

Modification Effect of the “Sponge Belt” Restraint Strap on the Incidence of Injury in the Mounting Area in Patients with Decreased Consciousness

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Received December 27, 2023; Revised January 06, 2023; Accepted January 19, 2024

ABSTRACT

Objective: To find out the effect of the modification of the “Sponge Belt” restraint strap on the incidence of injury in the mounting area in patients with decreased consciousness.

Materials and Methods: a quantitative study conducted at the Intensive Care Unit (ICU) of Semen Gresik Hospital. The research design used was the post-test only control group design experimental approach. The sampling method used was purposive sampling. The sampling taken were 16 respondents. The independent variable is the act of using a sponge belt restraint strap modification. The dependent variable is injuries in patients with decreased consciousness. Data retrieved using observation. Data were analyzed by Wilcoxon Test analysis. Adjusted odds ratio (ORs) with 95% confidence interval (CI) was calculated.

Results: The results of means there is an influence of sponge belt restraint strap modification on the incidence of injury in the mounting area in patients with decreased consciousness ($p=0,000 < \alpha < 0.05$). Patient safety procedures, especially in performing restraint measures aimed at preventing the occurrence of patient safety incidents especially restraint devices made from safe materials, a fairly wide cross-section, strong fixation, and long enough ties.

Conclusion: Modification of the Sponge belt restraint strap has the characteristics of a sponge-based belt, because it uses a silica drill that can absorb sweat, a rope with two sides and a length of 50 cm, simplifying the process of binding and double fixation, which uses a belt and adhesive. The hospital always monitors the use of restraint in patients, especially observations during restraint installation.

Keywords: Patient safety, Restraint, Sponge belt

INTRODUCTION

Currently, the main issue in health care is the issue of patient safety. Patient safety is a system that makes caring patient safer, including risk assessment, identification and management of patient risk, reporting and analysis of incidents, ability to learn from incidents and follow-up, and the implementation of solutions to minimize the risk and prevent injuries caused by mistakes caused by carrying out an action or not taking the action that should have been taken [1]. Implementation of patient safety, one of which is a restraint which is to provide physical and psychological security for these individuals and improve patient safety and comfort. Restraint in patients can cause trauma, including physical and psychological trauma. Restraint is often given to patients with decreased consciousness. However, the

restraint also has a negative physical impact in the form of injuries (pressure sores, muscle atrophy, bone damage) on the extremities due to the use of unsafe restraint straps. Besides the negative physical impact, psychological negative

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Citation: Zahroh R, Umah K, Rahmawati I, Utami & Huda S. (2024) Modification Effect of the “Sponge Belt” Restraint Strap on the Incidence of Injury in the Mounting Area in Patients with Decreased Consciousness. *J Nurs Occup Health*, 5(1): 544-550.

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effects often occur in patients when restraint in the form of depression, emotional isolation and even a decline in emotional function [2]. Patient Safety Incident, is any incident that is unintentional and conditions that result in or have the potential to cause injury that can be prevented in patients, consisting of unexpected events (KTD), non-injury events (KTC), near-injury events (KNC) and potential injury events (KPC). The patient safety incidence rate according to the Institute of Medicine (IOM) report, United States in 2004 in the book, "To Err Is Human, Building a Safer Health System" followed by 2010 WHO data from various countries stated that in the service of inpatients at home there are about 3% - 16% of unexpected illness. In Indonesia, the case report of patient safety incidents by KKP-RS in January - April 2015 found that there were reports of KNC cases (18.53%) and KTD (14.41%) due to medical process or procedure (9, 26%) and patients fell (5.15%) and East Java province ranks top at 27% among eleven other provinces [3]. The number of patient safety incidents at Semen Gresik Hospital in 2018 contained 16 cases, with details of KNC 5 cases, KTD 11 cases. Of the 11 cases of KTD in 2018 there were 6 types of injury cases with details: blisters on the wrists / ankles where the ties were (3 patients), shoulder joint dislocations (1 patient), torn injuries (1 patient), and suffered burns/combustion (combustion (1 patient) at the time of the restraint, have received injury management and patient safety procedures [4]. A restraint is a device or intervention for patients who are violent or aggressive, threatening, attacking staff, or hurting themselves, which needs to be stopped so as not to cause further injury to themselves or others. The purpose of using the restraint is to keep patients and staff safe in emergency situations [5]. Restraint is a direct action using physical strength in individuals that aims to limit freedom of movement. This physical strength can use human power, mechanical devices or a combination of both. Restraint with human labor occurs when the nurse physically controls the client. Then, a mechanical device restraint uses equipment that is usually mounted on the wrist and ankle to reduce the physical aggressiveness of the client, such as punching and kicking [6]. The use of restraint cannot be separated from the effects that can be caused. According to the research of Kandar and Pambudi (2013), 36.7% or as many as 11 times the restraint action taken provides side effects to patients. Data from the study showed that out of 11 restraint procedures, 68.7% of patients had physical injuries and 31.5% of patients had psychological injuries. This shows the restraint action taken in patients with decreased awareness will have side effects in the form of physical effects and psychological effects. Physical injury in the form of physical discomfort, blisters on the area of restraint installation, increased risk of contractures and bone damage [7]. The results of Saseno's research, Pramono Giri Kriswoyo (2013) about the effect of physical restraint action with cuffs on patients with restless rowdy, concluded that there is an effect of physical restraint action with cuffs on decreasing violent

