraint and the frequency of physical restraint use in hospitals (Huang et al., 2009; Koczy et al., 2011; Pellfolk et al., 2010; Smith, Timms, Parker, Reimels, & Hamlin, 2003). In contrast, a few studies have reported no change in the frequency of the use of physical restraint after implementing an educational programme and no difference in nurses' attitudes between pre- and post-intervention (Huizing et al., 2009).

It is obvious that nursing studies aim to improve quality of care and patient satisfaction, which are the highest priority in care settings. Much harm and many deaths have been recorded due to the inappropriate application of physical restraint. Therefore, physical

restraint education not only influences nurses' knowledge and attitudes but also promotes quality of care for patients. The implementation of educational programmes can perhaps lead to a high standard of nursing practice towards physical restraint, while at the same time filling the gaps in their knowledge (Suen et al., 2006).

1.3 Problem Statement

Many staff and patients are in danger from the consequences of physical restraint use and it seems that physical restraint has become a regulated procedure in care settings, such as hospitals. Mohr (2010) stated:

> "Nurses report that they prefer to use other means to manage aggressive behaviour, that they are not altogether comfortable with restraint use, and that the process is as painful for them as for their patients". (p. 3)

Literature has reported patient deaths as being related to being placed in restraint (Berzlanovich et al., 2012; Sclafani et al., 2008). Subsequently, federal regulations and Joint Commission: Accreditation, Health Care, and Certification JCAHO produced standards regarding the appropriate use and a reduction in the use of physical restraint (Sclafani et al., 2008). Therefore, it is important to investigate the use of physical restraint rate and also the patterns of physical restraint use. Much of the literature has reported the rate of using physical restraint in different countries but few studies have investigated the patterns of physical restraint in detail. Furthermore, to my knowledge, this study is the first to examine the rate and pattern of physical restraint in Malaysia. Assessment of the incidence and patterns of physical restraint use, such as reasons for restraint, types of restraint, alternatives used, and the length of physical restraint per

incident is necessary before developing a minimizing physical restraint use programme in hospitals.

One of the key research question answered in this study is what is the frequency of physical restraint use and what are the patterns of its use, and can the educational intervention reduce the use of physical restraint in hospital? Frankfort-Nachmias and Nachmias (2008) defined a research problem as, "a question or an issue that stimulates a response in the form of a structured scientific inquiry" (p. 46). Therapeutic failure occurs as a result of physical restraint use (Huckshorn, 2006), and it has actually been observed as a treatment failure's output (Curie, 2005). Better therapeutic environments and organizational policies have been suggested by researchers as being needed to minimize the use of physical restraints researchers (Miller, Hunt, & Georges, 2006). Although some organizational factors might influence the rate of physical restraint use, the awareness, attitude and intention of nurses are powerful determinants of restraint use (Feng et al, 2009; Suen et al., 2006). Several studies demonstrated that nurses' knowledge regarding physical restraint was not enough (Kandeel & Attia, 2013; Suen et al, 2006) and their attitudes were negative about physical restraint (Huang et al, 2009; Lai, 2007; Mohler & Meyer, 2014). Effective interventions, which have been called "alternatives" can meet patients' needs and prevent physical restraint being used. Many research studies recommended that increasing healthcare provider knowledge about alternatives also promotes patient-centred standards of quality care with positive results (Smith et al., 2005). While in many countries, such as the United States, European countries and few Asian countries, the application of physical restraint in hospitals has been studied in detail (Capezuti, 2004; Gulpers et al., 2013; Janeli et al, 2006; Köpke et al., 2012; Suen, 2006), only one study reported the perception of nurses and elderly patients towards the use of restraint in a small number of medical wards in Malaysia (Lian, 2003). In addition, many studies assessed knowledge and attitude as important

factors influencing whether physical restraint is used or not, but few studies have investigated the effect of the intention of nurses to use physical restraint (Werner& Mendelsson, 2001). In order to meet future challenges in care settings, the elimination or at least a reduction in the application of physical restraint is crucial. As long as nurses are usually the ones to initiate the decision on whether to use physical restraint for patients, improved awareness, modified attitudes and the intention of nurses towards physical restraint become vital (Yeh et al., 2004). Therefore, the purpose of this study was to determine the effect of an educational intervention for nurses on physical restraint incidence, patterns of physical use, and also the effect on the knowledge, attitude, practice of nurses and their intention towards physical restraint.

1.4 Assumptions of the Study

1. In-patient adults are physically restrained, in many cases, unessentially.

2. In many cases, alternatives to physical restraints can substitute the use of physical restraints.

3. If nursing staff knew more and feel appropriate about physical restraint, they would try to apply proper patterns of physical restraint use or adopt alternative methods to its use.

4. Implementing valuable education programme on physical restraint and its alternatives can impact on the nurses' knowledge, attitude, practice and intention towards physical restraint, patterns of physical restraint as well as reducing the rate of physical restraint use.

1.5 Objectives and Research Questions of the Study

The following are the aim and specific objectives of the study.

1.5.1 Aim of the study

The aim of the study is to evaluate the effect of educational intervention for nurses on the knowledge, attitude, intention and practice of nurses towards physical restraint and the incidence rate and patterns of physical restraint use.

1.5.2 Specific objectives

The specific objectives of the study are:

- To identify the incidence rate and patterns of physical restraint use.
- To validate Malay version of knowledge, attitude, intention and practice of nurses towards physical restraint questionnaire.
- To evaluate the effect of educational intervention on knowledge, attitude, intention and practice of nurses.
- To determine the association between nurses' characteristics and knowledge, attitude, intention of nurses and the practice of nurses towards physical restraint (baseline, pre-intervention, post intervention phases).
- To compare incidence rate and patterns of physical restraint use before and after intervention.

1.5.3 Research questions

- What are the incidence rate and patterns of physical restraint used in a teaching hospital in Malaysia?
- What are the knowledge, attitude, intention and practice of nurses towards physical restraint in a teaching hospital in Malaysia?

- Is there a difference in mean knowledge scores on physical restraint use before and after intervention in a teaching hospital in Malaysia?
- Is there a difference in mean attitude scores on physical restraint use before and after intervention in a teaching hospital in Malaysia?
- Is there a difference in mean intention scores on physical restraint use before and after intervention in a teaching hospital in Malaysia?
- Is there a difference in mean practice scores on physical restraint use before and after intervention in a teaching hospital in Malaysia?
- Is there any association between nurses' characteristics and knowledge, attitude, intention and practice of nurses regarding physical restraint in a teaching hospital in Malaysia?
- Is there a difference in incidence rate and patterns of physical restraint use before and after intervention in a teaching hospital in Malaysia?

1.6 Hypotheses

- Null Hypothesis 1: There will be no difference in incidence rate of physical restraint before and after educational intervention.
- Null Hypothesis 2: There will be no difference in patterns of physical restraint use before and after educational intervention.
- Null Hypothesis 3: There will be no difference in mean knowledge score before and after educational intervention.
- Null Hypothesis 4: There will be no difference in mean attitude score before and after educational intervention.
- Null Hypothesis 5: There will be no difference in mean intention score before and after educational intervention.

- Null Hypothesis 6: There will be no difference in mean practice score before and after educational intervention.
- Null Hypothesis 7: There will be no relationship between nurses' characteristics and their knowledge, attitude, intention and practice to do physical restraint.

1.7 Operational Definition of Terms

a. Nurse: In this study, all the nurses on 22 wards, comprising medical-surgical wards, critical care units, intensive care units, geriatric and rehabilitation wards and psychiatric wards, were included as participants for the pilot, validity and reliability and main studies.

b. Incidence rate: The number of new cases of a variable under study over a period of time divided by the number of people at risk during that period (Hully, Cummings, Browner, Grady, & Newman, 2013). In this study the incidence rate was the number of new cases of physically restrained patients over 16 months divided by the number of people at risk during those 16 months. All hospitalized patients in mentioned wards had been considered as a population at risk of exposure to physical restraint.

c. Physical restraint: Physical restraint is defined as "Any action or procedure that prevents a person's free body movement to a position of choice and/or normal access to his/her body by the use of any method that is attached or adjacent to a person's body and that he/she cannot control or remove easily" (Gulpers et al., 2012, p.107).

d. Restraint days: Restraint days are defined as the number of observed physical restraint incidents at the time of data collection.

e. Patterns of physical restraint use: In this study patterns of physical restraint use consisted of reason to use physical restraint, alternatives to use physical

restraint, type of physical restraint use, frequency of assessment, shift of physical restraint commenced, physical restraint period per incident, episodes of physical restraint and complication of physical restraint use. These items were measured by a restraint order form which was verified by the hospital for the nurses.

f. Alternatives to use of physical restraint: A classification of strategies that can be applied to minimize physical restraint use, such as: (a) environmental equipment like wedge chairs, lowered beds, night lights, alarm systems; (b) meaningful activities including exercise, training in daily living activities ; (c) psychosocial interference, such as touching, behaviour modification, reality orientation; (d) physiological intervention, such as physical therapy, occupational therapy, pain management, sensory rehabilitation, medication assessment, and regular nursing care, such as physical assessment and frequent supervision (Freeman, Hallett, & McHugh, 2016). In this study, applied alternatives for the patients were consisted of reassurance, active listening, explanation of consequences, clear direction, offer oral medication and parenteral medication. Other alternatives were educated during the educational intervention to nurses.

g. Type of physical restraint: Physical restraint involves the use of equipment, for example soft padded wrist or ankle restraint, vest or belt restraint, body restraint, bed rail and mitten, which is a glove to restrict the patient's hands. In this study, the type of physical restraint used consisted of leg and wrist restraint, belts, vests, constricting chair and mitten.

h. Physical restraint period per incident: Refers to the duration of time that a patient has been restrained.

i. Frequency of assessment of physical restraint: In this study this refers to how frequently nurses assess restrained patients to prevent or manage the negative effects of physical restraint.

j. Episodes of physical restraint use: In this study, it refers to how many times patients restrained during a single hospitalization.

k. Knowledge towards physical restraint: In this study this refers to nurses' knowledge of physical restraint as measured by the knowledge part of the questionnaire developed by Janelli et al. (2006).

l. Attitude towards physical restraint: In this study this refers to nurses' attitude towards physical restraint, as measured by the attitude part of the questionnaire developed by Janelli et al. (2006).

m. Intention towards physical restraint: In this study this refers to nurses' intention towards physical restraint, as measured by the intention part of the questionnaire developed by Werner and Mendelsson (2001).

n. Practice towards physical restraint: In this study this refers to nurses' practice regarding physical restraint, as measured by the self-report practice part of the questionnaire developed by Janelli et al. (2006).

o. Educational intervention: An education programme was developed by the researcher for nurses targeting proper use of physical restraint and restraint reduction. This educational intervention focused on consequences of using physical restraint, myths and facts about restraints, alternatives to the use of physical restraints and proper use of physical restraint for patients as a last resort. Some simulated scenarios were included in the group discussion of the teaching session to influence the attitude and intentions of nurses. In addition, three video clips demonstrated common mistakes in physical restraint use, and alternatives to the use of physical restraint in different patients' conditions.

1.8 Significance of the Study

Physical restraint persists as one of the controversial procedures that are often used in many countries to control disruptive behaviours and to manage patient difficulties, such as interference with a medical device, falls and some cognitive and psychological disturbance symptoms (Agens, 2010; Benbenbishty et al., 2010; Lane & Harrington, 2011; Sees, 2009). The use of physical restraint cannot be considered as a therapeutic intervention either physically or psychologically (Witte, 2008). There is no evidence that the use of physical restraint has any therapeutic advantages (Ashcraft & Anthony, 2008; Leidy, Haugaard, Nunno, & Kwartner, 2006). In addition, the literature recommended that the use of physical restraint involves patients with negative effects including death (Duxbury & Paterson, 2005; Migon et al., 2008). Consequently, to reduce physical restraint use several federal regulations and Joint Commission accreditation standards have been established (Fogel, Berman, Merkel, Cranston, & Leipzig, 2009; Sclafani et al., 2008).

The application of nurses' education to minimize the use of physical restraints in different hospital units becomes relevant in this study. When John Connolly abandoned the use of physical restraint in support of a human approach toward the community it was the first time that the argument regarding physical restraint use in some health settings had been raised (Colaizzi, 2005). However, physical restraint use continued for various reasons, such as opposition from some founders of mental institutions (Colaizzi, 2005). Nonetheless, for the past 20 years the misuse of physical restraint has given rise to a great deal of attention, especially in psychiatric and geriatric care centres. Therefore, teaching nursing staff to accomplish the correct knowledge and favourable skills and attitudes regarding physical restraint has become necessary (Huang et al., 2009).

The benefits of minimizing the use of physical restraint influence nurses, clients, families, and the care settings. On the part of the nurses, it will bring evidence-based practice with updated knowledge and skills to nursing procedures. Thus, quality of care in the healthcare settings will be facilitated. On the part of the patients, patients will receive adequate nursing care, treatment therapies in a free environment and will maintain their dignity and autonomy instead of suffering from being physically restrained. Ultimately, the number of legal actions taken and the financial cost of patients' injuries will be diminished or even removed as a result of finding appropriate alternatives to the use of physical restraint by nursing staffs.

Data on physical restraints use in healthcare settings such as hospitals are sparse in Malaysia. Therefore, firstly, the attempt made in this study to investigate the incidence rate and patterns of using physical restraint as epidemiological data are foundations for the development of educational interventions. In addition, in the local context, there is a very little literature about physical restraint use and nurses. Only one study showed that the use of physical restraint was mainly perceived in terms of preventive, therapeutic, protective and supportive by nurses who had worked with elderly patients (Lian, 2003). Although this study stated that nurses need to receive education about physical restraints, researcher still does not know about the knowledge, attitude, intention and practice of nurses towards physical restraint in Malaysia.

In addition, although nurses' knowledge and attitude have been considered as the main factors in making the decision to use or not use restraints, a few studies have assessed the intentions of nurses throughout the world to use physical restraints. Therefore the study was conducted to assess the knowledge, attitude, intention and practice of nurses in order to explore the educational needs before implementing an educational intervention. The evidence-based educational intervention in this study may help to improve nurses' knowledge, attitude and intention towards physical restraint use and

towards the use of alternative methods. The aim is with their improved knowledge, attitude, intention and practice, the incidence rate of physical restraint use will be minimized and patterns of physical restraint use will be modified.

1.9 Conceptual Framework

The conceptual framework for this study is derived from the theory of planned behaviour. This theory was developed as a side shoot of Ajzen's theory of reasoned action in 1988. Based on this theory, three kinds of components are involved in the formation of human behaviour. These are: behavioural beliefs, which are beliefs about expected outcomes of the behaviour and its evaluations; normative beliefs, which are described as beliefs regarding others' normal expectations and the motivation to respect these expectations; and lastly, beliefs towards the existence and perceived power of some factors, which can promote or prevent the implementation of behaviour. According to the theory, a favourable or unfavourable attitude is produced by behavioural beliefs to the behaviour, normative beliefs generate subjective norms or perceived social pressure and control beliefs result in perceived behavioural control (Ajzen, 2006).

In aggregation, attitude, subjective norm and perceived behavioural control give rise to behavioural intention. Thus, this means that a favourable attitude and subjective norm and great perceived control should establish a strong intention to perform the behaviour. As a rule, intention is considered to be the prompt forerunner of the behaviour. The theory of planned behaviour utilizes attitude, subjective norm and perceived behavioural control to predict intention and then behaviour efficiently (Ajzen, 2006).

Even though, knowledge, or correct factual information, plays no direct role in the theory of planned behaviour, it was considered as a foundation to building attitudes,

subjective norms, and perceived behavioural control (Ajzen, 1991). However, increased knowledge probably leads to a more stable, strong and accessible attitude (Fabrigar, Petty, Smith, & Crites, 2006). Although TPB has not been extensively applied in experimental studies regarding the domain of physical restraint, many researchers have used the TPB among healthcare professionals to predict clinical practice (Eccles et al., 2006; Godin, Bélanger-Gravel, Eccles, & Grimshaw, 2008; Perkins et al., 2007; Zhou, Stoltzfus, Houldin, Parks, & Swan, 2010).

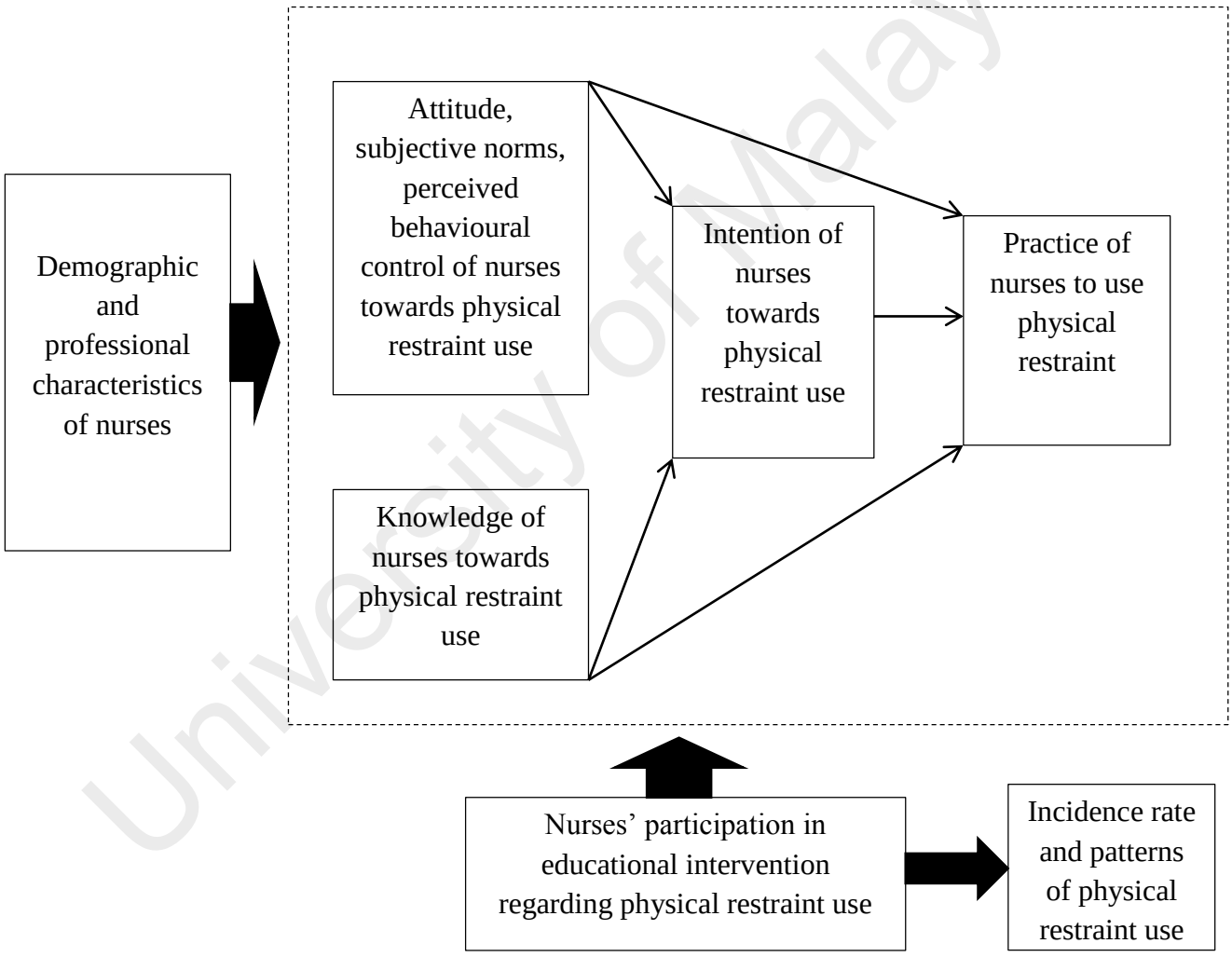

Figure 1.1: Conceptual framework of study.

For this current research, the survey items were conceptually grouped together based on the TPB so that the main research variables were the knowledge, attitude, intention, and physical restraint, nurses' demographic and professional characteristics and educational intervention for nurses. The design, research instrument and educational intervention are guided by these concepts. In spite of the finding of a significant correlation between intention and behaviour in meta-analysis studies (Armitage & Conner, 2001; Hagger, Chatzisarantis, & Biddle, 2002), some research studies explained that there might be a gap between intention and behaviour. Therefore, this research has been assessed the change of practice behaviour of nurses regarding using physical restraints and the incidence rate of physical restraint use, as well as change of intention of nurses towards physical restraint use (Figure 1.2). Any association between demographic and professional characteristics of nurses and knowledge, attitude, intention and practice of nurses was also examined.

1.10 Outline of the Thesis

This thesis is structured in six chapters to facilitate clarity and understanding of the study.

Chapter one provides an introduction to the study, including background, problem statement, assumptions, objectives, research questions and hypotheses, operational definition of terms, significance of the study and the conceptual framework.

Chapter two is a critical review of the literature, which includes previous studies on areas of the research to identify a gap in the existing literature and recommendations, and to demonstrate the need for a new study. Consequently, it enables a more comprehensive analysis to be made and a discussion on the data in the later chapters.

Chapter three presents a detailed description of the methodology, research design, research instrument, sampling method and the data collection process. Details of the survey, pilot study, validation study, intervention study, plans for data analysis and ethical considerations are also described in this section.

In chapter four, findings from the study are presented. This includes the results of the assessment of the incidence rate of physical restraint use, patterns of physical restraint use and the effectiveness of the educational intervention on nurses' knowledge, attitude, intention, practice and incidence rate and patterns of physical restraint use. Comparisons of incidence rate and patterns of physical restraint use before and after intervention, and comparisons between knowledge, attitude, intention and practice of nurses towards physical restraint before and after intervention are presented. Results of associations between nurses' demographic and professional characteristics and knowledge, attitude, intention and practice of nurses towards physical restraint are also presented.

Chapter five presents a discussion of the findings of the study. Results of previous studies are used to support and draw the conclusion from the findings of this study.

The last chapter draws the conclusion from the study, considers the implications and presents limitations of the study and recommendations for further study.

1.11 Summary

Many staff and patients are in danger as a consequence of physical restraint use and it seems that physical restraint has become a regular procedure in care settings such as hospitals. Therefore, it is important to investigate the incidence rate of physical restraint and patterns of its use. Studies continue to explore the best way to develop and implement restraint-free programmes, the importance of professional healthcare attitudes, nurses' knowledge and practice of physical restraint use. In this study, the

theory of planned behaviour guided the investigation of the effectiveness of an educational intervention on nurses' knowledge, attitude, intention, practice and the reduction of the use physical restraint as well as patterns of physical restraint use.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

In this chapter, reviews of previous studies are made. Several electronic and printed reference sources were selected in conducting research for the related literature. The researcher starts with a brief description on the literature search strategy used to identify the relevant articles and retrieve the existing literature. Findings from the retrieved studies are then critiqued to explore the gap in the literature.

2.2 Search Strategy

Information in this review was obtained from professional publications including books, internet sources and peer-reviewed journal articles. The reviewed databases are as follows: Cumulative Index to Nursing and Allied Health Literature (CINAHL), OVID, MEDLINE, ProQuest, Springer and Science Direct. In addition, search engines such as Google and Google Scholar were used. Key search terms included physical restraint use, incidence and prevalence of physical restraint, consequences of physical restraint, reasons for physical restraint use, patterns of physical restraint use, knowledge, attitude and practice of nurses towards physical restraint, intention of nurses and physical restraint use, perception of nurses towards physical restraint, alternatives to physical restraint use, clinical guideline, educational intervention, and restraint-free programme. Filtering the research articles was guided by the selection criteria discussed below.

2.2.1 Selection criteria

The literature search used the following selection criteria: The study had to have a population of adult patients in hospital. Physical restraint use in chronic mental institutions, residential facilities, emergency wards, recovery operational rooms and outpatient clinics were excluded from the studies. Additionally, the articles had to be in English language. High-quality full-text papers, which focused on physical restraint use and nurses and the effect of a teaching programme on physical restraint and nursing practice were included in the review. The studies included were mostly published between 2001 and 2016.

2.2.2 Results of key studies

Related full-text articles were evaluated and relevant information selected from the main articles, including study objectives, design and results. Key studies that were relevant to physical restraint use, knowledge, attitude, intention and practice of nurses towards physical restraint and the effect of an educational programme on nurses and incidence of physical restraint use were retrieved and critically reviewed.

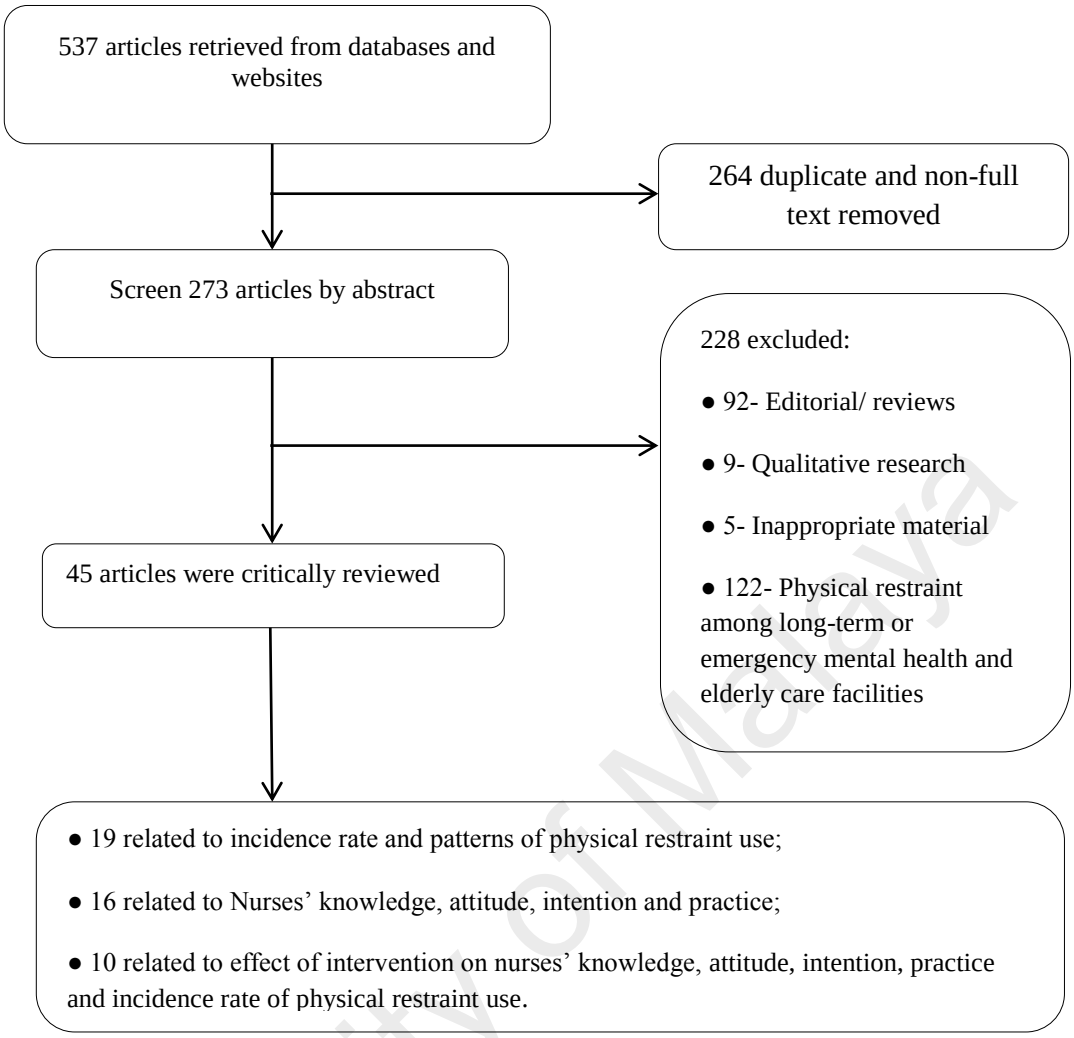

Figure 2.1: Flow chart of the systematic approach used in literature review

2.3 Incidence rate and patterns of physical restraint use

Physical restraint is described as any manual, mechanical or physical device that cannot removed easily by patients and leads to the restriction of a person's activity, mobility and freedom of movement (Centres for Medicare and Medicaid Services, 2012). Restraint intervention increases the risk for physical and psychological impairment and death among inpatients and is a common reason for staff injury (Berzlanovich, Schopfer, & Keil, 2012; Bromberg & Vogel, 1996 as cited in Kim et al, 2008; Mion, Frengley, Jakovcic, & Marino, 1989 as cited in Bai, Ip, Woo, Kwok, Chui, Ho, 2014).

Although physical restraints are recognized as traumatizing procedures and they are contrary to effective treatment criteria, these interventions are considered as a last resort treatment to protect patients and staff. However, a significant number of patients are still forced to undergo physical restraint. The purpose of this section is to highlight that physical restraint use with inpatient adults persists in being a common approach, in spite of a history of various researches in this field.

In the United States, Minnick, Mion, Johnson, Catrambone, & Leipzig (2007) tried to investigate physical restraint rates and patterns in United States hospitals. In this descriptive study in 40 acute care hospitals, the prevalence of the use of physical restraint and patterns of this use, which involved gender, age, physical restraint type and rationale for restraint were determined in all units excluding psychiatric, emergency, operation rooms, obstetric and long-term care units. Data were collected by direct observation and nursing reports by a data collector. Also, two or three unannounced checks were made during the 18-day period of the study. The rate of restraint use was 50 per 1,000 patients, while the average per hospital was 52.8 per 1000 patient days. The intensive care unit (ICU) had the highest rate of restraint days (56%) which was much higher than non-ICU rates. However, there were significant differences between different non-ICU units; for instance, the non-ICU neurology/neurosurgery units had a much higher rate than non-ICU surgical units ($P<0.01$). With regard to the reasons for using restraint, prevention and treatment of disruptive behaviours was the most commonly mentioned reason (74.9% of restrained days). Confusion (25.4%) and fall prevention (17.6% of restrained days) were other items. Wrist restraint (79.4%) was the most common physical restraint, while chair and leather restraints were less than 0.1 percent. Adults over 65 years or older and men had less tendency to be restrained than younger patients and women. In this study, researchers concluded that they estimated that at least 27,000 patients in United States hospitals were restrained daily.

In Germany, Krüger, Mayer, Haastert, and Meyer (2013) found the rate of physical restraint use in 47 general wards and 14 intensive care units totalled 11.8% (general wards: 0 to 31.3%, ICUs: 0 to 90%). In this descriptive study, paediatric, emergency wards and operating rooms were excluded. Within a period of 3 months, each ward of the hospital was visited by one investigator at three random times on randomly selected days. The most frequently used physical restraint type was the bed rail (13.1%), followed by the wrist restraint (4.9%). There was a significant association between physical restraint use and the age of patient (80–99 years versus 18–54 years), the use of a feeding tube and/or urinary catheter and long stay in intensive care units with physical restraint use. The physical restraint rate between hospitals varied from 6.2 % to 16.6%. In this study, researchers concluded that this kind of variation between hospitals and different wards shows that hospital standard care with minimum physical restraint use is practicable and only requires staff members to be educated.

The most important limitation of the above studies was the exclusion of psychiatric wards, which can change the rate of restraint in hospitals.

Most of the studies regarding physical restraint have been conducted in the ICUs of hospitals. Kooi et al. (2015) conducted a prospective cross- sectional study to assess the prevalence of physical restraint use in 25 intensive care units in 25 different hospitals in the Netherlands. During using restraint, researchers recorded use of physical restraint type. Results showed that of all patients (n= 379), 23% (n=87) restrained during the researchers' visitor sessions. Leg or wrist restraint was the most common type of physical restrain (98%). Most common reason to use physical restraint was threat to airway (68%) followed by pulling on the catheters (56%). The limitation of this study was investigation on physical restraint use during daytime while delirium may be common during evening and night shift. Therefore, the reported rate of physical restraint probably has been underestimated.

In another study, Benbenbishty, Adams & Endacott (2010) carried out a survey study to investigate the prevalence rate of physical restraint use in 34 general ICUs in nine European countries. A structured data collection form was completed by volunteer registered nurses and doctors based on direct observation of patients. They collected data 24 hours a day, weekdays and weekends. Results indicated that 39% of patients were physically restrained and the rate of physical restraint varied across the units. For example, in four ICUs in England and two Portuguese units, the rate of physical restraint was zero, while all patients of an Italian unit were restrained during the study period. There was no relationship between time of week and restraint but physical restraint rate was significantly higher in patients with endotracheal tubes and patients who were sedated than with other patients. Most common reasons for using physical restraint were risk of self-extubation, restlessness and delirium, and in 89% of restrained patients wrist restraints were applied. Researchers concluded that evidence-based guidelines and educational interventions should be planned to reduce the rate of restraint according to the variations and patterns of physical restraint in different countries. The most important limitation of this study is that the extent of representativeness of the rate of physical restraint use for other countries is unknown regarding the variation in the rate of physical restraint use in different units.

Luk, Burry, Rezaie, and Mehta (2015) conducted a prospective-observational study in two Canadian intensive care units to describe patterns of physical restraint use by nurses. Researchers used a standardized case report form and observed nurses who delivered caring for the patients on the first day of physical restraint use. They collected data on restraint use for 71 in ICU 1 and 70 in ICU 2. Regarding patterns of physical restraint use, mean restraint duration for 109 patients (77%) was 1.8 (SD 1.0) days. Most common physical restraint type was wrist restraint (n = 128, 91%). Four-point restraints (n = 6, 4%) was infrequent. In most restrained patients (n = 117, 83%)

physical restraint were used on the night shift. Agitation (n = 107, 43%), restlessness (n = 42, 17%) and to prevent device removal and maintain patient safety (n = 42, 17%) were the most common reasons for restraint application. Alternative used prior to physical restraint application consisted of communication during reorientation (27%), management of causes of agitation (20%), using analgesia (18%), involvement of family and friends (10%) and others (25%) such as patient ambulation and cognitive stimulation. In this study, researchers concluded that using physical restraint as a precautionary measure especially when ability of nurses to be present at the bedside was reduced; recommend an optimal and innovative minimization programme.

Another cross-sectional study has been conducted in 11 intensive care units by Kandeel and Attia (2013) in Egypt. A physical restraint observation form was completed by researchers. Two times in a day each patient was observed, once in the morning and once in the evening, until the physical restraint was removed or the patient was discharged from the unit. The findings indicated that neurological, gastrointestinal and chest ICUs had higher rates of using physical restraint in both morning and evening shifts. The range of physical restraint use was 2 to 15 times (4.7± 1.9) per week, overall. The most common type of physical restraint was the bed rail (22.8%), followed by four-point wrist and ankle restraint (12.7%). Gauze and dressing was used by 98.8% of nurses as a physical restraint device, which is not a standard device for restraint in hospitals. Most complications of physical restraint use were redness (96.5%), followed by bruising (51.1%) at the restraint site. The results showed that assessment of restrained patients was usually implemented every 8 hours. The reasons given for using physical restraint were the risk of the removal of a medical device by the patient (79.1%), resisting treatment (64.7%) and a tendency to get out of the bed (46.4%). This study concluded that physical restraint was a common practice in the study area of Egypt, which needs to enhance the knowledge and skills of nurses regarding physical

restraint use. The use of convenience sampling of only one geographical area of Egypt may affect the generalization of this study across Egypt or other African countries.

Most studies about physical restraint in Asian countries have been conducted regarding elderly patients in nursing homes, which have different rates of physical restraint use than hospitals. However, some Asian researchers tried to assess the rate of use of physical restraint in general wards and ICUs. Raguan, Wolfovitz, and Gil (2015) carried out an observational cross-sectional study to determine prevalence of physical restraint use over 3 month in medical-surgical and intensive care units of a mid-sized hospital in Israel. The investigators recorded number of hospitalized patients and number of restrained patients on the wards during 10 unannounced visits to the wards. The results demonstrated that of all patients (n=2163), 76 patients were restrained. The highest prevalence of physical restraint reported from medical wards (5.19%). Physical restraint prevalence in night shift (4.40%) was significantly higher than morning shift ($p< 0.05$). Although, the strength of this study was data collection by direct observation, there was risk of repeated observation due to anonymous data.

Choi and Song (2003) conducted a cross-sectional study to determine the patterns of physical restraint in a Korean ICU. The researchers gathered data from restraint document sheets, ICU flow sheet and chart reviews which were completed by nurses over a 6-week period. Of all hospitalized patients in ICU, 46.6% were restrained with a two-point wrist restraint, which was the most common type of physical restraint. The majority of cases of restraint were to prevent the patient from removing medical devices, such as an endotracheal tube (48.6%) and for the convenience of the nurse (26.1%). Of these patients, 70.2% were restrained for between 1 and 24 hours, 11.7% between 1 and 10 days and 2% of them were restrained for more than 10 days. There was no difference between rates of physical restraint use between shifts. In this study, the researchers suggested the assessment of the knowledge and attitude of nurses and

patients with regard to physical restraint in order to plan a programme to minimize physical restraint. The limitation of this study was the small sample of patients and nurses.

Another study in Asia assessed the reasons for using physical restraint and some patterns of physical restraint use in Turkey. Turgay, Sari & Genc (2009) carried out a cross-sectional study in the ICUs of 7 hospitals in west Turkey. A total of 190 volunteer female nurses completed the self-administered questionnaire in the internal, surgical and medical ICUs. The results showed that the mean age of the nurses was 27.94 years and most of them (76.3%) were between 20 and 30 years old. A total of 49.5% of nurses had a graduate degree, 40.5% of nurses had 1 to 5 years work experience, and 84.7% reported the use of physical restraint without an order from a physician and only 40.5% stated that they recorded the use of physical restraint in nursing notes. The most commonly used physical restraint type was wrist and ankle restraints (84.7%). Characteristics of nurses had no significant relationship with the rate of physical restraint use or the documentation of physical restraint in nursing notes. The maintaining medical devices in place (86.8%), restlessness (86.3%), mental status impairment (79.5%), performance of medical treatment (53.7%), convenience (23.2%), and the suggestion of the patient, family or other medical staff (12.1%) were reasons cited for the application of physical restraint. With regard to the complication of physical restraint, 36.8% of nurses reported complications during and after application of the restraint and the most common complication was the breaking of skin. A total of 83.2% of nurses mentioned that there was no difference in the rate of physical restraint between day and night shift works. In conclusion, this study showed the use of physical restraints without any special protocol in ICUs in Turkish hospitals and reflected the importance of nurses' attitudes towards the application of physical restraint. This study

suggested further education based on standardized protocols of physical restraint for nurses in ICUs.

In Turkey, another cross-sectional study has reported the use of physical restraint in ICUs, emergency departments and neurosurgery wards in four hospitals. In this study, Demir (2007) collected data via an open-ended semi-structured interview with 254 nurses who were working in these four hospitals. The findings showed that most participants (96.1%) used wrist restraints, 88.2% ankle restraints, 35.8% mitten restraints and 35.8% whole-body restraints in the previous week. There was a significant difference between hospitals in the use of physical restraints. The higher rate of use of physical restraint was in surgical ICUs (31.9%) and emergency departments (20.9%). A total of 89.8% of nurses had not participated in any in-service training regarding the use of physical restraints. Only in 5.1% of restraint the decision to use physical restraint was made by the physician. In most cases (30.3%), nurses assessed restrained patients every 8 hours, and in 22% of cases edema and cyanosis were the complications that occurred as a result of using wrist and ankle restraints. The worst complications were shoulder dislocation and arm paralysis (0.4%). Just over a quarter (25.6%) of nurses had not tried any type of alternative method before applying physical restraint. In conclusion, this study demonstrated a high rate of physical restraint in Turkey. Some patients had moderate to severe complications. The researcher recommended educating nurses to consider and meet patients' needs before applying physical restraint.