behavior. To ensure patient safety in restraint measures, a safe and non-injuring restraint tool should be chosen, the restraint strap is made of cloth that is given a cuff so that it is soft but still strong, and the wide cuff cross section avoids blisters injury on the skin area of the extremity by the restraint [8]. The occurrence of injury to the skin during a restraint is explained by Braden and Bergstrom (1987) in Bryant (2007) stating there are two main things related to the risk of pressure sores which are pressure factors and tissue tolerance factors. The pressure factor is influenced by the intensity and duration of the pressure (cord restraint), while the tissue tolerance factor is affected by the material, friction (between the skin and the surface of the rope), moisture, nutritional disorders, old age, low blood pressure (hypotension), psychosocial status, smoking and increase in body temperature [9]. The factors that contribute to the incidence of pressure sores (lesion injuries due to restraint) consist of internal factors namely nutrition, infection and age and external factors namely material, friction and humidity [8]. Potter and Perry (2005) state the factors that contribute to the incidence of pressure sores (lesion injuries due to restraint) consist of internal factors namely nutrition, infection and age and external factors namely material, friction and humidity [10]. The emergence of the impact due to restraint measures in accordance with Haimowits, Urff & Huckshorn, 2006, that restraint in patients can cause trauma, including physical and psychological trauma. Physical / manual restraint is used in some mental health inpatient units as a tool for managing aggressive behavior, although paradoxically its use carries several risks of physical and mental harm to health workers and patients [11,12]. Based on the physical and psychological complications arising from the use of restraint straps and the many benefits of using a good restraint strap on the patient, the authors are interested in conducting research on modification of the "sponge belt" restraint strap on the incidence of injury in the area of restraint placement of patients with decreased awareness.

MATERIALS AND METHODS

The research used experimental research with design study was the Post-test Only Control Group Design Experiment. The independent variable in this study was the use of a sponge belt restraint strap modification and the dependent variable was injury in patients with decreased consciousness. Sample in this study used a sample of 16 respondents with a purposive sampling technique. The procedures and respondents involved in this research were appropriate of Ethical Clearance (EC) with No.038/UG. R/ET/2020. Data retrieved using observation /checklist for standard operational patient safety with restrains. Data were analyzed by Wilcoxon Test analysis. Adjusted odds ratio (ORs) with 95% confidence interval (CI) was calculated.

RESULTS

Of the 16 patient respondents who met the requirements as respondents, the following characteristics were obtained:

1. Characteristics of Respondents Based on Gender

Figure 1 shows that the distribution of respondents based on gender was mostly women, 10 people (62.5%).

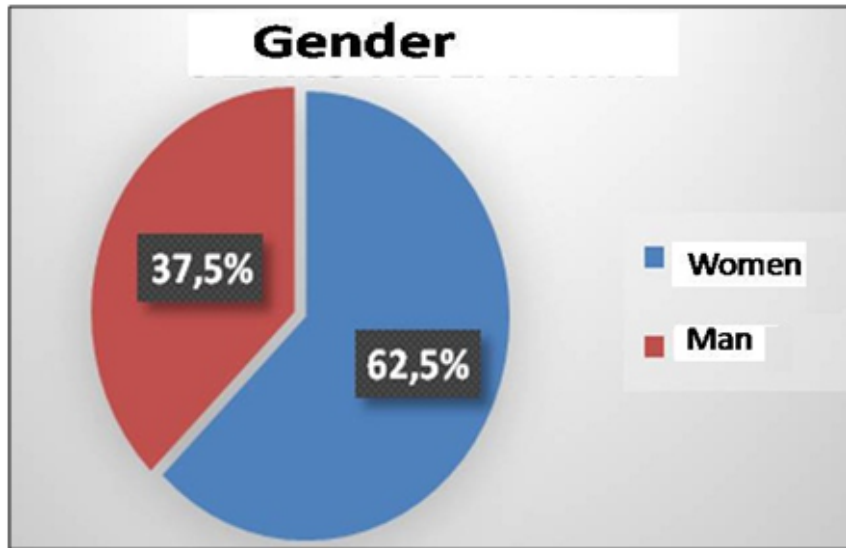


Figure 1. Pie chart of distribution of respondents based on respondent gender in the Intensive Care Installation of Semen Gresik Hospital in October 2021.

2. Characteristics of Respondents Based on Age

Figure 2 shows that the majority of respondents are aged 26-50 years as many as 8 people (50%) and a small portion are aged 1-25 years as many as 1 person (6.25%).

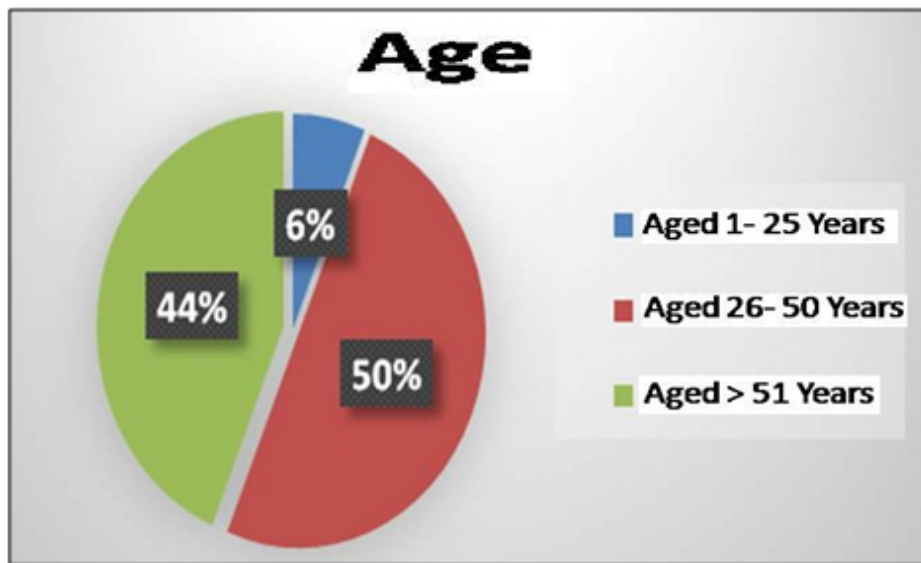


Figure 2. Pie chart of distribution of respondents based on respondent age in the Intensive Care Installation of Semen Gresik Hospital in October 2021.

3. Characteristics of Respondents Based on GCS Scores

Figure 3 shows that the majority of respondents had a GCS score of 6-10 as many as 7 people (43.75%) and a small percentage of respondents had a GCS score of 11-14 as many as 4 people (25%).