None of the above studies assessed the physical restraint rate among psychiatric patients. It seems that researchers tend to exclude psychiatric wards from their study because of the psychiatric patients' situation, the reasons for using physical restraint in psychiatric wards and probably their attitude towards the management of patients' behaviour or the necessity of restraint use in psychiatric units. However, some studies

evaluated the physical restraint rate among psychiatric wards. Hendryx , Trusevich, Coyle, Short, and Roll (2010) conducted a study investigated the distribution of seclusion and restraint episodes among 1266 adult psychiatric inpatients at a state psychiatric hospital located in Eastern Washington State. A retrospective, secondary data analysis of seclusion and restraint episodes was applied. Hospital staff had recorded restraint information as part of the Oryx initiative to submit to the Joint Commission for Accreditation of Healthcare Organizations. The analysis included type of restraint, clock time and date of event, treatment unit, age, race, sex, primary diagnosis, and length of hospital stay. Different parts of the data were reviewed and verified by a registered nurse and a medical record technician. The results of this study showed that 115 (8% of all patients) experienced one or more restraint episodes. The number of restraint hours averaged 22.1 hours per episode and 115.9 hours per person restrained. The count of restraint hours over the year found no seasonal pattern. The ten patients most prone to being restrained accounted for 47.9% of the total number of restraint episodes. In conclusion, the results demonstrated that episodes of restraint were concentrated on a small proportion of patients. This issue suggested exploring the particular needs that place these individuals at risk of restraint. Also, knowing what works to reduce the need for restraint for high-risk patients requires staff skills in counselling with patients to learn what they need and what they find upsetting and what makes them aggressive. Therefore, the hospital context needs to focus on nurse education to reduce or eliminate use of restraint. The limitations of this study consist of the fact that it was conducted in one hospital at one particular time. Despite the concentration of restraint in a small proportion of patients, there are other individuals who experience restraint over the year. So, focusing on high-risk patients is not an appropriate and holistic strategy.

Husum, Bjørngaard, Finset, and Ruud (2010) determined the frequency in the use of coercive measures in acute psychiatric wards in one part of their study in Norway. The study was a cross-sectional prospective study in 17 acute psychiatric wards in Norway during 2005 and 2006. The results revealed that the total number of admitted patients was 1214, of whom 117 (10%) had been restrained and 106 (9%) patients had experienced both seclusion and restraint. In addition, 13 (1%) patients had experienced restraint, seclusion and involuntary medications. Admission wards showed no statistical difference from other wards in the use of restraint.

In Italy, another European country, physical restraint rate and patterns of physical restraint use have been reported among psychiatric wards (Lorenzo, Baraldi, Ferrara, Mimmi, & Rigatelli, 2012). In this retrospective study, data were collected from medical charts between January 2005 and January 2008. Results showed that the physical restraint incidence rate was ranged from 13% to 21% of all hospitalized patients over the four years. The average duration of physical restraint was 6 hours. The rate of physical restraint use was frequently significantly higher during the night shift than that of the morning and evening shifts ($P<0.0001$).The main reason for using restraint was reported as being to control aggressive behaviour and it was more frequent in schizophrenic patients and other psychotic disorders rather than other mental disorders. In conclusion, the researchers stated that physical restraint use can be considered as an acute and severe condition of a patient's situation. In addition, they believed that more frequent physical restraint use at night could be related to a worsened state of confusion, circadian conditions and a shortage of staff.

To accomplish further information regarding the use of restraint in psychiatric wards, Knutzen, Sandvik, Hauff, Opjordsmoen, and Friis (2007) conducted a study to estimate usage rates and types of patient restraint, and their relationship with age, gender and immigrant background. The researchers designed a retrospective study and data were

collected from the restraint protocols, records and electronic files at the Department of Psychiatry at Ullevaal University Hospital, Oslo, Norway. In this 2-year period, 960 psychiatric patients were admitted. A slight majority of them was women (52.2%). Most patients were in the age group 30–39 years (28.7%) and 13% were immigrants. The use of seclusion and restraint in Norway was defined by the Psychiatric Health Care Law, and included mechanical restraints, which consisted of different kinds of belts and straitjackets, and pharmacological restraints, which consisted of anti-psychotic and sedative medications. The degree of restraint was illustrated using an ordinal scale: from no restraint, pharmacological restraint only, mechanical restraint only, to a combination of pharmacological and mechanical restraint. In order to compare the degree of restraint in two patient groups, the Mann–Whitney U test was used and the Kruskal–Wallis test was applied to compare five age groups. Also, a Chi-square test was used to compare frequencies between patient groups. Logistic regression was used to determine the impact of age, gender and immigrant background on the use of restraint. The result showed that 135 patients (14.1%) were exposed to restraint at least once during their stay in hospital. There was no significant difference of the rate of restraints between men and women. For all groups, the rate of restraint varied between 14.1% and 16.0% in all of the groups below 60 years of age, whereas in the age group of 60 years and above, only 6.8% were restrained ($P<0.015$). Of all patients who were native born, 108 (12.9%) were restrained, compared with 21.6% among immigrants ($P<0.014$). Of those patients who were exposed to restraints, 50% received both pharmacological and mechanical restraints. Patients with an immigrant background were more often restrained. There was no clear difference in the degrees of restraint by gender. Age and gender were not significantly related to the use of restraint in the regression analysis of native-born patients. In contrast, for patients with an immigrant background, age was significantly related to the use of restraints ($P<0.010$). In

conclusion, the researchers explained that a minority background can increase the use of restraint, and in this study the increased restraint rate among immigrant patients may be related to factors associated with a minority background. Perceived racial and language differences between staff and patients may have increased communication problems and disturbed the trust between individuals. With regard to the limitations of this study, it is worth noting that the length of the study may have affected on the probability use of restraint. Taking into consideration the differences in sources, traditional norms and culture in healthcare organizations, and also the difference in demographic characteristics and legislation between different countries, leads one to question to what extent the results can be generalized.

In older patients, comorbidity of many physical illnesses with mental problems can cause challenges to nursing care. The use of physical restraint in elderly patients with cognitive impairment is high (Minnick, Mion, Johnson, Catrambone, & Leipzig, 2007). Gerace, Mosel, Oster and Muir-Cochrane (2013) conducted a retrospective study in three acute and two extended-care psychiatric inpatient wards for older people in Australia. The results showed that there was a variation in physical restraint use between wards. The highest incidence rate of physical restraint use was 12.74% in one of the acute wards and the lowest incidence rate was 0 in an extended ward. In addition, patients diagnosed with dementia had the highest rate of physical restraint incidence rate compared to other patients. The main reason for using physical restraint was to manage aggressive behaviours (48.8%), followed by to prevent falls (27.38%). A total of 40.3% restraint incidents occurred between 09:00 and 17:00 hours, 37.8% after 17:00 hours to midnight and 21.8% of restraint incidents occurred between 12.00 and 9:00 hours. The longest duration of using physical restraint was 12 hours. Researchers in this study concluded that a better understanding of symptoms of dementia and the needs of patients involved with this disorder may reduce physical restraint use in geriatric wards.

Although all wards of this study performed under the same policy and guidelines regarding restraint, the validity of the data is dependent on the accuracy of the nursing reports.

In another study about older people, Chiba, Yamamoto-Mitani, and Kawasaki (2012) conducted a retrospective national survey in 718 long-term care hospitals to discover the prevalence of physical restraint use for one study day in Japan. The instrument was a questionnaire, which was mailed and completed by the nurse manager of each ward. The results showed that 241 (78.0%) wards used physical restraint on the study day. Of those patients restrained 81% were under restraint for one month or more. A bilateral bed rail was applied more than other types of physical restraint and preventing falls was the most frequent reason given for the use of physical restraint. In conclusion, this study showed an alarming number of restrained days (one month or more) among elderly patients. It seems that long-term care facilities need more attention regarding the proper application of physical restraint in order to prevent patients' injuries due to physical restraint use.

Oearsakul, Sirapo-ngam, Strumpf, and Mlathum (2011) carried out a descriptive study to determine the prevalence and some patterns of physical restraint among the hospitalized elderly. Data were gathered by a physical restraint observation tool (PRUOT) on nine medical-surgical and orthopaedic wards in a large teaching hospital in Thailand. The results showed that the prevalence of physical restraint use was 65.7% (n=281). Of the patients restrained, 6.3% were subject to more than one restraint device, such as bed rails and wrist restraint. The most common reason for using physical restraint was to prevent falls. In conclusion, the researchers explained that using effective alternatives based on the literature could reduce the prevalence of physical restraint among elderly patients. For example, one of the effective physical restraint alternatives is family participation at the bedside, which can minimize the use of bed

rails in hospitals. The study's sample derived from one hospital; therefore, there is a limitation to the generalization of the findings.

Various physical restraint incidence rates have been shown in the above studies. In a literature review study, Steinert et al. (2010) carried out a study to identify information on the use of seclusion and restraint in 12 different countries, and on initiatives to reduce these interventions. In this study data were gathered from three sources. First, a Medline search for the years 2000–2008. Studies were selected if they described initiatives in more than a single institution or hospital, or articles reported a percentage of admissions or patients involved in at least one kind of coercive intervention. In a second step, the abstracts of the two most relevant conferences were checked and the authors contacted to provide further information and finally, all members of the European Violence in Clinical Psychiatry Research Group (EViPRG) were asked to provide unpublished data. The results demonstrated that the highest percentage of physical restraint use was related to Austria (35.6%) with 4.5 hours mean duration, whereas the lowest percentage came from Iceland (no coercive intervention). After Austria, New Zealand had the highest percentage among countries, as they reported 15.6% with 4.7 hours' mean duration. In England, the percentage of restraint was estimated as being 7.3% with duration of 20 minutes. In addition, the researchers ascertained the percentage of restraint and mean duration of this intervention in other countries. Finland (5%, mean duration: 11.1 hours), Germany (8%, mean duration: 9.6 hours), Japan (4.1%, mean duration: 68 hours), Netherlands (11.6%, mean duration: 1182 hours), Norway (2.6%, mean duration: 7.9 hours), Spain (13.5%, mean duration: 16.4 hours), Switzerland (3.1%, mean duration: 41.6 hours) and Wales (5.7%, mean duration: 9 minutes). Overall, this review shows that the information about coercive intervention among psychiatric inpatients in different countries is very limited. Also, the results of this review show a vast variety in the frequency and duration of restraint.

Since Western European mental health resources are similar in their hospitals and populations at risk, the data represent the fact that the use of restraints may be based on traditions and policies related to medical or safety requirements. In this study, the researchers do not consider that the definition of restraint is different from one country to another. For instance, in the United Kingdom, restraint means holding a patient upright or on the floor without a belt, while in all other countries, restraint means fix a patient using a belt to a bed or a chair. This can have an effect on the interpretation of data.

One gap in the literature revolves around the wide variation in the use of physical restraints. Some hospitals compared to others have for example a significant difference in their rates and patterns of these interventions. In some hospitals there can even be a wide variation from unit to unit. To my knowledge, there is no published information on physical restraint incidence rate and its pattern in Malaysia. Therefore, the first step of this study can provide some detailed information regarding physical restraint use in this country before implementing an educational minimization of restraint programme for nurses.

2.4 Alternatives to physical restraint use

Physical restraint alternatives can be considered as any strategy or method that is used to keep the person safe without resorting to a device or material that would limit the person's physical freedom. Alternatives to restraints have been categorized as environmental, physical, psychosocial, physiological, and nursing care interventions (Centres for Medicare and Medicaid Services, 2012). Examples of restraint alternatives include such strategies as adequate lighting, appropriate footwear, toileting plans, balance or strengthening exercises through physical therapy, pain assessment and management, medication reviews, wheelchair or seating assessment, individual's

activity plans etc. Restraint alternatives must be specific to each patient, as each person will have different needs and preferences concerning his/her care and daily routines (Quality Improvement Organizations, 2013). Before implementing alternatives, nurses try to identify some factors that may lead to difficult behaviour, such as the patient's age, mental status, communication skills and any degeneration or failure of musculoskeletal, neurologic, urologic, cognitive and cardiovascular systems. In addition, nurses consult with other staff members of hospital before choosing the best alternative to physical restraint (Minnesota Department of Health, 2013).

According to the literature, alternatives to physical restraint exist. However, the point is that nurses are usually unaware of the various types of physical restraint alternatives. Thus, one of the most important topics during a restraint minimization programme would be to introduce and focus on the use of alternatives to the use of physical restraint (Azab & Abu Negm, 2013; Suen et al., 2006). In Freeman's study (2002), which was conducted among 117 senior nursing students in four colleges of nursing in the U.S., the researcher concluded that physical restraint alternatives are not applied by nurses because of a lack of knowledge and a negative attitude among nursing students about alternatives and elderly patients in geriatric wards. This study suggested that educating nursing students regarding restraint alternatives is necessary to reduce physical restraint use.

2.5 Knowledge, attitude, intention and practice of nurses towards physical restraint use

Doerflinger (2004) stated that while literature has contraindicated the use of physical restraint and healthcare settings have mandated to change their behaviour to reduce physical restraint use, the rate of restraint in many settings has remained unchanged. In

this regard, the researcher conducted a descriptive study to identify the knowledge and attitude of nurses toward restraint and nurses' perceived barriers to restraint reduction implementation. In this study, a questionnaire was completed by 86 nurses selected from the membership list of the American Nurses Association based on convenience sampling in different geographic areas in the United States. In data analysing, Chi-square, T-test and content analysis were used. Respondents were categorized into two groups. Group A (49 nurses) achieved successful restraint reduction and group B (37 nurses) had not achieved successful restraint reduction. The results showed that group A had a higher mean score of knowledge, attitude and practice than group B. The T- test did not show a significant difference of means between groups on attitude and practice subscales but there was a significant difference of means for the two groups on total restraint survey (P<0,00) and on the knowledge subscales (P< 0.00). In this study, the average of the knowledge score of all nurses was 81%. Group B had a lower average score (69%) than group A (90%). In addition, the findings showed that 100% of nurses had received a formal restraint reduction programme. Group A had passed 14 educational restraint reduction programmes compared with 12 programmes in Group B. The sample consisted of 2 men and 84 women. Both groups had 20 nurses with graduate degrees and 1 nurse with a doctoral level in nursing. Work experience years in group A ranged from 2 to 37 years compared with 8 to 40 years in group B. Group A had 21 head nurses or assistant head nurses while group B had 9 nurses working at these levels. The nurses reported almost the same area of work in both groups. In conclusion, the researcher explained that knowledge of restraint can be effective on successful restraint reduction but professional characteristics did not have a significant relationship with restraint reduction programmes. The fact that the questionnaires were mailed to the respondents can be considered as an important limitation to this study, since some essential factors might be missing and may not have been identified in this study.

Another descriptive study aimed to examine knowledge and practice of physical restraint among nurses conducted by Sujata & Kaur (2015) in Punjab. Sixty nurses working in intensive care units, emergency and neuro-surgery wards of a selected hospital selected based on convenience sampling method. Data collected by a structured knowledge of physical restraint questionnaire and observational checklist of practice of physical restraint use. The result showed that knowledge of majority of nurses (76.66%) was average while only 1.66% had good knowledge towards physical restraint. For all restrained patients (n=30) there was no written order by physician and no documentation was done. Most of patients (56.7%) were in restraint for more than 72 hours and no assessment of physical restraint was performed. The researchers concluded majority of nurses had average knowledge and poor practice regarding using physical restraint. They suggested that hands on skill training are necessary to improve practice of physical restraint among nurses.

Most of the studies regarding knowledge and attitude and practice of nurses about the use of physical restraint have been carried out in ICUs. For example: Janelli, Stamps and Delles (2006) explained that nursing staff commonly have considered physical restraint a necessity in the past, based on their clinical judgment. However, this issue has changed because of the disadvantages of physical restraint. The correct perception and knowledge among nurses can reduce the risk of injury, especially in acute-care centres. With these ethical and legal issues in mind, these researchers carried out a descriptive study to determine the knowledge, practice, and attitudes of nursing staff towards the use of physical restraint. A total of 216 registered nurses from two acute-care hospitals in the United States took voluntary part in the descriptive study based on convenience sampling. A questionnaire on knowledge, attitude and practice towards physical restraint was used in the data collection. The results demonstrated that the majority of participants were between 40 and 49 years of age. Thirty-five percent of

nurses were working on medical surgical wards and 44% of participants were on day shift. Over 73% of nurses had received information about physical restraints as a part of the registered nursing programme. Seventy-seven percent of the participants explained that they had tried to use alternative methods prior to using restraints. Regarding their knowledge of restraint, the most correct answers were related to the following statements: "When a patient is restrained, skin can break down or restlessness can increase," (98.6%) "A physical restraint requires a physician's order," (97.7%)"When a patient is restrained in a bed, the restraint should not be attached to the side rails," (93.5%) and the most incorrect answers were related to "A restraint should be released every 2 hours if the patient is awake," (47.7%) "Patients are allowed to refuse to be placed in a restraint," (44.5%) and "Restraints should put on patient tightly," (47.3%). Regarding alternatives to restraint, 31.2% had attempted on one-on-one observation, 23% had used sedation/medication, 22.5% diversional activities, 18.4% bed/chair alarms, 10.7% family involvement and 7.6% had placed the patient near the nurses' station. With regard to the attitudes of nurses toward restraint, the results showed that 153 participants explained that they felt nurses have the right to refuse to place a patient in restraints and 137 of nurses stated, "If I were the patient, I feel I should have the right to refuse/resist when restraints are placed on me." A total of 152 of participants expressed feeling bad if the patient becomes more upset after restraints. Only 7 participants believed that a lack of nurses affected the frequency of the use of restraints. Although 19 nurses explained, "I feel that it is more important to let the patient in restraints know that I care about him or her," 181 of the participants felt knowledgeable about caring for a restrained patient. In this study, the researchers concluded that nurses performed well on the knowledge questionnaire but there was some misperception about restraints among them. To accomplish desirable results in an education programme the risks and benefits of restraint use, personal and organizational attitudes

and best alternatives should be considered. Although, this study excluded psychiatric wards, its results and conclusion can be of considerable value to restraint use in psychiatric settings as well as other wards.

In another study in ICUs, Akansel (2007) conducted research into determining ongoing practices and perception of nurses towards the use of physical restraint in a hospital in the north-western area of Turkey. A total of 63 critical care nurses who were working in the hospital's 9 ICUs participated in this study. Data were collected using a three-part questionnaire: demographic data, the practice of nurses and the perception of nurses towards physical restraint. Mean age of nurses was 28.2 years and 88.9% of nurses were female. Of the qualifications held by nurses, 17.5% had a diploma, 42.9% an associate degree and 39.6% a bachelor's degree. Nurses had a mean of 2.45 years' work experience in ICU wards. Regarding the practice of nurses in using physical restraint, 95% reported they had used physical restraint at least once during one month of study. A total of 89.2% of nurses applied a roll of gauze instead of standard restraint material for patients. More than half of the nurses stated that they tend to use a four-point restraint. Of the study's participants, 3.2 % did not assess a restrained patient at all while 49% of nurses examined the colour and pulse of the restrained extremities. Fifty-three percent of nurses used physical restraint without a physician's order and 59% of participants did not document applying the restraint. Regarding the perception of nurses towards physical restraint use, 98.4% believed that before using restraints, alternatives should be applied (true), 22.2% of nurses stated patients who received sedatives should be restrained concurrently (false), and 17.5% of participants believed restrained patients do not need to have information about the restraint (false). In addition, 92.1% of nurses believed that physical restraint is the best way to prevent falling and injuries (false) and 87.3% reported that physical restraint allows nurses to work safely in hospital (false). This study concluded that physical restraint practice is the highly preferred method by

nurses in ICUs. Nurses need to attend an educational programme to modify their knowledge and attitudes.

In the Central Anatolian area of Turkey, Kragozoglu, Ozden, and Yildiz (2013) evaluated the knowledge, attitude and practice of Intern nurses regarding physical restraint. In this study, 91 fourth-grade students who had completed the nursing internship programme were assessed. The data were gathered using Janelli's questionnaire on demographic data and knowledge, attitude and practice. Of the intern nurses, 90.1% were female and their mean age was 22.61±1.33. A total of 69.2% of the participants applied physical restraint in hospitals. The mean knowledge score of the participants towards physical restraint was 9.38 out of 11. This means that most intern nurses answered the knowledge section of the questionnaire correctly. For example: 86.8% of participants gave the correct answer to the following statements: patients have the right to refuse physical restraint use; the size and type of physical restraint should be appropriate for the patient; physical restraint should be opened every 2 hours. Regarding the attitude of the intern nurses towards physical restraint, the mean attitude score was 34.70 out of 48 points. Of the participants 86.8% stated that patients can reject the use of physical restraint. About half of them (50.5%) considered that a patient suffers from a loss of dignity during the physical restraint procedure. However, 34% of the intern nurses reported that using physical restraints reduces nursing care time for the restrained patient. The majority of nurses (91.2%) believed that use of physical restraints leads to a reduction in the number of patient falls. The mean practice score of the participants regarding physical restraint was 37.95 from 42 points. A total of seventy-eight percent of nurses said that they always try alternatives before using restraints and 95.6% stated that they checked restrained patients at least every 2 hours. Regarding removing the restraint, 92.3% reported that they frequently assessed the patients for the removal of the restraint as soon as possible, although 34.1% revealed that when they were short of

staff, more patients were placed in restraints, and 48.4% reported that they used physical restraint without a physician's instruction. In conclusion, that is very important to correct, in the early stage of their hospital career, the misunderstanding and improper feelings of intern nurses as well as to address their application of physical restraint. They recommended the reinforcement of physical restraint education programmes in universities followed by an in-service education programme in hospitals. The limitation of this study was its small number of intern nurses.

In addition, other researchers, Azab and Abu Negm (2013) carried out a descriptive study to assess the knowledge, attitude and practice of intensive care nurses regarding the use of physical restraint in five ICUs of a hospital in Egypt. A total of 131 intensive care nurses were selected for the study based on the convenience sampling method. Data were gathered using Janelli's questionnaire. The results showed that most of the nurses (76.4%) were 20 to 35 years old; 90% of them were female; 49.1% of them held a diploma in nursing and 28.2% had a bachelors' degree in nursing. Most of the participants (36.4%) had 5 to 10 years of experience in ICUs. The nurses' knowledge score ranged from 6 to 14 (median: 10). Of the knowledge questions, 35.5% to 94.5% were answered correctly by nurses. A total of 64.5% of participants believed that good alternatives to physical restraint exist. Eighty percent of nurses stated that a physical restraint should be released at least every 2 hours. While 94.5% of them were aware of some of the consequences of physical restraint, 59.1% of nurses did not know that there was a risk of death because of improper use of physical restraints. In addition, 60.9% of nurses believed that patients do not have the right to refuse physical restraint. Furthermore, the results of the study revealed that nurses' attitude score ranged from 17 to 30 (median: 23). It was found that 60.9% of nurses believed that a restrained patient suffers from loss of dignity and 57.3% felt nurses should have the right to refuse the application of restraint to their patients. However, 88% of the participants stated that the

hospital cannot be held responsible for the consequences of using physical restraint to keep patient safe. Overall, about 64% of nurses felt confident in caring for restrained patients. Regarding the practice of nurses towards physical restraint, the practice score ranged from 18 to 39 (median: 28). Only 41% of nurses indicated that they always tried to use an alternative before using physical restraint. In addition, only 18.2% of participants used physical restraint with physicians' instructions and 55.5% of nurses reported that they informed patients' families about physical restraint use. In conclusion, the researchers stated that an in-service care programme about physical restraint use, based on proper guidelines for nurses who are working in ICU wards, is necessary in order to improve nurses' practice regarding physical restraint.

Knowledge and attitudes of staff toward the use of restraint affect practice both directly and indirectly. Nurses in psychiatric units play an important role in the decision to use the restraining process with psychiatric patients (Suen et al., 2006). Gelkopf et al. (2009) examined nurses' attitudes and opinions regarding the goals of restraint, the emotional aspects of restraint, the characteristics of environment influencing restraint and the environmental conditions influencing restraint. The survey was conducted in a government hospital in the centre of Israel and consisted of four acute inpatient and four chronic centres, including 320 patients in total. Average hospitalization duration was 39 days in the acute units and 392 days in the chronic units. More than 30 percent of the nurses worked in acute units. Participants were 111 nurses who responded to a questionnaire about attitudes, opinions, behaviours and emotions regarding restraint. Results were analysed using the chi-square test for dichotomous variables and the t-test was used for sequential variables. The mean age of nurses was 43.3 years. Of the participants, 53 percent were licensed and 28.4% of the licensed and non-licensed nurses had taken part in an Advanced Psychiatric Nursing Course. Compared to open wards there were more nurses in closed wards who were interested in restraint if one

patient fought with another ($p< 0.002$). Compared with women, more men considered restraints if a patient refused medication ($p<0.04$), kept others from sleeping ($p<0.04$), bothered other patients ($p<0.02$), or created a noisy or violent fight in the ward ($p<0.04$). Non- licensed nurses showed a greater tendency to use physical restraint in the case of a refusal to take medication ($p<0.03$). The reasons for restraint were explained, as most nurses considered using restraint to calm patients and prevent harm being caused to other patients and staff. A small percentage of the nurses used restraints to end sudden excitement in the psychiatric ward. Nurses in closed wards considered using restraints to end fighting between patients more than nurses in open wards ($p<0.01$). Compared with female nurses, male nurses introduced restraint as a way to "show a patient that he/she had behaved badly" – i.e. as an education method ($p<0.01$). While 76.1% of nurses considered restraints to calm the patient, 41% felt that their use sent a message that the staff was helpless. There were 37.4% of participants who believed that patients suffer from restraint. It is important that only 20% of nurses believed that restraints can be harmful to patients and were perceived by patients as a punishment. In this study, the researchers concluded that the perception of the therapeutic value of restraint can alter nurses' perceptions of the restraint process. Also, the lack of tools to cope with violence, a lack of skills and assertiveness may lead to lack of patience in the staff on psychiatric wards. This study would have been stronger if the researchers had included the in-depth concepts that could be gained from a mixed-methods study.

Regarding the attitude of hospital staff toward the use of physical restraint, another study demonstrated that most nurses did not believe that using physical restraint can result in patients becoming more restless, more aggressive or to cause injury. In this study, which was carried out by Wynn (2003) in the psychiatric department of a hospital of Northern Norway, 267 staff completed a questionnaire about the use of physical

restraints. Most of them were female (59.6%) and under 40 years old (59.9%). Among the participants, 43.4% were nurses and the remainders were doctors and psychologists, occupational therapists, physical therapists and social workers. The results showed that 89.4% of staff believed that they used physical restraint correctly. Regarding the staff's beliefs about physical restraint use, 93.2% of them believed that physical restraint made the patient calmer. Less than half of the participants believed that physical restraint causes injury to patients (10.8%), injury to staff (17.7%) and causes more aggression (28.2%). However, staff gave the following reasons for why physical restraints have to be used: to prevent violent behaviours against staff (86.1%) and other patients (54.7%), and to prevent patients harming themselves (62.9%). A number of staff (18%) felt there was no reason for using physical restraint in hospitals. The researcher concluded that physical restraint should be considered ethically, legally, and clinically for some actual emergencies. Although the actual behaviours of participants were not assessed, this study indicated that staff needed to modify their attitude by receiving a correct education programme that could have an effect on the beliefs and attitudes of people.

Suen et al. (2006) examined staff knowledge, attitude, practices and predictors toward restraint use in rehabilitation settings in Hong Kong. Participants consisted of 209 licensed nurses and healthcare assistants who were working in two rehabilitation centres and who were selected based on convenience sampling. The instrument was a questionnaire consisting of four sections (knowledge, attitude, practice and related factors) about restraint use. The questionnaire was completed by 109 licensed nurses and 59 healthcare assistants. The female: male ratio was 9:1. Most nurses (87 nurses) reported having 5 years or more work experience. The results showed that the mean knowledge score was just above average. Most participants (72%) answered incorrectly to the possible outcomes of the use of restraint, such as skin breakdown and choking. In addition, only 16.8% accepted that useful alternatives to physical restraint exist.

Regarding the attitude of nurses towards physical restraint, 90% of participants answered that they agree that physical restraint can be effective for fall prevention and 70% believed that restraint use can reduce the time spent on nursing care. With regard to nursing practice in the use of restraint, 85.7% of participants reported that they explain to clients the reason they are being restrained and 70% said that they frequently observe the client during restraint. In conclusion, a negative attitude and low level of knowledge among nurses in this study could be considered strong reasons for the need to implement education programme for nurses. The data in this study were acquired based on a convenience sampling from two rehabilitation settings, which limits the external validity of the findings.

Another study demonstrated misunderstanding, improper attitudes and the effect of subjective norms and perceived behaviour control in physical restraint use. Lai (2007) conducted a qualitative study to determine the perspectives of nursing staff on the use of physical restraint in Hong Kong. This study was part of a clinical trial aimed at reducing the use of physical restraint in rehabilitation units. Focus group interviews were conducted to explore the perspective of the nurses on the use of physical restraint. A total of 22 registered nurses (3 males and 19 females) attended the four sessions in four focus groups. They participated in the study voluntarily. The mean of clinical experience was 2.5 years. One member of the research team who was not involved in the educational programme conducted all focus group interviews. The tapes were transcribed by a trained research assistant who was present as an observer at all of the interviews and were then reviewed by the author. The results showed several themes had been identified from the transcribed data. These themes consisted of "experiencing internal conflicts, making a strong case against inadequate staffing, and voicing their frustration with the pressure from management." Theme 1: "I will use restraints despite ambivalence and inner turmoil": Staff reported that they do not like to use restraint but

they had to use it in order to prevent falls, treatment disruption behaviour, and self-injury. Theme 2: "We are always short-staffed at work and we are just trying to do the best we can." Nurses said that the low number of nurses leads to physical restraints being applied in order to reduce complications such as feeding tube removal. Theme 3: "Frustrated as a result of pressure from management and the need to conform." Theme 4: "Communication problems between various parties, each with a different notion of what function(s) a restraint could serve, did not facilitate restraint reduction." Nurses believed that ineffective communication and pressure from other colleagues was considered as a reason for nursing staff resorting to restraint use. Overall, nurses believed that the incidence of falls would be increased if physical restraints were removed. Also, they said patients feel insecure without physical restraint. This study concluded that knowledge, attitude, subjective norms and perceived behaviour control should be considered when developing an education programme to minimize physical restraint use.

In a systematic review study, Mohler and Meyer (2014) examine attitudes of nurses regarding physical restraint use in geriatric wards. Medline, CINAHL, EMBASE, Psyndex, Psychinfo, and SocialSci Search were used to collect data. They included all German and English language publications that revealed nurses' attitudes about applying physical restraint in geriatric care settings. They implemented a thematic synthesis for qualitative research and a narrative synthesis for quantitative studies. Some publications did not meet the inclusion criteria and 31 articles were finally included in the study. Some of the results from recent studies, conducted from 2000 to 2013 were reported. In the studies of Chuang and Huang (2007), Sarrnio and Isola (2010) and Hantikainen and Kappeli (2000) , most nurses had negative feelings towards physical restraint use, while some of them reported that they feel secured and relieved when they have placed restraints on the patients. In these three studies, some nurses indicated they

felt pity for patients and guilty about using physical restraints. Nurses believed that the priority of nursing care is to maintain patients' safety and they use physical restraints most of the time to meet this priority. The participants believed that physical restraint can reduce the risk of falls and medical device removal by patients (Hantikainen & Kappeli, 2000; Karlsson, 2000). Moreover, nurses tend to use physical restraint to manage behaviours such as wandering to maintain the patient's safety (Hantikainen & Kappeli, 2000; Sarrnio and Isola, 2010). Nurses sometimes used physical restraint because they wanted to do other tasks, like caring for other patients (Karlson, 2000; Lai, 2007). They described insufficient staffing as an important reason for using physical restraint. In addition, the participants in many cases simply continued using physical restraint because of other nurses' decisions or a physician's decision to use physical restraint without reassessment. In these studies, the knowledge of participants on using physical restraint was frequently considered as an important factor in the use of physical restraint (Chuang & Huang, 2007; Lai, 2007; Sarrnio & Isola, 2010). Nurses sometimes became involved with moral conflicts when they used physical restraint (Chuang & Huang, 2007; Hantikainen, 2011; Sarrnio & Isola, 2010). In this case they started to choose coping strategies, such as focusing on the expected benefits of using physical restraint and positive intentions regarding physical restraint use. Therefore the researcher concluded that in spite of a lack of evidence about the advantages of using physical restraints, the attitudes of nurses were marked by using some coping strategies. For a better perception of behaviour, some social theories such as the theory of reasoned action and the theory of planned behaviour have been developed. One of the main components of these theories is intention, which is the strongest predictor of actual behaviour (Ajzen, 2006). Therefore, the researcher intends to determine intention towards behaviour as a predictor of behaviour, or as well as incidence rate of physical restraint use to find any gaps between intention and behaviour. Regarding physical

restraint use, many studies have examined knowledge, attitude and practice but only a few studies indicated the intention of nurses towards physical restraint use.

In 2001, Werner and Mendelsson conducted a study to determine attitudes, subjective norms and intention of nurses to applying physical restraint with elderly patients. Taking part in this study were 303 nursing staff of an elderly care hospital in Israel. The mean age of nurses was 42.4 years old and most of them were female (95.2%). Over half (52.3%) of the participants were licensed practical nurses or registered nurses and the remainder were nursing assistants. They had an average of 16.1 years of experience in nursing practice. Data were gathered by the Theory of Reasoned Action (TRA) questionnaire, which was designed by the researchers. The results showed that nurses had a negative attitude towards the physical restraints (mean score: 4.35 out of 7). They also had moderate beliefs that significant others, such as their colleagues, support their applying restraint (mean: 4.03 out of 7). Regarding the intention of nurses towards physical restraint use, they scored more than average, which reflects a positive intention to apply restraints to patients. In conclusion, the results of this study advised others to explore subjective norms and the intention of nurses regarding use of physical restraint besides their knowledge and attitude. The limitation of this study was in using only one institution to assess nurses regarding physical restraint use.

To my knowledge, in Malaysia, only one study has assessed the perception of nurses in a few medical wards. Lian (2003) carried out a descriptive study in five medical units of one hospital in Kuala Lumpur. In this study, a convenience sample of 100 nurses who worked in medical wards completed 17 items of a PRUQ (perception of restraint use questionnaire). The results showed that the mean age of participants was 27.8 years old. Almost all (99%) of them were female and 82% had a diploma in nursing. Most nurses believed that physical restraint can prevent of falls (74%) and 32% stated that physical restraint can facilitate patients' treatment. Over half (58%) of the participants believed

that physical restraint protects other patients and staff from harm, while 28% said that the use of physical restraint provides rest and safety for the patient and can help to manage agitation in patients. The use of physical restraints due to insufficient staffing was reported by 39% of the participants. This study concluded that physical restraint has been perceived in terms of being preventive, protective, supportive and therapeutic for nurses. Accordingly, nurses need to modify their information and perceptions about the use of physical restraint.

The above studies showed various mean scores for knowledge, attitudes and practices of nurses towards physical restraint in different countries and different wards. It is obvious that educational needs of nurses can be identified through assessment in terms of their knowledge, attitude and ongoing practice. In other words, before preparing and developing any educational programme for nurses to reduce physical restraint use or to use physical restraint properly, it is necessary to know about nurses' knowledge, attitude, intention and practice towards physical restraint. Furthermore, the intention of nurses regarding physical restraint use is a very important concept in changing behaviour, has been overlooked the majority of studies. Thus, in this study researcher assessed knowledge, attitude, intention and practice of nurses towards physical restraint in Malaysia.

2.5.1 Association between nurses' characteristics and knowledge, attitude, intention and practice of nurses towards physical restraint

Many factors can impact the use of physical restraint and are usually classified into organization (wards) characteristics, patient characteristics, and staff members' characteristics (Husum et al., 2010). While nurses play a key role in the decision to use physical restraints, their individual and professional characteristics may be important factors that affect their knowledge, attitude, intention and practice towards the use of physical restraint (Suen et al., 2006). In some studies, researchers have tried to establish

the influence of nurses' individual and/or professional characteristics on their knowledge, attitude and practice towards physical restraint use score.

Stinson (2016) conducted a correlational study to examine the relationships between nurses' clinical experience and their attitude and practice issues towards physical restraint. SurveyMonkey was used to collect the data online. 413 Nurses who were member of the American Association of Critical Care Nurses (AACN) filled up the questionnaire. Mean attitude score of nurses to use physical restraint was 45.12 (SD= 2.44) ranged from 36 to 51 and mean practice score of nurses was 16.63 (SD= 2.66) ranged from 9 to 23. The results showed no strong association to explain the variances between the nurses' attitude and nurses' clinical experience in general or critical care wards and nursing practice issues towards physical restraint use. However, investigator recommended continuing studies in this area. One important limitation of this study was participating higher level of experts in the study based on convenience sampling.

In Azab and Abu Negm's study (2013) in Egypt, they found that only those working in public or private hospitals had a significant association with the practice towards physical restraint score of nurses ($p<0.000$). There were no significant associations between gender, years of experience in nursing, educational background and previous knowledge of use of physical restraint and nurses' knowledge, attitude and practice of physical restraint use scores in their study.

Also, Ben Natan, Akrish, Zaltkina, and Noy (2010) found no association between nurses' level of education and years of experience and the practice of physical restraint. In addition, in a study by Farina-Lopez et al. (2014) in Spain, researchers could not find any relationships between staff perception of restraint use and age, gender, years of experience, participation in an in-service programme and reading articles about restraint. But the average perception score of nursing assistants was markedly higher

than registered nurses, which means that nursing assistants (76.1%) found the use of physical restraint more effective than registered nurses (44.7%), ($P<0.05$). In the same way, Werner and Mendelsson in Israel (2001) found that nursing assistants had more intention ($P<0.05$) and a more favourable attitude ($P<0.05$) to use physical restraint than registered nurses. In their study, age and years in the profession showed an association with the intention of nurses towards physical restraint ($P<0.001$), since older age and more years of experience in nursing had a weaker score of intention to use physical restraint. In addition, nurses with a higher level of education had less favourable attitudes regarding the use of physical restraints.

Racey (2006) conducted a retrospective study to examine the relationship of nurses' age, critical care experience, and nursing education degree to implement and remove physical restraints in adult patients in an intensive care unit. The participants comprised nurses (n=26) who had implemented restraint in the 7-bed ICU between July 2003 and October 2005 at the Rural Veterans' Affairs Medical Centre in the United States. Pearson's correlation test was used to examine the correlation between the independent variables and the application and discontinuation of physical restraints. The findings showed that the mean age of the nurses was 43.03 and 20 percent of participants were male. The mean number of years of critical care experience of participants was 12.26 years and nurses who had implemented or removed a restraint had worked shifts of 8 or more hours. Regarding education, most nurses had a Baccalaureate degree and 48.9% had applied the use of restraint. In contrast, one nurse (n=1) with a master's degree did not use restraints during the study. There was no significant correlation between restraint use and restraint removal and nurses' age, years of work experience in critical care units, or nurses' level of education in this study.

Suen et al. (2006) assessed the association between nurses' characteristics and their knowledge, attitude and practice regarding physical restraint in Hong Kong. Contrary to

Racey's study, in this study a significant association found between nurses' knowledge ($P<0.007$) and attitude ($P<0.001$) and the different level of nursing as registered nurses had a higher knowledge level and positive attitude than assistant nurses. Additionally, nurses with five years or more of experience in nursing had a higher level of knowledge ($P<0.001$), a less negative attitude towards the use of restraints ($P<0.002$) and demonstrated a better practice level ($P<0.001$) than others.

The above studies showed that although the majority of studies did not find any relationship between nurses' characteristics and their knowledge, attitude, intention and practice, there were some studies that showed strong associations between these components.

2.5.2 Association between knowledge, attitude, intention and practice of nurses towards physical restraint

According to social cognitive models, such as theory of planned behaviour, there is a link between attitude, intention and practice or behaviour of people. Therefore, a few researchers intend to prove any links between these concepts. However, in the theory of planned behaviour, knowledge is not considered as a main component but it is considered as a basic factor to changing behaviour. In this regards, a few studies have tried to find possible relationships between knowledge and other components of the model.

Some studies found that there was an association between attitude and practice or behaviour regarding physical restraint use (Azab & Abu Negm, 2013; Suen et al., 2006). In addition, Werner and Mendelsson (2001) had found a correlation between attitudes and intention to use physical restraint ($r= 0.65$, $p<0.001$) in their study. Suen et al. (2006) found that the knowledge of nurses had a positive indirect effect on the practice of physical restraint, and attitudes of nurses towards physical restraint use

showed positive direct effects on restraint practice (β=0.25, p< 0.05)., while Myers et al. (2001) found that nurses' attitude cannot predict the practice of physical restraint use.

Overall, there is a lack of studies about the link between the components of the theory of planned behaviour regarding physical restraint use. The correlation or prediction between knowledge, attitude, intention and practice of physical restraint can help us to better understand behavioural change in this case.