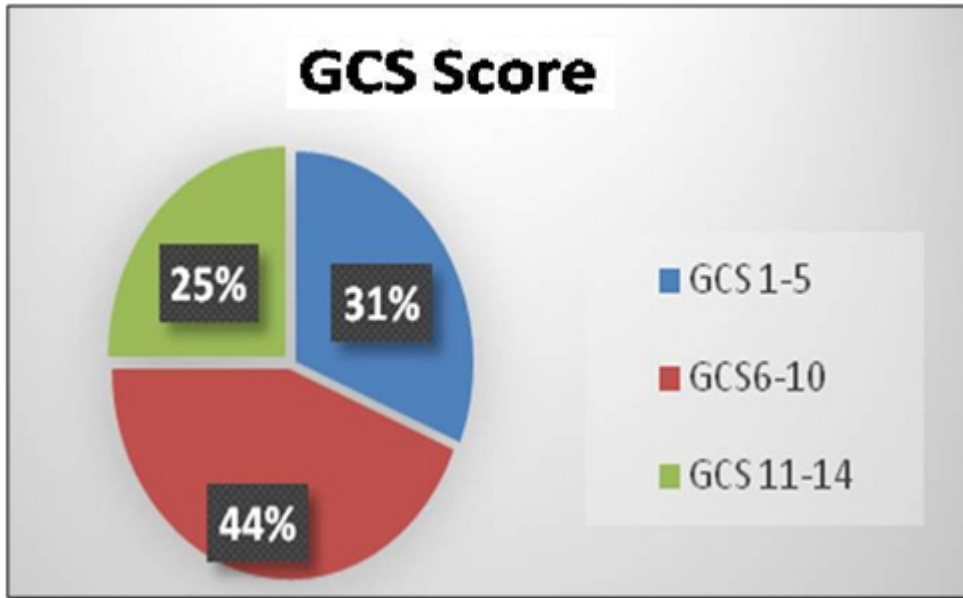


Figure 3. Pie chart of distribution of respondents based on respondents' GCS scores in the Intensive Care Installation of Semen Gresik Hospital in October 2021.

4. Characteristics of Respondents Based on Length of Restraint Use

each (43.75%) and a small number of respondents had a duration of restraint use of 4 days, namely 2 people (12.5%).

Figure 4 shows that the majority of respondents had a duration of restraint use of 2 and 3 days, namely 7 people

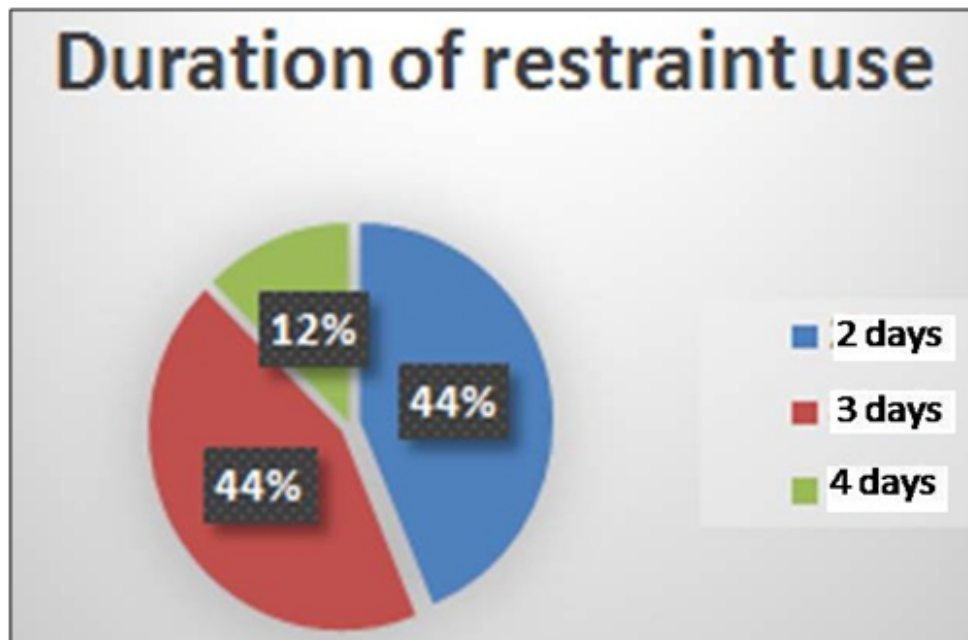


Figure 4. Pie chart of distribution of respondents based on respondents' length of use of restraints at the Intensive Care Installation of Semen Gresik Hospital in October 2021.

The influence of the "Sponge Belt" restraint strap modification on the incidence of injury in the area of the installation in patients with decreased consciousness are

shown in Table 1. that none of the respondents suffered injuries, as many as 16 respondents (100%). The analysis showed that the significance level $p = 0,000$ means that there

was a significant influence on the incidence of injury in the installation area after the rope modification "Sponge Belt" restraint is $\alpha < 0.05$ (Table 1).

Table 1. Tabulation of data on the influence of the "Sponge Belt" restraint strap modification on the incidence of injury in the area of the installation in patients with decreased consciousness at the Intensive Care Installation (ICU) of Semen Gresik Hospital on October 1 - 24 2019.

Injury Event	Modification of the restraint strap "Sponge Belt"		Total		p-value
	Freq	%	Freq	%	
Injury	0	0%	0	0%	0, 000*
Not Injury	16	100%	16	100%	
Total	16	100%	16	100%	

*Wilcoxon Test

DISCUSSION

The research results showed that the most common characteristics of patients in the gender group were women (62.5%) while the number of patients was men (37.5%). The results of this study do not match the results of research conducted by Wanda (2003) which stated that the number of male patients was greater than female patients. The results of the research show that the ages of respondents in the general tabulation data are mostly 26 - 50 years old, 8 people (50%), this is in accordance with the theory of Videbeck (2008), which states that the highest incidence of injuries due to binding treatment is in the range aged 25-45 years. Where this productive age has the strength to fight back when restraint is carried out so that it can result in injury. However, after using the modification of the "Sponge Belt" restraint strap on patients with decreased consciousness, no injuries occurred because the material used in making the restraint used a sponge base so it was comfortable to wear and used silica drill cloth which can absorb sweat. The GCS scores for most patients were 6-10, as many as 7 people (44%), where the GCS score was the middle level of consciousness [15]. This can affect the patient's movement, possibly causing abrasions on the skin of the extremities. However, we use a modification of the "Sponge Belt" restraint strap which has a strap with two sides and a length of 50 cm to facilitate the tying process and has double fixation, namely using a belt and adhesive. So that no injury occurs due to patient movement. Based on the research results, it shows that most of the duration of restraint use is 2 and 3 days, namely 7 people each (44%). A safe duration based on literature sources, both according to CMS Psychiatric Residential Treatment Facilities, COA, and JCAHO, the period of restraint action for mental disorders patients over 18 years of age is more than 4 h. This is done to minimize the side effects of the restraint procedure, but basically there is no standard for a good length of binding. Each institution or department that handles the preparation of SOPs has different policies in determining the duration of this engagement. However, other literature adds, as stated by

the Idaho Department of Correction (2010) in the SOP for restraint measures, the maximum initial duration of restraint intervention is 8 h. After the 8 h period has ended, a re-evaluation is carried out regarding the patient's aggressive behavior. If the behavior displayed by the patient is still the same and has not shown improvement, then the restraint procedure can be applied again if other alternative steps to control behavior have not been effective. However, the use of modified "Sponge Belt" restraint straps in patients with decreased consciousness does not result in injury, this could be because the material used in making the restraint uses a sponge base material so it is comfortable to wear and uses silica drill cloth which can absorb sweat, in addition to having rope with two sides and a length of 50 cm to facilitate the fastening process and has double fixation, namely using a belt and adhesive. So that no injury occurs due to patient movement during gradual observation up to a limit of 2 x 24 h. Based on data from medical records at Semen Gresik Hospital in 2018, the number of patient safety incidents before the use of modified restraint straps was carried out, the incidence of injury in the form of abrasions on the wrist was 3 incidents (50%) out of 6 KTD. This is partly due to friction between the restraint materials and the length of time the restraint rope is used. The results of a significant influence on the incidence of injury in the installation area after the rope modification "Sponge Belt" restraint. The use of modified sponge belt restraint straps in patients with decreased awareness provides a sense of security and comfort so as to avoid the occurrence of KTD. Restraint extremity is limiting the motion of extremities by using cuffs on the wrists or ankles and fastening cloth. Restraint must be done in special conditions; this is the last intervention if the client's behavior cannot be overcome or controlled with behavioral strategies or environmental modification [13]. Restraints are used when other, less restrictive interventions have been unsuccessful/ineffective in protecting the patient, staff, or others from a threat [14]. Restraint sponge belt is the name of a modified restraint for patients with decreased consciousness. The modification characteristics of sponge belt restraint straps are sponge-