2.6 Effect of intervention on incidence rate, patterns of physical restraint use and nurses' knowledge, attitude, intention and practice regarding physical restraint

Most minimizing physical restraint educational programmes have been carried out in nursing homes and it has been shown that interventions could minimize the rate of physical restraint use and change the patterns of physical restraint use, such as the duration of physical restraint application, among nursing home residents (Gulpers et al., 2013; Koczy et al., 2011; Testad, Ballard, Brønnick, & Aarsland, 2010), although a few studies showed that an educational programme could not change the physical restraint rate in psychogeriatric nursing homes in the short term (Huizing, Hamers, Gulpers, Berger, 2006). Their study was the only study that represented a significant difference regarding the type of restraint between the experimental and control groups, since nurses in the experimental group used less restrictive forms of physical restraint more than the control group after intervention. Nursing homes differ from hospitals in terms of different environment situations, residents' health situations and length of stay. Although there is a lack of literature regarding the effect of a teaching programme to minimize using physical restraint in hospitals, the below studies have tried to assess the effect of educational intervention in hospitals.

Smith, Timms, Parker, Reimels and Hamlin (2003) believed that one of the most common reasons for using physical restraint given by nurses, especially in acute settings, is a lack of evidence-based research. They conducted a study in a 587-bed acute care hospital in South Carolina and North-eastern Georgia in United States. They acquired baseline information about the rate and patterns of physical restraint use by conducting a retrospective study. Then, an educational programme was performed consisting of 23 formal classes for all nursing staff of the hospital. Following the educational classes, data were collected in two ways. First, data were collected from patient's safety charts which were completed by nurses in charge, and secondly, as a double check, it was obtained the accounting department was consulted regarding the charges made to the patient for physical restraint devices. The results showed that the number of physical restraints used diminished for disruptive behaviours in acute care settings. The highest rate of physical restraint before running the education programme was 93 during 3 months in ICUs, which reduced to 53 during the 3 months after the education programme. In the 3 months before the education programme 7% of hospitalized patients were restrained for an average of 8.2 days per incident. After the education programme this average reduced to 1 to 2 days and the rate of patients restrained was minimized to half of the total admissions. For 3 months after the education programme, 46 patients with disruptive behaviours were restraint-free due to the use of alternatives by nurses. Overall, this study indicated that the educational programme was significantly effective in the rate of physical restraint used. However, the Wilcoxon test showed that there was no significant change in restraint episodes before and after educational classes. In conclusion, the researchers recommended two strategies to minimize the use of physical restraint in hospitals. The first one was to explore the current rate of physical restraint and patterns of use, and the second was to increase the knowledge of nurses regarding alternatives to physical restraint. The

limitation of this study was that the use of only one hospital makes it difficult to generalize the findings to other large populations.

Older people suffer more from the negative effects of physical restraint than benefit from it if such benefit exists. Enns, Rhemtulla, Ewa, Fruetel, and Holroyd-Leduc (2014) evaluated an evidence- informed multicomponent strategy to minimize the rate of using physical restraints among older people in four acute care medical units in Canada. Data were gathered from patients aged 65 and older in the units during monthly physical restraint audits. Intervention consisted of the education class of physicians and nursing managers regarding use of physical restraint and educational rounds about reducing the use of the restraint in study units. The results showed that the rate of physical restraint was 13% to 27% before intervention. This percentage reduced to 7% to 14% after implementing the intervention. The most common type of physical restraint was using the bedrails, which was unchanged after the intervention. In addition, the study demonstrated that the median number of falls remained unchanged. However the results showed that one of the restraint alternatives that were used frequently during the intervention was to contact family members to come to the hospital and sit with the patients. In conclusion, the researchers stated that an evidence-informed multicomponent intervention can reduce the rate of physical restraint among older patients. The limitation to this study was the possible cross-contamination of the intervention to the units before starting the interventional programme.

The management of aggression and disruptive behaviours is the most common reason for using physical restraint in psychiatric wards (Bergk, Einsiedler, & Steinert, 2008). Lewis, Taylor, and Parks (2009) showed the outcomes of an evidenced-based practice improvement programme, which was implemented by a group of psychiatric nurses in a hospital to reduce the use of seclusion and restraint as an intervention without extra funding. The purpose of this study was to describe an evidenced-based Crisis

Prevention Management (CPM) programme at a psychiatric clinic at The Johns Hopkins Hospital in the United States, with 88 inpatients beds on five different units, such as emergency and other psychiatric units. Over 20% of patients in the units were reported as having been in seclusion or under restraint during past hospitalization. The focus of the programme was on change of culture of care in a psychiatric setting and consisted of primary, secondary, and tertiary prevention strategies in order to reduce the use of seclusion and restraint, with more stress on primary prevention. Primary prevention consisted of aggression screening, personal safety plans, a daily safety focused community meeting, milieu rounds, and yearly staff education as alternatives. At the admission time, nurses assessed patients for previous aggression, legal history, current symptoms, and behavioural problems through the use of an aggression screening tool. Its purpose was to create a greater awareness of nurses of patients' violence risk. The personal safety plan involved patients in their care plan, individually. If patients were unable to respond, family or other significant persons helped to acquire these data. This could provide warning symptoms of anxiety or anger and specific action to help to patients. In the milieu rounds, nurses discussed any current or potential issue regarding patients and safety, twice a week. Training was implemented in primary, secondary, and tertiary prevention and consisted of the statistics of seclusion and restraint in the units, the relationships between patients and staff, and techniques and research findings. In the secondary prevention phase, helpful and supportive actions of the personal safety plan and patient support sheet were identified and applied for each patient. The patient support sheet was a tool that included target symptoms and effective interventions for the patient. Also, units had a rolling cart, which consisted of comfort supplies such as stress balls, CD players, games, musical instruments, art supplies, karaoke, and writing supplies, that was offered to patients and patients participated in these types of activities. Tertiary prevention was started after seclusion/restraint had occurred. During

this type of prevention, methods were implemented to reduce any negative effect on patients and staff. In this phase a witness system was used in which the root causes of the need to use seclusion/restraint were assessed by an on-call clinician, the day following an episode. This included a chart review, patient interview, and a case conference with the nurses involved in the event. This witness phase was non-punitive and was considered as a learning opportunity. The outcome of the programme was evaluated between 2004 and 2006. All of the units experienced a reduction in the use of seclusion/restraint, ranging from 20% to 97%. With regard to patient and staff injuries, there was only one moderate injury. In conclusion, the findings showed that a crisis prevention management programme based on alternatives to the use of coercive interventions reduced the use of these kinds of interventions in a psychiatric hospital significantly. Overall, the above study demonstrated that the awareness of staff regarding a comprehensive assessment of the patient and the use of alternatives is essential to reducing the use of coercive interventions in hospitals.

In another study in psychiatric units, Kontio et al. (2011) explored the effect of an e-learning course on psychiatric nurses' professional competency in physical restraint. Studies had shown that e-learning is a favourable method to reinforce education in healthcare settings (Wutoh, Boren, & Balas, 2004). Therefore, the authors decided to educate nurses via an Internet-based course. All nurses of 12 psychiatric wards of three hospitals in Finland participated in the study. Randomization determined six wards for experimental and six wards for control groups. Before implementing the intervention, which was called e.PsychNurse.net, nurses' educational needs regarding managing aggressive patients and patients' restraints were explored. Data were completed using Janelli's questionnaire on knowledge and attitude of nurses towards physical restraint during 2 weeks before the intervention and 3 month after it. The findings demonstrated that knowledge concerning physical restraint increased in both intervention and control

groups (P< 0.001). In this case, the researchers explained that this result was probably related to the concurrent continuing education of hospitals in the control groups. In addition, the results showed no change in nurses' attitude towards physical restraint in either group. In conclusion, this study did not demonstrate the benefits of .PsychNurse.net on knowledge and attitudes of nurses towards physical restraint. They recommended further e-learning study to find the effectiveness of an e-course programme on coercive procedures in psychiatric wards.

Nursing staff should consider restraint as the last choice when alternative methods have failed. Therefore, the enhancement of nursing knowledge and skills regarding physical restraint, a proper attitude and the suitable application of restraint all need to receive immediate attention in order to provide the desired care for patients (Suen et al., 2006). In this regard, Huang, Chuang, and Chiang (2009) assessed the effectiveness of a short-term in-service education programme in improving nurses' knowledge, attitudes, and self-reported practices on the use of physical restraints. A quasi-experimental research was designed and 140 nurses who worked full-time at medical, surgical and intensive care units in two branches of one general hospital in southern Taiwan participated in the study. Half of them were assigned to the control group. During post-test 11 nurses dropped out. A total of 90 minutes of a physical restraint education programme was delivered to nurses in the intervention group, which consisted of: the effects of physical restraint use (including physical, psychological, social, and financial aspects); (b) nursing care provided while using physical restraints (including the proper time to apply, appropriate devices, and nursing care principles); (c) alternatives to physical restraint use in preventing falls and in managing treatment interference behaviour, agitated behaviour, and wandering behaviour; and (d) ethical issues regarding the use of physical restraints. A Power-Point presentation, scenario reflections, sharing, and discussion were used. A questionnaire was distributed to both groups after two weeks.

Descriptive analyses were used to describe demographic characteristics. Also, a chi-square test to determine the differences between the two groups in the demographic category was used. The Mann–Whitney U test was used to compare the differences in interval variables. The Wilcoxon test was used to compare the differences in nurses' ages, years of nursing experience, and pre- intervention and post-intervention scores for the two groups regarding physical restraint use, knowledge, attitudes, and practices. The results represented 129 female nurses who participated in this study, with 59 nurses in the intervention group with a mean age of 29.59 years and 70 nurses with a mean age of 27.86 years in the control group. Just less than three quarters (69.8%) of the participants were single and most of the participants had passed a 5-year nursing programme in college or university. There were no differences between the two groups with respect to age, length of nursing experience, level of education, marital status, previous training on restraint and restraint policy. Also, there were no differences in the primary scores for knowledge, attitude and practice. A Mann–Whitney U test demonstrated a significant difference in physical restraint knowledge between the intervention and control groups after completion of the in-service education programme ($p<0.001$). A significant improvement in the knowledge of nurses between the pre-test and post-test in the intervention group was demonstrated by the Wilcoxon test ($p<.000$). Mean knowledge scores remained unchanged between the pre-test and post-test in the control group. Additionally, after the intervention, there was a significant difference in nurse-reported practice of physical restraint between the two groups ($p<0 .001$). The Wilcoxon test found a significant improvement in nurses' self-reported practices between pre-test and post-test in the intervention group ($p<0.048$). Although attitude scores significantly increased after the intervention in the experimental group, there were no significant differences in terms of attitude between the two groups post-test. In this study the researcher concluded that the 90-minute education programme improved nurses'

knowledge and self-reported practices regarding the use of physical restraints. However, the 90-minute educational programme was insufficient to change the attitudes of nurses because working space, hospital policy and the kind of leadership affect attitude. In this study, there were no direct data such as frequency of physical restraint use, and since it was only based on self-report data, it may have an effect on the results in this study.

Pellfolk, Gustafson, Bucht and Karlsson (2010) evaluated the effects of a restraint reduction educational intervention on staff knowledge and attitude using a cluster randomized controlled trial study. This study was conducted in Sweden in units that were established to provide care for persons with dementia. In the primary phase, 99 units were assessed for the prevalence of restraint use, and 40 units comprising 540 staffs were included in the study. Twenty units (184 staff) were randomized into intervention groups and 20 units (133 staff) into the control group. Staff and resident data were gathered during one month before and after the programme. The 6-month education programme was designed for registered nurses, licensed practical nurses and nurses' aides. It consisted of six themes, which described and taught about dementia, delirium in old people, predisposing factors for injury in these people, the use of physical restraint, caring for people with dementia and complications. One volunteer in each unit was invited to a 2-day seminar. The educational programme was presented through videotaped lectures and some notes for group discussions to the rest of the staff. The manager of each unit had to arrange time for staff to watch the video and to establish group discussions. In this programme, the staff was encouraged to consider physical restraint as a last resort. A questionnaire was applied for gathering data from staff. A visual analogue scale was used to measure the subjective knowledge of staff about caring for people with dementia. Staff attitudes to the use of physical restraint were assessed by the PRUQ. The chi-square test and t-test for unpaired groups and McNemar's test for paired groups were used. The difference in physical restraint use

between the intervention group and control group was analysed by multiple logistic regression analysis. The Wilcoxon test was run to analyse the change within the groups. The results demonstrated that subjective and objective knowledge had increased in the intervention group ($p<0.001$, $p<0.02$) and their attitude showed change ($p<0.01$), while in the control group only subjective knowledge had increased significantly. However, the results did not show any intergroup differences regarding attitudes toward the use of physical restraints at follow-up. Also, analysis within the intervention group demonstrated that staff knowledge about legislation regulating the use of restraint remained unchanged. In the intervention group, 31.3% of the restrained patients at baseline had not been restrained at follow-up, compared with 3.6% in the control group ($P<0.007$). Before and after intervention, the proportion of falls did not show any significant differences between or within the groups. At baseline, the number of units that had no restrained patients was five in the intervention units and four in the control group, while after intervention, the number reached to seven units in the intervention group and two units in the control group. In this study the researchers concluded that a staff education programme can improve knowledge and attitudes and decrease the use of restraints without increasing the frequency of falls or the use of psychoactive drugs. Data gathering and implementation of education by nursing staff was one of the limitations of this study.

Lai, Chow, Suen, and Wong (2013) believed that staff education accompanied by management input can be the best way to reduce using physical restraint in hospitals. Accordingly, they conducted a clinical trial in different wards of a hospital in Hong Kong. The restraint minimization programme consisted of the education of staff and running a restraint reduction committee. Data on the rate of physical restraint were gathered before and after the intervention. Additionally, all staff participated in the education programme, which was prepared based on nurses' knowledge, attitudes and

practices regarding the use of physical restraint before intervention. The data on nurses' perception was accomplished by a questionnaire. The questionnaire was completed by 114 nurses and 54 healthcare aides. Before intervention, some misconception about restraints was apparent. A large proportion (89.9%) of staff members believed that physical restraint can reduce the falls rate. Also, most of them stated that using physical restraint could reduce nursing care time (77.8%). The staff education consisted of case scenarios, sharing experiences and evidence presentation during 3 sessions in a part-time workshop. The restraint reduction committee developed a restraint reduction policy and monitoring system regarding the use of restraints in the hospital. In addition, nurses, other staff members of the hospital, such as physicians, occupational therapists, physical therapists and social workers, were involved to implement restraint reduction policy. Moreover, one part of the intervention was related to using family involvement to reduce physical restraint use. However, the follow-up demonstrated that families were not interested in a restraint reduction programme. The results of this study showed no change in the physical restraint rate and nurses' knowledge, attitude and practices after the intervention. In this study, because the hospital was not a university teaching hospital and did not have a research culture, a nursing school was involved in conducting the research, establishing a committee and in the policy development. Therefore, the result may be affected by this issue. Finally, the researchers recommended that if researchers want to conduct a multicomponent education programme and collaborative restraint reduction programme, hospital management team involvement is necessary before running a restraint reduction programme in hospitals.

One of the important indicators of the quality of nursing care in ICUs is the reduced number of restrained patients (Yeh et al., 2004). A quasi-experimental study was conducted by Yeh et al. (2004) to determine the effect of continuing education on the knowledge, attitude and clinical practice of nurses regarding the use of physical

restraint. Thirty-seven novice nurses participated in the study by convenience sampling from 11 ICUs of a medical centre in Taiwan. Data were collected using the knowledge of restraint scale (KRS), perception of physical restraint use (PRUQ), the attitude towards physical restraint use (ATRUQ) and the clinical practice of restraint use questionnaire (CPRUQ). A 4-hour restraint reduction lecture was given as an intervention for nurses. During the class, nurses learned about the principles of nursing care to reduce restraint use, alternatives to physical restraint and standard procedures for the nursing care of restrained patients. They were educated on a restraint free-environment, patients' rights and hospital policy and managing aggressive behaviours and patients' agitation. The results showed a significant difference between the average mean knowledge pre-test score (7.00± 1.47) and the post-test score (8.59± 1.62) ($P<0.01$). In four items of the 12 items of the PRUQ, significant differences were declared: 1) preventing of unplanned extubation; 2) agitation management; 3) prevention of the pulling out intravenous tubes; and 4) preventing of the removing of other tubes. The mean attitude pre-test score of 26.68± 3.94 was significantly different from the mean post-test score of 28.35± 3.01($P<0.01$). However, there was no significance difference in the self-report clinical practice of nurses towards physical restraint. Researchers believed that this result in the clinical practice part of study was due to the short time lapse between the pre-test and the post-test. The participants had only three days to demonstrate a difference in their practice concerning physical restraint. However, the findings demonstrated that the use of alternatives increased significantly after the education of the nurses. The limitation of this study can be considered in its small sample size of participants and the short-term education programme. Additionally, another limitation that probably affected the results was the fact that there was only a three- days' interval between the pre and post-test so nurses did not have enough time to make apparent any changes in their practice.

Dermaid and Byrne (2006) mentioned that the policy of the Ontario Ministry of Health and long-term care reported that restraint should be considered as a last resort and should be used only in situations in which other alternatives were not effective. In their opinion, a physical restraint reduction programme challenges the knowledge, attitude and current practice of nurses. Therefore, this challenge can change physical restraint use as well as modify the knowledge, attitude and behaviour of nurses towards physical restraint use. They conducted a pre-test/ post-test study to determine the change in knowledge, attitude and behaviour of nurses regarding physical restraint use. They also wanted to know whether a reduction in the use of physical restraint can result in minimizing falls and aggressive behaviours. All nurses of one of the long-term care units of a hospital in Toronto participated in this study. A control group of nurses in a matched unit was used. Before implementing education programme, nurses completed a 20-item knowledge questionnaire, which was developed by the researchers. The attitude of nurses was assessed using a mix of open- and close-ended questionnaire. Data on physical restraint and used alternatives were collected via "nursing monthly quality indicators." Data were gathered two more times, 1 month and 3 months after intervention. Topics of intervention consisted of the definition of physical restraint, misconceptions regarding restraint, the effect of restraint on patients, alternatives to using physical restraint, and ethical and legal issues regarding applying physical restraint. Analysis of covariance was used to compare groups' knowledge and attitudes. The findings demonstrated that there was an increase in the knowledge and attitude scores of both time one and time two in the experiment group. However, the control group also showed improvement in knowledge and attitude in two times. In addition, there was no difference between the number of restrained patients between the experimental and the control units. In this study, the researchers explained that although the units had been matched by environment and number of patients, it seems that other

environmental factors, patients' characteristics and nurses' professional characteristics may have had an effect on the rate of physical restraint use and nurses' knowledge, attitude and behaviour. Moreover, the fact that there was no difference between the experimental and the control group may be related to there not having been enough time for intervention in the experimental group. In conclusion, the researchers stated that the slight change in knowledge and attitudes did not mean a change in behaviour. Furthermore, they recommended that the study design should be considered carefully because it is necessary to match units or wards accurately.

2.7 Theory of planned behaviour

In chapter 1, it was explained that theory of planned behaviour explains how human behaviour changes with the change of attitude and intention of human. From this understanding, theory can guide to describe the relationship between knowledge, attitude and intention of nurses to wards physical restraint and reduce of physical restraint use.

Social cognitive models have been contributed to provide a better perception of behaviours and these has been adopted in behavioural science studies. These social cognitive models explore how various behaviours occur in relation to expectations, beliefs, experiences and intentions (Conner & Norman, 2005). An extensively used social cognition model is the theory of planned behaviour (TPB), which states that behaviour can be predicted by the intention construct (Figure 2.2).

The degree of positive or negative validation of behaviour performance by an individual is called attitude. The subjective norm is defined as an individual's perception of social pressure to perform or not to perform behaviour. Perceived behavioural control refers to an individual's perception of her/his ability or confidence to implement a specified

behaviour. In aggregation, attitude, subjective norm and perceived behavioural control give rise to behavioural intention. Thus, this means that a favourable attitude and subjective norm and great perceived control should establish a strong intention to perform the behaviour. As a rule, intention is considered to be the prompt forerunner of the behaviour. The theory of planned behaviour utilizes attitude, subjective norm and perceived behavioural control to predict intention and then behaviour efficiently (Ajzen, 2006).

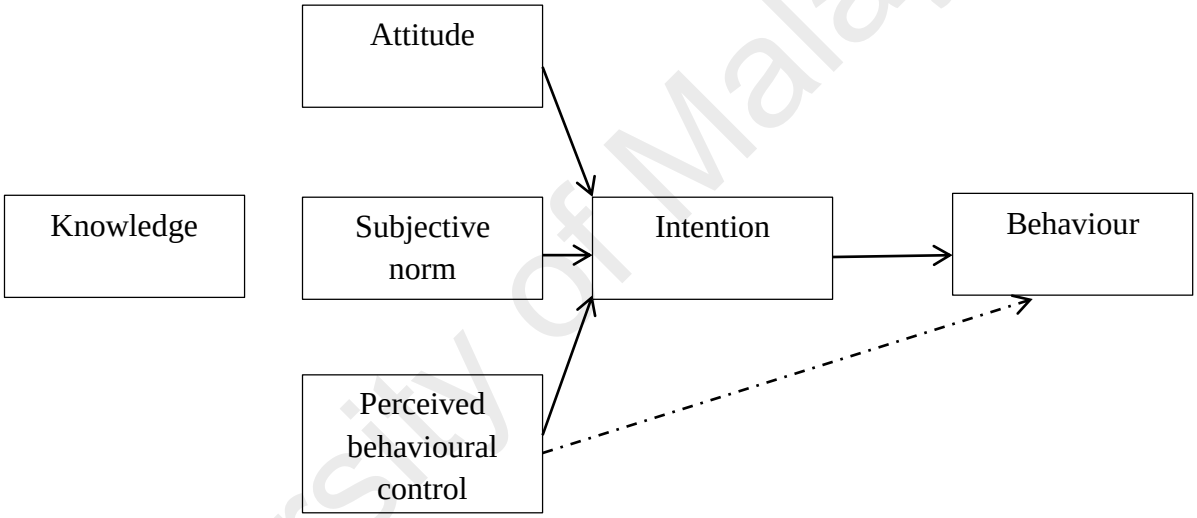

Figure 2.2: Theory of planned behaviour (Ajzen, 1991).

Even though, knowledge, or correct factual information, plays no direct role in the theory of planned behaviour, it was considered as a foundation to building attitudes, subjective norms, and perceived behavioural control (Ajzen, 1991). However, increased knowledge probably leads to a more stable, strong and accessible attitude (Fabrigar, Petty, Smith, & Crites, 2006). Although TPB has not been extensively applied in experimental studies regarding the domain of physical restraint, many researchers have used the TPB among healthcare professionals to predict clinical practice (Eccles et al.,

2006; Godin, Bélanger-Gravel, Eccles, & Grimshaw, 2008; Perkins et al., 2007; Zhou, Stoltzfus, Houldin, Parks, & Swan, 2010).

In studies, TPB constructs showed 30–50% of the variance in health professional practice more than other types of cognitive behavioural theory (Eccles et al., 2007; Foy et al., 2007).

2.8 Summary

Despite the controversy over the efficacy of physical restraint use, the continued use of this procedure in hospitals remains. Consequently, many injuries, and even deaths, have been reported. Accordingly, restraint minimization programmes have been mandated by different health agencies, such as the Joint Commission and Centre for Medicare and Medicaid (Demir, 2007; Huckshorn, 2006). To protect patients from harming others and themselves is the most common reason given by staff for using physical restraints. Thus, educating staff on alternatives to physical restraint can be a very helpful method to prevent patients from injury and also to reduce the use of physical restraint (Omolewa, 2012). In addition, reinforcing nurses' knowledge and skills and modifying attitudes and the intention of nurses has reduced the number of times physical restraints are used in some studies. Various education programmes to minimize using physical restraint have been implemented in nursing home centres. In contrast, interventional studies in general hospitals have remained sparse. In addition, very few studies have considered the patterns of physical restraint and the role of nursing staff's intention to apply physical restraint in reduction of physical restraint use programmes. Therefore, the purpose of the present study is to determine the effect of educational intervention on nurses' knowledge, attitude, intention, practice and incidence rate and patterns of physical restraint use.

CHAPTER 3: METHODOLOGY

3.1 Introduction

This chapter profiles the research methodology used to address the research design, study settings, and phases of study which include population and sampling, research instruments, instrument validation, data collection and data analysis plan. Ethical considerations and details about the pilot study are also presented.

3.2 Study design

The framework which the investigator creates is the study or research design. The purpose of study design provides a plan to answer the research problems (Wood & Haber, 2014). In this study, a survey design was used to study the incidence rate and patterns of physical restraint use while a quasi-experimental pretest- posttest one group design was used to examine whether the educational intervention led to any improvement in the nurses' knowledge, attitude, intention and practice towards physical restraint use.

Quasi- experimental designs also examine cause and effect relationships similar to true experimental designs but they lack the element of randomization or a control group. When a truly experimental design or randomized control trial (RCT) design is not practical, quasi-experimental design can be considered an appropriate method to investigate cause and effect relationships between independent and dependent variables (Harris et al., 2006). When control of confounding factors is complex, randomization of participants is not feasible, only one group is available for the study ; in addition, when the sample size is small, RCT is not practical (Harris et al., 2006; Polit & Beck, 2008).

In this study, the different patients' condition in various hospital wards may affect the rate and patterns of physical restraint use and thus did not allow for the use of a study design with a control group or randomization. Therefore, the design of this study has been considered as a one group (pre-test, post-test) quasi-experimental study.

3.3 Study setting

This study was carried out in the University of Malaya Medical Centre, which is a large public teaching hospital in Malaysia. This hospital, established in 1968, is the oldest hospital in Malaysia. This 920-bed university hospital has a wide range of specialized health services, around 1,200 registered nurses and is located in Kuala Lumpur. As there was not a consistent physical restraint policy for staff members of hospitals throughout the country, a single hospital was chosen to avoid any confounding biasness. This selected hospital was logically feasible and ideal for conducting a long-term survey and educational intervention as it is one of the major teaching hospitals with a clear physical restraint policy. The hospital is also a highly respected medical research centre; therefore it is a choice location to conduct this quasi-experimental study.

3.4 Study phases

The study was divided into three phases (Figure 3.1):

1. Phase one was an exploratory phase of the incidence rate and patterns of use of physical restraint before implementing an educational intervention using a survey approach for 16 months (survey1) . Post assessment of the incidence rate and patterns of physical restrain was carried out after the completion of the educational intervention programme (survey 2). In addition, the face and content validity of instrument (knowledge, attitude, intention and practice of nurses

towards physical restraint questionnaire) and pilot study were carried out during this phase. In this phase, the pre-assessment of the incidence rate and patterns of physical restraint was discontinued when the educational intervention programme started.

2. Phase two was validation phase of the study. Construct validity of the instrument was measured in this phase.
3. Phase three involved implementation and evaluation of the intervention. During this phase, knowledge, attitude, intention and practice of nurses were evaluated before implementation of the intervention (pre-assessment). Then, participants attended the educational programme. An education programme was developed based on the hospital policy, expert panel's opinions, analysis of phase one results, literature review regarding minimizing programmes of physical restraint use in hospitals and concepts of theory of planned behaviour. After implementing educational intervention, knowledge, attitude, intention and practice of nurses regarding physical restraint was evaluated (post-assessment.)

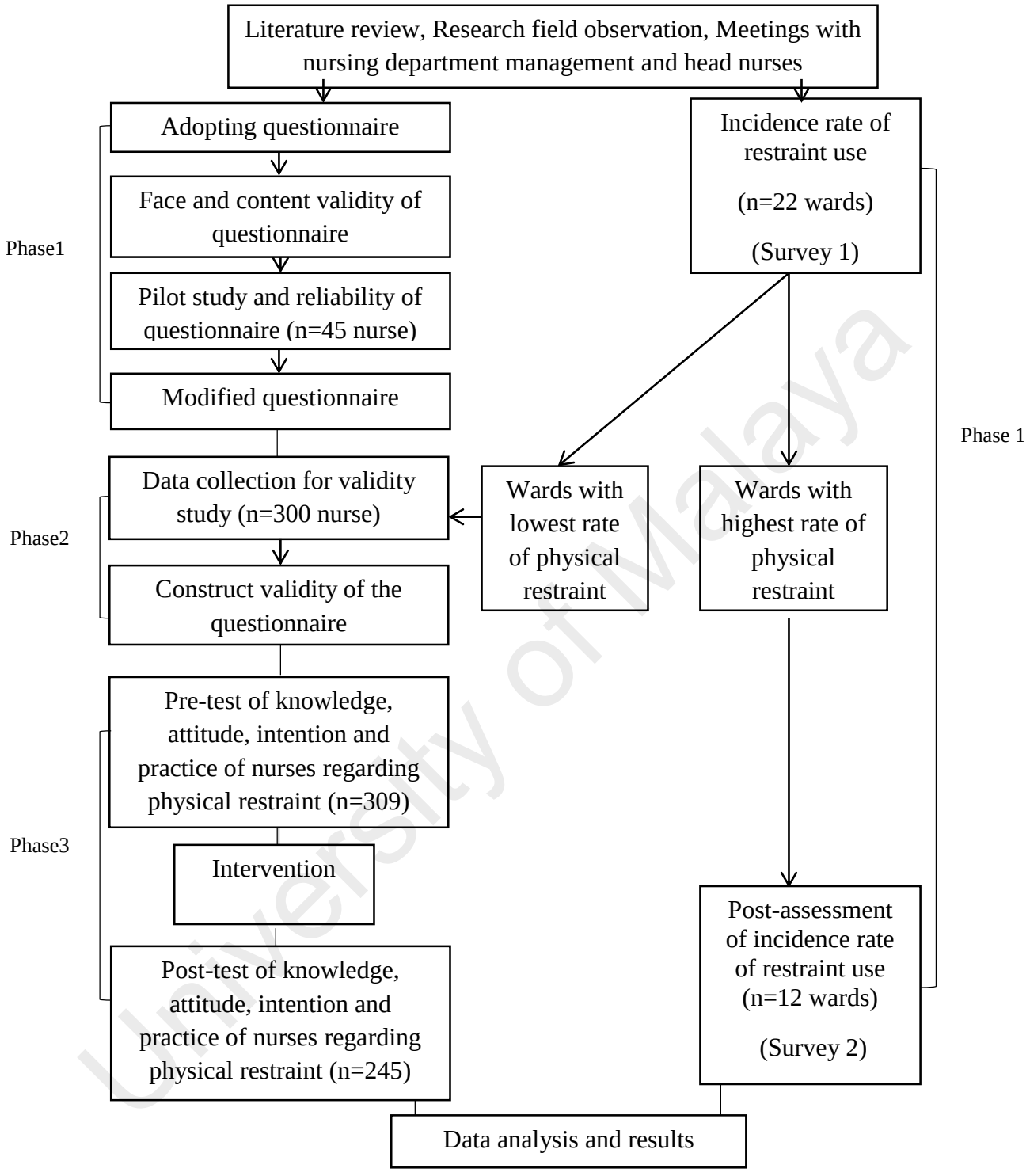

Figure 3.1: Flow chart of phases of study design.

3.4.1 Phase one

One set of instrument was the restraint order form which was used to assess incidence rate and patterns of physical restraint use. The restraint order form was formulated by the hospital but was only used in psychiatric wards. In this study, the restraint order form was discussed in the expert panel comprising ten bilingual experts (psychiatrists, faculty members from the nursing department and clinical nurses) and all items of the restraint order form were approved by the expert panel. Since the study was started, it was decided that all study wards should have the restraint order form put to practice (Appendix A). Incidence rate and patterns of physical restraint were collected using the restraint order form. The form had six parts: 1) reason for physical restraint, 2) alternatives to physical restraint use, 3) physical restraint type, 4) shift of physical restraint commenced, 5) physical restraint period per incidence and 6) restrained patient's assessment frequency. In addition, patients' admission number, age, gender, ethnicity and diagnosis and episodes of physical restraint were attached to this form. After filling up the restraint order form by nurses and verifying by doctors, it was attached to the patient's folder. A copy of the restraint order form was kept by the wards' head nurses and was collected by researcher three times a week.

3.4.1.1 Incidence rate and patterns of physical restraint use (survey 1)

An incidence survey technique was used in 22 medical (n=7), surgical wards (n=2), orthopaedic wards (n=2), haematology and oncology wards (n=2), intensive care unit (n=1), cardiac intensive care unit, and critical care unit (n=2), neurology and neurosurgery wards (n=2), geriatric and rehabilitation wards (n=2) and psychiatric wards (n=2). All patients in the ward on the days of the survey were included. Exclusion criteria were considered based on hospital ward, rather than patient. Thus, operation rooms, paediatric, and neonatal wards were excluded from the study due to nature of the patient's conditions, challenges regarding different definitions of physical restraint and

different reasons for application of physical restraint to patients in these particular units. Data on the incidence rate and patterns of physical restraint use, which nurses provided on the physical restraint form and verified by the doctors, were collected by the researcher between July 2012 and January 2014 (16 month).

3.4.1.2 Post- assessment of incidence rate and patterns of physical restraint use (survey 2)

Based on the results of the first survey of incidence rate, researcher purposefully selected twelve wards (medical, surgical, intensive and critical care, neurology and neurosurgery, geriatric and rehabilitation and psychiatric wards) with higher rates of physical restraint use to compare incidence rate of physical restraint use before and after educational intervention. Data on the post-assessment incidence rate and patterns of physical restraint were collected in the study wards (n=12) six month after the intervention, between July 2014 and January 2015 by the researcher. Data on last six month of survey one in the same 12 study wards was compared to data on post-assessment to evaluate the effect of educational intervention on incidence rate and patterns of physical restraint use.

3.4.1.3 Face and content validity of the knowledge, attitude, intention and practice questionnaire (KAIP)

Another set of instrument was knowledge, attitude, intention and practice of nurses (KAIP) towards physical restraint questionnaire.

The knowledge, attitude and practice parts of the questionnaire were initially developed by Janelli, Scherer, Kanski, and Neary (1991) in the U.S.A for nursing homes; in 2006 they were adopted for all hospital units by the original developers (Janelli et al., 2006). The intention domain of the questionnaire (5 items) was developed by Werner and

Mendelssohn (2001) in Israel (Appendix B). The KAIP questionnaire contained five sections.

Section I: Demographic and professional characteristics

Demographic and professional characteristics included in this study were age, gender, years working in nursing, academic qualification, and some professional characteristics such as attending any physical restraint training or reading any information source about physical restraint use. The explanation for assessing these data was to investigate whether some of the selected variables had any influence on nurses' knowledge, attitude, intention and practice regarding physical restraint use.

Section II: Knowledge test

The knowledge section of the questionnaire consisted of 15 items, which were used to measure knowledge of nurses towards the definition, indications and contraindications, proper application and legal and ethical considerations of physical restraint use. A four-point ordinal scale ("I agree completely" to "I do not agree at all") was applied to determine nurses' responses to the items; it contained negative and positive sentences. Positive items, if answered with "I agree completely" or "I agree," were considered correct; if answered with "I do not agree at all" or "I do not agree," items were considered incorrect. Reverse ratings were applied for negative items. Scores for this section ranged from 15 to 60, with high scores indicating that more questions were answered correctly.

Section III: Attitude test

The attitude part of the questionnaire consisted of 10 items used to assess nurses' attitude regarding physical restraint use. Two of these items (items 4 and 10) covered subjective norms and perceived behavioural control of nurses in addition to their

attitudes. A four-point ordinal scale ("I agree completely" to "I do not agree at all") was used to measure nurses' responses to the items. If participants answered with "I agree completely" or "I agree," items were considered to indicate the positive attitude and if they answered with "I do not agree at all" or "I do not agree," items were considered to indicate negative attitudes. Scores for this section ranged from 10 to 40 and high scores reflecting that more questions were responded to properly.

Section V: Intention test

The intention part of the questionnaire consisted of 5 scenarios applied to assess nurses' intention regarding physical restraint use which was developed by Werner and Mendelssohn (2001) and was modified according to experts' panel opinions. During content validity process of the questionnaire, these scenarios were modified based on the most common situations in the study units by panel experts. A four-point ordinal scale ("not definitely" to "definitely yes") was used to evaluate nurses' responses to the items. If participants answered "not definitely" or "probably not," the response was considered a weak intention for physical restraint use. If respondents answered "definitely yes" or "probably yes" the response was considered strong intention to use physical restraint. Scores for this section ranged from 5 to 20 and low scores reflected that more questions were answered properly.

Section IV: Practice test

The practice part of the questionnaire consisted of 15 items used to evaluate the practice of nurses regarding physical restraint use and alternatives to physical restraint use. A three-point ordinal scale (always to never) was applied to determine nurses' answers to the items. The scale contained negative and positive sentences. Items were considered positive (i.e., correct) if answered as "always" and if answered as "never" or "sometimes," items were considered incorrect. Reverse ratings were used for negative

items. Scores for this section ranged from 15 to 45 with high scores showing that more questions were answered correctly.

During the first step of instrument validation, to review the original questionnaire in terms of a Malaysian context, three bilingual clinical and academic nurses were consulted and the items were found to disclose similar items to those that are usual in the clinical settings in Malaysia. The questionnaire was translated from its original language (English) to the Malay language using the forward-backward translation technique. First, the items were translated from English to Malay by a bilingual specialist. A second expert, who did not have access to the original questionnaire, completed the back translation. High similarity in meaning for each item was found between the back translated version and the English version of the questionnaire by those three bilingual clinical and academic nurses.

Content validity is concerned with whether the items of the instrument represent the content which investigator intends to measure (Wood & Haber, 2014). A panel comprising ten bilingual experts (psychiatrists, faculty members from the nursing department and clinical nurses) who were not only experts but also involved in the setting the policy for physical restraint in the hospital was appointed to assess face and content validity of the questionnaire. According to their opinions, five (5) items of the questionnaire were removed due to not being consistent with hospital policy. To do content validity, the expert panel was also requested to score each item from 1 to 4 (1 = not relevant to 4 = very relevant). The content validity (CVI) index was 80%, which indicates good content validity for the instrument (Polit & Beck, 2008). In addition, 45 nurses who attended the pilot study and were recruited from a surgical unit in the hospital, believed that all items on the questionnaire were clear and relevant to their practice.

3.4.1.4 Pilot study and reliability of questionnaire

The pilot study aimed to determine the suitability of the language of the questionnaire and whether it was understandable for participants and to test the reliability (test re-test reliability and internal consistency) of the knowledge, attitude, intention and practice (KAIP) questionnaire.

The reliability of an instrument is defined as the extent to which results are consistent over time. In other words, a reliable instrument can establish the same results if the behaviour or concept is assessed again by the same measure. Stability, homogeneity and equivalency are three major elements of the reliability of an instrument. Equivalency refers to having the same findings when a parallel or equivalent scale is used. Stability and homogeneity of a scale refers to the ability of an instrument to establish the same results in repeated testing and when all items of the instrument measure the same concept, respectively (Wood & Haber, 2014).

In the pilot study and to test reliability of the instrument, 45 nurses in a surgical ward were recruited using a simple random method. The participating nurses were excluded from the main study in order to reduce the bias of the measured effect. A test-retest reliability of the questionnaire was conducted when the KAIP questionnaire, with a cover letter, was distributed to the nurses and a repeated test was done after one month interval. A blank space for participants' comments about clarity of the questionnaire items was included.

Cronbach's alpha (α) was conducted to measure internal consistency reliability of the translated instrument. Moreover, the correlation coefficient was used to estimate the test-retest reliability coefficient. The results were analysed using SPSS version 22.0 software. The internal consistency of the questionnaire was 0.85, which demonstrated

sufficient internal consistency placed on the recommended level for a coefficient's alpha of 0.70 and above. There was a lack of multicollinearity (inter-item correlations ranged from 0.44 to 0.72). The calculated Pearson's correlation coefficient for test-retest reliability between time 1 and time 2 assessments on the knowledge, attitude, intention and practice score was 0.94, 0.87, 0.90, and 0.87 respectively. The test-retest reliability coefficient on the total questionnaire score was 0.88, which indicated acceptable stability over a one month period (Table 3.1).

Table 3.1: Test- re test reliability of KAIP questionnaire

Components	Number of participants	Number of items	Pearson's correlation coefficient
Knowledge	45	15	0.94
Attitude	45	10	0.87
Intention	45	5	0.90
Practice	45	15	0.87
Total items	45	45	0.88

3.4.2 Phase two

3.4.2.1 Construct validity of knowledge, attitude, intention and practice questionnaire

The measurement instrument of a research study should be valid and reliable (Creswell, 2014). Validity demonstrates whether an instrument accurately measures what it intends to measure (Wood & Haber, 2014). There are three main types of validity, which are selected according to the purpose of the research. Content validity is concerned with whether the items of the instrument represent the content which the investigator intends to measure (measured in phase one). Construct validity defines how correctly a

measurement instrument measures what it claims to measure. This type of validity determines if the operational definition of a variable demonstrates the proper theoretical meaning of a concept (Wood & Haber, 2014). Convergent and discriminant validity and factor analysis are two common approaches to conducting construct validity for studies. Convergent and discriminant validity demonstrate a relationships between a set of variables and conceptually-related constructs. Confirmatory factor analysis is applied to assess the factor structure of the instrument (Wood & Haber, 2014).

For construct validity of instruments, all registered nurses (n=300), except the head nurses and nurse officers, from nine medical and surgical and orthopaedic wards with low rates of physical restraint use were selected based on the findings of the incidence rate survey. Demographic characteristics of the participants in the validation study are shown in Table 3.2. Considering this study observes latent variables such as the knowledge, attitudes, and behaviour, Structural Equation Model (SEM) was use to put the latent variables in one measurement model to find unreliable items between constructs.

Therefore, one objective of this study was validity and reliability of constructs involved in this study using confirmatory factor analysis (CFA).

Table 3.2: Demographic characteristics of validation study participants (n= 300)

Demographic Characteristics	Frequency	Percentage
Gender		
Female	284	94.6
Male	16	5.4
Marital status		
Single	115	38.3
Married	184	61.3
Widowed	1	0.4
Ethnicity		
Malay-Malaysian	286	95.3
Indian- Malaysian	4	1.3
Chinese- Malaysian	6	2.1
Others	4	1.3
Academic qualification		
Diploma	262	87.3
Post-basic certification	29	9.6
Degree	9	3.1
	Mean	**SD**
Age	28.44	7.01
Years working in nursing	6.24	6.34

Analysis of Moments Structures (AMOS) version 21 was used to ascertain the validity and reliability of the measurement model. To ensure the consistency of the measurement model, convergent and discriminant validity was deployed to validate all constructs. Convergent validity occurs where a set of items in one construct are correlated (Kline, 2011). In this study, the factor loadings, composite reliability (CR) and Average Variance Extracted (AVE) were used to examine the convergent validity of the measurement model. The item had a loading factor of around or greater than 0.50 and composite reliability (CR) was higher than 0.70, which showed that the variables did converge at some points (Hair, Black, Babin, & Anderson, 2010). Additionally, the AVE for the variables was above 0.50. Therefore, this result showed that the latent variables also had a high convergent validity (Hair et al., 2010).

Discriminant validity is measures whether concepts that should not to be related are, in point of fact, not related (Kline, 2011). To test discriminant validity of the measurement model, the Maximum Shared Squared Variance (MSV) and the Average Squared Variance (ASV) were used. The value of these two indexes must be less than Average Variable Extracted (AVE) to show discriminant validity of the model (Hair et al., 2010). Table 3.3 shows the results of the convergent and discriminant validity of the constructs.

Moreover, the Average Variable Extracted (AVE) for each construct against squared correlations (shared variance) between the construct and all other constructs in the model was measured to test discriminant validity, precisely. If the AVE exceeds the squared correlation among the constructs, it shows that the construct will have sufficient discriminant validity (Fornell & Larcker as cited in Henseler, Ringle, Sarstedt, 2015). According to this measure and based on Table 3.4, each of the squared correlations between the two constructs is less than the AVE for each construct (knowledge, attitude, intention and practice). Thus, discriminant validity is adequate for all of the constructs in this study.

Table 3.3: Convergent validity and discriminant validity

Constructs	Items	Factor loadings	CR	AVE	MSV	ASV
Knowledge	Knowledge 1	0.62	0.727	0.609	0.030	0.011
	Knowledge 2	0.67				
	Knowledge 3	0.57				
	Knowledge 4	0.49				
	Knowledge 5	0.49				
	Knowledge 6	0.56				
	Knowledge 7	0.49				
	Knowledge 8	0.74				
	Knowledge 9	0.67				
	Knowledge 10	0.66				
	Knowledge 11	0.53				
	Knowledge 12	0.67				
	Knowledge 13	0.57				
	Knowledge 14	0.57				
	Knowledge 15	0.53				
Attitude	Attitude 1	0.57	0.868	0.599	0.023	0.008
	Attitude 2	0.49				
	Attitude 3	0.57				
	Attitude 4	0.56				
	Attitude 5	0.83				
	Attitude 6	0.57				
	Attitude 7	0.62				
	Attitude 8	0.61				
	Attitude 9	0.74				
	Attitude 10	0.57				
Intention	Intention 1	0.62	0.824	0.572	0.030	0.020
	Intention 2	0.53				
	Intention 3	0.49				
	Intention 4	0.79				
	Intention 5	0.71				
Practice	Practice 1	0.51	0.876	0.524	0.009	0.003
	Practice 2	0.62				
	Practice 3	0.52				
	Practice 4	0.51				
	Practice 5	0.74				
	Practice 6	0.85				
	Practice 7	0.60				
	Practice 8	0.88				
	Practice 9	0.78				
	Practice 10	0.88				
	Practice 11	0.63				
	Practice 12	0.78				
	Practice 13	0.49				
	Practice 14	0.49				
	Practice 15	0.63				

Note. Composite Reliability (CR), Average Variance Extracted (AVE), Maximum Shared Squared Variance (MSV), and Average Shared Squared Variance (ASV).

Table 3.4: Fornell and Lacker approach for discriminant validity

Dimension	Attitude	Intention	Knowledge	Practice
Attitude	**0.632**			
Intention	0.170	**0.610**		
Knowledge	0.150	-0.067	**0.640**	
Practice	0.093	0.002	0.000	**0.651**

Note: Correlations are below the diagonal, and AVE is presented on the diagonal, in bold.

Confirmatory factor analysis was applied to assess the extent of the model fit and measured the factor loadings; the degree of model fit, the explained variances, and standardized residual for the measurement variables. To obtain the overall fit of the data model, the following tests were used: chi-square/degree of freedom test; Root Mean Square Error of Approximation (RAMSEA); Goodness of Fit Index (GFI); Adjusted Goodness of Fit Index (AGFI); Comparative Fix Index (CFI); and Standard Root Mean Square Residual (SRMR). The measurement CFA model of this study includes 45 items to measure four constructs (Figure 3.2). Using AMOS, the construct validity on all construct of measurement model showed satisfactory fit statistics (Chi-squared = 1053.9, df = 445, SRMR = .037, CFI = .948, AGFI = .80, GFI = .824, RMSEA =0.068). According to Hair et al. (2010) at a minimum, three indices must be well fitted to establish model fit. Mueller and Hancocks (2008) suggested that the model for constructs fit the data very well since RMSEA< 0.06 CFI > 0.90 and $\chi 2/df < 3$. While an ideal RMSEA score is 0.05 or less, a value of about 0.068 indicates acceptable fit (Chen, Curran, Bollen, Kirby, & Paxton, 2008).

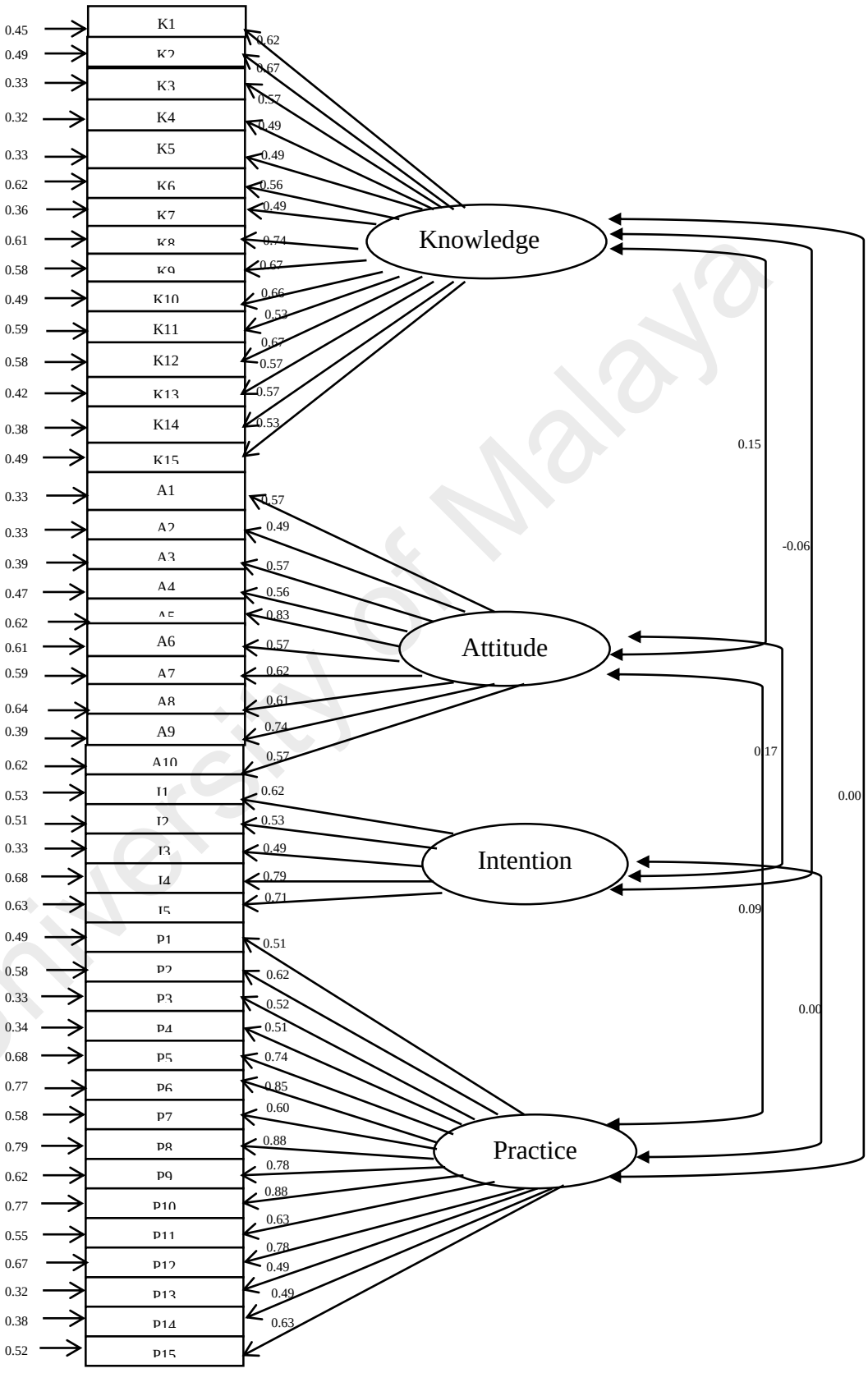

Figure 3.2: Measurement model of Malay version of the KAIP questionnaire.

3.4.3 Phase 3

3.4.3.1 Pre-assessment of knowledge, attitude, intention and practice of nurses towards physical restraint

A cover letter outlining the aim of the research together with the knowledge, attitude, intention and practice (KAIP) questionnaire was presented to the participants. The researcher explained that their responses would remain confidential and anonymous. Those nurses who were willing to participate in the research completed consent forms. Data on pre-assessment knowledge, attitude, intention and practice of nurses towards physical restraint was collected from 309 registered nurses (all nurses) who worked in the study ward of the hospital (n=12) before attending the educational intervention programme. These wards included the intensive care unit (n=1), critical care unit (n=1), medical wards (n= 2) and surgical wards (n=1), neurology and neurosurgery wards (n= 2), geriatric and rehabilitation wards (n=2), and the oncology ward (n=1), and psychiatric wards (n=2). These wards were selected based on the incidence survey which indicated these wards as having the higher incidence rate compare to other wards.

3.4.3.2 Intervention

During implementation of intervention phase, 64 out of 309 nurses were exempted from the study due to transfer to outpatient units, study leave, long-term medical leave, or retirement. Overall, 80 percent of nurses of each ward participated in the education intervention and post-assessment phase of the study. Therefore, the educational intervention was introduced to 245 nurses over three months. Overall, 20 educational sessions were implemented with the nurses. Each nurse was invited to a one day educational session (8 hours). Fifteen to twenty nurses attended each educational session. In every session, the participants had been grouped in three groups by the researcher to discuss and solve the scenarios. To establish the educational sessions,

nursing department of the hospital announced the plan to the head nurses of study wards. Nursing department arranged ten sessions of the class and rest of the sessions had been arranged by the researcher and head nurses. Classes were established in a lecture hall of the University Malaya Medical Centre or a discussion room of nursing science department of the University of Malaya. A structured teaching plan for educational intervention was developed according to hospital policy, expert panel's opinions, analysis of the results of phase one, a literature review regarding minimizing programmes of physical restraint use in hospitals and the concept of theory of planned behaviour. The educational intervention focused on the facts and myths of physical restraint use, physical restraint alternatives, especially for patients with tubes and catheters, patients with cognitive impairments and mental problems, and proper use of physical restraint as a last resort in the hospital. The teaching method consisted of lecture, demonstration of some types of physical restraint and proper use of physical restraint, group discussion, and three video demonstrations. A panel of eight nursing management experts and psychiatrist of the hospital validated and verified the content of educational intervention. Two of three physical restraint videos were prepared by a healthcare training programme service. The content of videos, which was about avoiding the use of physical restraints by using alternatives and face to face evaluation of physical restraint, was verified by the Centres of Medicare and Medicaid Services (CMS) and Joint Standards ("Envision incorporate", 2013a, b). Another video was an online clip about different types of restraint and proper use of physical restraints (Huambo, 2013).

During the educational sessions, a summary of power point slides associated with the lecture and case scenarios was distributed to participants (Appendix C). Participants discussed scenarios in a group and presented their opinions to the other groups. Finally,

the researcher stated the summary of opinions of the groups and the discussion was concluded.

The power point slides covered the following content:

1) Definition and types of physical restraint

2) Contraindication and consequences of physical restraint use

3) Myths and facts regarding use of physical restraint

4) Alternatives to use of physical restraint and restraint free hospitals

5) Reduce use of physical restraints for patients with catheters, tubes and cognitive impairments

6) Managing aggressive behaviours

7) Using temporary and least restrictive forms of physical restraint as a last resort

8) Legal issues and documentation of use of physical restraint

9) Proper and safe application of physical restraint

In addition, at the end of the eight-hour class a summary of the lecture on proper use of physical restraint and video contents as an informational booklet named "let's talk about restraint" was distributed to all participants in the session (Appendix D).

Using knowledge, attitude, intention and practice of nurses towards physical restraint questionnaire, the effect of educational sessions on knowledge, attitude, intention and practice were evaluated one month after nurses' participation in the educational classes.

The effect of the educational intervention on the incidence rate and patterns of physical restraint use was evaluated after completion of the educational programme for the following six (6) month in the same twelve study wards.

3.4.3.3 Post-assessment of knowledge, attitude, intention and practice of nurses towards physical restraint

One month after the educational intervention, data on post-assessment knowledge, attitude, intention and practice of nurses towards physical restraint were collected from 245 nurses in twelve study wards. Knowledge, attitude, intention and practice questionnaire regarding physical restraint was given to nurses who had attended in educational programme one month ago and then was collected the questionnaire on the same day by researcher. The post intervention data regarding knowledge, attitude, intention and practice of nurses towards physical restraint use was completed by the end of June 2014; 64 out of 309 nurses were exempt from this part of the study due to transferring to outpatient units, study leave, long-term medical leave or retirement.

3.5 Research variables

3.5.1 Dependent variables

A dependent variable is an element or characteristic that is affected by or dependent on the independent variable(s) (Creswell, 2014). In this study, the incidence rate and patterns of physical use, knowledge, attitude, intention and practice of nurses towards physical restraints were dependent variables.

3.5.2 Independent variable

Independent variables are characteristics that can impact the dependent variable. Actually, researchers explore independent variables to find out how they influence outcomes (Creswell, 2014). In this study, independent variables were a restraint

reduction educational intervention and characteristics of nurses (i.e., age, academic qualifications and years working in nursing…).

3.6 Data analysis

The data were analysed using the Statistical Package for Social Science, version 22. Normality, central tendency and variability of data were analysed. Kolmogorov-Smirnov, Kurtosis and Skewness and graphical methods such as Histogram and Q-Q plot was used to test normality. Based on the results of these tests, all variables except demographic characteristics of nurses were distributed normally. Descriptive statistics were used in the analysis of knowledge, attitude, intention and practice scores of nurses, nurses' characteristics, and incidence rate and patterns of physical restraint use. Therefore, to test any relationship between nurses' characteristics and other variables of the study Independent t-test and Mann Whitney U test was used. A paired t-test was used to compare mean total knowledge, attitude, intention and practice scores before and after the intervention. A comparison of the incidence rate of physical restraint use before and after the educational intervention was performed by two-proportion Z-test. A Chi- Square and Fisher's exact test was used to compare patterns of physical restraint use before and after the intervention. Simple and multiple linear regressions were performed to determine the association between the knowledge, attitude, intention and practice of nurses towards physical restraint use and demographic and professional nurses' characteristics. Pearson correlation coefficient and multiple linear regression was also used to discover any association between knowledge, attitude, intention and practice of nurses regarding use of physical restraint. Cronbach's alpha (α), Pearson's correlation coefficient, and Structural equation modelling was used to ascertain reliability and validity of the instrument.

3.7 Ethical considerations

Ethical approval for the study was obtained from the University of Malaya Medical Centre's Research Ethics Committee (Appendix E). Managers and nurse participants were notified of the aim of the study and their involvement in this research which not resulted in any harm or difficulty for them. All nurses were invited to participate voluntarily and written consent was obtained (Appendix F & Appendix G). Participants were assured of their anonymity and confidentiality. All restraint forms were coded, thus ensuring anonymity, and access to the patients' records was restricted to only the nurse and doctor in charge of the patients. A coding system was also used in the questionnaire as the participants were not identified in the reports.

3.8 Summary

This chapter outlined the methodology performed to explore the research objectives of the study. Research setting, sampling methods, instruments, data collection and data analysis were also presented in details. The following chapter will present the results of the study.

CHAPTER 4: RESULTS

4.1 Introduction

This chapter presents the results of the study. The aim of the study was to evaluate the effect of educational intervention on nurses' knowledge, attitude, intention, practice and physical restraint use incidence and its patterns. The results are presented based on the findings related to the research questions.

4.2 Study sample

The effect of the educational intervention on the knowledge, attitude, intention and practice of 245 nurses was assessed. To assess the incidence rate and patterns of physical restraint, the last six months of the incidence rate study (July 2013 to January 2014) was considered as the pre-intervention phase to compare the incidence rate and patterns of physical restraint use before and after the educational intervention. After completing the educational intervention, the incidence rate and patterns of physical restraint were examined in the following six months (post-intervention phase).

4.3 Research question 1

What are the incidence rate and patterns of physical restraint use in a teaching hospital in Malaysia?

4.3.1 Patients' characteristics

Details of the demographic characteristics for 16 months between September 2012 and January 2014 are shown in Table 4.1. The mean age of all patients was 49.84 years (SD= 16.59; range 18 to 98 years old). The mean age of patients was 40.82 (SD= 13.72)

and 58.86 (SD= 19.47) in the psychiatric and non-psychiatric wards, respectively. In total, most of the patients were Chinese-Malaysian (42.17%, n= 569) followed by Indian- Malaysian (30.02%, n= 405). In the psychiatric wards, most of the patients were diagnosed with schizophrenia (38.8%, n= 92) followed by bipolar mood disorder (34.2%, n= 81). Other mental disorders included mental retardation; distress-related and somatoform disorders were the least diagnosed (11.0%, n= 51) in the psychiatric wards. In the non-psychiatric wards most patients were diagnosed with cerebro-vascular disease (33.5%, n= 373), followed by infectious disease (12.3%, n= 137). In the non-psychiatric wards the least diagnosed condition was cognitive impairment disorders (2.4%, n= 26). In Table 4.1, other physical diseases mentioned are physical disability, amputation, endocrine disorders, blood disorders and immune system diseases. There is no possibility of comparing the incidence rate and patterns of physical restraint among psychiatric and non-psychiatric patients due to the different situations of illness and symptoms. With regards to the different patterns of physical restraint use between these two types of ward, the results were described separately.

Table 4.1: Demographic characteristics of the restrained patients in psychiatric and non-psychiatric wards between September 2012 and January 2014 (n=1349)

Characteristics	**Total Patients**	**Psychiatric wards (n=237)**	**Non-Psychiatric wards (n=1112)**
Mean age (SD)	49.84 (16.59)	40.82 (13.72)	58.86 (19.46)
		n (%)	
Gender			
Male	939 (69.60)	126 (53.2)	813 (73.1)
Female	410 (30.40)	111 (46.8)	299 (26.9)
Ethnicity			
Malay-Malaysian	324 (24.01)	58 (24.5)	266 (23.9)
Chinese- Malaysian	569 (42.17)	108 (45.6)	461 (41.5)
Indian-Malaysian	405 (30.02)	45 (19.0)	360 (32.4)
Others	51 (3.78)	26 (11.0)	25 (2.2)
Diagnosis			
Schizophrenia	92 (38.8)	92 (38.8)	0 (0.0)
Bipolar mood disorder	81 (34.2)	81 (34.2)	0 (0.0)
Major depressive disorder	26 (11.0)	26 (11.0)	0 (0.0)
Substance abuse	23 (9.7)	23 (9.7)	0 (0.0)
Other mental disorders	15 (6.3)	15 (6.3)	0 (0.0)
Cerebro-vascular disease	373 (33.5)	0 (0.0)	373 (33.5)
Infectious diseases	137 (12.3)	0 (0.0)	137 (12.3)
Respiratory diseases	120 (10.7)	0 (0.0)	120 (10.7)
Gastrointestinal diseases	96 (8.7)	0 (0.0)	96 (8.7)
Cardiovascular diseases	94 (8.5)	0 (0.0)	94 (8.5)
Renal diseases	51 (4.6)	0 (0.0)	51 (4.6)
Metabolic disorders	51 (4.6)	0 (0.0)	51 (4.6)
Cancer	80 (7.1)	0 (0.0)	80 (7.1)
Cognitive impairment disorders	26 (2.4)	0 (0.0)	26 (2.4)
Other physical diseases	84 (7.6)	0 (0.0)	84 (7.6)

4.3.2 Incidence rate of physical restraint use

Of all patients (n= 39,693) hospitalized between September 2012 and January 2014 (16 months), 3.39% were restrained. In psychiatric wards, 13.6% of hospitalized patients had been restrained. In non-psychiatric wards, the highest incidence rate was in the neurology/ neurosurgical wards (19.77%, n= 315), while orthopaedic wards had the lowest incidence of physical restraint use (0.54%, n= 31). The results are shown in Table 4.2.

Table 4.2: Incidence rate of physical restraint use by ward types between September 2012 and January 2014

Ward	Total number of hospitalized patients	Number of restrained patients	Incidence rate of PR use (%)
Intensive care unit	1,335	132	9.88
Cardiac/Cardiac intensive care unit/Critical care unit	3,101	103	3.32
Neurology/ Neurosurgery	1,593	315	19.77
Surgery	7,616	132	1.73
Orthopaedic	5,709	31	0.54
Oncology/Haematology	2,546	37	1.45
Medical	14,549	203	1.39
Geriatric/ Rehabilitation	1,512	159	10.51
Psychiatric	1,732	237	13.68
Total	39,693	1,349	3.39

4.3.3 Patterns of physical restraint use

In non-psychiatric wards, the most common reported reason for physical restraint use was 'trying to pull out tubes and catheters' (44.9% of restrained days, n= 499) followed by 'fall prevention' (24.1% of restraint days, n= 268) and 'restless' (18.7% of restraint days, n= 208). The most used alternative before using physical restraint was only reassurance (63%, n= 701). In 7.3% of cases, no alternatives to physical restraint had been used. Almost 99% (n= 1,101) of restrained patients were in restraint only once and 'abrasions' were reported in only 0.3% (n=3) of restrained patients as a complication of physical restraint use. Among all restrained patients, 83.4% (n= 927) were restrained with a two-point (wrist) restraint and 1.1 % (n= 12) were restrained by body restraint. In most restrained patients (44.7%, n= 497), physical restraint had commenced during the night shift. Most restrained patients were in restraint for two to six days (58.2%, n= 647) and 6.6% (n= 74) of restrained patients were in restraint for more than 12 days. In most cases (38%, n= 423), frequency of checking restrained patients was every 120 minutes.

In psychiatric wards, 'uncooperative towards fasting for ECT' was the most commonly reported reason for using physical restraint (19% of restrained days, n= 45) followed by 'irritability' (16% of restrained days, n= 38), 'risk to self' (10.1% of restrained days, n= 24), and 'insist to go home' (8% of restraint days, n= 19). One hundred and thirty-three restrained patients (56.1%) had been restrained only once, 38% (n= 90) of them twice, and the rest of them, more than twice. Among two restrained patients (0.8%), 'abrasions' were reported as a complication of using physical restraint. Of all restrained patients, 52.3% (n= 123) were restrained with four-point (wrist and ankle) restraints. In 24.5% of cases (n= 58), no alternative to physical restraint had been used. Sixty-eight (28.7%) restrained patients were given parenteral medication (sedatives) as an

alternative before physical restraint, while only 5.5% (n= 13) of restrained psychiatric patients had received reassurance from nurses as an alternative. In most cases (59.9%, n= 142), physical restraint was initiated during the night shift and frequency of checking restrained patients was every 15 minutes for all patients. Details are displayed in Table 4.3.

Table 4.3: Patterns of physical restraint use in psychiatric and non-psychiatric wards between September 2012 and January 2014

Patterns of physical restraint	Psychiatric wards (n=237)	Non-psychiatric wards (n=1112)	Total (n=1349)
	n (%)	n (%)	n (%)
Reason for using physical restraint			
Trying to pull out catheter	1 (0.1)	499 (44.9)	500 (37.0)
To prevent falls	0 (0.0)	268 (24.1)	268 (19.8)
Restless	17 (7.2)	208 (18.7)	225 (16.6)
Confusion	0 (0.0)	111 (10.0)	111(8.2)
Sedation	0 (0.0)	14 (1.3)	14 (1.0)
Assaultive	19 (8.0)	12 (1.0)	31 (2.2)
Uncooperative towards fasting before ECT[a]	45 (19)	0 (0.0)	45 (3.3)
Irritability	38 (16.0)	0 (0.0)	38 (2.8)
Risk to self	24 (10.1)	0 (0.0)	24 (1.7)
Insisting on going home	19 (8.0)	0 (0.0)	19 (1.4)
Wandering	18 (7.7)	0 (0.0)	18 (1.3)
Disturbing staff and/or others	18 (7.7)	0 (0.0)	18 (1.3)
Refused medication	12 (5.2)	0 (0.0)	12 (0.8)
Cross red line	10 (4.3)	0 (0.0)	10 (0.7)
Others	16 (6.7)	0 (0.0)	16 (1.8)
Used alternatives before using PR[b]			
Explanation of consequences	4 (1.7)	139 (12.5)	143 (10.6)
Reassurance	13 (5.5)	701 (63.0)	714 (52.9)
Clear directions	52 (21.9)	11 (1.0)	63 (4.6)
Offer oral medication	42 (17.7)	4 (0.4)	46 (3.4)
Parenteral medication	68 (28.7)	116 (10.4)	184 (13.6)
All items	0 (0.0)	59 (5.4)	59 (4.3)
Nothing	58 (24.5)	82 (7.3)	140 (10.3)
Physical restraint types			
1-point	0 (0.0)	17 (1.5)	17 (1.2)
2-point	112 (47.3)	927 (83.4)	1039 (77.0)
4-point	124 (52.3)	136 (12.2)	260 (19.2)
Mitten	1 (0.4)	20 (1.8)	21(1.5)
Body restraint	0 (0.0)	12 (1.1)	12 (0.8)
Shift of PR commenced			
Morning shift	30 (12.7)	190 (17.1)	220 (16.30)
Evening shift	65 (27.4)	425 (38.2)	490 (36.3)
Night shift	142 (59.9)	497 (44.7)	639 (47.3)
PR period per incidence			
<12 hours	141 (59.5)	0 (0.0)	141 (10.4)
12–23 hours	57 (24.1)	0 (0.0)	57 (4.2)
1 day	39 (16.4)	21 (1.8)	60 (4.4)
2–6 days	0 (0.0)	647 (58.2)	647 (47.9)
7–11 days	0 (0.0)	370 (33.4)	370 (27.4)
≥ 12 days	0 (0.0)	74 (6.6)	74 (5.4)
Frequency of assessment			
Every 15 minutes	237 (100.0)	0 (0.0)	237 (17.5)
Every 60 minutes	0 (0.0)	300 (26.9)	300 (22.2)
Every 90 minutes	0 (0.0)	389 (35.1)	389 (28.8)
Every 120 minutes	0 (0.0)	423 (38.0)	423 (31.3)

Note: [a] ECT= electroconvulsive therapy; [b] PR= physical restraint.

4.4 Research question 2

What are the knowledge, attitude, intention and practice of nurses towards physical restraint in a teaching hospital in Malaysia?

4.4.1 Knowledge regarding physical restraint use

The mean knowledge score of the nurses towards physical restraint use was 40.48± 4.05 (ranging from 15 to 60 points). The results showed that the majority of nurses answered the subsequent items properly: physical restraint should be fitted and secured comfortably (96.4%, n= 298); in emergencies nurses should be allowed to restrain patients without doctors' instruction (92.2%, n= 285); records of usage should be kept for each restrained patient in every shift (87.1%, n= 269); and doctor's instruction on the use of physical restraint must be specific (82.5%, n= 285). On the contrary, a majority of nurses answered the important following items incorrectly: physical restraint must be used when a person is not capable of supervising a patient (66.3%, n= 205); no other good methods instead of physical restraint exist (71.2%, n= 220); and confusion and disorientation are proper reasons for using physical restraint (82.2%, n= 254).

Only 24.6% (n= 76) of nurses considered death could be related to using vest restraint. Moreover, less than half of nurses (44.7%, n= 138) agreed that patients have the right to refuse restraint. Percentage and number of correct and incorrect answers of knowledge items are shown in Table 4.4.

Table 4.4: Baseline knowledge towards physical restraint use (n=309)

No.	Knowledge items	Frequency (per cent)	
		Disagree	Agree
1.	Physical restraint is a vest or safety attire used to prevent injuries.	72(23.3)	237(76.7)[a]
2.	Physical restraint is only allowed if it is required to protect patients or other people from injuries.	63(20.4)	246(79.6)[a]
3.	Physical restraint must be used when a person is not capable of supervising a patient intensively.	103(33.7)[a]	206(66.3)
4.	Patients have the right to refuse to be restrained.	171(55.3)	138(44.7)[a]
5.	Physical restraint requires a doctor's order.	126(40.7)	183(59.3)[a]
6.	Confusion or disorientation is proper reason for the use of physical restraint.	55(17.8)[a]	254(82.2)
7.	Physical restraint should be fitted and secured comfortably.	11(3.6)	298(96.4)[a]
8.	Patients are not to be restrained while lying facing up on the bed for fear of spluttering/ choking.	154(49.8)	155(50.2)[a]
9.	When a patient's movement on the bed is restrained, physical restraint must not be tied to the side bars of the bed.	112(36.3)	197(63.7)[a]
10.	Nurses can be prosecuted for threatening the patients if they use physical restraint when it is not required.	95(30.7)	214(69.3)[a]
11.	Records of usage should be kept for each patient who is restrained in every shift.	40(12.9)	269(87.1)[a]
12.	Doctor's instructions on the use of physical restraint must be specific.	54(17.5)	255(82.5)[a]
13.	In emergencies, nurses are allowed to use the physical restraint on patients without any doctor's instruction.	24(7.8)	285(92.2)[a]
14.	No other good methods instead of physical restraint exist.	89(28.8)[a]	220(71.2)
15.	There have been deaths related to the use of vest physical restraint.	233(75.4)	76(24.6)[a]

[a] Correct answers.

4.4.2 Attitude regarding physical restraint use

The mean attitude score of the nurses was 24.13± 3.09 (ranging from 10 to 40 points). More than half of the nurses (52.1%, n= 161) considered that family members do not have the right to refuse the use of physical restraints. Most nurses (61.2%, n= 189) stated that nurses do not have the right to refuse using physical restraint for patients. Additionally, 43.4% (n= 134) of nurses explained that if they were patients they felt that they would not have the right to refuse physical restraint. However, more than half of nurses (56.3%, n= 174) agreed that the hospital is responsible for adhering to the laws on the use of restraints to ensure the safety of a restrained patient. Some nurses (24.6%, n= 76) agreed that patients suffer from feeling inferior when they are restrained. A number of nurses (25.6%, n=79) stated that they feel uncomfortable applying restraints to patients in front of their colleagues and 56.3% (n= 174) stated that they feel embarrassed when family members enter the restrained patient's room. Nearly half of the nurses (46.6%, n= 144) felt confident in performing physical restraint. Details about the numbers and percentage of attitude items are presented in Table 4.5.

Table 4.5: Baseline attitude towards physical restraint use (n=309)

No.	Attitude items	Frequent (per cent)			
		Strongly disagree	**Disagree**	**Agree**	**Strongly agree**
1.	I feel that family members have the right to refuse the use of physical restraints.	78(25.2)	161(52.1)	59(19.1)	11(3.6)
2.	I feel that nurses have the right to refuse using physical restraint on patients.	35(11.3)	189(61.2)	61(19.7)	24(7.8)
3.	If I were a patient, I feel that I would have the right to refuse being restrained.	50(16.2)	134(43.4)	77(24.9)	48(15.5)
4.	I feel uncomfortable when placing a patient under restraint in front of my colleagues.	78(25.2)	144(46.6)	79(25.6)	8(2.6)
5.	I feel embarrassed when family members enter the restrained patient's room and they have not been informed.	27(8.7)	174(56.3)	93(30.1)	15(4.9)
6.	The hospital is responsible for adhering to the laws on the use of restraints to ensure the safety of a patient.	2(0.6)	49(15.9)	174(56.3)	84(27.2)
7.	I would feel a little uncomfortable if a patient becomes more upset after being restrained.	66(21.4)	112(36.2)	98(31.7)	33(10.7)
8.	I feel that it is important to tell restrained patients that I am concerned about them.	11(3.6)	136(44.0)	89(28.8)	73(23.6)
9.	Patients suffer from feeling inferior when they are restrained.	30(9.7)	189(61.2)	76(24.6)	14(4.5)
10.	Generally, I feel confident in performing physical restraint.	6(1.9)	114(36.9)	144(46.6)	45(14.6)

4.4.3 Intention regarding physical restraint use

The mean score of intention was 15.50± 2.48 (ranging from 5 to 20). In a scenario of a patient with Alzheimer's, 58.8% (n= 181) of nurses stated that they would probably use physical restraint in such a case. Additionally, 13.9 % (n= 43) said they would definitely use physical restraint for an Alzheimer's patient. In a schizophrenia scenario, the majority of nurses (65%, n= 201) said they would definitely use physical restraint in such a case. Furthermore, 26.5% (n= 83) also stated that they would probably use physical restraint for the schizophrenic patient. In a cerebro-vascular scenario, 36.6% (n= 113) of nurses would probably and 28.2% (n= 87) would definitely use physical restraint for the patient. Only 10% (n= 31) of nurses said they would not definitely use physical restraint in an elderly patient scenario. Moreover, 0.3% (n=1) of nurses said they would not definitely use physical restraint in the case of a patient with malnutrition while only 4.2% (n= 13) of nurses stated that they would probably not use physical restraint for a patient with malnutrition. Details are shown in Table 4.6.

Table 4.6: Baseline intention towards physical restraint use (n=309)

Intention items	Frequency (per cent)			
	Yes definitely	**Probably yes**	**Probably not**	**Not definitely**
Scenario 1: Alzheimer's disease	43(13.9)	181(58.6)	65(21.0)	20(6.5)
Scenario 2: Cerebro-Vascular Accident	87(28.2)	113(36.6)	74(23.9)	35(11.3)
Scenario 3: Elderly	89(28.8)	130(42.1)	59(19.1)	31(10)
Scenario 4: Malnutrition	155(50.2)	140(45.3)	13(4.2)	1(0.3)
Scenario 5: Schizophrenia	201(65.0)	83(26.9)	16(5.2)	9(2.9)

Note: Yes definitely implies very strong intention to use physical restraint.

Not definitely implies very weak intention to use physical restraint.

4.4.4 Practice regarding physical restraint use

The mean score of practice was 25.32± 4.81 (ranging from 15 to 45). Only 37.5% (n= 116) of nurses reported that they always tried a few nursing methods before restraining the patient and 36.6% (n= 113) of nurses never use alternatives before starting physical restraint. The majority of nurses (85.1%, n= 263) reported that they do not consider why they have to use restraint for the patients before using physical restraint, and 43.4% (n= 134) explained that they never inform the patients why they need to be physically restrained. In addition, 68.9% (n= 213) of nurses never explained the reason for the physical restraint to the patients' families. More than half of the nurses (55.3%, n= 171) never suggest to the doctor that the patient does not need physical restraint. A total of 31.4% of nurses (n= 97) explained that they always prefer to give sleeping pills rather than use physical restraint. A number of nurses (12.6%, n= 39) reported that they always use physical restraint for disoriented patients. Only 10.7% (n= 33) of nurses always respond to the signal light or call for help from a restrained patient. Moreover, only 3.9% of nurses (n= 12) stated that they always give personal care, such as examining the patient's skin to prevent side effects of the restraint. Furthermore, 11.7% (n= 36) of nurses reported that the standard requirement for restraint is always available in their units. However, more than half of the nurses (55.3%) always assessed the restrained patients at least every two hours during the restraint period. Details about practice items are presented in Table 4.7.

Table 4.7: Baseline practice towards physical restraint use (n=309)

No.	Practice items	Frequent (per cent)		
		Never	Sometimes	Always
1.	I try a few nursing methods before physically restraining the patient.	113(36.6)	80(25.9)	116(37.5)[a]
2.	Before using the physical restraint on the patient, I will find out why I need to do so.	263(85.1)	29(9.4)	17(5.5)[a]
3.	When I feel that the patient does not need to be restrained, I suggest this to the doctor.	171(55.3)	109(35.3)	29(9.4)[a]
4.	I respond to the signal light or the call for 'help' from a restrained patient immediately.	227(73.5)	49(15.8)	33(10.7)[a]
5.	I examine restrained patients on an at least a two-hourly basis.	94(30.4)	44(14.3)	171(55.3)[a]
6.	When giving personal care to the restrained patients, I examine their skin to find parts that are red or bruised.	267(86.4)	30(9.7)	12(3.9)[a]
7.	I tell the patients why they are restrained.	134(43.4)	36(11.7)	139(45.0)[a]
8.	I tell the family members/visitors why the patient is restrained	213(68.9)	33(10.7)	63(20.4)[a]
9.	I inform the patient when the restraint will be removed.	113(36.6)	69(22.3)	127(41.1)[a]
10.	I inform the family members/visitors when the restraint will be removed.	232(75.1)	66(21.3)	11(3.6)[a]
11.	Physical restraint must be used in the hospital to prevent the patients from injuring themselves.	225(72.8)	54(17.5)	30(9.7)[a]
12.	All patients in the state of disorientation must be restrained.	79(25.6)[a]	191(61.8)	39(12.6)
13.	All staff will strive together to find ways to control the behaviour of patients through methods other than restraints.	81(26.2)	146(47.3)	82(26.5)[a]
14.	When I need to restrain a patient, equipment is available in my unit.	161(52.1)	112(36.2)	36(11.7)[a]
15.	I prefer to give sleeping pills rather than restrain the patients.	41(13.3)[a]	171(55.3)	97(31.4)

[a] Correct answer.

4.5 Research question 3

Is there a difference in the mean knowledge scores on physical restraint use before and after intervention in a teaching hospital in Malaysia?

4.5.1 Item analysis of knowledge score before and after intervention

The knowledge part of the questionnaire consisted of 15 questions, which utilized a 4-point Likert scale rating, and was used to describe and compare the median of each item before and after intervention. Reverse ratings were applied for negative items. Scores for this section ranged from 15 to 60, with high scores indicating that more questions were answered correctly. The Wilcoxon signed-rank test was used to find any differences between pre- and post-intervention on knowledge items. Most of the items had a higher median score in the post-intervention phase than in the pre-intervention phase. A higher median score indicates that there is a higher level of knowledge. The results showed significant differences in the median score in all items except item 7. Only the median score of item 7 titled ‘physical restraint should be fitted and secured comfortably’ remained unchanged. Details are shown in Table 4.8.