based belt pads, silica drill fabric that absorbs sweat, double-sided and 50 cm long ropes, simplifying the process of double binding and fixation using belts and adhesives. The results showed that the age of respondents in the general tabulation data was that most of the ages 26 - 50 years were 8 people (50%). The highest incidence of injuries resulting from the treatment of binding actions was in the range age 25-45 years. Where this productive age has the strength to fight when a restraint is taken so that it can result in injury [14]. However, after the use of a "Sponge Belt" restraint strap modification in patients with decreased awareness, injuries do not occur because the material used in making the restraint uses a sponge base material so that it is comfortable to wear and wear a silica drill cloth that can absorb sweat. Besides that, in general data tabulation the GCS value of patients is mostly 6-10 as many as 7 people (44%), where the GCS value is a mid-level awareness level [15]. The Glasgow Coma Scale has become an integral part of clinical practice and research worldwide. Findings using the scale have shown strong associations with those obtained by use of other early indices of severity and outcome [15]. This can affect the movement of the patient which allows blisters on the extremities of the skin. However, the use of a modified "Sponge Belt" restraint strap which has a rope with two sides and a length of 50 cm, facilitates the binding process and has double fixation using a belt and adhesive. So that injuries do not occur due to patient movement. Based on the results of research shows that most of the use of restraint 2 and 3 days is 7 people (44%) each. Safe duration based on literature sources, according to the CMS Psychiatric Residential Treatment Facilities, COA, and JCAHO, the duration of restraint action in patients with mental disorders aged over 18 years is a tick may take more than 4 h. This is done to minimize the side effects of the restraint procedure, but basically there is no standard long-time good binding. Each institution or department that handles the preparation of SOP has a different policy in determining the duration of this engagement. However, other literature adds, as revealed by the Idaho Department of Correction (2010) in the SOP of restraint measures, the maximum initial duration of restraint intervention is 8 h. After the 8 h period is over, a re-evaluation is made regarding the patient's aggressive behavior, if the behavior displayed by the patient is still the same and has not shown improvement, then the restraint procedure can be reapplied if other alternative measures for controlling the behavior of the results have not been effective [16]. However, the use of a "Sponge Belt" restraint strap modification in patients with decreased awareness of injury does not occur, this could be due to the material used in making the restraint using a sponge base material so that it is comfortable to wear and use a silica drill cloth that can absorb sweat, in addition to having a rope with two sides and a length of 50 cm, facilitates the binding process and has a double fixation using a belt and adhesive. So that injuries do not occur due to the movement of the patient during the gradual observation to the limit of 2 x 24 h. The impact

experienced by patients during the restraint besides physical condition is also psychological. This study shows that the physical effects experienced directly in the implementation of a restraint are the emergence of physical discomfort, abrasions in the area of the restraint installation, increased risk of contractures and bone damage. The results of this study are not in accordance with the research of Kandar and Pambudi (2013) where the results of the restraint action did not cause injury so that it proved effective in reducing violent behavior [17]. However, the results of this study are consistent with the results of research conducted by Wanda [18], stating that restraint measures taken in mental patients can cause emotional trauma or psychological effects [18]. Limitations in this research are: 1) Observations are carried out only on patients who experience decreased consciousness, and sampling was only carried out on intensive care unit (ICU) patients, so the results cannot represent all patients with decreased consciousness at Semen Gresik Hospital. This study provides recommendations about modification of the Sponge belt restraint strap has the characteristics of a sponge-based belt, because it uses a silica drill that can absorb sweat, a rope with two sides and a length of 50 cm, simplifying the process of binding and double fixation, which uses a belt and adhesive. The hospital always monitors the use of restraint in patients, especially observations during restraint installation.