Table 4.8: Knowledge towards physical restraint in pre- and post-intervention Phase (n=245)

No.	Knowledge items	Pre-intervention	Post-intervention	Pre-vs post [a]
		Median	Median	p
1.	Physical restraint is a vest or safety attire used to prevent injuries.	3	4	0.001*
2.	Physical restraint is only allowed if it is required to protect patients or other people from injuries.	3	4	0.001*
3.	Physical restraint must be used when a person is not capable of supervising a patient intensively.	2	4	0.001*
4.	Patients have the right to refuse to be restrained.	2	3	0.001*
5.	Physical restraint requires a doctor's order.	3	3	0.001*
6.	Confusion or disorientation is a proper reason for the use of physical restraint.	2	3	0.001*
7.	Physical restraint should be fitted and secured comfortably.	3	3	0.225
8.	Patients are not to be restrained while lying facing up on the bed for fear of spluttering /choking.	2	3	0.001*
9.	When a patient's movement on the bed is restrained, physical restraint must not be tied to the side bars of the bed.	3	3	0.001*
10.	Nurses can be prosecuted for threatening the patients if they use physical restraint when it is not required.	3	3	0.001*
11.	Records of usage should be kept for each patient who is restrained in every shift.	3	3	0.001*
12.	Doctor's instructions on the use of physical restraint must be specific.	3	3	0.001*
13.	In emergencies, nurses are allowed to use the physical restraint on patients without any doctor's instruction.	3	4	0.001*
14.	No other good methods instead of physical restraint exist.	2	3	0.001*
15.	There have been deaths related to the use of vest physical restraint.	2	4	0.001*

Note: Analysis was carried out based on Wilcoxon signed-rank test; [a] pre- versus post-intervention median score.

*Significant at the 0.05 level.

4.5.2 Effect of educational intervention on knowledge score

To test the hypothesis that there will be no difference in the mean knowledge score of nurses towards physical restraint use before and after educational intervention, a paired-samples t-test was performed. The results showed that there was a significant increase in the mean knowledge scores, which increased from a mean of 39.61(SD=3.76) in the pre-intervention, to a mean of 50.62 (SD=3.13) in the post intervention phase. Conditions; t (244) = -38.96, P<0.001. Cohen's *d* was estimated at 3.18 which is considered to be a large effect size (Cohen, 2013) (Table 4.9).

Table 4.9: Comparison of knowledge scores between pre-intervention and post-intervention phases

Knowledge score	n	Mean (SD)	t	df	p	*d*[a]
Pre-intervention knowledge score	245	39.61 (3.76)	-38.964	244	0.001*	3.18
Post-intervention knowledge score	245	50.62 (3.13)				

Note: [a] Calculation based on Cohen's *d*.

*Significant at the 0.05 level.

4.6 Research question 4

Is there a difference in the mean attitude scores on physical restraint use before and after intervention in a teaching hospital in Malaysia?

4.6.1 Item analysis of attitude scores before and after intervention

The attitude part of the questionnaire, with 10 items that utilized a 4-point Likert scale rating, measured the difference between the median scores in the pre- and post-

intervention phase. Scores for this section ranged from 10 to 40, with high scores indicating that more questions were answered correctly. The Wilcoxon signed-rank test was used to find any differences between pre- and post-intervention knowledge items. Most items had a higher median score in the post-intervention phase than pre-intervention phase. A higher median score indicates that there is a higher level of positive attitude towards physical restraint. The results showed that most of the items had a higher median score in the post-intervention phase than in the pre-intervention phase. In spite of that, the median score for item 6 'Confusion or disorientation is a proper reason for the use of physical restraint', and item 8 'I feel that it is important to tell restrained patients that I am concerned about them' remained unchanged, but the Wilcoxon signed-rank test found that there was a significant difference in the median score of all items between before and after intervention. Details are presented in Table 4.10.

Table 4.10: Attitude towards physical restraint in pre- and post-intervention phase (n=245)

No.	Attitude items	Pre-intervention	Post-intervention	Pre-vs post
		Median	Median	p
1.	I feel that family members have the right to refuse the use of physical restraint.	2	3	0.001*
2.	I feel that nurses have the right to refuse using physical restraint on patients.	2	3	0.001*
3.	If I were a patient, I feel that I have the right to refuse being restrained.	2	3	0.001*
4.	I feel uncomfortable when placing a patient under restraint in front of my colleagues.	2	3	0.001*
5.	I feel embarrassed when family members enter the restrained patient's room and they have not been informed.	2	3	0.001*
6.	The hospital is responsible for adhering to the laws on the use of restraint to ensure the safety of a patient.	3	3	0.001*
7.	I would feel a little uncomfortable if a patient becomes more upset after being restrained.	2	3	0.001*
8.	I feel that it is important to tell restrained patients that I am concerned about them.	3	3	0.001*
9.	Patients suffer from feeling inferior when they are restrained.	2	3	0.001*
10.	Generally, I feel confident in performing physical restraint on patients.	3	4	0.001*

Note: Analysis was carried out based on the Wilcoxon signed-rank test; [a] pre- versus post-intervention median score.

*Significant at the 0.05 level.

4.6.2 Effect of educational intervention on attitude score

A paired-samples t-test was conducted to test the hypothesis that there will be no difference in the mean attitude score of nurses towards physical restraint use before and after educational intervention. The result of the comparison showed that there was a significant difference in the mean attitude scores between the pre-intervention (mean 24.00, SD=3.04) and post-intervention phase (mean 31.09, SD=2.72) conditions; t (244) = -26.49, P<0.001. Therefore, the greater mean attitude score in the post-intervention phase pointed out that the null hypothesis of equal mean attitude scores was rejected. Cohen's *d* was estimated at 2.45, which is considered to be a large effect size (Cohen, 2013)(Table 4.11).

Table 4.11: Comparison of attitude scores between pre-intervention and post-intervention phases

Attitude score	**n**	**Mean (SD)**	**t**	**df**	**p**	***d*[a]**
Pre-intervention attitude score	245	24.00 (3.04)	-26.497	244	0.001*	2.45
Post-intervention attitude score	245	31.09 (2.72)				

Note: [a] Calculation based on Cohen's *d*.

*Significant at the 0.05 level.

4.7 Research question 5

Is there a difference in the mean intention scores on physical restraint use before and after intervention in a teaching hospital in Malaysia?

4.7.1 Item analysis of intention scores before and after intervention

The intention part of the questionnaire consists of five questions, which utilized a 4-point Likert scale rating, and was used to describe and compare the median of each item before and after intervention. High median scores show strong intention to use physical restraint. Wilcoxon's signed-rank test was used to find any differences between pre- and post-intervention in intention items. All items had a lower median score in the post-intervention phase than the pre-intervention phase, which revealed that the intention to use physical restraint was reduced after educational intervention. Details are presented in Table 4.12.

Table 4.12: Intention towards physical restraint in pre- and post-intervention phase (n=245)

Intention items	**Pre-intervention**	**Post-intervention**	**Pre-vs post[a]**
	Median	**Median**	**p**
Scenario 1: Alzheimer's disease	3	2	0.001*
Scenario 2: Cerebro-vascular accident	3	2	0.001*
Scenario3: Elderly	3	2	0.001*
Scenario4: Malnutrition	3	2	0.001*
Scenario5: Schizophrenia	4	3	0.001*

Note: Analysis was carried out based on the Wilcoxon signed-rank test; lower median implies weak intention to use physical restraint; [a] pre- versus post-intervention median score. *Significant at the 0.05 level.

4.7.2 Effect of educational intervention on intention score

To test the hypothesis that there will be no difference in the mean intention score of nurses towards physical restraint use before and after educational intervention, a paired-samples t-test was performed. The results showed that there was a significant decrease in the mean intention scores in the pre-intervention from a mean of 15.60 (SD=2.38) to a mean of 10.77(SD=1.28) in the post-intervention phase conditions; t (244) = 28.07, P<0.001. Lower mean intention scores imply a weak intention to use physical restraint by nurses. Cohen's *d* was measured at 2.52, which is recognized as a large effect size (Cohen, 2013) (Table 4.13).

Table 4.13: Comparison of intention scores between pre-intervention and post-intervention phases

Intention score	No.	Mean (SD)	t	df	p	*d*[a]
Pre-intervention intention score	245	15.60 (2.38)	28.071	244	0.001*	2.52
Post-intervention intention score	245	10.77 (1.28)				

Note: Lower median implies weak intention to use physical restraint; [a] calculation based on Cohen's *d*.

*Significant at the 0.05 level.

4.8 Research question 6

Is there a difference in the mean practice scores on physical restraint use before and after intervention in a teaching hospital in Malaysia?

4.8.1 Item analysis of practice scores before and after intervention

The difference between the median scores of practice items was assessed in the pre and post- intervention phase. The practice part of the questionnaire consisted of 15 items with a 3-point Likert scale. The results showed that most of the items had a higher

median score in the pre-intervention phase than in the post-intervention phase. The median score of item 5, 'I examine restrained patients on an at least two-hourly bases, and item 14, 'When I need to restrain a patient, equipment is available in my units', remained unchanged. However, significant differences were found between the median score of these items before and after intervention. The Wilcoxon signed-rank test was used to find any difference between the median practice scores of the pre- and post-intervention phase. The results revealed that there were significant differences between the median score of all items between the before and after intervention, statistically. A significant higher median score in the post-intervention phase indicates proper physical restraint practice after intervention. Details are shown in Table 4.14.

Table 4.14: Practice towards physical restraint in pre-and post-intervention phase (n=245)

No.	Practice items	Pre-intervention	Post-intervention	Pre-vs post
		Median	Median	p
1.	I try a few nursing methods before physically restraining the patient.	2	3	0.001*
2.	Before using physical restraint on the patient, I will find out why I need to do so.	1	3	0.001*
3.	When I feel that the patient does not need to be restrained, I suggest this to the doctor.	1	2	0.001*
4.	I respond to the signal light or the call for 'help' from a restrained patient immediately.	1	3	0.001*
5.	I examine restrained patients on an at least two-hourly basis.	3	3	0.001*
6.	When giving personal care to the restrained patients, I examine their skin to find parts that are red or bruised.	1	3	0.001*
7.	I tell the patients why they are being restrained.	2	3	0.001*
8.	I tell the family members/visitors why the patient is being restrained.	1	3	0.001*
9.	I inform the patient when the restraint will be removed.	2	3	0.001*
10.	I inform the family members/visitors when the restraint will be removed.	1	2	0.001*
11.	Physical restraint must be used in the hospital to prevent patients from injuring themselves.	1	3	0.001*
12.	All patients in a state of disorientation must be restraint.	2	3	0.001*
13.	All staff will strive together to find ways to control the behaviour of patients through methods other than restraining them.	2	3	0.001*
14.	When I need to restrain a patient, equipment is available in my unit.	2	2	0.001*
15.	I prefer to give sleeping pills rather than restrain the patients.	2	3	0.001*

Note: Analysis was carried out based on the Wilcoxon signed-rank test; [a] pre- versus post-intervention median score. *Significant at the 0.05 level.

4.8.2 Effect of educational intervention on practice score

A paired-samples t-test was conducted to test the hypothesis that there will be no difference in the mean practice score of nurses towards physical restraint use before and after educational intervention. The results showed that there was a significant difference in the mean practice scores between pre-intervention (mean 25.36, SD=4.71) and post-intervention phase (mean 38.22, SD=2.69) conditions; t (244) = -36.77, P<0.001. Therefore, a greater mean practice score in the post-intervention phase shows that the null hypothesis of equal mean practice scores was rejected. Cohen's *d* was estimated at 3.35, which is considered to be a relatively large effect size (Cohen, 2013) (Table 4.15).

Table 4.15: Comparison of practice scores between pre-intervention and post-intervention phases

Practice score	No.	Mean (SD)	t	df	p	*d*[a]
Pre-intervention practice score	245	25.36(4.71)	-36.778	244	0.001*	3.35
Post-intervention practice score	245	38.22(2.69)				

Note: [a] Calculation based on Cohen's *d*.

*Significant at the 0.05 level.

4.9 Research question 7

Is there any association between nurses' characteristics and the knowledge, attitude, intention and practice score of nurses in a teaching hospital in Malaysia?

Univariate, simple or multiple linear regression analysis were carried out to find the relationship between nurses' characteristics and nurses' knowledge, attitude, intention and practice regarding physical restraint use in baseline, pre-intervention and post-intervention phase. In order to perform a multiple or simple linear regression, all significant variables from univariate analysis (P<0.05) and knowledge, attitude and

intention scores based on the conceptual framework of the study were entered into the model.

4.9.1 Association between demographic and professional characteristics and knowledge towards physical restraint (baseline phase)

Univariate and multiple regression analysis were carried out to find the relationship between nurses' characteristics and nurses' knowledge score regarding physical restraint use.

Analysis of an independent t-test showed that nurses who held higher academic qualifications (post-basic and bachelor's) had a significantly higher mean knowledge score compared to nurses with a diploma ($P<0.01$).

As shown in Table 4.8, nurses who had read any information source during the past year had significantly higher mean knowledge score than nurses who had not ($P< 0.02$).

Using multiple linear regression analysis, all significant associations ($P< 0.05$) from univariate analyses were entered into the model. Academic qualification ($\beta= 0.12$, $P< 0.02$) and any information source read ($\beta= 0.15$, $P<0.005$) were found to be significant correlates of the total mean knowledge score (Table 4.16). The adjusted R^2 (0.038) indicates that the correlate variables accounted for 3% of the variances in nurses' knowledge towards physical restraint use. The accomplished small variance points out that this is a weakly correlated model.

Table 4.16: Univariate and multiple linear regression analysis of nurse characteristics associated with knowledge (baseline phase)

Items		Mean total knowledge score		Multiple linear regression F(2,306)= 7.07, p< 0.001 Adjusted square R=0.038	
	No.	Mean± SD	p	β (SE)	CI (95%)
Gender					
Female	296	40.51± 4.00	0.47[a]	-	-
Male	13	39.69± 5.12		-	
Age					
20–25	150	40.29± 3.96	0.42	-	-
26 and above	159	40.66± 4.14		-	
Marital status					
Single	155	40.18± 4.02	0.13	-	-
Married	154	40.87± 4.07		-	
Ethnicity					
Malay	283	40.47± 4.06	0.90[a]	-	-
Non-Malay	26	40.57± 3.99		-	
Religion					
Muslim	284	40.48± 4.06	0.95[a]	-	-
Others	25	40.44± 4.01		-	
Years working in nursing					
≤ 4 years	178	40.14± 3.84	0.08	-	-
> 4 years	131	40.94± 4.29		-	
Academic qualification					
Diploma	251	40.21± 3.91	0.01*	Reference	2.44, 0.15
Post-basic/ Bachelor's	58	41.65± 4.45		0.12 (0.58)*	
Awareness of aggression management guideline					
Yes	204	40.77± 3.97	0.06	-	-
No	105	39.88± 4.16		-	
Received physical restraint training during nursing programme					
Yes	244	40.67± 3.97	0.11	-	-
No	65	39.76± 3.71		-	
Awareness of hospital policy regarding restraint					
Yes	146	40.93± 3.98	0.06	-	-
No	163	40.07± 4.08		-	
Read any information source regarding restraint during past year					
Yes	92	41.53± 3.75	0.02*	0.15 (0.49)*	0.42, 2.37
No	217	40.03± 4.10		Reference	
Received in-service restraint programme					
Yes	32	41.53± 3.91	0.12	-	-
No	277	40.36± 4.06		-	

Note: [a] Analysis based on Mann–Whitney U Test. * Significant at level <0.05.

4.9.2 Association between demographic and professional characteristics and attitude towards physical restraint (baseline phase)

Univariate and simple regression analyses were carried out to find the association between nurses' characteristics and the attitude score of nurses regarding physical restraint use.

Analysis of the independent t-test showed that nurses who had read information resources during the past year had a significantly higher mean attitude score compared to nurses who had not ($P<0.04$). The results of the independent t-test and the Mann–Whitney U test indicated that there were no statistically significant differences on the mean total attitude score between other demographic and professional characteristics.

Using simple linear regression analysis, 'had read any information source during the past year' was entered into the regression model. 'Read any information source' ($\beta= 0.11$, $P<0.04$) was found to be a significant correlate of the total mean attitude score (Table 4.17). The adjusted R^2 (0.01) indicates that the predictor variables accounted for 1% of the variances in nurses' attitude towards physical restraint use. The accomplished small variance indicated that this is a weakly correlated model. However, statistical significance was noticed.

Table 4.17: Univariate and Simple linear regression analysis of nurses' characteristics associated with attitude (baseline phase)

Items		Mean total attitude score		Simple linear regression F(1,307)= 4.05, p< 0.04 Adjusted square R=0.010	
	No.	Mean± SD	p	β (SD)	CI (95%)
Gender					
Female	296	24.12± 3.08	0.83[a]	-	-
Male	13	24.30± 3.42		-	
Age					
20–25	150	24.20± 3.08	0.68	-	-
26 and above	159	24.06± 3.10		-	
Marital status					
Single	155	24.34± 3.03	0.23	-	-
Married	154	23.92± 3.14			
Ethnicity					
Malay	283	24.15± 3.13	0.62[a]	-	-
Non-Malay	26	23.84± 2.55		-	
Religion					
Muslim	284	24.14± 3.14	0.82[a]	-	-
Others	25	24.00± 2.48		-	
Years working in nursing					
≤ 4 years	178	24.30± 3.02	0.24	-	-
> 4 years	131	23.89± 3.17			
Academic qualification					
Diploma	251	24.21± 3.08	0.35	-	-
Post-basic/ Bachelor's	58	23.79± 3.13		-	
Awareness of aggression management guideline					
Yes	204	24.26± 3.12	0.29	-	-
No	105	23.87± 3.02		-	
Received physical restraint training during nursing programme					
Yes	244	24.13± 3.27	0.97	-	-
No	65	24.12± 2.30		-	
Awareness of hospital policy regarding restraint					
Yes	146	24.32± 3.11	0.29	-	-
No	163	23.95± 3.07		-	
Read any information source regarding restraint during past year					
Yes	92	24.67± 3.14	0.04*	0.11(0.38)*	0.01, 1.52
No	217	23.90± 3.04		Reference	
Received in-service restraint programme					
Yes	32	25.43± 2.62	0.31	-	-
No	277	23.98± 3.11		-	-

Note: [a] Analysis based on Mann–Whitney U Test. * Significant at level <0.05.

4.9.3 Association between demographic and professional characteristics, knowledge, attitude and intention towards physical restraint (baseline phase)

Univariate and multiple regression analyses were carried out to find the relationship between nurses' characteristics, knowledge, attitude and nurses' intention score regarding physical restraint use.

The results of the independent t-test and the Mann–Whitney U test indicated that there were no statistically significant differences in the mean total intention score between demographic and professional characteristics of nurses. The Pearson's correlation coefficient test showed a very weak positive linear correlation for knowledge (r= 0.02) and attitude (r= 0.003) with intention and the correlations were not significant statistically (Table 4.18).

To construct the multiple regression model, 'knowledge' and 'attitude' were entered into the model to find any association between these variables and nurses' intention towards physical restraint. As shown in Table 4.18, there were no significant associations between knowledge (β= 0.02, P<0.65), attitude (β= 0.00, P<0.97) and intention of nurses regarding physical restraint use in the baseline phase (adjusted R^2 = -0.006, P<0.09).

Table 4.18: Univariate and multiple linear regression analyses of nurses' characteristics, knowledge and attitude associated with intention (baseline phase)

Items		Mean total intention score	Multiple linear regression F(2,306)= 0.10, p< 0.09 Adjusted square R= -0.006		
	No.	Mean± SD	p	β (SE)	CI (95%)
Gender					
Female	296	15.51± 2.47	0.91[a]	-	-
Male	13	15.30± 2.92		-	
Age					
20–25	150	15.31± 2.54	0.18	-	-
26 and above	159	15.68± 2.43			
Marital status					
Single	155	15.27± 2.68	0.10	-	-
Married	154	15.73± 2.25		-	
Ethnicity					
Malay	283	15.63± 2.40	0.22[a]	-	-
Non-Malay	26	15.03± 2.97		-	
Religion					
Muslim	284	15.65± 2.41	0.45[a]	-	-
Others	25	14.80± 2.76		-	
Years working in nursing					
≤ 4 years	178	15.43± 2.58	0.58	-	-
> 4 years	131	15.59± 2.36		-	
Academic qualification					
Diploma	251	15.56± 2.41	0.34	-	-
Post-basic/ Bachelor's	58	15.22± 2.79		-	
Awareness of aggression management guideline					
Yes	204	15.66± 2.45	0.12	-	-
No	105	15.20± 2.54		-	
Received physical restraint training during nursing programme					
Yes	244	15.49± 2.63	0.90	-	-
No	65	15.53± 1.86		-	
Awareness of hospital policy regarding restraint					
Yes	146	15.65± 2.42	0.30	-	-
No	163	15.36± 2.54		-	
Read any information source regarding restraint during past year					
Yes	92	15.91± 2.54	0.06	-	-
No	217	15.33± 2.44		-	
Received in-service restraint programme					
Yes	32	16.31± 1.73	0.06	-	-
No	277	15.41± 2.54		-	
Knowledge	309	40.48± 4.05[c]	0.64[b]	0.02(0.03)	-0.05, 0.08
Attitude	309	24.13± 3.09[d]	0.95[b]	0.00(0.04)	-0.09, 0.09

Note: [a] Analysis based on Mann–Whitney U Test; [b] analysis based on Pearson's correlation;

[c] mean total knowledge score; [d] mean total attitude score; * significant at level <0.05.

4.9.4 Association between demographic and professional characteristics, knowledge, attitude, intention and practice towards physical restraint (baseline phase)

Univariate and multiple regression analyses were carried out to find the relationship between nurses' characteristics, knowledge, attitude, intention and nurses' practice score regarding physical restraint use.

Analysis of the independent t-test showed that nurses who were aware of hospital policy regarding physical restraint had a significantly higher mean practice score compared to nurses who were not ($P< 0.04$). The results of the independent t-test and the Mann–Whitney U test indicated that there were no statistically significant differences in the mean total practice score between other demographic and professional characteristics. The Pearson's correlation coefficient test showed a very weak linear correlation for knowledge ($r = 0.08$), no linear correlation for attitude ($r = 0.00$), and no significant correlation for intention ($r = 0.10$) (Table 4.19).

Using multiple linear regression analysis, awareness of hospital policy regarding physical restraint use, knowledge, attitude and intention of nurses towards physical restraint were entered into the regression model. Awareness of hospital policy regarding physical restraint use ($\beta= 0.20$, $P<0.001$) was found to be a significant correlate of the total mean practice score (Table 4.19). The adjusted R^2 (0.10) indicates that the predictor variables accounted for 10% of the variances in nurses' practice towards physical restraint use. The accomplished small variance indicated that this is not a strong correlated model. However, statistical significance was noticed.

Table 4.19: Univariate and multiple linear regression analyses of nurses' characteristics, knowledge, attitude and intention associated with practice (baseline phase)

Items		Mean total practice score	Multiple linear regression $F(4,304)=9.81$, $p<0.001$, $R^2=0.10$		
	No.	Mean± SD	p	β (SE)	CI (95%)
Gender					
Female	296	25.40± 4.79	0.11[a]	-	-
Male	13	23.46± 5.17		-	
Age					
20–25	150	25.14± 4.66	0.52	-	-
26 and above	159	25.49± 4.96		-	
Marital status					
Single	155	26.03± 4.67	0.70	-	-
Married	154	24.61± 4.87		-	
Ethnicity					
Malay	283	25.41± 4.93	0.42[a]	-	-
Non-Malay	26	24.38± 3.17		-	
Religion					
Muslim	284	25.40± 4.93	0.42[a]	-	-
Others	25	24.40± 3.24		-	
Years working in nursing					
≤ 4 years	178	25.44± 4.67	0.60	-	-
> 4 years	131	25.16± 5.01		-	
Academic qualification					
Diploma	251	25.36± 4.85	0.76	-	-
Post-basic/ Bachelor's	58	25.15± 4.69			
Awareness of aggression management guideline					
Yes	204	25.65± 5.17	0.09	-	-
No	105	24.69± 3.99		-	-
Received physical restraint training during nursing programme					
Yes	244	25.41± 4.73	0.52	----------	-
No	65	24.98± 5.13		----------	-
Awareness of hospital policy regarding restraint					
Yes	146	26.39± 5.05	0.04*	0.20(0.52)*	0.97,3.08
No	163	24.36± 4.39		Reference	
Read any information source regarding restraint during past year					
Yes	92	26.06± 5.08	0.07	-	-
No	217	25.01± 4.67		-	
Received in-service restraint programme					
Yes	32	28.31± 5.26	0.07	-	-
No	277	27.98± 4.65		-	
Knowledge	309	40.48± 4.05[c]	0.14[b]	0.10(0.06)	-0.002,0.25
Attitude	309	24.13± 3.09[d]	0.06[b]	0.00(0.08)	-0.55,-0.21
Intention	309	15.50± 2.48[e]	0.07[b]	0.08(0.10)	-0.34,0.37

Note: [a] Analysis based on Mann–Whitney U Test; [b] analysis based on Pearson's correlation; [c] mean total knowledge score; [d] mean total attitude score; * significant at level <0.05.

4.9.5 Association between demographic and professional characteristics and knowledge regarding physical restraint (pre-intervention and post-intervention phases)

Univariate and simple linear regression analyses were carried out to find the relationship between nurses' demographic and professional characteristics and their knowledge regarding physical restraint use.

Analysis of the independent t-test showed that nurses who had read any information source about physical restraint had a significantly higher mean knowledge score (40.80±3.49, t=3.25, P<0.001) compared to nurses who had not in the pre-intervention phase of the study. The mean knowledge scores between these two groups of nurses did not show any significant differences statistically in the post-intervention phase.

As shown in Table 4.20, the independent t-test and the Mann–Whitney U test did not show any significant differences between other data and professional nurses' characteristics and nurses' knowledge in the pre-intervention phase.

In the post-intervention phase, the independent t-test found a significant difference between the mean knowledge score of nurses who had received physical restraint training during the nursing programme (39.75± 3.79, t= 2.14, P<0.03) and nurses who had not.

However, analysis of the knowledge improvement scores revealed that there were statistically significant differences across academic qualification, t= 2.27, P<0.02, and received in-service restraint programme, t= -2.86, P<0.005, since nurses who had a higher academic qualification and nurses who did not attend an in-service restraint programme had gained significantly more knowledge than other nurses (Table 4.20).

Using a simple linear regression analysis for the pre-intervention and post-intervention phases, all significant associations (P< 0.05) from the univariate analyses were entered into the model. In the pre-intervention phase, 'had read an academic source during the past year' did not associate significantly with the knowledge score, (β= 0.07, P< 0.26). However, 'received physical restraint training during the nursing programme' (β= 0.13, P<0.03) was associated with the knowledge score in the post-intervention phase (Table 4.20). The adjusted R^2 (0.015) indicates that the correlate variables accounted for 1% of the variances in nurses' knowledge towards physical restraint use in the post-intervention phase. The accomplished small variance showed that this is a weakly correlated model. Table 4.20 displays the detailed results.

Table 4.20: Univariate and linear regression analyses of characteristics associated with knowledge (pre- and post-intervention phase)

Demographic and professional characteristics		Pre-intervention		Post-intervention		Post-intervention–pre-intervention [b]		Linear regression F(1,243)= 1.26, p< 0.26 Adjusted square R=-0.001 (pre-intervention)		Linear regression F(1,243)= 4.59, p< 0.03 Adjusted square R=0.015 (post-intervention)	
	No.	**Mean± SD**	**p**	**Mean± SD**	**p**	**Mean±SD**	**p**	**β (SD)**	**CI (95%)**	**β (SD)**	**CI (95%)**
Gender											
Female	234	39.65± 3.71	0.56[a]	50.67± 3.17	0.25[a]	11.01± 4.46	0.98[a]	-	-	-	-
Male	11	38.72± 4.79		49.63± 1.85		10.90± 3.83		-		-	
Age											
20–25	125	39.56± 3.73	0.83	50.92± 3.07	0.12	11.36± 4.37	0.21	-	-	-	-
26 and above	120	39.66± 3.80		50.31± 3.17		10.65± 4.47		-		-	
Marital status											
Single	131	39.69± 3.87	0.72	50.77 ± 3.05	0.44	11.07± 4.43	0.80	-	-	-	-
Married	114	39.52± 3.65		50.46 ± 3.23		10.93± 4.44		-		-	
Ethnicity											
Malay	227	39.55± 3.74	0.53[a]	50.57± 3.13	0.42[a]	11.01± 4.44	0.86[a]	-	-	-	-
Non-Malay	18	40.33± 3.98		51.27± 3.12		10.94± 4.35		-		-	
Religion											
Muslim	228	39.57± 3.75	0.73[a]	50.60 ± 3.15	0.67[a]	11.02± 4.43	0.80[a]	-	-	-	-
Others	17	40.11± 3.99		51.00± 2.97		10.88± 4.48		-		-	
Years working in nursing											
≤ 4 years	148	39.47± 3.62	0.46	50.87± 3.03	0.12	11.40± 4.32	0.08	-	-	-	-
>4 years	97	39.83± 3.97		50.24± 3.25		10.41± 4.54		-		-	

Note: [a] Analysis based on Mann–Whitney U Test; [b] Knowledge improvement score.

* Significant at level <0.05.

Table 4.20, Continued

Demographic and professional characteristics		Pre-intervention		Post-intervention		Post-intervention– pre-intervention [b]		Linear regression F(1,243)= 1.26, p< 0.26 Adjusted square R=-0.001 (pre-intervention)		Linear regression F(1,243)= 4.59, p< 0.03 Adjusted square R=0.015 (post-intervention)	
	No.	**Mean± SD**	**p**	**Mean± SD**	**p**	**Mean±SD**	**p**	**β (SD)**	**CI (95%)**	**β (SD)**	**CI (95%)**
Academic qualification											
Diploma	204	39.43± 3.66	0.09	50.73± 3.11	0.23	11.29± 4.45	0.02*	-	-	-	-
Post-basic /degree	41	40.51± 4.16		50.09± 3.20		9.58± 4.04		-		-	
Awareness of aggression management guideline											
Yes	161	39.93± 3.62	0.07	50.56± 2.98	0.66	10.63± 4.34	0.06	-	-	-	-
No	84	39.01± 3.97		50.75± 3.42		11.73± 4.52		-		-	
Received physical restraint training during nursing programme											
Yes	193	39.75± 3.79	0.26	50.84 ± 3.05	0.03*	11.09± 4.36	0.58	-	-	0.13 (0.48)*	0.08, 2.00
No	52	39.09± 3.64		49.80 ± 3.31		10.71± 4.68		-		Reference	
Awareness of hospital policy regarding restraint											
Yes	217	39.72± 3.80	0.19[a]	50.67± 3.17	0.49[a]	10.94± 4.48	0.53[a]	-	-	-	-
No	27	38.77± 3.42		50.25± 2.87		11.48± 4.25		-		-	
Read any information source regarding restraint during past year											
Yes	72	40.80± 3.49	0.001*	51.18 ± 3.05	0.07	10.37± 4.41	0.14	0.07 (0.58)	-0.04, 1.81	-	-
No	173	39.12± 3.77		50.39± 3.14		11.27± 4.42		Reference		-	
Received in-service restraint programme											
Yes	27	40.96± 3.94	0.62[a]	49.70± 2.87	0.10[a]	8.74± 5.20	0.005*	-	-	-	-
No	218	39.44± 3.71		50.74± 3.15		11.29± 4.25		-		-	

Note: [a] Analysis based on Mann–Whitney U Test; [b] knowledge improvement score.

* Significant at level <0.05.

4.9.6 Association between demographic and professional characteristics and attitude towards physical restraint (pre-intervention and post-intervention phases)

Univariate and simple linear regression analyses were carried out to find the association between nurses' characteristics and the attitude of nurses regarding physical restraint use in both pre-intervention and post-intervention phases.

Analysis of the independent t-test showed that nurses who had received an in-service restraint programme had a significantly higher mean attitude score compared to those nurses who had not, in pre-intervention (25.37± 3.94, t= 2.50, P<0.04). The results of the independent t-test and the Mann–Whitney U test indicated that there were no statistically significant differences in the mean total attitude score between other demographic and professional characteristics in the pre-intervention phase.

In the post-intervention phase, analysis of the independent t-test found a mean attitude score difference between nurses who had received the in-service restraint programme and nurses who had not, as nurses who had not received the in-service restraint programme showed a significantly greater mean attitude score than others (31.24± 2.70, t= -2.47, P<0.01). The independent t-test and the Mann–Whitney U test did not show any other significant differences between other nurses' characteristics and the attitude of nurses towards physical restraint use.

However, analysis of the attitude improvement scores revealed that there were statistically significant differences across receiving the in-service restraint programme, t= -3.48, P<0.001. Nurses who had not received in-service restraint training gained more significantly in proper attitude than other nurses (Table 4.21).

Using simple linear regression analysis for the pre-intervention and post-intervention phases, all significant associations (P< 0.05) from the univariate analysis were entered

into the model. 'Received in-service restraint programme' was entered into the model using linear regression analysis. In both the pre-intervention phase ($\beta = 0.15$, $P < 0.01$) and the post-intervention phase ($\beta = 0.15$, $P < 0.01$), receiving the in-service restraint programme was associated significantly with the attitude score, (Table 4.21). The adjusted R^2 (0.02) indicates that the correlate variables accounted for 2% of the variances in nurses' attitudes regarding physical restraint use. In the linear regression analysis, small variances showed that this is a weak correlated model. Table 4.21 displays the detailed results.

Table 4.21: Univariate and linear regression analysis of characteristics associated with attitude (pre- and post-intervention phase)

Demographic and professional characteristics		Pre-intervention		Post-intervention		Post intervention– pre intervention [b]		Linear regression F(1,243)= 6.28, p< 0.01 Adjusted square R=0.02 (pre-intervention)		Linear regression F(1,243)= 6.11, p< 0.01Adjusted square R=0.02 (post-intervention)	
	No.	Mean± SD	p	Mean± SD	p	Mean±SD	p	β (SD)	CI (95%)	β (SD)	CI (95%)
Gender											
Female	234	24.00± 3.02	0.59[a]	31.09± 2.73	0.82[a]	7.09± 4.19	0.95[a]	-	-	-	-
Male	11	24.00± 3.63		31.09± 2.66		7.09± 3.80		-		-	
Age											
20–25	125	24.03± 3.09	0.86	31.09± 2.67	0.99	7.06± 4.26	0.89	-	-	-	-
26 and above	120	23.96± 3.00		31.10± 2.78		7.13± 4.07		-		-	
Marital status											
Single	131	24.32± 2.95	0.77	30.93± 2.53	0.30	6.61± 3.95	0.38	-	-	-	-
Married	114	23.63± 3.11		31.28± 2.91		7.65± 4.35		-		-	
Ethnicity											
Malay	227	24.06± 3.10	0.19[a]	31.06± 2.74	0.33[a]	7.00± 4.24	0.16[a]	-	-	-	-
Non-Malay	18	23.22± 2.04		31.55± 2.43		8.33± 2.82		-		-	
Religion											
Muslim	228	24.04± 3.11	0.33[a]	31.06 ± 2.73	0.44[a]	7.02± 4.43	0.27[a]	-	-	-	-
Others	17	23.41± 1.93		31.52± 2.50		8.11± 4.48		-		-	
Years working in nursing											
≤ 4 years	148	24.14± 3.03	0.36	31.06± 2.63	0.83	6.92± 4.24	0.42	-	-	-	-
>4 years	97	23.78± 3.05		31.14± 2.86		7.36± 4.06		-		-	

Note: [a] Analysis based on Mann–Whitney U Test; [b] attitude improvement score.

* Significant at level <0.05.

Table 4.21, Continued

Demographic and professional characteristics	Pre-intervention		Post-intervention		Post-intervention– Pre-intervention [b]		Linear regression F(1,243)= 6.28, p< 0.01 Adjusted square R=0.02 (pre-intervention)		Linear regression F(1,243)= 6.11, p< 0.01Adjusted square R=0.02 (post-intervention)	
	No.	Mean± SD	p	Mean± SD	p	Mean±SD	p	β (SD)	CI (95%)	β (SD)	CI (95%)
Academic qualification											
Diploma	204	24.05± 3.09	0.53	31.05± 2.69	0.61	7.00± 4.26	0.43	-	-	-	-
Post-basic /degree	41	23.73± 2.78		31.29± 2.89		7.56 ± 3.66		-		-	
Awareness of aggression management guideline											
Yes	161	24.24± 3.08	0.07	30.86± 2.47	0.69	6.62± 4.10	0.01*	-	-	-	-
No	84	23.25± 2.92		31.53± 3.10		8.01± 4.16		-		-	
Received physical restraint training during nursing programme											
Yes	193	24.05± 3.25	0.57	31.14± 2.72	0.07	7.08± 4.31	0.94	-	-	-	-
No	52	23.78± 2.12		30.92± 2.73		7.13± 3.59		-		-	
Awareness of hospital policy regarding restraint											
Yes	217	23.94± 3.07	0.30[a]	31.18± 2.75	0.11[a]	7.24± 4.23	0.05*[a]	-	-	-	-
No	27	24.55± 2.84		30.37± 2.43		5.81± 3.45		-		-	
Read any information source regarding restraint during past year											
Yes	72	24.56± 2.96	0.06	31.33± 2.88	0.38	6.76± 4.53	0.41	-	-	-	-
No	173	23.76± 3.05		31.00± 2.65		7.23± 4.00		-		-	
Received in-service restraint programme											
Yes	27	25.37± 3.94	0.01*[a]	29.88± 2.62	0.01*[a]	4.51± 4.32	0.001*[a]	0.15(0.61)*	0.33,2.75	0.15 (0.27)*	0.13, 1.22
No	218	23.83± 3.71		31.24± 2.70		7.41± 4.04		Reference		Reference	

Note: [a] Analysis based on Mann- Whitney U Test; [b] Attitude improvement score

* Significant at level <0.05

4.9.7 Association between demographic and professional characteristics, knowledge, attitude and intention towards physical restraint (pre-intervention and post-intervention phases)

Univariate and multiple linear regression analyses were performed to find the relationship between nurses' characteristics, knowledge and attitude and nurses' intention regarding physical restraint use in the pre-intervention and post-intervention phases.

The independent t-test showed a significant difference in the mean total intention score of nurses who had read any information source regarding restraint during the past year and nurses who had not ($t= 2.76$, $P<0.006$), before educational intervention. In the post-intervention phase, there were no significant differences in the mean intention score between these two groups of nurses. However, analysis of the intention decreased scores revealed that there were statistically significant differences in 'read any information source during the past year', $t= -2.35$, $P<0.02$. Those nurses who had read any information source during the past year showed a significantly lower intention to use physical restraint than others. The results of the independent t-test and the Mann–Whitney U test indicated that there were no other statistically significant differences in the mean total intention score between demographic and professional characteristics of nurses in the pre- and post-intervention phase (Table 4.22).

In the pre-intervention phase, the Pearson's correlation coefficient test showed a very weak negative linear correlation for knowledge ($r= -0.03$) and attitude ($r= - 0.01$) with intention and the correlations were not significant statistically (Table 4.22).

In the post-intervention phase, the results of the independent t-test revealed that there was a difference between the mean intention score of nurses who had received in-service restraint programme and those who had not. As shown in Table 4.22, nurses who had not received in-service restraint programme showed a significantly lower intention score to use physical restraint after educational intervention than other nurses (t= 1.93, P<0.05).

The Pearson's correlation coefficient test found a negative linear correlation for knowledge (*r*= -0.35) and attitude (*r*= - 0.70) with intention and the correlations were statistically significant for both the knowledge and attitude variables in the post-intervention phase (P<0.001) (Table 4.22).

To construct the multiple regression model, 'read any information source',' knowledge' and 'attitude' were entered into the model to find any association between these variables and nurses' intention towards physical restraint in the pre-intervention phase. As displayed in Table 4.22, there were no associations between knowledge (β= -0.003, P<0.96), attitude (β= 0.003, P<0.96) and intention of nurses regarding physical restraint use in the pre-intervention phase. However, the multiple linear regression analysis found that there was an association between 'read any information source during the past year' (β= 0.17, P<0.008) and nurses' intention to use physical restraint (Adjusted R^2 = 0.01, P<0.05). Therefore, the results revealed that the correlate variables accounted for only 1% of the variances in nurses' intention to use physical restraint. This small amount presented a very weak correlation model in this phase.