CONCLUSION

The research results show no respondent experienced an injury event after using a modification of the "sponge belt" restraint strap in the mounting area in patients with decreased consciousness, and no injuries after the use of a modified "sponge belt" restraint strap in the area of restraint installation in patients with decreased consciousness. However, a significant influence of the use of a "sponge belt" restraint strap modification on the incidence of injury in the area of attachment in patients with decreased consciousness. It is hoped that nurses will always pay attention to patient safety procedures, especially in carrying out restraint actions which aim to prevent patient safety incidents from occurring by participating in training and socialization regarding restraint action techniques so that nurses can have continued professionalism in carrying out restraint actions. Hospitals always monitor the quality of patient safety by making regulations/SOPs for restraint actions on patients, especially observing the length of time the restraint strap is used.

REFERENCES

1. Health TIM (2011) Regulation of the Minister of Health of the Republic of Indonesia Number. 11 / MENKES / PER / VIII / 2017 About Patient Safety in Hospitals. pp: 41.
2. Haimowits U & H (2006) Restraint and Seclusion - A Risk Management Guide.

3. Ministry of Health, RI (2008) National Guidelines for Hospital Patient Safety (Patient Safety). KKP-RS Edi.
4. Hospital SG (2018) Quality of Semen Gresik Hospital.
5. Springer G (2015) When and how to use restraints. *Am Nurse Today* 10: 1.
6. Videbeck L, Sheila (2008) *Psychology Nursing Textbook*. Jakarta: EGC.
7. Kandar, Pambudi, Prabawati S (2013) Efektivitas tindakan restrain pada pasien perilaku kekerasan yang menjalani perawatan di unit pelayanan intensif psikiatri (UPIP) RSJ Daerah Dr. Amino Gondohutomo Semarang 2013 [The effectiveness of restraint on patients with violent behavior who undergo. In: prosiding konferensi nasional II PPNI Jawa Tengah 2014.
8. Saseno, Pramono, Giri, Kriswoyo (2013) Pengaruh tindakan restrain fisik dengan manset terhadap penurunan perilaku kekerasan pada pasien skizofrenia di ruang rawat intensif bima Rumah Sakit Jiwa Grhasia Daerah Istimewa Yogyakarta [the effect of physical restraint with cuff on increasing violent. *Jurnal Keperawatan Mersi* 4(2): 1-6.
9. Bryant AR, Nix PD (2007) *Acute & Chronic Wounds: Current Management Concepts*. Third Edit. St. Louis, Missouri.: Mosby.
10. Potter PA, Perry AG (2005) *Fundamental of Nursing*. 4th Edn. Jakarta: Salemba Medika.
11. Stubbs B (2009) The manual handling of the aggressive patient: A review of the risk of injury to nurses. *J Psy Ment Health Nurs* 16: 395-400.
12. Happell B, Harrow A (2010) Nurses' attitudes to the use of seclusion: A review of the literature. *Int J Ment Health Nurs* 19: 162-168.
13. Riyadi S, Purwanto T (2009) *Mental Nursing*. Yogyakarta: Graha Science.
14. Videbeck L, Sheila (2008) *Psychology Nursing Textbook*. Jakarta: EGC.
15. Harsono (1996) *Clinical Neurology Textbook*. Yogyakarta.
16. Idaho Department of Correction Law Insider (2023) Available online at: <https://www.lawinsider.com/contracts/22iVltA8biB>
17. Kandar, Pambudi, Prabawati S (2014) Effectiveness of restraint measures in violent behavior patients undergoing treatment at the psychiatric intensive care unit (UPIP) of the Regional General Hospital, dr. Amino Gondohutomo Semarang (Efektivitas tindakan restrain pada pasien perilaku keker. In: Prosiding Konferensi Nasional Ii Ppni Jawa Tengah 2014.
18. Wanda K (2003) Breakaway and physical restraint techniques in acute psychiatric nursing. *J Forens Psychiatry Psychol* 16: 380-398.