To find any association between the variables in the post-intervention phase, 'received in-service restraint programme, 'knowledge', 'attitude' were entered into the model. The results showed that there was an association between attitude and intention ((β= -0.69, P<0.001). However, no association were found between knowledge and intention

or received in-service restraint programme and intention in this phase of the study. The adjusted R^2 (0.48) indicates that the correlate variables accounted for 48% of the variances in nurses' intention regarding physical restraint use. Details are showed in Table 4.22.

Table 4.22: Univariate and multiple linear regression analyses of characteristics, knowledge and attitude associated with intention (pre- and post-intervention phase)

Demographic and professional characteristics		Pre-intervention		Post-intervention		Post intervention–pre-intervention [b]		Linear regression F(3,241)= 2.53, p< 0.05 Adjusted square R=0.01 (pre-intervention)		Linear regression F(3,241)= 77.18, p< 0.001, Adjusted square R=0.48 (post-intervention)	
	No.	**Mean± SD**	**p**	**Mean± SD**	**p**	**Mean±SD**	**p**	**β (SD)**	**CI (95%)**	**β (SD)**	**CI (95%)**
Gender											
Female	234	15.61± 2.38	0.87[a]	10.75± 1.29	0.49[a]	-4.85± 2.72	0.62[a]	-	-	-	-
Male	11	15.65± 2.46		11.18± 0.87		-4.28± 2.86		-		-	
Age											
20–25	125	15.58± 2.40	0.89	10.87± 1.24	0.23	-4.71± 2.74	0.49	-	-	-	-
26 and above	120	15.62± 2.38		10.67± 1.31		-4.95± 2.72		-		-	
Marital status											
Single	131	15.35± 2.61	0.07	10.84± 1.27	0.34	-4.59± 2.88	0.06	-	-	-	-
Married	114	15.89± 2.07		10.69± 1.29		-5.20± 2.50		-		-	
Ethnicity											
Malay	227	14.70± 2.33	0.53[a]	10.75± 1.30	0.47[a]	-3.95± 2.71	0.84[a]	-	-	-	-
Non-Malay	18	14.33± 2.70		11.03± 0.99		-3.03± 2.96		-		-	
Religion											
Muslim	228	15.72± 2.34	0.79[a]	10.75± 1.29	0.46[a]	-4.97± 4.43	0.06[a]	-	-	-	-
Others	17	15.00± 2.37		11.05± 1.02		-3.95± 4.48		-		-	
Years working in nursing											
≤ 4 years	148	15.68± 2.48	0.49	10.86± 1.26	0.17	-4.82± 2.86	0.97	-	-	-	-
>4 years	97	15.47± 2.23		10.63± 1.30		-4.83± 2.85		-		-	

Note: [a] Analysis based on Mann–Whitney U Test; [b] intention decreased score; analysis based on Pearson's correlation coefficient. Lower mean scores reflected that more questions were answered properly.

* Significant at level <0.05.

Table 4.22, Continued

Demographic and professional characteristics		Pre-intervention		Post-intervention		Post intervention– pre-intervention [b]		Linear regression F(3,241)= 2.53, p< 0.05 Adjusted square R=0.01 (pre-intervention)		Linear regression F(3,241)= 77.18, p< 0.001, Adjusted square R=0.48 (post-intervention)	
	No.	**Mean± SD**	**p**	**Mean± SD**	**p**	**Mean±SD**	**p**	**β (SD)**	**CI (95%)**	**β (SD)**	**CI (95%)**
Academic qualification											
Diploma	204	15.71± 2.34	0.11	10.82± 1.26	0.19	-4.88± 2.70	0.45	-	-	-	-
Post-basic /degree	41	15.07± 2.53		10.53± 1.34		-4.53± 2.85		-		-	
Awareness of aggression management guideline											
Yes	161	15.73± 2.43	0.24	10.85± 1.19	0.16	-4.87± 2.67	0.70	-	-	-	-
No	84	15.35± 2.29		10.61± 1.42		-4.73± 2.85		-		-	
Received physical restraint training during nursing programme											
Yes	193	15.68± 2.51	0.31	10.76± 1.25	0.83	-4.91± 2.85	0.32	-	-	-	-
No	52	15.30± 1.84		10.80± 1.37		-4.50± 2.21		-		-	
Awareness of hospital policy regarding restraint											
Yes	217	15.52± 2.44	0.09[a]	10.74± 1.26	0.18[a]	-4.77± 2.78	0.53[a]	-	-	-	-
No	27	16.18± 1.79		11.11± 1.33		-5.07± 2.23		-		-	
Read any information source regarding restraint during past year											
Yes	72	16.25± 2.29	0.006*	10.79± 1.34	0.89	-5.45± 2.65	0.02*	0.17 (0.34)*	0.24,1.58	-	-
No	173	15.33± 2.37		10.76± 1.25		-4.56± 2.72		Reference		-	
Received in-service restraint programme											
Yes	27	16.22± 1.60	0.15[a]	11.22± 1.31	0.05*[a]	-5.00± 2.16	0.73[a]	-	-	-0.01 (0.09)	-0.21,0.16
No	218	15.52± 2.45		10.72± 1.26		-4.80± 2.79		-		Reference	
Knowledge	245	39.61± 3.76[d]	0.55[c]	50.62± 3.13[d]	0.001*[c]	-	-	-0.003 (0.05)	-0.10,0.09	0.002 (0.02)	-0.04,0.04
Attitude	245	24.00± 3.04[e]	0.77[c]	31.09± 2.72[e]	0.001*[c]	-		0.003 (0.04)	-0.08,0.08	-0.69 (0.02)*	-0.37,-0.27

Note: [a] Analysis based on Mann–Whitney U Test; [b] intention decreased score; [c] analysis based on Pearson's correlation coefficient; lower mean scores reflected that more questions were answered properly; [d] mean total knowledge score; [e] mean total attitude score.

* Significant at level <0.05.

4.9.8 Association between nurses' demographic and professional characteristics, knowledge, attitude, intention and practice towards physical restraint (pre-intervention and post-intervention phases)

Univariate and multiple regression analyses were carried out to find the relationship between nurses' characteristics, knowledge, attitude, intention and nurses' practice regarding physical restraint use in both the pre-intervention and post-intervention phase.

In the pre-intervention phase, the results of the independent t-test showed that there was a difference in the mean practice score of nurses who had read any information source during the past year and who had not as the first group had a significantly higher mean practice score compared to others (26.55± 5.11, t= 2.58, P<0.01). In addition, nurses who had received in-service restraint programme had a significantly greater mean practice score than nurses who had not (29.18± 5.12, U= 4.65, P<0.001). The results of the independent t-test and the Mann–Whitney U test indicated that there were no statistically significant differences in the mean total practice score between other demographic and professional characteristics.

In the pre-intervention phase, Pearson's correlation coefficient test showed no significant linear correlation for knowledge (r = 0.10, P<0.09), attitude (r = 0.10, P<0.09), and intention (r = 0.09, P< 0.10). Details are presented in Table 4.23. In the post-intervention phase, the independent t-test and the Mann–Whitney U test no statistically significant differences were found in the mean total practice score between demographic and professional characteristics. In this phase, the results of Pearson's correlation coefficient test indicated a significant positive linear correlation for knowledge (r = 0.26, P<0.001) and attitude (r = 0.37, P<0.001) and a significant negative correlation for intention (r = -0.36, P<0.001).

Analysis of the practice improvement scores revealed that there were statistically significant differences across 'had read any information source during the past year' (t= -2.18, P<0.04) and 'receiving an in-service restraint programme, t= -4.54, P<0.001. Nurses who had not received an in-service restraint programme and those nurses who had not read any information source about restraint gained significantly in proper practice compared to other nurses (Table 4.23).

Using multiple linear regression analysis, 'had read any information source during the past year', 'received in-service restraint programme, 'knowledge', 'attitude' and 'intention' were entered into the model for the pre-intervention phase. 'Received in-service restraint programme' (β= -0.27, P<0.001) and 'attitude' (β= -0.17, P<0.004) were found to be significant correlates of the total mean practice score. The adjusted R^2 (0.01) indicates that the predictor variables accounted for 1% of the variances in nurses' practice towards physical restraint use. The accomplished small variance indicated that this is a weak correlated model. However, statistical significance was noticed.

To construct the multiple regression model, knowledge, attitude and intention were entered into the model to find any association between these variables and nurses' practice towards physical restraint in the post-intervention phase. The results showed that there were associations between attitude and practice (β= 0.19, P<0.03) and intention and practice (β= -0.19, P<0.01). However, no association was found between knowledge and practice of nurses towards physical restraint. The adjusted R^2 (0.15) indicates that the correlate variable accounted for 15% of the variances in nurses' practice towards physical restraint use. Details are displayed in Table 4.23.

Table 4.23: Univariate and linear regression analysis of nurses' characteristics, knowledge, attitude and intention associated with nurses' practice (pre- and post-intervention phase)

Demographic and professional characteristics		Pre-intervention		Post-intervention		Post-intervention–Pre-intervention [b]		Linear regression F(5,239)= 6.98, p< 0.001 Adjusted square R=0.01 (pre-intervention)		Linear regression F(3,241)= 16.39, p< 0.001,Adjusted square R=0.15 (post-intervention)	
	No.	**Mean± SD**	**p**	**Mean± SD**	**p**	**Mean±SD**	**p**	**β (SD)**	**CI (95%)**	**β (SD)**	**CI (95%)**
Gender											
Female	234	25.43± 4.66	0.21[a]	38.24± 2.69	0.42[a]	12.81± 5.41	0.48[a]	-	-	-	-
Male	11	23.81± 5.58		37.63± 2.65		13.81± 6.86		-		-	
Age											
20–25	125	25.18± 4.56	0.54	38.12± 2.84	0.58	12.94± 5.46	0.80	-	-	-	-
26 and above	120	25.55± 4.87		38.31± 2.52		12.76± 5.50		-		-	
Marital status											
Single	131	26.14± 2.95	0.06	37.94± 2.75	0.80	11.82± 3.95	0.32	-	-	-	-
Married	114	25.35± 3.11		37.53± 2.59		12.18± 4.35		-		-	
Ethnicity											
Malay	227	25.46± 4.81	0.28[a]	38.23± 2.68	0.93[a]	12.76± 5.59	0.37[a]	-	-	-	-
Non-Malay	18	24.05± 2.91		38.05± 2.79		14.00± 3.48		-		-	
Religion											
Muslim	228	25.46± 4.80	0.29[a]	38.24 ± 2.68	0.70[a]	12.78± 5.58	0.49[a]	-	-	-	-
Others	17	24.05± 3.00		37.78± 2.78		13.82± 3.50		-		-	
Years working in nursing											
≤ 4 years	148	25.51± 4.56	0.53	38.07± 2.81	0.29	12.56± 5.45	0.29	-	-	-	-
>4 years	97	25.13± 4.93		38.44± 2.49		13.30± 5.49		-		-	

Note: [a] Analysis based on Mann–Whitney U Test; [b] practice improvement score; analysis based on Pearson's correlation coefficient.

* Significant at level <0.05.

Table 4.23, Continued

Demographic and professional characteristics		Pre-intervention		Post-intervention		Post intervention– Pre-intervention [b]		Linear regression F(5,239)= 6.98, p< 0.001 Adjusted square R=0.01 (pre-intervention)		Linear regression F(3,241)= 16.39, p< 0.001,Adjusted square R=0.15 (post-intervention)	
	No.	**Mean± SD**	**p**	**Mean± SD**	**p**	**Mean±SD**	**p**	**β (SD)**	**CI (95%)**	**β (SD)**	**CI (95%)**
Academic qualification											
Diploma	204	25.43± 4.74	0.59	38.13± 2.67	0.28	12.70± 5.51	0.32	-	-	-	-
Post-basic /degree	41	25.00± 4.56		38.63± 2.76		13.63 ± 5.22		-		-	
Awareness of aggression management guideline											
Yes	161	25.63± 5.07	0.21	38.13± 2.47	0.50	12.50± 5.73	0.16	-	-	-	-
No	84	24.84± 3.90		38.38± 3.10		13.53± 4.89		-		-	
Received physical restraint training during nursing programme											
Yes	193	25.35± 4.54	0.94	38.21± 2.72	0.92	12.86± 5.44	0.98	-	-	-	-
No	52	25.40± 5.32		38.25± 2.58		12.84± 5.64		-		-	
Awareness of hospital policy regarding restraint											
Yes	217	25.34± 4.85	0.09[a]	38.32± 2.68	0.06[a]	12.98± 5.64	0.02*[a]	-	-	-	-
No	27	25.37± 3.50		37.33± 2.67		11.96± 3.88		-		-	
Read any information source regarding restraint during past year											
Yes	72	26.55± 5.11	0.01*	38.23± 2.09	0.95	11.64± 5.80	0.04*		-0.42,2.20	-	-
No	173	24.86± 4.45		38.21± 2.90		13.34± 5.26		0.08 (0.66) Reference		-	
Received in-service restraint programme											
Yes	27	29.18± 5.12	0.001*[a]	37.70± 2.89	0.29[a]	8.51± 6.27	0.001*[a]	-0.27(0.47)*		-	-
No	218	24.88± 4.44		38.28± 2.66		13.39± 5.12		Reference	-3.01,-1.14	-	
Knowledge	245	-	0.09[c]	-	0.001*[c]	-	-	0.09 (0.07)	-0.03,0.27	0.09 (0.05)	-0.03,0.19
Attitude	245	-	0.09[c]	-	0.001*[c]	-	-	-0.17(0.09)*	-0.47,-0.09	0.19(0.08)*	0.01,0.36
Intention	245	-	0.10[c]	-	0.001*[c]	-	-	0.05 (0.12)	-0.14, 0.33	-0.19(0.17)*	-0.75,-0.07

Note: [a] Analysis based on Mann–Whitney U Test; [b] practice improvement score; [c] analysis based on Pearson's correlation coefficient.

* Significant at level <0.05.

4.10 Research question 8

The restraint order form of all restrained patients of 12 wards of the hospital (medical–surgical, geriatric, rehabilitation, intensive care unit, critical care unit, neurology and neurosurgery and psychiatric wards) was assessed to compare the incidence rate and patterns of physical restraint use in the six months before and after the educational intervention.

To assess the incidence rate and patterns of physical restraint, the incidence rate in the last six months of the study (July 2013 to January 2014) was considered as a pre-intervention phase to compare the incidence rate and patterns of physical restraint use before and after the educational intervention. After completing the educational intervention, the incidence rate and patterns of physical restraint were examined for the following six months (post-intervention phase).

4.10.1 Comparison of demographic and clinical characteristics of restrained patients before and after intervention

Demographic and clinical characteristics, namely age, gender, ethnicity, diagnosis, and date of hospitalization, were collected via restraint order form. The independent t- test for non-categorical data (age), Fisher's exact test and a Chi-square test for categorical data was performed to examine the pre- and post-intervention demographic and clinical characteristics group differences. The expectation was that there would be no significant differences in the demographic and clinical characteristics between both two study groups in psychiatric and non-psychiatric wards.

4.10.1.1 Comparison of demographic and clinical characteristics of restrained patients before and after intervention in psychiatric wards

The mean age of restrained patients in the pre-intervention phase (mean 38.9, SD= 13.9) was similar to the mean age of restrained patients in the post-intervention phase (mean 39.5, SD= 15.0). Statistically no significant difference in age was found between the groups, t (142) = -0.254, P= 0.80.

Most of restrained patients were male in both the pre-intervention (55.9%, n= 48) and post-intervention (60.3%, n= 35) groups. In the pre-intervention phase, Chinese patients represented about 39.5% (n= 34) of the study sample followed by Malay (27.9%, n= 24), Indian (22%, n= 19) and other ethnicities (10.5%, n= 9). This was similar to the post-intervention phase where Chinese numbered around 37.9% (n= 22) followed by Malay (34.4%, n= 20), Indian (17.2%, n= 10) and other ethnicities (10.3%, n=6). No statistically significant differences were found in gender (χ^2= 0.291, P<0.58) or ethnicity ((χ^2= 0.918, P<0.82) between the pre- and post-intervention.

In the pre-intervention phase, schizophrenia followed by bipolar mood disorder was the main diagnosis of the psychiatric patients, similar to the post-intervention phase. Fisher's exact test did not show any significant differences on patients' diagnosis between the phases (χ^2= 1.85, P<0.76).

Regarding month of hospitalization, no significant differences were found between the month of hospitalization of restrained patients between the pre-intervention and post-intervention phase (χ^2= 1.07, P<0.95). The majority of the restrained patients had been hospitalized in August in both the pre-intervention (19.7%, n= 17) and post-intervention (22.4%, n= 13) groups. Details are presented in Table 4.24.

Table 4.24: Comparison of demographic characteristics of the restrained patients between pre-intervention and post-intervention phase in psychiatric wards

Characteristics	Pre-intervention (n= 86)	Post-intervention (n=58)	
	n (%)	n (%)	p
Gender			
Female	38 (44.1)	23 (39.5)	0.58[a]
Male	48 (55.9)	35 (60.3)	
Ethnicity			
Malay-Malaysian	24 (27.9)	20 (34.4)	0.82[a]
Chinese-Malaysian	34 (39.5)	22 (37.9)	
Indian- Malaysian	19 (22.0)	10 (17.2)	
Others	9 (10.5)	6 (10.3)	
Diagnosis			
Schizophrenia	36 (41.8)	25 (43.1)	0.76[b]
Bipolar mood disorder	31 (36.0)	17 (29.3)	
Substance abuse	7 (8.1)	6 (10.3)	
Major depressive disorder	6 (6.9)	5 (8.6)	
Other mental disorders	6 (6.9)	5 (8.6)	
Month of hospitalization			
July	15 (17.4)	12 (20.6)	0.95[a]
August	17 (19.7)	13 (22.4)	
September	12 (13.9)	9 (15.5)	
October	11 (12.7)	7 (12.0)	
November	15 (17.4)	7 (12.0)	
December	16 (18.6)	10 (17.3)	
Age	Mean,38.9±13.9	Mean, 39.5±15.0	0.80[c]

Note: [a] Analysis was carried out based on Chi-square test; [b] analysis based on Fisher's exact test; [c] analysis based on independent t-test.

4.10.1.2 Comparison of demographic and clinical characteristics of restrained patients before and after intervention in non-psychiatric wards

The mean age of restrained patients in the pre-intervention phase (mean 60.0, SD= 19.7) was similar to the mean age of restrained patients in the post-intervention phase (mean 60.8, SD= 19.9). Statistically no significant difference in age was found between the groups, t (568) = -0.476, P= 0.63.

Most of the restrained patients were male in both the pre-intervention (75.7%, n= 256) and post-intervention (76.7%, n= 178) groups. In the pre-intervention phase, Chinese patients represented about 42.0% (n= 142) of the study sample followed by Indian (33.4%, n= 113), Malay (22.4%, n= 76) and other ethnicities (2.0%, n= 7). This was similar to the post-intervention phase where Chinese numbered around 42.6% (n= 99) followed by Indian (33.1%, n= 77), Malay (21.9%, n= 51) and other ethnicities (2.2%,

n= 5). No statistically significant differences were found in gender (χ^2= 0.073, P<0.78) or ethnicity ((χ^2= 0.037, P<0.99) between the pre- and post-intervention.

In the pre-intervention phase, cerebro-vascular diseases followed by respiratory diseases were the main diagnosis of the non-psychiatric patients, similar to the post-intervention phase. Fisher's exact test did not show any significant differences in patients' diagnosis between the phases (χ^2= 8.88, P<0.44).

Regarding month of hospitalization, it was noted that most restrained patients were hospitalized in August (19.5%, n= 66) followed by July (17.7%, n= 60) in the pre-intervention phase, while in the post-intervention phase most restrained patients were hospitalized in July (18.1%, n= 42) followed by August (16.3%, n= 38). However, no significant differences were found between month of hospitalization of restrained patients between the pre-intervention and post-intervention phase (χ^2= 1.20, P<0.94). Details are showed in Table 4.25.

Table 4.25: Comparison of demographic characteristics of the restrained patients between pre-intervention and post-intervention phase in non-psychiatric wards

Characteristics	Pre-intervention (n=338)	Post-intervention (n=232)	
	n (%)	n (%)	p
Gender			
Female	82 (24.2)	54 (23.2)	0.786[a]
Male	256 (75.7)	178 (76.7)	
Ethnicity			
Malay-Malaysian	76 (22.4)	51 (21.9)	0.998[b]
Chinese-Malaysian	142 (42.0)	99 (42.6)	
Indian- Malaysian	113 (33.4)	77 (33.1)	
Others	7 (2.0)	5 (2.2)	
Diagnosis			
Cerebro-vascular diseases	127 (37.5)	87 (37.5)	0.448[b]
Respiratory diseases	41 (12.1)	35 (15.0)	
Infectious diseases	32 (9.4)	23 (3.0)	
Cardiovascular diseases	33 (9.7)	23 (3.0)	
Gastrointestinal diseases	24 (7.1)	18 (7.7)	
Cancer	24 (7.1)	17 (7.3)	
Metabolic disorders	9 (2.6)	7 (3.0)	
Renal diseases	6 (1.7)	5 (2.1)	
Cognitive impairment disorders	6 (1.7)	6 (2.5)	
Other physical diseases	39 (11.5)	11 (4.7)	
Month of hospitalization			
July	60 (17.7)	42 (18.1)	0.945[a]
August	66 (19.5)	38 (16.3)	
September	52 (15.3)	39 (16.8)	
October	58 (17.1)	38 (16.3)	
November	48 (14.2)	36 (15.5)	
December	54 (15.9)	39 (16.8)	
Mean age (SD)	60.0 (19.7)	60.8(19.9)	0.634[c]

Note: [a] Analysis was carried out based on Chi-square test; [b] analysis based on Fisher's exact test; [c] analysis based on independent t-test.

4.10.2 Comparison of incidence rate of physical restraint use before and after educational intervention

In the pre-intervention phase, of all patients (n=7606) hospitalized between July 2013 and January 2014 (6 months), 5.57% (n= 424) were restrained. The highest incidence rate of physical restraint was related to neurology–neurosurgery wards (20.70%, n= 118) followed by psychiatric wards (13.19%, n= 86) and geriatric–rehabilitation wards (12.33%, n= 57). The lowest incidence rate of physical restraint was found in medical–surgical units (1.76%, n= 78).

In the post-intervention phase, the highest incidence rate was observed in neurology–neurosurgery wards (14.72%, n= 77) followed by geriatric–rehabilitation wards (11.44%, n= 40) and then psychiatric wards (8.72%, n= 58).

As shown in Table 4.26, the highest incidence decline rate was found in neurology–neurosurgery (5.98%) followed by psychiatric wards (5.47%). The result of the two-proportion Z-test revealed that there was a statistically significant difference in the proportion of restrained patients and in the incidence rate of physical restraint use in each ward, except the geriatric–rehabilitation wards, between pre- and post-intervention. In general, there was a statistically significant difference of incidence rate of physical restraint use in 12 wards of hospital between the pre- and post-intervention phase ($Z= 5.129$, $P< 0.001$). Details are presented in Table 4.26.

Table 4.26: Comparison of incidence rate of physical restraint use by ward types before and after intervention

Ward types	Pre-intervention			Post-intervention			Pre–Post[a]		
	Hospitalized patients(n)	Restrained patients(n)	Incidence rate (%)	Hospitalized patients(n)	Restrained patients(n)	Incidence rate (%)	Incidence rate (%)	Z	p
Intensive care unit	674	46	6.82	768	35	4.50	2.32	1.865	0.03*
Cardiac/critical care unit	822	39	4.74	831	27	3.21	1.53	1.652	0.05*
Neurology/ Neurosurgery	570	118	20.70	523	77	14.72	5.98	2.579	0.001*
Medical–surgical units	4426	78	1.76	4469	53	1.13	0.63	2.256	0.02*
Geriatric/ Rehabilitation	462	57	12.33	350	40	11.44	0.89	0.395	0.34
Psychiatric	652	86	13.19	661	58	8.72	5.47	2.560	0.01*
Total	7606	424	5.57	7602	290	3.81	1.76	5.129	0.001*

Note: Analysis was carried out based on the two-proportion Z-test; [a] pre-intervention incidence rate minus post-intervention.

*Significant at P value < .05.

4.10.3 Comparison of patterns of physical restraint use in non-psychiatric wards before and after educational intervention

Reasons for using physical restraint, alternatives used before applying physical restraint, types of physical restraint, physical restraint period per incident, frequency of restrained patient's assessment and episodes of physical restraint use for each patient were considered as patterns of physical restraint use.

4.10.3.1 Reasons for using physical restraint

In non-psychiatric wards, the most common reported reason for using physical restraint was the patient 'trying to pull out tubes and catheters' in both the pre-intervention (42.2% of restrained days, n= 499) and post-intervention phase (53.4% of restrained days, n= 124). The chi-squared test did not show any significant differences between the number of 'trying to pull out catheter' as a reason to use physical restraint between the pre- and post-intervention phase (χ^2= 3.172, P<0.07).

'Fall prevention' was the second reason to use physical restraint (21.3% of restraint days, n= 72) in the pre-intervention phase, while the rate of the use of physical restraint due to fall prevention diminished to 6.8% restrained days (n=16) after intervention (χ^2= 21.86, P<0.001). 'Restlessness' was the third reason given for using physical restraint (18.6% of restraint days, n= 63) in the pre-intervention phase. The percentage of this reason increased to 21.55% restrained days (n= 50) in the post-intervention phase. However, there was no significant difference in the rate of restlessness as a reason of physical restraint use between the pre- and post-intervention phase.

The Fisher exact test showed that there was a significant difference between the number of assaultive behaviour' as a reason to use physical restraint between the pre-intervention (1.4% restrained days, n= 5) and post-intervention phase (4.31% restrained days, n= 10), χ^2= 4.303, P<0.03.

4.10.3.2 Used alternatives before using physical restraint

The use of only one alternative, such as reassurance or explanation reduced in the post-intervention phase. The chi-squared test showed significant differences between pre- and post-intervention in both reassurance (χ^2= 220.381, P<0.001) and explanation (χ^2= 5.892, P<0.01). Therefore, the use of a combination of reassurance, active listening and explanation was the most used alternative in the post-intervention phase (61.20%, n= 142). There was a significant difference in this item between the pre- and post-intervention phase (χ^2= 170.561, P<0.001).

There was a significant difference between using 'all items' of alternatives before applying physical restraint before and after intervention, as a greater percentage of using all alternatives was reported during the post-intervention phase (χ^2= 5.819, P<0.01).

4.10.3.3 Physical restraint types

Due to the type of physical restraint, the two-point restraint and body restraint had the highest and lowest rate of restraint type, respectively, in both the pre-intervention and post-intervention phase. There was a significant difference between rates of applying mitten and four-point restraint between the pre- and post-intervention phase. In the post-intervention phase, the rate of applying a four-point restraint diminished from 13.31% (n= 45) to 3.01% (n= 7) (χ^2= 17.592, P<0.001). In addition, the rate of using a mitten, which is known as the least restrictive form of physical restraint was increased from 4.43% (n= 15) in the pre-intervention phase to 21.12% (n= 49) in the post-intervention phase (χ^2= 36.960, P<0.001).

4.10.3.4 Physical restraint period per incident

Regarding the physical restraint period per incidence, none of the patients were under physical restraint for less than 24 hours in both phases. However, the physical restraint period per incidence was reduced after intervention. In the pre-intervention phase, 36.6% of restrained patients (n= 124) were in restraint for 7–11 days, which was reduced to 5.1% (n= 12) in the post-intervention phase (χ^2= 75.207, P<0.001). Furthermore, 4.1% of restrained patients (n= 14) were in restraint for more than 12 days before intervention and that was eliminated to 0.0% after intervention (χ^2= 9.851, P<0.001).

At the same time, the physical restraint period of incidence for one day (χ^2= 6.513, P<0.01) and 2–6 days (χ^2= 73.301, P<0.001) was significantly increased after intervention.

4.10.3.5 Frequency of restrained patient assessment

In the pre-intervention phase, most of the restrained patients (36.6%, n= 124) were assessed every 120 minutes while this was decreased to 4.7% (n= 11) in the post-intervention phase (χ^2= 77.672, P<0.001). Additionally, the majority of the restrained patients (90%, n= 209)) were assessed every 60 minutes after intervention. In the pre-intervention phase only 17.4% of restrained patients (n= 59) were examined every 60 minutes, while this was about 90% (n= 209) in the post-intervention phase (χ^2= 291.32, P<0.001).

4.10.3.6 Episodes of physical restraint use

All patients were under physical restraint only once during their hospitalization in both the pre-intervention and post-intervention phase. Details of patterns of physical restraint used in both the pre- and post-intervention phase are shown in Table 4.27.

4.10.4 Comparison of patterns of physical restraint use in psychiatric wards before and after educational intervention

Reasons for using physical restraint, alternatives used before applying physical restraint, types of physical restraint, physical restraint period per incident, frequency of restrained patient's assessment and episodes of physical restraint use for each patient were considered as patterns of physical restraint use.

4.10.4.1 Reason to use physical restraint

In psychiatric wards, the most common reported reason was the patient becoming 'assaultive' in the pre-intervention (17.3% of restrained days, n= 15) followed by 'restlessness' (11.6% restrained days, n= 10) and 'insisting on going home' (11.6% restrained days, n= 10). In the post-intervention phase, the most common reason was 'restlessness' (17.2% restraint days, n= 10) followed by 'becoming assaultive' (15.5% restrained days, n= 9) and 'irritability' (15.5% restrained days, n= 9) and 'wandering' (15.5% restrained days, n= 9). 'Uncooperative with fasting before electroconvulsive therapy' was a reason to use physical restraint for 9.3% of patients (n= 8) in the pre-intervention phase, while no patients were restrained for this reason in the post-intervention phase. There was a statistically significant difference in the number of restraints due to 'uncooperative with fasting before electroconvulsive therapy' as a reason to apply physical restraint between the pre-intervention and post-intervention phase (χ^2= 5.813, P<0.02). The results showed that the rate of restraint use because of

'insisting on going home' and 'refusing medication' was diminished after intervention. However, there was no significant difference in the number of these cases between the pre- and post-intervention phase, statistically.

4.10.4.2 Alternatives used before using physical restraint

The use of a combination of reassurance, active listening and clear direction was increased after intervention from 0.0% (pre-intervention phase) to 22.4% (n= 13) (post-intervention phase), significantly (χ^2= 14.842, P<0.001). In addition, the use of only oral medication or parenteral medication was reduced significantly after intervention.

In 36.2% of cases, all alternatives had been used in the post-intervention phase while there was no report of using all alternatives in the pre-intervention phase (χ^2= 36.454, P<0.001). The use of no alternatives in the pre-intervention phase (11.6%, n= 10) was decreased to 1.7% (n= 1) in the post-intervention phase, significantly (χ^2= 4.816, P<0.05).

4.10.4.3 Physical restraint types

In the -intervention phase, the four-point restraint had the highest rate of restraint type (58.1%, n= 50), while this was reduced to 19% (n= 11) of restraint types in the post-intervention phase. The Chi-squared test showed that there was a significant difference between the rate of use of the four-point restraint between the pre- and post-intervention phase of the study (χ^2= 21.771, P<0.001). The rate of using the mitten and body restraint was reported as 0 in both phases. Therefore, there was a significant difference between the rates of applying the two-point restraint between the pre- and post-intervention phase. In the post-intervention phase, the rate of applying a two-point restraint increased from 41.9% to 81.0% (χ^2= 21.771, P<0.001).

4.10.4.4 Physical restraint period per incident

Regarding the physical restraint period per incident, none of the patients was in physical restraint for more than 24 hours in both the pre-intervention and post-intervention phase. There was no significant difference in the physical restraint period per incident between the pre- and post-intervention phase.

4.10.4.5 Frequency of restrained patient assessment

All patients in both the pre-intervention and post-intervention phases were assessed every 15 minutes in the psychiatric wards.

4.10.4.6 Episodes of physical restraint use

The number of patients who were restrained more than once was decreased in the post-intervention phase. The rate of being restrained twice was reduced from 40.7% (n= 35) in the pre-intervention phase to 27.6% (n= 16) in the post-intervention phase. In addition, the rate of being restrained three times was 3.5% in the pre-intervention phase, which was reduced to 0.0% in the post-intervention phase. However, the Chi-squared test and Mann–Whitney U test did not find any difference in these items between the pre- and post-intervention phases. Most of the patients (72.4%, n= 42) were restrained only once after intervention (χ^2= 4.072, P<0.05). Details of the patterns of physical restraint use in both the pre- and post-intervention phase are shown in Table 4.27.

Table 4.27: Comparison of patterns of physical restraint before and after intervention in psychiatric and non-psychiatric wards

Patterns of physical restraint use	Psychiatric wards				Non-psychiatric wards			
	Pre-intervention (n=86)	Post-intervention (n=58)			Pre-intervention (n=338)	Post-intervention (n=232)		
	n (%)	n (%)	X^2	p	n (%)	n (%)	X^2	p
Reason for using physical restraint								
Trying to pull out catheters	0 (0.0)	0 (0.0)	-	-	155 (42.2)	124 (53.4)	3.172	0.07
To prevent falls	0 (0.0)	0 (0.0)	-	-	72 (21.3)	16 (6.8)	21.867	0.001*
Risk to self	9 (10.5)	8 (13.8)	0.368	0.54	0 (0.0)	1 (0.4)	1.459	0.40[a]
Confusion	1 (1.2)	1 (1.7)	0.080	0.99[a]	39 (11.5)	28 (12.0)	0.037	0.84
Sedation	1 (1.2)	1 (1.7)	0.080	0.99[a]	4 (1.1)	3 (1.2)	0.014	0.99[a]
Assaultive	15 (17.3)	9 (15.5)	0.092	0.76	5 (1.4)	10 (4.31)	4.303	0.03*[a]
Restlessness	10 (11.6)	10 (17.2)	0.913	0.33	63 (18.6)	50 (21.55)	0.734	0.39
Uncooperative with fasting before ECT[b]	8 (9.3)	0 (0.0)	5.813	0.02*[a]	0 (0.0)	0 (0.0)	-	-
Irritability	9 (10.5)	9 (15.5)	0.808	0.36	0 (0.0)	0 (0.0)	-	-
Insist on going home	10 (11.6)	3 (5.2)	1.758	0.24[a]	0 (0.0)	0 (0.0)	-	-
Wandering	9 (10.5)	9 (15.5)	0.808	0.36	0 (0.0)	0 (0.0)	-	-
Disturbed staff and/ or others	5 (5.8)	5 (8.6)	0.042	0.51	0 (0.0)	0 (0.0)	-	-
Refusing medication	5 (5.8)	1 (1.7)	1.451	0.40[a]	0 (0.0)	0 (0.0)	-	-
Crossing red line	4 (4.7)	2 (3.4)	0.126	0.99[a]	0 (0.0)	0 (0.0)	-	-

Note: [a] Analysis was carried out based on Fisher's exact test; [b] ECT= electroconvulsive therapy.

*Significant at P value < .05.

Table 4.27, Continued

Patterns of physical restraint use	Psychiatric wards				Non-psychiatric wards			
	Pre-intervention (n=86)	Post-intervention (n=58)			Pre-intervention (n= 338)	Post-intervention (n= 232)		
	n (%)	n (%)	X^2	p	n (%)	n (%)	X^2	p
Alternatives used before using PR								
Explanation of consequences	1 (1.2)	0 (0.0)	0.679	0.99[a]	43 (12.72)	15 (6.46)	5.892	0.01*
Reassurance	5 (5.8)	0 (0.0)	1.451	0.40[a]	247 (73.7)	30 (12.93)	220.381	0.001*
Reassurance &active listening &explanation	0 (0.0)	13 (22.4)	14.842	0.001*[a]	0 (0.0)	142 (61.20)	170.561	0.001*[a]
Clear direction	24 (27.9)	12 (20.7)	0.962	0.43	1 (0.29)	2 (0.86)	0.842	0.57[a]
Offer oral medication	17 (19.8)	3 (5.2)	6.169	0.01*[a]	0 (0.0)	0 (0.0)	-	-
Parenteral medication	29 (33.7)	8 (13.8)	7.205	0.01*	35 (10.35)	24 (10.34)	0.116	0.73
All items	0 (0.0)	21 (36.2)	36.454	0.001*[a]	10 (2.95)	19 (8.18)	5.819	0.01*
Nothing	10 (11.6)	1 (1.7)	4.816	0.05*[a]	2 (0.59)	0 (0.0)	1.738	0.51[a]
Physical restraint types								
1-point	0 (0.0)	0 (0.0)	-		3 (0.88)	0 (0.0)	0.411	0.64[a]
2-point	36 (41.9)	47 (81.0)	21.771	0.001*	273 (80.76)	176 (75.86)	1.981	0.15
4-point	50 (58.1)	11 (19.0)	21.771	0.001*	45 (13.31)	7 (3.01)	17.592	0.001*
Mitten	0 (0.0)	0 (0.0)	-		15 (4.43)	49 (21.12)	36.960	0.001*
Body restraint	0 (0.0)	0 (0.0)	-		2 (0.59)	0 (0.0)	1.378	0.51[a]

Note: [a]Analysis was carried out based on Fisher's exact test.

*Significant at P value < .05.

Table 4.27, Continued

Patterns of physical restraint use	Psychiatric wards				Non-psychiatric wards			
	Pre-intervention (n=86)	Post-intervention (n=58)			Pre-intervention (n= 338)	Post-intervention (n= 232)		
	n (%)	n (%)	X^2	p	n (%)	n (%)	X^2	p
PR[b] period per incident								
<12 hours	49 (57.0)	30 (51.7)	0.203	0.65	0 (0.0)	0 (0.0)	-	-
12–23 hours	20 (23.3)	16 (27.6)	0.154	0.69	0 (0.0)	0 (0.0)	-	-
1 day	17 (19.8)	12 (20.7)	0.018	0.99	2 (0.59)	8 (3.4)	6.513	0.01*[a]
2–6 days	0 (0.0)	0 (0.0)	-	-	198 (58.5)	212 (91.3)	73.301	0.001*
7–11 days	0 (0.0)	0 (0.0)	-	-	124 (36.6)	12 (5.1)	75.207	0.001*
≥ 12 days	0 (0.0)	0 (0.0)	-	-	14 (4.1)	0 (0.0)	9.851	0.001*[a]
Frequency of assessment								
Every 15 minutes	86 (100.0)	58 (100.0)	0.000	1.00	5 (1.4)	5 (2.1)	0.053	0.81
Every 30 minutes	0 (0.0)	0 (0.0)	-	-	18 (5.3)	7 (3.0)	0.638	0.42
Every 60 minutes	0 (0.0)	0 (0.0)	-	-	59 (17.4)	209 (90.0)	291.32	0.001*
Every 90 minutes	0 (0.0)	0 (0.0)	-	-	132 (39.0)	0 (0.0)	111.58	0.001*[a]
Every 120 minutes	0 (0.0)	0 (0.0)	-	-	124 (36.6)	11 (4.7)	77.672	0.001*
Episodes of PR[b] use								
Once	48 (55.8)	42 (72.4)	4.072	0.05*	338 (100.0)	232 (100.0)	0.000	1.00
Two times	35 (40.7)	16 (27.6)	2.603	0.11	0 (0.0)	0 (0.0)	-	-
Three times	3 (3.5)	0 (0.0)	2.066	0.27[a]	0 (0.0)	0 (0.0)	-	-

Note: [a]Analysis was carried out based on Fisher's exact test; [b] PR= Physical restraint.

*Significant at P value < .05.

4.11 Summary

This chapter provided the results of the data collected for a 16-month study of the incidence rate and patterns of physical restraint use in a teaching hospital in Malaysia. Of all patients (n=39,693) hospitalized between September 2012 and January 2014 (16 months), 3.39% were restrained. In psychiatric wards, 13.6% of hospitalized patients had been restrained. In non-psychiatric wards, the highest incidence rate was in the neurology/neurosurgical wards while orthopaedic wards had the lowest incidence of physical restraint use. In non-psychiatric wards, the most common reported reason for using physical restraint was 'trying to pull out tubes and catheters' followed by 'fall prevention'. The most used alternative before using physical restraint was reassurance only. In 7.3% of cases, no alternatives to physical restraint had been used. Most restrained patients were in restraint for two to six days. In psychiatric wards, 'uncooperative with fasting for ECT' was the most commonly reported reason for using physical restraint, followed by 'irritability'. More than half of restrained patients were restrained with four-point (wrist and ankle) restraints.

Inferential analyses were carried out to assess the effect of educational intervention on the knowledge, attitude, intention and practice of nurses towards physical restraint. The results showed that there was a significant difference in the mean scores for nurses' knowledge, attitude, intention and practice between the pre-intervention and post-intervention phase. A significant increase in the nurses' knowledge, attitude and practice and a significant decrease in the nurses' intention to use physical restraint with a large effect size were noted in the post-intervention phase.

A two-proportion Z-test was performed to find the effect of intervention on the incidence rate of physical restraint. In the pre-intervention phase, of all patients (n=7606) hospitalized between July 2013 and January 2014 (6 months), 5.57% (n= 424) were restrained. This percentage was reduced to 3.81% (n= 290) after educational intervention. In the post-intervention phase, the highest incidence decline rate was found in neurology–neurosurgery, followed by psychiatric wards. The results revealed that there was a statistically significant decrease in the proportion of restrained patients and the incidence rate of physical restraint use in each ward, except the geriatric–rehabilitation wards, after educational intervention. In general, there was a statistically significant difference in the incidence rate of physical restraint use in 12 wards of the hospital between the pre- and post-intervention phase.

Regarding the patterns of physical restraint use in the pre- and post-intervention phase, some differences such as the proper use of alternatives, reduced physical restraint period per incident, and using least restrictive physical restraint were observed in the patterns after educational intervention, which has been explained in detail in the last part of this chapter.

Nurses' demographic characteristics did not influence their knowledge, attitude, intention and practice in the baseline, pre-intervention and post-intervention phase. However, a few professional characteristics of nurses such as "read any information source during past year" and "awareness of hospital policy" showed an influence on their knowledge, attitude, intention and practice in the baseline, pre-intervention and post-intervention phase.

CHAPTER 5: DISCUSSION

5.1 Introduction

This study was carried out to evaluate the effect of educational intervention on the knowledge, attitude, intention, and practice of nurses towards physical restraint and the incidence rate and patterns of physical restraint used in a teaching hospital in Malaysia. This chapter presents a discussion of the results, considering participant characteristics and the findings of the study related to the research questions.

5.2 Participant Characteristics

5.2.1 Restrained patients' characteristics

In this study, 1,349 patients were restrained during a 16-month survey. The mean age of all patients was 49.84 years, with younger patients in psychiatric wards than in non-psychiatric wards. More than half of the restrained patients were male, and most of the restrained patients were diagnosed with schizophrenia and cerebrovascular disease in psychiatric and non-psychiatric wards, respectively. These characteristics were found to be similar with patients from some other studies in other countries (Husum et al., 2010; Knutzen et al., 2007; Zhu et al., 2013).

5.2.2 Nurses' characteristics

The analysis of nurses' demographic and professional characteristics demonstrated that the majority of nurses were female and that almost half of them were aged between 20 and 25 years old and married. More than half of the nurses had work experience of 4 years or less as registered nurses in clinical settings. The majority had a diploma in

nursing. These findings show that the nurses were young and lacked experience in nursing practice. In other studies in teaching hospitals in Malaysia, more than half of the nurses had work experience between 1 to 5 years as registered nurses, and less than one third had post-basic and bachelor's degrees (Atefi, 2014; Ludin et al., 2013). Therefore, the demographic characteristics of nurses in this study may reflect the characteristics of nurses in teaching hospitals in Malaysia. In addition, in the present study, most nurses had no prior in-service training about physical restraint use, which is similar to a few studies around the world (Huang et al., 2009; Sujata & Kaur, 2015; Yeh et al., 2004).

5.3 Incidence rate of physical restraint use

The literature revolves around the wide variation in the use of physical restraints. For example, a survey study showed an incidence rate of 0 to 100% of physical restraint use in nine European countries (Benbenbishty et al., 2010). In the present study, which is the first study of the rate of physical restraint use in Malaysia, of all patients hospitalized in 22 wards, 3.39% were restrained during 16 months of the study. The highest rate of physical restraint use was in the neurology/neurosurgical wards, similarly to a few studies in the USA (Minnick et al., 2007). This may be due to the patients in these wards having suffered from conditions that required the use of catheters and tubes. Patients with neurological conditions may not understand the need for the tubes or catheters in their care management. In addition, most nurses in the current study believed that confusion and disorientation are proper reasons to use physical restraint. Moreover, the rate of physical restraint use in the intensive care unit (ICU) was lower than Minnick et al.' s (2007) study of 17 ICUs in the USA, where 24% of patients were in physical restraint. Also, Choi and Song (2003) found that 46.4% of patients were in physical restraint in ICUs, a much higher rate than that found in the present study. This may be due to multiple ICUs being involved in these studies, as only one ICU was

involved in the current study, and both the above-mentioned studies were conducted around 10 years ago when there was less awareness of the side effects of physical restraint. In contrast, Martin and Mathisen (2005) reported no physical restraint use in one ICU in Norway.

In psychiatric wards, the incidence rate and restraint episodes were similar to those in another Norwegian study (14%, Knutzen et al., 2007) but higher than the 8% rate reported by Hendryx et al. (2010) from the USA. However, the rate of physical restraint in different countries, sometimes in different hospitals in the same country, cannot be compared because of hospital policies and characteristics. Similarly, different units in one hospital may have different patient characteristics that may have influenced the incidence rate. It may not be possible to compare the findings and results of this study with other countries in both psychiatric and non-psychiatric wards due to different definitions of physical restraint, the varying severity of patients' conditions, different data collection methods, and the characteristics of hospitals and wards according to studies of de Casterlé, Goethals, & Gastmans, 2015; Whittington, Lancaster, Meehan, Lane, & Riley, 2006. However, the important thing is that many studies demonstrate that the rate of physical restraint use would diminish via a suitable educational programme. In this study, only 32 nurses (10%) had attended an in-service restraint programme.

5.4 Patterns of physical restraint use

The most common reason for physical restraint use in non-psychiatric wards in this study was to prevent patients from pulling out tubes and catheters. This was also reported in other studies (Benbenbisht et al., 2010; Choi & Song, 2003; Minnick et al., 2007; Turgay et al., 2009). Other reported reasons included preventing falls and in

situations such as patients' restlessness, confusion, sedation, and assaultive behaviour, all of which are supported by other studies (Chiba et al., 2012; Turgay et al., 2009). However, previous studies have reported no relationships between a reduced rate of pulling out tubes and catheters and using physical restraint (Mion et al., 2007). In contrast, Chang, Wang, and Chao (2008) and Curry, Cobb, Kutash, and Diggs (2008) found that using physical restraint increases the risk for unplanned extubation. Bredthauer et al. (2005) demonstrated that physical restraint is used not only for preventing falls, yet some serious outcomes could be increased if physical restraint is used to decrease fall rate (Engberg, Castel, & McCaffrey, 2008; Evans, Wood, & Lambert, 2003).

In psychiatric wards, the most common reason to use physical restraint was patients being uncooperative for fasting before electroconvulsive therapy. In this study, most patients who were restrained before electroconvulsive therapy were diagnosed with bipolar mood disorders. Patients with this condition are reported to have the tendency not to follow directions easily. Whereas being uncooperative for fasting cannot be an acceptable reason to use physical restraint, alternatives such as frequent supervision of the patient and education by nurses may help these patients to understand and cooperate. In this study, the other reasons were irritability, risk to self, and assaultive behaviours. These are similar to findings from studies in other psychiatric wards (Gelkopf et al., 2009; Husum et al., 2010). Although risk to self and assaultive behaviour are common reasons for using physical restraint in psychiatric wards, there are some alternatives for nurses to prevent using a coercive procedure in these cases (Royal College of Nursing, 2008).

The findings in this study and in earlier studies reported the most common type of physical restraint was two or four points of wrist and ankle restraint (Akansel, 2007; Benbenbishty et al., 2010; Kooi, 2015; Turgay et al., 2009). Wrist and ankle physical

restraints are commonly used to prevent falls or to maintain a medical device (Turgay, 2009). In some studies, the most common type of physical restraint was using bedrails (Chiba et al., 2012; Enns et al., 2014; Kandeel & Attia, 2013; Kruger et al., 2013). Bedrails were excluded from the present study because they were not considered a physical restraint in hospital policy at the time. Based on the literature, the least restrictive form of restraint is mittens, and the most restrictive type is four-point and body restraint. Nurses must use restraints with the least restrictive form, if it is applicable for their patients (American Psychiatric Nurses Association, 2014).

This study also found that no alternatives were used for 10.3% of all 1,349 patients (psychiatric and non-psychiatric wards). This may be due to high workload, lack of knowledge, or negative attitudes by nursing staff and physicians towards using alternatives. In a study by Lee et al. (1999), 20% of nurses neglected to carry out alternatives to using physical restraint. In another study, 52.4% of nurses implemented only the 'talk to calm method' as an alternative (Hakverdioglu, 2002), which was similar to our finding. In contrast, other studies demonstrated that most nurses used alternatives to physical restraint successfully (Demir, 2007; Luk et al., 2015). In the psychiatric wards, the rate of choosing non-medicinal alternatives to physical restraint was low in this study. Perhaps this may be related to a patient's uncontrollable condition, lack of knowledge, or negative attitudes of nurses regarding non-medicinal alternatives for psychiatric patients. Some alternatives to using physical restraint are reassurance, explanation of consequences of assaultive behaviours, clear directions, management of causes of agitation, using analgesia, involvement of family and friends, patient ambulation, cognitive stimulation, and milieu therapy (Luk et al., 2015). Nurses need to know about alternatives and the importance of applying alternatives to physical restraint for patients.

The results of the study indicated that most of the physical restraint occurred during the night shift or evening shift, which is similar to studies of Akansel (2007), Luk et al. (2015), and Ragun et al. (2015), which showed that more than 80% of physical restraint occurred during evening and night shifts. Delirium symptoms may be common during evening and night shifts. Additionally, the long working hours during the night shift and the allocation of less staff during evening or night shifts may have contributed to the increased frequency of physical restraint during those shifts (Wynn, 2003). A lack of nurses has been reported as the main reason for using restraint in some studies in ICUs and acute care units, especially during night shifts (Gastmans & Milisen, 2006; Lai, 2007).

With regard to complications with physical restraint, abrasion was the only negative consequence reported in this study in non-psychiatric wards. In psychiatric wards, all patients were restrained for less than one day, with nursing assessment every 15 minutes. However, in non-psychiatric wards, most restrained patients were restrained continuously for more than one day, and some patients had been restrained for more than 11 days, with the frequency of assessment for restrained patients being two hours in most cases. Therefore, as in other studies expected more and serious reports on complications, as in other studies (Demir, 2007; Evans et al., 2003; Mott, Poole, & Kenrick, 2005). However, due to the nature of using a self-report form in the data collection method, there may have been poor documentation by the nurses about complications in this study. Physical restraints should be released or discontinued every two to four hours in adults aged 18 years and above (The Joint Commission, 2009).

5.5 Knowledge, attitude, intention, and practice of nurses towards physical restraint

5.5.1 Knowledge of nurses about physical restraint

In this study, the mean score of 40.48 (SD=4.05), which is slightly above the midpoint of the possible range (15 to 60 points) may implies a moderate level of knowledge. However, nurses showed some important misunderstandings regarding physical restraint use. These findings are consistent with other studies that revealed almost moderate level knowledge of nurses regarding physical restraint use (Azab & Negm, 2013, Karagozoglu et al., 2013; Suen et al., 2006). This study found, in agreement with other studies (De Jonghe, Constantin, Chanques, Capdevila, Lefrant, & Mantz, 2013; Janelli et al., 2006), that many nurses stated that physical restraints do not require a physician's order. This demonstrated that physical restraint was started and removed based on the nurses' clinical judgment, which can lead to a difficult situation for nurses. Similarly to some other studies (Azab & Abu Negm, 2013; Suen et al., 2006), participants demonstrated minimal awareness regarding alternatives in this present research. Alternatives to restraints have been categorised as environmental, physical, psychosocial, physiological, and nursing care interventions (Centres for Medicare and Medicaid Services, 2012). In this current study, less than half of the nurses reported that they tried a few nursing methods before using physical restraint, and at the same time, most of them believed that no other good methods exist other than physical restraint. Therefore, nurses are usually unaware of the various types and benefits of restraint alternatives. Thus, one of the most important topics during restraint minimisation programmes would be introducing and focusing on physical restraint alternatives.

Nurses' awareness of consequences of physical restraint use is another important issue. The risks of choking, spluttering, and even death, which are dangerous side effects of physical restraint use, were not considered by most nurses; this finding is in agreement with other studies (Azab & Abu Negm, 2013; Suen et al., 2006). Proper perception of consequences of physical restraint can be a preventive factor in using physical restraints inappropriately.

5.5.2 Attitude of nurses towards physical restraint

In this study, the mean score of 24.13 (SD=3.09), which is slightly below the midpoint of the possible range (10 to 40 points) may implies a moderate level of attitude. However, most of the nurses had negative attitudes regarding some important areas of physical restraint use. These findings are consistent with some other studies (Azab & Abu Negm, 2013; Karagozoglu et al., 2013; MacCabe, Alvarez, McNulty, & Fitzpatrick, 2011). For example, more than half of nurses disagreed with the statement 'I feel that family members have the right to refuse the use of physical restraint'. At the same time, most of them reported that they never inform family regarding the use of physical restraint for the patient or 'explain to the patient why they are restrained'. This indicated the need to promote nurses' awareness about ethical issues and the patient's and family's rights regarding using physical restraint.

On the other hand, in this study, less than half of nurses agreed that if they were a patient they should have a right to refuse physical restraint. Yet some of them (30.1%) stated that they felt embarrassed when the family entered a restrained patient's room or that they felt uncomfortable if the patient got more upset after physical restraint. The decision to use physical restraint is not without difficulty for nurses, and sometimes nurses were faced with a dilemma; this contributes to why the study demonstrated mixed feelings among nurses regarding physical restraint (Suen et al., 2006). However, a few nurses believed that patients suffer from physical restraint use, and more than half of them felt confident in the use of physical restraint. In studies by Chuang and Huang (2007) and Saarnio and Isola (2010), some nurses reported that they feel secure and relieved when they placed restraints on patients. This finding explains why the participants might strongly believe that physical restraint is the only and best way to protect both patients and staff from harm. Therefore, their attitude is affected by these

negative thoughts and inadequate knowledge. As Suen et al. (2006) demonstrated a lack of knowledge had some influence on nurses' attitude regarding physical restraint use.

5.5.3 Intention of nurses regarding physical restraint

Regarding nurses' intention to use physical restraints, the mean score was high, indicating that there was strong intention to use physical restraint among nurses in this study. There is a lack of studies focused on the intention of staff members to use physical restraint in hospitals. A study by Werner and Mendelsson (2001) found that nurses' intention to use physical restraint was strong among 303 elderly care nurses in Israel. In that study, nurses had a moderate score of attitude towards physical restraint, whereas nurses had a very strong intention to use physical restraint. Therefore, the findings of the study encourage researchers and nurse educators to consider intention as an important element of the theory of planned behaviour (Ajzen, 2006) in further studies about changing behaviour processes.

5.5.4 Practice of nurses towards physical restraint

In this study, the mean score of nurses' practice showed that more than half of nurses reported improper practice toward physical restraint use. Most nurses do not properly report their performance regarding restraint use, especially regarding alternatives and patients' and families' rights. When compared with the scores reported in the literature, there were some similarities to other studies (Azab & Abu Negm, 2013; Janelli et al., 2006; Karagozoglu et al., 2013; Suen et al., 2006). The result showed that the majority of nurses reported that they do not consider why they have to use restraint for the patients, and most of them explained that they never inform the patients and their families why they need to be physically restrained. Patients and their families have the right to know the reason for using physical restraint. They even have the right to refuse

physical restraint, except in emergency situations (Centres for Medicare and Medicaid Services, 2006).

The results demonstrated that more than half of the nurses never suggest to the doctor that the patient does not need physical restraint. Nurses often are the first line of care for patients, and they spend more time with them. Thus, they should use evidenced-based practices to provide better nursing care. Nurse–physician cooperation is necessary for improving patient care.

In this study, a small percentage of nurses stated that they always respond to the signal light or call for help from a restrained patient, and only 3.9% of nurses stated that they always give personal care, such as examining the patient's skin to prevent side effects from the restraint. According to the American Psychiatric Nurses Association (2014), nurses must assess restrained patients immediately and then every hour after restraining. They must pay attention to any physiological or psychological needs of the patients to prevent consequences from the physical restraint.

Furthermore, most nurses reported that the standard requirement (restraint product) for restraint is sometimes unavailable in their units. Thus, nurses sometimes wrapped the dressing pads around the patient's wrist or ankle to tie it to the bed frame with a roll of gauze. In the study of Kandeel and Attia (2013), it was reported that most nurses applied gauze and dressing as a physical restraint device, which is not a standard device for restraint in hospitals. In this case, the hospital is responsible for providing the standard restraint products to reduce negative outcomes of using this procedure.

5.6 Effect of educational intervention on the knowledge, attitude, intention, and practice of nurses towards physical restraint

To assess the effect of educational intervention on the knowledge, attitude, intention, and practice of nurses towards physical restraint, the knowledge, attitude, intention, and practice mean scores of 245 nurses were compared between pre- and post-intervention phases. The results showed that the educational intervention resulted in a statistically significant increase in the mean knowledge, attitude, and practice scores and a decrease in the mean intention scores of nurses towards physical restraint use. Lower mean intention scores imply a weak intention to use physical restraint by nurses. Previous studies have reported similar results for the knowledge, attitude, and practice of nurses regarding physical restraint. In a study of Huang et al. (2009), a significant improvement was demonstrated in the knowledge and self-reporting practice of nurses between the intervention and control groups and between the pre-test and post-test in the intervention group. Although attitude scores significantly increased after the intervention in the experimental group, there were no significant differences in terms of attitude between the two groups post-test. However, the 90-minute educational programme may be insufficient to change the feeling of nurses towards physical restraint in depth.

In a quasi-experimental study, Yeh et al. (2004) reported a significant increase in the average mean knowledge post-test score compared to the pre-test score. However, there was no significant difference in the self-reporting clinical practice of nurses towards physical restraint between pre- and post-intervention. In this study, a four-hour restraint reduction lecture was given as an intervention for nurses. During the class, nurses learned about the principles of nursing care to reduce restraint use, alternatives to physical restraint, standard procedures for the nursing care of restrained patients,

patients' rights, and managing aggressive behaviour. This result in the practice part of the study might be related to the short-time education or short-time lapse between the pre-test and the post-test. The participants had only three days to demonstrate a difference in their practice regarding physical restraint.

In a study of Pellfolk et al. (2010) which evaluated the effects of a 6-month restraint reduction educational intervention on staff knowledge and attitude, the results demonstrated improvement in the knowledge and attitude of nursing staff in the intervention group. The 6-month educational programme consisted of six themes, which described and taught about dementia, delirium in old people, predisposing factors for injury in these people, the use of physical restraint, caring for people with dementia, and complications. The educational programme was presented through videotaped lectures and some notes for group discussions that had been arranged by nursing managers.

In a few studies, intervention could not change the knowledge, attitude, and practice of nurses regarding physical restraint. For example, in a study of Dermaid and Byrne (2006), the results showed that there was no difference in nurses' knowledge, attitude, and practice to use physical restraint between the intervention and control groups. In this study, the researchers explained that other environmental factors and nurses' professional characteristics may have had an effect on nurses' knowledge, attitude, and behaviour, although the units had been matched by some environmental factors. In another study in psychiatric units, Kontio et al. (2011) explored the effect of an e-learning course on psychiatric nurses' professional competency in physical restraint, but the results did not demonstrate the benefits of PsychNurse.net on the knowledge and attitudes of nurses towards physical restraint. Further studies could demonstrate the effectiveness of e-learning educational intervention about coercive procedures. It seems that differences in research design, methodology, duration, content, and teaching

strategy might have accounted for the differences in the results between the current study and previous studies.

5.7 Effect of educational intervention on incidence rate and patterns of physical restraint use

Most educational programmes about minimising physical restraint that have been carried out in nursing homes could minimise the rate of physical restraint use and modify the patterns of physical restraint use, such as the duration of physical restraint application, among nursing home residents (Gulpers et al., 2013; Koczy et al., 2011; Testad, Ballard, Brønnick, & Aarsland, 2010). In contrast, a few researchers have demonstrated that a short-term educational programme could not change the physical restraint rate in psychogeriatric nursing homes (Huizing et al., 2006). There is a lack of literature regarding the effect of educational programmes on patterns of physical restraint use. In the study of Huizing et al. (2006), the results showed a significant difference regarding the type of restraint between the experimental and control groups, since nurses in the experimental group used less restrictive forms of physical restraint than nurses in the control group after intervention. However, environment situations, residents' situations, and the length of stay of residents in nursing homes are very different from hospitals. Although there is a lack of literature regarding the effect of an educational intervention on the incidence rate and patterns of physical restraint use in hospitals, the studies discussed below have considered the effect of educational intervention on physical restraint use in hospitals.

5.7.1 Comparing the incidence rate of physical restraint use before and after educational intervention

In this study, patients' characteristics that have been considered as possible effective factors on physical restraint incidence rate (Knutzen et al., 2007; McCue, Urcuyo, Lilu, Tobias, & Chambers, 2004; Whittington et al., 2006; Zhu et al., 2013) were matched in both psychiatric and non-psychiatric wards between pre- and post-intervention phases. These factors consisted of demographic and clinical factors (age, gender, ethnicity, patient's diagnosis, and month of hospitalisation). After controlling for the possible effects of patient demographic and clinical characteristics of the patient, the incidence rate of physical restraint use was compared between the pre- and post-intervention phases. In this current study, of all hospitalised patients in 12 study wards (n=7,606), 5.57% were restrained in the pre-intervention phase, and of all hospitalised patients (n= 7,602), 3.81% were restrained in the post-intervention phase. This result revealed that there was a statistically significant difference in the proportion of restrained patients and in the incidence rate of physical restraint use in each ward, except the geriatric-rehabilitation wards, between the pre- and post-intervention phases. In general, there was a statistically significant difference of incidence rate of physical restraint use in study wards of the hospital between the pre- and post-intervention phase. This study is in agreement with other studies that have showed positive results of an educational programme used to decrease the rate of physical restraint use (Bergk et al., 2008; Enns et al., 2014; Pelfolk et al., 2010; Smith et al., 2003).

In contrast to the finding of this study, Dermaid and Byrne (2006) and Lai et al. (2013) reported no change of physical restraint use rate in their study. Dermaid and Byrne (2006) conducted a case-control study to assess the effect of intervention on physical restraint use; therefore, it was necessary to match wards carefully. In their study, the researchers explained that the result may be affected by this issue. In the study of Lai et

al. (2013), the researchers explained that they needed collaboration of all staff members and of family in the intervention part of the study. Different educational intervention methods might have accounted for differences in the results between the present study and Lai et al.'s (2013) study.

In this study, although the number of restrained patients diminished after intervention in geriatric-rehabilitation wards, there was no significant difference in the incidence rate of physical restraint use between two phases in these wards. In the study of Ludwick, O' Toole, and Meehan (2010), nurses believed that there are more barriers to using alternatives instead of using physical restraint when they are working with older patients. They believed that 'safety is the biggest thing' in geriatric wards and that nurses must coordinate their safety work with the other nurses, physicians, families, and other health workers. Therefore, they felt too much pressure to make the best choice to maintain the patients' safety.

5.7.2 Comparing patterns of physical restraint use before and after educational intervention

5.7.2.1 Reasons for using physical restraint

This current study showed some differences in the reason for using physical restraint between the pre- and post-intervention phases. In non-psychiatric wards, 'fall prevention' was the second reason to use physical restraint (21.3%) in the pre-intervention phase, whereas the rate of the use of physical restraint due to fall prevention significantly diminished to 6.8% restrained per day after intervention. In the study of Enns et al. (2014), the rate of physical restraint use was diminished, while the number of falls remained unchanged. This study demonstrated that there was no positive relationship between reduced physical restraint use and increased fall events.

Therefore, there are some alternatives to prevent falls, such as re-orientation of the patient, instead of using physical restraint. In addition, the number of those using physical restraint due to 'assaultive behaviour' significantly increased after educational intervention. This means that more patients were in restraints due to assaultive behaviour, by which they can harm other patients, staff, or themselves. There were no statistically significant differences between 'pulling out tubes/catheters' and 'restlessness' as reasons to use physical restraint between the two phases. However, the literature has reported that physical restraint use increases the risk of extubation (Chang et al., 2008; Curry et al., 2008). In the present study, some alternatives to prevent pulling out tubes/catheters were included in the educational intervention content, but there was no significant decrease in using physical restraint to prevent the pulling out of tubes. Nurses probably fear life-threatening situations like extubation, so they still tend to use physical restraint instead of alternatives. Nurses may need long-term practical education to change their attitudes about the relationship between increased extubation and the freedom of movement of patients. An important suggestion of Yeh et al. (2004) is collaboration among nurses, physicians, families, and respiratory therapists to eliminate conflicts over the use of physical restraint to prevent the pulling out of tubes.

In psychiatric wards, there was a statistically significant difference in the number of restraints due to patients being 'uncooperative with fasting before electroconvulsive therapy' as a reason to apply physical restraint between the pre-intervention and post-intervention phases. No study has reported patients being 'uncooperative with fasting' as a reason to use physical restraint. It cannot be a sound reason for applying physical restraint on patients. After educational intervention, no patients were restrained for this reason. In this study, 'insisted on going home' and 'refused medication' were other reasons to use physical restraint in psychiatric wards. Although the rate of applying physical restraint because of these reasons reduced after intervention, there were no

significant differences in the rate of these reasons between the pre- and post-intervention. A significant change in some patterns of physical restraint use may need a longer time because of the need for more time to substitute alternatives to physical restraint.

5.7.2.2 Alternatives to using physical restraint

In both non-psychiatric and psychiatric wards, nurses used significantly more alternatives after educational intervention. In psychiatric wards, the use of medication without any other non-medical alternative significantly decreased after educational intervention. Similarly to finding of this present study, in the study of Yeh et al. (2004), nurses used more alternatives after an educational programme than before.

5.7.2.3 Physical restraint types

In non-psychiatric wards, there was a significant decrease in the rate of applying four-point restraint and a significant increase in the rate of using mittens after educational intervention. The present study showed similar results in psychiatric wards, as the use of four-point restraint significantly reduced after educational intervention. This result showed that after educational intervention, nurses applied the least restrictive forms of physical restraint more than before the intervention. Four-point restraint and mittens are the most and least restrictive forms of physical restraint, respectively. Based on the literature, when restraints are needed, the least restrictive form of all physical restraint types must be used. Mittens take away less freedom while still protecting the patients. When the least restrictive form of physical restraint can keep the patient safe from harm, other physical restraints should never be used (Tampa Bay Basic Training Medical Skills, 2010).

5.7.2.4 Physical restraint period per incident

In the current study, in non-psychiatric wards, the physical restraint period per incident reduced significantly after intervention. Fourteen patients were restrained for more than 12 days in the pre-intervention phase compared to 0 in the post-intervention phase. In psychiatric wards, no patient was restrained for more than 24 hours in both the pre- and post-intervention phases. In the study of Smith et al. (2003), in the 3 months before the educational programme, 7% of hospitalised patients were restrained for an average of 8.2 days per incident. After the educational programme, this average was reduced to 1 to 2 days. Physical restraints should be released at least every two hours to assess whether the patient needs to be in restraints again (American Psychiatric Nurses Association, 2014).

5.7.2.5 Frequency of restrained patient assessment

In this study, the majority of the restrained patients in non-psychiatric wards were assessed every 60 minutes by nurses after intervention, while the most frequent assessment was every 120 minutes before intervention. In psychiatric wards, all patients were assessed every 15 minutes in both the pre- and post-intervention phases. Assessment of psychiatric restrained patients every 15 minutes and non-psychiatric patients every 60 minutes has been recorded as a best practice in physical restraint use University Malaya Medical Centre policy. Therefore, the majority of nurses considered the hospital policy in the frequency of assessment of restrained patients after intervention. However, there is no existing study regarding the effect of educational intervention on frequency of restrained patient assessment to make a comparison.

5.7.2.6 Episodes of physical restraint use

In non-psychiatric wards, all patients were restrained only once in both the pre-intervention and post-intervention phases. In psychiatric wards, most of the patients were restrained only once after intervention. However, there was no significant decrease in the rate of two-time and three-time episodes of physical restraint before and after intervention. Similarly to results of this study, Smith et al. (2003) reported no significant change in episodes of physical restraint after an educational programme in a general hospital.

5.8 Association between the knowledge, attitude, intention, and practice of nurses towards physical restraint

In this study, multiple linear regression analysis of results demonstrated an association between nurses' attitude with intention and between attitude and intention with the practice of nurses towards physical restraint in the post-intervention phase. Nurses with more positive attitudes indicated weak intention and better practice of physical restraint use. In addition, nurses with weak intention to use physical restraint demonstrated better practice of physical restraint use. In the baseline, pre-intervention phase and post-intervention phase knowledge did not show any associations with other variables. The result of the study was in agreement with the theory of planned behaviour. In this theory, knowledge is not considered as a main component, but it is considered as a basic factor to change behaviour (Ajzen, 1991). However, a study conducted by Suen et al. (2006) found that the knowledge of nurses had a positive, indirect effect through attitude on the nurses' practice of physical restraint.

Similarly to the current study, some studies have found that there is an association between attitude and practice or behaviour regarding physical restraint use (Azab &

Abu Negm, 2013; Suen et al., 2006). In addition, Werner and Mendelsson (2001) found a correlation between attitudes and intention to use physical restraint. Also, Suen et al. (2006) found that attitudes of nurses towards physical restraint use showed positive direct effects on restraint practice.

In the present study, there was no association between the attitude, intention, and practice of nurses towards physical restraint in the baseline phase, whereas nurses' attitude showed a negative relationship with the practice of nurses in the pre-intervention phase. This result showed that relationships between attitude, intention, and practice did not follow the pattern of relationships between these components in the theory of planned behaviour in the baseline and pre-intervention phases. However, a pattern of relationships between knowledge, attitude, intention, and practice was according to the theory of planned behaviour after educational intervention.

5.9 Association between nurses' characteristics and their knowledge, attitude, intention, and practice

Among nurses' demographic characteristics, academic qualification was found to be significant correlate of the total mean knowledge score only in the baseline phase of the current study. Nurses who had post-basic and bachelor's degrees had a significantly higher mean knowledge score compared to nurses with a diploma. In the pre-intervention and post-intervention phases, no association was found between academic qualification and the knowledge, attitude, intention, and practice of nurses. In the study of Suen et al. (2006), registered nurses had a higher level of knowledge and positive attitude towards physical restraint than assistant nurses. In addition, in contrast to results of this study, nurses with five years or more of working experience had a higher level of knowledge, positive attitude, and better practice. Werner and Mendelsson (2001) found

that nurses with a higher level of education had less negative attitudes regarding physical restraint. However, most studies could not find any association between demographic characteristics of nurses and their knowledge, attitude, and practice towards physical restraint (Azab & Abu Negm, 2013; Ben Natan et al., 2010, Farina-Lopez et al., 2014; Racey, 2006; Stinson, 2016).

Regarding an association between other nurses' professional characteristics and their knowledge, attitude, intention, and practice, the results did not show a predictable pattern. 'Read any information source' was found to be a significant correlate of the total mean knowledge and attitude score. Nurses who had read any information source during the past year had significantly higher mean knowledge and attitude scores than nurses who had not. In the intervention phase, nurses who had read any information source had a higher intention score to use physical restraint. In addition, nurses who received physical restraint training during their nursing programme had a higher mean knowledge score in the post-intervention phase. Regarding an in-service restraint programme, nurses who attended an in-service restraint programme had a higher mean attitude score in the pre-intervention and post-intervention phases. However, nurses who attended an in-service restraint programme had a lower mean practice score in the pre-intervention phase of the study. In the post-intervention phase, no association was found between attending an in-service restraint programme and the knowledge, intention, and practice of nurses towards physical restraint. Similarly to the findings of the present study, Azab and Abu Negm (2013) demonstrated no significant association between the previous knowledge of nurses and their knowledge, attitude, and practice scores.

Awareness of the hospital policy regarding physical restraint use was found to be a significant correlate of the total mean practice score in the baseline phase of the study. No association was found between awareness of the hospital restraint policy and the knowledge and attitude of nurses in this study. Therefore, it seems that those nurses who

obeyed hospital policy demonstrated better practice towards physical restraint. However, this result has not been showed in the pre-intervention and post-intervention phases of the study.

Although this study showed few correlations between nurses' characteristics and their knowledge, attitude, intention, and practice, overall, nurses' demographic and professional characteristics could not predict their knowledge, attitude, intention, and practice towards physical restraint in this study. More studies are needed to assess the association between these variables among nurses in Malaysia.

5.9 Theoretical Consideration

The theory of planned behaviour utilizes attitude, subjective norm and perceived behavioural control to predict intention and then behaviour efficiently (Ajzen, 2006). For this present research, the attitude, subjective norms and perceived behavioural control were conceptually grouped together based on the TPB so that the main research variables were the knowledge, attitude, intention, and physical restraint, nurses' demographic and professional characteristics and educational intervention for nurses. Although the knowledge does not play a direct role in this theory, increased knowledge affects attitude, subjective norms and perceived behavioural control, indirectly (Ajzen, 2006).

In this study, nurses' knowledge could not predict nurses' attitude, intention and practice which were in agreement with the relationships between the construct of theory of planned behaviour. Attitude of nurses towards physical restraint could predict intention and practice of nurses towards physical restraint. So that nurses with more attitude score showed less intention to use physical restraint for their patients. Also, nurses with more attitude score showed more positive practice of use of physical

restraint. This result was in agreement with the relationships between components of theory of planned behaviour.

Even though some researchers suggested that there might be a gap between intention and behaviour, this present study showed intention of nurses to use physical restraint could predict nurses' practice of physical restraint use according to theory of planned behaviour and some meta-analysis research. There is a lack of theory- based predictive study of nurses' knowledge, attitude, intention and practice towards physical restraint, however, the study of Werner and Mendelsson (2001) showed that attitude and intention of nurses towards physical restraint use could predict practice of nurses towards physical restraint use by using theory of reasoned action.

5.10 Summary

This study assessed the impact of an educational intervention on the knowledge, attitude, intention, and practice of nurses towards physical restraint and the incidence rate and patterns of physical restraint use. The results of this study indicate that 3.39% of patients were restrained during the 16 months of the incidence survey study. The highest incidence rate of physical restraint use was in neurology/neurosurgery wards, followed by psychiatric wards. Although the literature revolves around the wide variation in the use of physical restraints, this finding reflects the findings of some studies. The most common reason to use physical restraint was to prevent patients from pulling out catheters/tubes in non-psychiatric wards, similarly to many other studies. Before intervention, the most common reason to use physical restraint in psychiatric wards was that the patient was uncooperative with fasting before electroconvulsive therapy, which is not an acceptable reason to use physical restraint.There were significant improvements in nurses' knowledge, attitude, and practice and a significant decrease in nurses' intention towards physical restraint use after educational

intervention. The incidence rate of physical restraint use was diminished after educational intervention, and some positive changes in patterns of physical restraint occurred after intervention. All these findings indicate possible benefits of educational intervention on minimising physical restraint use and encouraging the proper use of physical restraint as a last resort.

CHAPTER 6: CONCLUSION

6.1 Introduction

This study explored the incidence rate and patterns of physical restraint use in a teaching hospital in Malaysia. Of all patients (n=39,693) hospitalised between September 2012 and January 2014 (16 months), 3.39% were restrained. In psychiatric wards, 13.6% of hospitalised patients had been restrained. In non-psychiatric wards, the highest incidence rate was in neurology/neurosurgical wards (19.77%), while orthopaedic wards had the lowest incidence of physical restraint (0.54%).

The most common reasons for physical restraint use were to prevent patients from pulling out tubes and catheters and for patients who were uncooperative with fasting before electroconvulsive therapy in non-psychiatric and psychiatric wards, respectively. In both psychiatric and non-psychiatric wards, the most common type of physical restraint used was two- or four-point wrist and/or ankle restraint. Regarding alternatives to using physical restraint, most nurses used reassurance in non-psychiatric wards, whereas fewer nurses used non-medicinal alternatives in psychiatric wards. In most cases, physical restraint started in the evening and night shifts in both psychiatric and non-psychiatric wards. In non-psychiatric wards, most restrained patients were restrained continuously for more than one day, with a frequency of assessment for restrained patients of two hours in most cases. In psychiatric wards, all patients were restrained for less than one day, with nursing assessment every 15 minutes.

This study found a moderate level of knowledge and attitude, very strong intention, and some inappropriate practice of nurses towards physical restraint. Significant increases in nurses' knowledge, attitude, and practice and a significant decrease in intention scores were noted following educational intervention. In addition, the incidence rate of

physical restraint use decreased from 5.57% to 3.81% after educational intervention in 12 study wards of the hospital. Moreover, some positive changes were reported after intervention, such as a reduced period per incident, more use of the least restrictive form of physical restraint, and the use of more alternatives to physical restraint.

Regarding the association between knowledge, attitude, intention, and practice, the findings presented in this study showed that there was a significant negative association between nurses' attitude and their intention and between nurses' intention and their practice in the post-intervention phase of the study. In addition, there was a significant positive association between nurses' attitude and their practice. This result was in agreement with the concepts and relationships between components of theory of planned behaviour. There was no significant association between nurses' knowledge and their intention and practice. Additionally, no significant association was found between the demographic characteristics of nurses and their knowledge, attitude, intention, and practice in the post-intervention phase. A few demographic and professional characteristics of nurses such as academic qualification, awareness of hospital policy or reading information source were associated with their knowledge, attitude, and practice in the baseline phase, but they did not follow a specific pattern in the pre- and post-intervention phases.

6.2 Implications for nursing practice and education

One of the values of this study is the adoption and validation of the knowledge, attitude, intention, and practice of nurses towards physical restraint (KAIP) questionnaire in Malaysia. This research showed that the Malay version of the KAIP is a valid and reliable questionnaire to evaluate Malaysian nurses' knowledge, attitude, intention, and practice towards physical restraint. Thus, it is appropriate for application by educators,

administrators, policymakers, and researchers to improve the quality of care provided to patients who may need to be restrained. Based on the level of knowledge, attitude, practice, and intention of nurses, a programme to minimise physical restraint can be appropriately planned, implemented, and evaluated.

Practitioners need to know about the incidence rate and patterns of physical restraint, such as the reasons to use physical restraint and the use of alternatives to physical restraint in hospitals. These data should be recorded consistently to provide more awareness of the use of coercive procedures in the hospital. They can also help to empirically validate the effectiveness of using alternatives to physical restraint. In addition, in the research area, assessment of the incidence rate and patterns of physical restraint is valuable as an epidemiological database for future research.

In Malaysia, nursing education programmes allocate only two hours to teach nursing students about physical restraint. The results of this study would be instructive for educators and curriculum developers to allocate enough time to teach physical restraint reduction to nursing students.

The knowledge of nurses forms the basis of their behaviour to conduct meaningful nursing activities during a crisis. Thus, increasing the knowledge of nurses on how to find the root causes of patients' behaviour and to deal with patients' needs without applying physical restraint is crucial. Moreover, the attitudes of nurses regarding physical restraint use put nurses in the position of a patient or family, as they can guide them to think about alternatives to physical restraint. Therefore, nurses' improved attitudes can adjust the gap in patient care by reducing the need to use physical restraint. Awareness of the proper practice of physical restraint helps nurses to try alternatives and to value the autonomy and freedom of the patients, resulting in increased quality of care for patients. Therefore, the greatest value of this study is the development of an

educational intervention to improve nurses' knowledge, attitude, and practice regarding physical restraint use and to minimise physical restraint use in hospitals.

Providing the highest quality of care and safety, being cost-effective, and having a good reputation are the goals of healthcare leaders. Reducing physical restraint use leads to a more therapeutic and respectful space with a less violent milieu and greater staffing effectiveness. This is in alignment with patient-centred care. Therefore, the results and developed educational intervention of this study may help leaders to form a structure for staff planning and education. Hospital policies regarding physical restraint may also need to be revised.

Some points highlighted in this study showed the importance of team work for effective implementation of any practice improvement. Involvement and collaboration of physicians are important to choose the best alternatives to using physical restraint by nurses. Involvement of head nurses and nursing managers is necessary to encourage nurses to implement new alternatives and the best practice of physical restraint. Involvement of hospital managers to provide standard equipment can help to reduce consequences when it is necessary to use physical restraint as a last resort. All of these elements might lead to the best rate of acceptance of changes in nurses' practice.

6.3 Strengths and limitations

To the best of my knowledge, this study is the first attempt to identify the incidence rate and patterns of physical restraint use and the effect of intervention on nurses' knowledge, attitude, intention, practice, and incidence rate of using physical restraint in Malaysia. The incidence rate and patterns of physical restraint use were assessed for 16 months, so the results provide a comprehensive schema of physical restraint use in the hospital. Therefore, the results of this study are applicable for all healthcare workers and

managers to improve the quality of care in hospitals. Most previous studies assessed the knowledge, attitude, and practice of nurses regarding physical restraint use around the world, but this study showed that the intention of nurses is a strong element of their practice regarding physical restraint use.

Assessment of the knowledge, attitude, intention, and practice of nurses was accomplished using an adopted, highly reliable, and validated tool. The concept of this questionnaire was according to the theory of planned behaviour. Additionally, the development of the theoretical frame and contents of the educational intervention implemented in this study was based not only on standard guidelines but also on the inputs, opinions, and experiences of experts and the researchers and on the theory of planned behaviour. These elements are likely to enhance the integrity of the educational intervention.

In spite of its strengths, there were a number of limitations in this study. The first is that the nursing staff completed documentation on a physical restraint order form, and the results of the incidence rate and patterns of physical restraint use were analysed based on that documentation. The staff may have reported a reduced estimate of the actual rate of the use of physical restraint because of social desirability. Secondly, data on nurses' practice were gathered from a self-reported questionnaire. Self-reported data may be influenced by uncontrollable factors in completing the questionnaire, and thus there is a limitation in identifying the actual behaviour of nurses in this study.

Thirdly, this study was conducted in only one hospital. There are different protocols regarding physical restraint in different hospitals in Malaysia, and thus other hospitals were not included in this study. Therefore, the potential for generalisation may be limited in view of the considerable discrepancy in the culture or resources of each

healthcare system, demographic differences, and socio-political factors between countries.

Fourthly, due to the cross-sectional nature of this study, identifying the subsequent practice of nurses regarding physical restraint use was impossible. Future longitudinal studies can find the exact applicability of the educational intervention in the long term. Additionally, to examine whether the educational intervention led to any improvement in nurses' knowledge, attitude, intention, and practice towards physical restraint use, a pretest–post-test one group design was selected. Therefore, the different patients' conditions in various hospital wards may affect the nurses' practice and the rate and patterns of physical restraint use, which did not allow for the use of a study design with a control group or randomisation.

Lastly, data of this study did not allow us to match more variables other than the age, gender, ethnicity, diagnosis, and month of hospitalisation of the patients between pre- and post-intervention incidence rate surveys. Although most studies mentioned the above variables as significantly influencing patients' factors on the rate of physical restraint use, other patients' situations may affect the frequency of physical restraint use in hospitals. To control the effects of all confounding factors, conducting a study to assess other influencing factors, such as more patient factors, and the organisation factors on the incidence rate of physical restraint requires greater time and more funding than were considered for this student project. Thus, further study regarding these influencing factors is recommended.

6.4 Recommendations for future study

In this current study a self-report restraint order form was used to assess the incidence rate and patterns of physical restraint use. I recommended to use an observational study method to closer monitoring of physical restraint use in Malaysia.

In this study, bedrail restraint was excluded based on the hospital policy when study has been started. There is a need to further study the incidence rate of physical restraint in hospitals in Malaysia that include bedrail restraint.

The incidence rate of physical restraint in this study did not significantly decrease in geriatric-rehabilitation wards. Future studies should focus on the patients', nurses', and organisations' influencing factors on physical restraint use in geriatric-rehabilitation wards to find barriers.

This study was the first attempt to find incidence rate and patterns of physical restraint use in Malaysia. More studies are recommended to do specially in medical wards or general hospital to find a wide view of physical restraint use in this country. Moreover, due to the cross-sectional nature of this study, identifying the subsequent practice of nurses regarding physical restraint use was impossible. Future longitudinal or cohort studies can find the exact applicability of the educational intervention in the long term.

A qualitative study to provide an in-depth exploration of nurses' feelings, beliefs, and experiences regarding the use of physical restraint would have added value to the results. Additionally, further studies exploring the knowledge and attitudes of physicians and other health workers could help to engage them in minimising restraint programmes in hospitals to achieve the best results. Another study could be conducted

to explore in-depth the expectation and attitudes towards the use of physical restraint among restrained patients and their families.

In the baseline and pre-intervention phases, there was an association between few nurses' professional characteristics and nurses' knowledge, attitude, intention, and practice, but it was not significant in the post-intervention phase. Further studies are needed in this area of the research. Moreover, although physical restraint alternatives have been cited in the literature, there is a need for further studies to expand the research on alternatives to physical restraint use to promote a more successful reduction of physical restraint use. Finally, this study could be adopted and replicated in different hospitals and other care settings, such as nursing homes and residential treatment programmes. This may show some positive results to reduce the use of physical restraint in other settings. Multi-centre studies show how different sources and cultures alter the rate and patterns of physical restraint use.

6.5 Summary

This study was carried out in a teaching hospital to assess the effect of educational intervention on the knowledge, attitude, intention, and practice of nurses towards physical restraint and the incidence rate and patterns of physical restraint use in Malaysia. An educational intervention was conducted for 245 nurses in 12 wards of the hospital, and the incidence rate and patterns of physical restraint use were assessed in 22 wards of the hospital and compared in those 12 wards. The results indicated that the incidence rate of physical restraint was 3.39%, with the highest rate in neurology/neurosurgery wards and the lowest rate in orthopaedic wards during the 16-month study. The findings demonstrate that educational intervention could improve nurses' knowledge, attitude, and practice and reduce their intention to use physical

restraint. Furthermore, the reduction in the incidence rate and the improvement in patterns of physical restraint indicate the effectiveness of the educational intervention.

This study contributes to the literature as the first study conducted in Malaysia and according to concept of the theory of planned behaviour regarding physical restraint use in general hospitals. The intention of nurses to use physical restraint, which was ignored in previous studies, was determined in this study. Additionally, the patterns of physical restraint use were assessed in detail. The validation of the Malay version of the KAIP questionnaire is another valuable contribution of this study. The results of this study and the developed educational intervention are applicable for nurses, nursing educators, nursing managers, hospital managers, researchers, hospital policymakers, and, potentially, the Ministry of Health and its subsidiary.

REFERENCES

Agens, J. E. (2010). Chemical and physical restraint use in older persons. *British Journal for Medical Practitioners, 3*(1), 302.

Ajzen, I. (1991). The Theory of Planned Behavior. *Organizational Behavior and Human Decision Processes, 5*(2), 179-211.

Ajzen, I. (2006). Constructing a TPB questionnaire: Conceptual and methodological considerations. Retrieved from: http://wwwunix.oit.umass.edu/~aizen/pdf/tpb.measurement.pdf

Akansel, N. (2007). Physical restraint practices among ICU nurses in one university hospital in Western Turkey. *Health Science Journal, 1*(4), 51–57.

Amato, S., Salter, J. P., & Mion, L. C. (2006). Physical restraint reduction in the acute rehabilitation setting: A quality improvement study. *Rehabilitation Nursing, 31*(6), 235–241.

American Psychiatric Nurses Association (2014). APNA position on the use of seclusion and restraint. Retrieved from http://www.apna.org. April 2016.

Armitage, C. J., & Conner, M. (2001). Efficacy of the theory of planned behaviour: A meta-analytic review. *British Journal of Social Psychology, 40*, 471–49.

Ashcraft, L., & Anthony, W. (2008). Eliminating seclusion and restraint in recovery oriented crisis services. *Psychiatric Services, 59*(10), 1198–1202.

Atefi, N. (2014). *Comparing job satisfaction among registered nurses in an Iranian hospital and a Malaysian hospital.* (Doctoral dissertation). University of Malaya. Malaysia.

Azab, S. M. S., & Abu Negm, L. (2013). Use of physical restraint in intensive care units (ICUs) at Ain Shams university hospitals, Cairo. *Journal of American Science, 9*(4), 230–240.

Bai, X., Kwok, T. C. Y., Ip, I. N., Woo, J., Chui, M. Y. P., Ho, F. K. Y. (2014). Physical restraint use and older patients' hospital stay. *Health Psychology Behavioural Medicine. 2* (1), 160-170.

Benbenbishty, J., Adam, S., & Endacott, R. (2010). Physical restraint use in intensive care units across Europe: The PRICE study. *Intensive and Critical Care Nursing*, *26*(5), 241–245.

Ben Natan, M., Akrish, O., Zaltkina, B., & Noy, R. H. (2010). Physically restraining elder residents of long-term care facilities from a nurses' perspective. *International Journal of Nursing Practice*, *16*(5), 499–507.

Bergk, J., Einsiedler, B., & Steinert, T. (2008). Feasibility of randomized controlled trials on seclusion and mechanical restraint. *Clinical Trials*, *5*, 356–363.

Berzlanovich, A. M., Schöpfer, J., & Keil, W. (2012). Deaths due to physical restraint. *Deutsches Arzteblatt International*, *109*(3), 27–32. doi: 10.3238/arztebl.2012.0027

Brower, T. (1991). The alternatives to restraint. *Journal of Gerontological Nursing*, *17*, 18–22.

Brush, B., & Capezuti, E. (2001). Historical analysis of side rail use in American hospitals. *Journal of Nursing Scholarship*, *33*, 381–38.

Capezuti, E. (2004). Minimizing the use of restrictive devices in dementia patients at risk ofr falling. *Nursing Clinics of North America*, *39*(3), 625–647.

Capezuti, E., Strumpf, N. E., Evans, L. K., Grisso, J. A., & Maislin, G. (1998). The relationship between physical restraint removal and falls and injuries among nursing home residents. *Journal of Gerontology*, *53A*(1), M47–M52.

Centers for Medicare and Medicaid Services. (2012).Restraint rate per 1000 LTCH days measure specification. Retrieved from https://www.cms.gov.

Center of Medicare and Medicaid Service. (2012). Retrieved from https://www.cms.gov/Regulations-and-Guidance/Guidance/Transmittals.

Centers for Medicare and Medicaid Services. (2006). Medicare and Medicaid programs: Hospital conditions of participations; Patients' right. Retrieved from https://www.cms.gov. April 2016.

Chang, L. Y., Wang, K. W., & Chao, Y. F. (2008). Influence on physical restraint on unplanned extubation of adult intensive care unit: A case control study. *American Journal Critical Care*, *17*, 408–415.

Chen, F. N., Curran, P. J., Bollen, K. A., Kirby, J., & Paxton, P. (2008). An empirical evaluation of the use of fixed cutoff points in RMSEA test statistic in structural equation models. *Sociological Methods & Research*, *36*(4), 462−494.

Chiba, Y., Yamamoto-Mitani, N., & Kawasaki, M. (2012). A national survey of the use of physical restraint in long-term care hospitals in Japan. *Journal of Clinical Nursing*, *21*, 1314–1326.

Choi E., & Song, M. (2003). Physical restraint use in Korean ICU. *Journal of Clinical Nursing*, *.12*, 651–659.

Chuang, Y., & Huang, H. (2007). Nurses' feelings and thoughts about using physical restraints on hospitalized older patients. *Journal of Clinical Nursing*, *16*(3), 486–494.

Cohen, J. (2013). *Statistical power analysis for the behavioral sciences* (2nd ed.). New York: Routledge.

Colaizzi, J. (2005). Seclusion and restraint: a historical perspective. *Journal of Psychosocial Nursing Mental Health Services, 43*(2): 31-37.

Conner, M., & Norman P. (2005). *Predicting health behavior: Research and practice with social cognition models* (2nd ed.). Maidenhead: Open University Press, 1, 373.

Creswell, J.W. (2014). *Research design: Qualitative, quantitative, and mixed methods research* (4th ed.). Thousand Oaks: Sage.

Curie, C. G. (2005). SAMHSA's commitment to eliminating the use of seclusion and restraint. *Psychiatric Services, 56*(9), 1139–1140.

Curry, K., Cobb, S., Kutash, M., & Diggs, C. (2008). Characteristics associated with unplanned extubations in a surgical intensive care unit. *American Journal Critical Care*, *17*, 45–51.

de Casterlé, B. D., Goethals, S., & Gastmans, C. (2015). Contextual influences on nurses' decision-making in cases of physical restraint. *Nursing Ethics*, *22*(6), 642-651.

Demir, A. (2007). Nurses' use of physical restraint in four Turkish hospitals. *Journal of Nursing Scholarship, 39*(1), 38–45.

Dermaid LM, Byrne C. (2006) Restraint reduction education. *Canadian Nursing Home, 17*, 10–14.

De Jonghe, B., Constantin, J. M., Chanques, G., Capdevila, X., Lefrant, J. Y., & Mantz, J. (2013). Physical restraint in mechanically ventilated ICU patients: A survey of French practice. *Intensive Care Medicine, 39*, 31-37.

De Roza J. (2004). Literature review: Factors influencing nurses' decision to use physical restraints in the elderly. *Singapore Nursing Journal, 31*(4), 12–16.

Doerflinger, D. M. C. (2004). *The relationship between acute care nurse administrators' knowledge and attitudes and restraint reduction*. (Doctoral dissertation). George Mason University. United States.

Duxbury, J., & Paterson, B. (2005). The use of physical restraint in mental health nursing: An examination of principles, practice and implications for training. *Journal of Adult Protection, 7*(4), 13–24.

Eccles, M. P., Hrisos, S., Francis, J., Kaner, E. F., Dickinson, H. O., Beyer, F., & Johnston, M. (2006). Do self-reported intentions predict clinicians' behaviour? : A systematic review. *Implement Science, 1*, 28.

Engberg, J., Castel, N., & McCaffrey, D. (2008). Physical restraint initiation in nursing homes and subsequent resident health. *Gerontologist, 48*, 442–452.

Enns, E., Rhemtulla, R., Ewa, V., Fruetel, K., & Holroyd-Leduc, J. M. (2014). A controlled quality improvement trail to reduce the use of physical restraint in older hospitalized adults. *Journal of American Geriatric Society, 62*, 541–545.

Envision incorporate. (2013a). *Providing evidence-based care: Avoiding the use of restraints on DVD*. [DVD]. Nashville, Tennessee.

Envision incorporate. (2013b). *Restraints, seclusion, and the 1 hour face to face Evaluation on DVD*. [DVD]. Nashville, Tennessee.

Evans, D., Wood, J., & Lambert, L. (2002). A review of physical restraint minimization in acute and residential care settings. *Journal of Advanced Nursing, 40*, 616–625.

Evans, D., Wood, J., & Lambert L. (2003). Patient injury and physical restraint devices: A systematic review. *Journal of Advanced Nursing, 41*, 274–282.

Fabrigar, L. R., Petty, R. E., Smith, S. M., & Crites, S. L. (2006). Understanding knowledge effects on attitude-behavior consistency: The role of relevance, complexity, and amount of knowledge. *Journal of Personality and Social Psychology, 90*, 556–577.

Farina-Lopez, E., Estevez-Cuerra, G. J., Gandoy-Crego, M., Polo-Luque, L. M., Gomez-Cantorna, C., & Capezuti, E. A. (2014). Perception of Spanish nursing staff on the use of physical restraints. *Journal of Nursing Scholarship, 46*(5), 322–330.

Feng, Z et al (2009). Use of physical restraints and antipsychotic medications in nursing homes: a cross-national study. *International Journal Geriatric Psychiatry, 24*(10), 1110-1118.

Fogel, J. F., Berman, C. S., Merkel, C., Cranston, T., & Leipzig, R. M. (2009). Efficient and accurate measurement of physical restraint use in acute care. *Care Management Journals, 10*(3), 100–109. doi: 10.1891/1521-0987.10.3.100

Food and Drug Administration (2015). Potential hazards with restraint devices. FDA Backgrounder. Washington, DC: Food and Drug Administration. Forrester, D.A., McCabe-Ben.

Foy, R., Bamford, C., Francis, J. J., Johnston, M., Lecouturier, J., Eccles, M., . . . Grimshaw, J. (2007). Which factors explain variation in intention to disclose a diagnosis of dementia? *Implement Science, 2*, 31.

Frankfort-Nachmias, C., & Nachmias, D. (2008). *Research methods in the social sciences*
(7th ed.). New York, NY: Worth Publishers.

Freeman, F. J. (2002). *The relationship of senior nursing students' knowledge and attitude of physical restraints and alternatives to physical restraints with older adults* (Doctoral dissertation) Retrieved from ProQuest information and learning. (UMI Number :3065542).

Freeman, S., Hallett, C., & McHugh, G. (2016). Physical restraint: experiences, attitudes and opinions of adult intensive care unit nurses. *Nursing in Critical Care, 21*(2), 78-87.

Frengley, J. D., & Mion, L. C. (1986). Incidence of physical restraints on acute general medicalwards. *Journal of the American Geriatrics Society, 34*, 565-568.

Gastmans, C., & Milisen, K. (2006). Use of physical restraint in nursing homes: clinical ethical considerations. *Journal of Medical Ethics. 32*(3), 148-159.

Gelkopf, M., Roffe, Z., Behrbalk, P., Melamed, Y., Werbloff, N., & Bleich, A. (2009). Attitudes, opinions, behaviors, and emotions of the nursing staff toward patient restraint. *Issues in Mental Health Nursing, 30*, 758–763. doi: 10.3109/01612840903159777

Gerace, A., Mosel, K., Oster, C., & Muir-Cochrane, E. (2013). Restraint use in acute and extended mental health services for older persons. *International Journal of Mental Health Nursing, 22*, 545-557.

Godin, G., Bélanger-Gravel, A., Eccles, M., & Grimshaw, J. (2008). Healthcare professionals' intentions and behaviours: A systematic review of studies based on social cognitive theories. *Implement Science, 3*, 36. doi: 10.1186/1748-5908-3-36

Goethals, S., Dierckx de Casterlé, B, & Gastmans, C. (2012). Nurses' decision-making in cases of physical restraint: A synthesis of qualitative evidence. *Journal of Advanced Nursing, 68*(6), 1198–1210. doi: 10.1111/j.1365-2648.2011.05909.x

Gulpers, M. J, Bleijlevens, M. H., Ambergen, T., Capezuti, E., van Rossum, E., & Hamers, J. P. (2013). Reduction of belt restraint use: Long-term effects of the EXBELT intervention. *Journal of the American Geriatrics Society, 61*, 107–112.

Hagger, M. S., Chatzisarantis, N. L. D., & Biddle, S. J. H. (2002). A meta-analytic review of the theories of reasoned action and planned behavior in physical activity: Predictive validity and the contribution of additional variables. *Journal of Sport and Exercise Psychology, 24*, 3–32.

Hair, J., Black, W., Babin, B., & Anderson, R. (2010). *Multivariate data analysis* (7th ed.). New Jersey, Prentice Hall.

Hamers, J. P. H., Meyer, G., Kopke, S., Lindenmann, R., Groven, R., & Huizing, A.R. (2008). Attitudes of Dutch, German and Swiss nursing staff towards physical restraint use in nursing home residents: A cross-sectional study. *International Journal of Nursing Studies, 46*(2), 248–255.

Hantikainen, V. (2011). Nursing staff perceptions of the behavior of older nursing home residents and decision making on restraint use: A qualitative and interpretative study. *Journal of Clinical Nursing, 10*(2), 246–256.

Hantikainen, V., & Kappeli, S. (2000). Using restraint with nursing home residents: A qualitative study of nursing staff perceptions and decision-making. *Journal of Advanced Nursing, 32*(5), 1196–1205.

Harris, A. D., McGregor, J. C., Perencevich, E. N., Furuno, J. P., Zhu, J., Peterson, D. E., & Finkelstein, J. (2006). The Use and Interpretation of Quasi-Experimental Studies in Medical Informatics. *Journal of the American Medical Informatics Association*, *13*(1), 16-23.

Haut, A., Köpke, S., Gerlach, A., Mühlhauser, I., Haastert, B., & Meyer, G.m. (2009). Evaluation of an evidence-based guidance on the reduction of physical restraints in nursing homes: A cluster-randomized controlled trial. *BMC Geriatrics, 42*.

Hendryx, M, Trusevich, Y., Coyle, F., Short, R., & Roll, J. (2010). The distribution and frequency of seclusion and/ or restraint among psychiatric inpatients. *Journal of Behavioral Health Services & Research, 37(*2), 272–281.

Henseler, J., Ringle, C. M., Sarstedt, M. (2015). A new criterion for assessingdiscriminant validity in variance- based structural equation modeling. *Journal of the Academy of Marketing Science, 43*, 115-135.

Herrera, C. D. (2011). Justifying restraint use in psychiatric care. *Journal of Ethics in Mental Health, 6*, 1-5.

Huambo, K. (2013, December 6). *Restraints* [Video]. Retrieved from https://www.youtube.com/watch?v=aqKg0wG2P4w

Huang, H. T., Chuang, Y. H., Chiang, K. F. (2009). Nurses' physical restraint knowledge, attitudes, and practices: The effectiveness of an in-service education program. *Journal of Nursing Research*, *17*(4), 241-247.

Huang, H. T., Huang, Y. T., Lin, K.C., & Kuo, Y. F. (2014). Risk factors associated with physical restraints in residential aged care facilities: A community-based epidemiological survey in Taiwan. *Journal of Advanced Nursing, 70(*1), 130–143.

Huang, H., T., Ma, F. C., & Chen, C. H. (2003). A correlational study among nurses' knowledge, attitudes, and practice toward physical restraints. *Tzu Chi Nursing Journal, 2*(2), 32–41(Original work published in Chinese).

Huckshorn, K. A. (2006). Redesigning state mental health policy to prevent the use of seclusion and restraint. *Administration and Policy in Mental Health and Mental Health Services Research, 33*(4), 482–491. doi: 10.10007/s10488-005-0011-5

Huizing, A. R., Hamers, J. P., Gulpers, J. M., & Berger, M. P. F. (2006). Short-term effects of an educational intervention on physical restraint use: A cluster randomized trial. *BMC Geriatric, 6*, 17.

Huizing, A. R., Hamers, J. P. H., Gulpers, M. J. M., & Berger, M. P. F. (2009). A cluster randomized trial of an educational intervention to reduce the use of physical restraints with psychogeriatric nursing home residents. *Journal of American Geriatrics Society, 57*(7), 1139–1148. doi: 0.1111/j.1532-5415.2009.02309

Hully, S., Cummings, S. R., Browner, W. S., Grady, D. G., & Newman, T. B. (2013). *Designing clinical research* (4th ed.). Philadelphia: Lippincott Williams & Wilkinsr.

Husum, T. L., Bjørngaard, J. H., Finset, A., & Ruud, T. (2010). A cross-sectional prospective study of seclusion, restraint and involuntary medication in acute psychiatric wards: Patient, staff and ward characteristics. *BMC Health Services Research, 10*(89). doi: 10.1186/1472-6963-10-89

Janelli, L. M., Stamps, D., & Delles, L. (2006). Physical restraint use: A nursing perspective. *Medical-Surgical Nursing, 15*(3), 163–167.

Joint Commission on Accreditation of Healthcare Organizations. (2000). *Accreditation manual for hospitals.* Chicago.

Kandeel, A.N., & Attia A. K. (2013). Physical restraint practice in adult intensive care units in Egypt. *Nursing and Health Sciences, 15*, 79–85.

Kayser-Jones, J. (1992). Culture, environment, and restraints: A conceptual model for research and practice. *Journal of Gerontological Nursing, 18*(11), 13-20.

Karagozoglu, S., Ozden, D., & Yildiz, F. T. (2013). Knowledge, attitudes and practices of Turkish intern nurses regarding physical restraints. *Clinical Nurse Specialist, 27*(5), 262–71. doi: 10.1097/NUR.0b013e3182a0baec

Karlsson, S. (2000). Restraint use in elder care: Decision making among registered nurses. *Journal of Clinical Nursing, 9*(6), 842–850.

Kim, Y. H., Jeong, Y. S., Park, J. H., Yoon, S. H. (2008). The effects of nurse education on physical restraint use in the ICU. *Korean Journal of Anaesthesiology, 55* (5), 590-595.

Kline, R. B. (2011). *Principles and practice of structural equation modeling*. (3th ed.). New York. The Guilford Press.

Knutzen, M., Sandvik, L., Hauff, E., Opjordsmoen, S., & Friis, S. (2007). Association between patients' gender, age and immigrant background and use of restraint: A 2-year retrospective study at a department of emergency psychiatry. *Nordic Journal of Psychiatry*, *61*(3), 201–206. doi: 10.1080/08039480701352520

Koczy, P., Becker, C., Rapp K., Klie, T., Beische, D., Buchele, G., … Bredthauer, D. (2011). Effectiveness of a multifactorial intervention to reduce physical restraints in nursing home residents. *Journal of American Geriatric Society, 59*, 333–339.

Kontio, R., Lahti, M., Pitkanen, A., Joffe, G., Putkonen, H., … Valimaki., M. (2011). Impact of e-learning course on nurses' professional competence in seclusion and restraint practices: A randomized controlled study. *Journal of Psychiatric and Mental Health Nursing, 18*, 813–821.

Kooi, A. W., Peelen, L. M., Raijmakers, R. J., Vroegop, R. L., Bakker, D. F., Tekatli, H.,… Slooter, A. J. C. (2015). Use of physical restraint in Dutch intensive care units: A prospective multicenter study. *American Association of Critical- Care Nurses, 24*(6), 488-495.

Köpke, S., Mühlhauser, I., Gerlach, A., Haut, A., Haastert, B., M¨ohler, R., & Meyer, G. (2012). Effect of a guideline-based multicomponent intervention on use of physical restraints in nursing homes: A randomized controlled trial. *Journal of the American Medical Association, 307*(20), 2177–2184.doi:10.1001/jama.2012.4517

Krüger, C., Mayer, H., Haastert, B., & Meyer, G. (2013). Use of physical restraint in acute hospitals in Germany: A multi-center cross-sectional study. *International Journal of Nursing Study, 50*, 1599–1606.

Lai, C. K. (2007). Nurses using physical restraints: Are the accused also the victims? A study using focus group interviews. *Bio Medical Central Journal of Nursing, 6*(5), 1–7.

Lai, C. K. Y., Chow, S. K. Y., Suen, L. K. P., & Wong, I. Y. C. (2013). Reduction of physical restraints on patients during hospitalization/rehabilitation: A clinical trial. *Asian Journal Gerontology and Geriatric, 8*, 38–43.

Lane, C., & Harrington, A. (2011). The factors that influence nurses' use of physical restraints: A thematic literature review. *International Journal of Nursing Practice, 17*(2), 195–204.

Leidy, B. D., Haugaard, J. J., Nunno, M. A., & Kwartner, J. K. (2006). Review of restraint data in a residential treatment center for adolescent females. *Child Youth Care Forum, 35*, 339–352. doi:10.1007/s1056-006-9021-z

Lewis, M., Taylor, K., & Parks, J. (2009). Crisis prevention management: A program to reduce the use of seclusion and restraint in an inpatient mental health setting. *Issues in Mental Health Nursing, 30*, 159–164. doi: 10.1080/01612840802694171

Lian, N. L. (2003). *The perception of the nurses and elderly patients on the use of physical restraints in the medical wards* (Master's thesis). University of Malaya. Malaysia.

Lorenzo, R. D., Baraldi, S., Ferrara, M., Mimmi, S., & Rigatelli, M. (2012). Physical restraints in an Italian psychiatric ward: Clinical reasons and staff organization problems. *Perspective in Psychiatric Care, 48*, 95–107.

Ludin, S. M., Arbon, P., & Parker, S. (2013). Patients' transition in the intensive care units: Concept analysis. Intensive and Critical Care Nursing, *29*(4), 187-192.

Ludwick, R., Meehan, A., Zeller, R., & O'Toole, R. (2008). Safety work: Initiating, maintaining, and terminating restraints. *Clinical Nurse Specialist, 22*(20), 81–87. doi: 10.1097/01.NUR.0000311672.03857.1b

Luk, E., Burry, L., Rezaie, S., Mehta, S., Rose, L. (2015). Critical care nurses' decisions regarding physical restraints in two Canadian ICUs: A prospective observational study. *Canadian Journal of Critical Care Nursing, 26*(4), 16-22.

McCabe, D. E., Alvarez, C. D., McNulty, S. R., Fitzpatrick, J. J. (2011). Perceptions of physical restraint use in the elderly among registered nurses and nurse assistants in a single acute care hospital. *Geriatric Nursing, 32*(1), 39-45.

Martin, B., & Mathisen, L. (2005). Use of physical restraints in adult critical care: A bicultural study. *American Journal of Critical Care, 14*(2), 133–142.

Mayer, S. (2005). Restraint should be last resort for violent behaviour. *British Medical Journal, 330*(7489), 438. doi: 10.1136/bmj.330.7489.438-d

Meyer, G., Köpke, S., Haastert, B., & Mühlhauser, I. (2009). Restraint use among nursing home residents: Cross-sectional study and prospective cohort study. *Journal of Clinical Nursing, 18*(7), 981–990.

Migon, M. N., Coutinho, E. S., Huf, G., Adams, C. E., Cunha, G. M., & Allen, M. H. (2008). Factors associated with the use of physical restraints for agitated patients in psychiatric emergency rooms. *General Hospital Psychiatry, 30*, 263–268. doi: 10.1016/j.genhosppsych.2007.12.2005

Miller, J. A., Hunt, D. P., & Georges, M. A. (2006). Reduction of physical restraints in residential treatment facilities. *Journal of Disability Policy Study, 16*(4), 202–208.

Minnesota Department of Health. (2013). *Safety without restraints: A new practice standard for safe care*. Minnesota: Minnesota Department of Health.

Minnick, A. F., Mion, L. C., Johnson, M. E., Catrambone, C., & Leipzig, R. (2007). Prevalence and variation of physical restraint use in acute care settings in the US. *Journal of Nursing Scholarship, 39*(1), 30–37.

Mion, L. C., Minnick, A. F., Leipzig, R. M., Catrambone, C. D., & Johnson, M. E. (2007). Patient initiated device removal in intensive care units: A national prevalence study. *Critical Care Medicine, 35*, 2714–20.

Mohler, R., & Meyer, G. (2014). Attitudes of nurses towards the use of physical restraints in geriatric care: A systematic review of qualitative and quantitative studies. *International Journal of Nursing Studies, 51*, 274–288.

Mohr, W. K. (2010). Restraints and the code of ethics: An uneasy fit. *Archives of Psychiatric Nursing*, *24*(1), 3–14.

Mohr, W. k., Petti, T. A., & Mohr, B. D. (2003). Adverse effects associated with physical restraint. *Canadian Journal of Psychiatry*, *48* (5), 330-337.

Mott, S., Poole, J., & Kenrick, M. (2005). Physical and chemical restraints in acute care: Their potential impact on the rehabilitation of older people. *International Journal of Nursing Practice, 11*, 95–101.

Mueller, R. O., Hancock, G. R. (2008). *Best practices in structural equation modeling* (1th ed). Thousand Oaks, CA: Sage Publications.

Myers, H., Nikoletti, S., & Hill, A. (2001). Nurses' use of restraints and their attitudes toward restraint use and the elderly in an acute care setting. *Nursing & Health Sciences, 3*(1), 29–34.

Nelson, K. E., & Masters Williams, C. (2014). *Infectious disease epidemiology: Theory and practice* (3rd ed.). Burlington: Jones and Bartlett Learning.

Neufeld, R. R., Libow, L. S., Foley, W. J., Dunbar, J. M., Cohen C., & Breuer, B. (1999). Restraint reduction reduces serious injuries among nursing home resident. *Journal of American Geriatrics Society, 47*, 1202–1207.

Ohio Department of Health: Division of Quality Assurance. (2007). Physical restraints. Retrieved from: www.odh.ohio.gov.

Oearsakul, B., Sirapo-ngam, Y., Strumpf, N. E., & Malathum, P. (2011). Physical restraint use among hospitalized elderly Thais. *Pacific Rim International Journal of Nursing Research, 15*(2), 125–136.

Omolewa, P. (2012). *The impact of instructive educational program on physical restraint reduction in acute mental health hospitals*. (Doctoral dissertation). Walden University, United States.

Paterson, B., & Duxbury, J. (2007). Restraint and the question of validity. *Nursing Ethics, 14(*4), 535–545. doi:10.1177/0969733007077888

Park, M., & Tang, J.H. (2007). Evidence-based guideline: Changing the practice of physical restraint use in acute care. *Journal of Gerontological Nursing, 33*(2), 9–16.

Pellfolk, T. J., Gustafson, Y., Bucht, G., & Karlsson, S. (2010). Effects of a restraint minimization program on staff knowledge, attitudes, and practice: A cluster randomized trial. *Journal of American Geriatrics Society, 58*, 62–69. doi: 10.1111/j.1532-5415.2009.02629.x

Perkins, M. B., Jensen, P. S., Jaccard, J., Gollwitzer, P., Oettingen, G., Pappadopulos, E., & Hoagwood, K.E. (2007). Applying theory-driven approaches to understanding and modifying clinicians' behavior: What do we know? *Psychiatric Services, 58*, 342–348.

Polit, D. F., & Beck, C. T. (2008). Nursing research: *Principles and methods* (8th ed.). Philadelphia, PA: Lippincott Williams & Wilkins.

Position Statement on the Use of Seclusion and Restraint. (2014). American Psychiatric Nurses Association. http://www.apna.org. Access 18 Feb 2015.

Quality Improvement Organizations. (2013). *Just facts: Eliminating and reducing physical restraints*. U.S.A: Ohio Medicare Quality Improvement Organization.

Racey, S. J. (2006). *Relationship between nurse age, critical care experience, education degree, and work shift length and use of physical restraints in the intensive care unit*. (Master's degree thesis). Mountain State University. United States.

Raguan, B., Wolfovitz, E., & Gil, E. (2015). Use of physical restraints in a general hospital: a cross-sectional observational study. *Israel Medical Association Journal. 17*, 633-638.

Royal College of Nursing. (2008). Restraint, Rights, Risks and Responsibilities. England: London, Royal College of Nursing.

Saarnio, R., & Isola, A. (2010). Nursing staff perceptions of the use of physical restraint in institutional care of older people in Finland. *Journal of Clinical Nursing*, *19*(21/22), 3197–3207.

Sclafani, M. J., Humphrey II, F. J., Repko, S., Ko, H. S., Wallen, M. C., & DiGiacomo, A. (2008). Reducing patient restraints: A pilot approach using clinical case review. *Perspectives in Psychiatric Care*, *44*(3), 32–39.

Sees, D. L. (2009). Impact of the health care financing administration regulations on restraint and seclusion usage in the acute psychiatric setting. *Archives of Psychiatric Nursing*, *23*(4), 277–282. doi:10.1016/j.apnu.2008.07.002

Smith, G. M., Davis, R. H., Bixler, E. O., Lin, H., Altenor, A., Altenor, R. J.,…. & Kopchick, G. A.(2005). Pennsylvania State Hospital system's seclusion and restraint reduction program. *Psychiatric Services, 56*(9), 1115–1122.

Smith, N. H., Timms, J., Parker, V., Reimels, E. M., & Hamlin, A. (2003). The impact of education on the use of physical restraints in the acute care settings. *The Journal of Continuing Education in Nursing*, *34*(1), 26–33.

Standards for restraint/ seclusion for hospitals. (2009). The Joint Commission website. http://www.jointcommission.org/standards_information. Access Jun 2, 2014.

Steinert, T., Lepping, P., Bernhardsgru, R., Conca, A., Hatling, T., Janssen, W.,… Whittington, R. (2010). Incidence of seclusion and restraint in psychiatric hospitals: A literature review and survey of international trends. *Social Psychiatry and Psychiatric Epidemiol, 45,* 879–897. doi: 10.1007/s00127-009-0132-3

Stinson, K. J. (2016). Nurses' attitudes, clinical experience, and practice issues with use of physical restraints in critical care units. *American Association of Critical-Care nurses, 25* (1), 21-26

Suen, L. K. P., Lai, C. K. Y., Wong, T. K. S., Chow, S. K. Y., Kong, S. K. F., Ho, J. Y. L., …& Wong, I. Y. C. (2006). Use of physical restraints in rehabilitation settings: Staff knowledge, attitudes and predictors. *Journal of Advanced Nursing, 55*(1), 20–28.

Sujata, N., Kaur, J. (2015). Knowledge and practice regarding physical restrainting among nurses working in selected hospital of Ludhiana, Punjab. *Asian Journal of Nursing Education and Research, 5*(2), 242-245.

Tampa Bay Basic Training Medical Skills. (2010). Restraints and restraint use: 4 class hours 15.00. http://www.tbpcs.org. Access 11 Jun 2016.

Testad, I., Ballard, C., Brønnick, K., & Aarsland, D. (2010). The effect of staff training on agitation and use of restraint in nursing home residents with dementia: A single blind, randomized controlled trial. *Journal of Clinical Psychiatry, 71,* 80–86.

Turgay, A. S., Sari, D., & Genc, R. E. (2009). Physical restraint use in Turkish intensive care units. *Clinical Nurse Specialist, 23*(2), 68–72.

Werner P., & Mendelsson, G. (2001). Nursing staff members' intentions to use physical restraints with older people: Testing the theory of reasoned action. *Journal of Advanced Nursing, 35*(5), 784–791.

Whittington, R., Lancaster, G., Meehan, C., Lane, S., & Riley, D. (2006). Physical restraint of patients in acute mental health care settings: patient, staff, and environmental factors associated with the use of a horizontal restraint position. *The Journal of Forensic Psychiatry and Psychology, 17*(2), 253-265.

Witte, L. (2008). Reducing the use of seclusion and restraint. *Behavioral Health Care, 28*(4), 54–57.

Wood, G. L., & Haber, J. (2014). *Nursing research: Methods, critical appraisal, and utilization* (8th ed.). St. Louis: Mosby.

Wutoh R., Boren S., & Balas A. (2004). E- Learning: A review of Internet-based continuing medical education. *The Journal of Continuing Education in the Health Professions, 24*, 20–30.

Wynn, R. (2003). Staff's attitudes to the use of restraint and seclusion in a Norwegian university psychiatric hospital. *Nordic Journal of Psychiatry*, *57*, 453–459.

Yeh, S., Hsiao, C., Ho, T., Chiang, M., Lin, L., Hsu, C. Y., & Lin, S. Y. (2004). The effects of continuing education in restraint reduction on novice nurses in intensive care units. *Journal of Nursing Research*, *12*(30), 246–255.

Zhou, G., Stoltzfus, J. C., Houldin, A. D., Parks, S. M., & Swan, B. A. (2010). Knowledge, attitudes, and practice behaviors of oncology advanced practice nurse regarding advanced care planning for patients with cancer. *Oncology Nursing Forum*, *37*(6), 400–410.

Zhu, X. M., Xiang, Y.T., Zhou, J. S., Gou, L., Himelhoch, S., Ungvari, G. S., …& Wang, X. P. (2013). Frequency of physical restraint and its associations with demographic and clinical characteristics in a Chinese psychiatric institution. *Perspectives in Psychiatric Care*, *50*, 251-256.

LIST OF PUBLICATIONS AND PAPERS PRESENTED

Publications

Eskandari, F., Abdullah, K. L., Zainal, N. Z., Wong, L. P. Use of physical restraint: Nurses' knowledge, attitude, intention and practice and influencing factors. Accepted. *Journal of Clinical Nursing.*

Eskandari, F., Abdullah, K. L., Zainal, N. Z., Wong, L. P. Incidence rate and patterns of physical restraint use among adult patients in Malaysia. Published. *Clinical Nursing Research.*

Eskandari, F., Abdullah, K. L., Zainal, N. Z., Wong, L. P., Danaee, M. (Under review). Psychometric properties of Malay version of knowledge, attitude, intention, and practice towards physical restraint questionnaire**.** *Archives of Psychiatric nursing. Under review.*

Eskandari, F., Abdullah, K. L., Zainal, N. Z., Wong, L. P. The effect of educational intervention on nurses' knowledge, attitude, intention, practice and incidence rate of physical restraint use. *Clinical Nursing Research. Under review.*

Conference Presentation

Eskandari, F., Abdullah, K. L., Zainal, N. Z., Wong, L. P., Danaee, M. Psychometric properties of Malay version of knowledge, attitude, intention and practice of nurses towards physical restraint questionnaire. 1st international Nursing Conference by the Nursing Council of the public Institution of Higher Learning Malaysia: Transforming Nursing. Kuching, Sarawak, Malaysia.