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# Demystifying The Impact Of Non-Pharmacological Interventions On Seclusion Episodes In Adult Psychiatry Settings: A Systematic Review.

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***Abstract***
***Introduction:*** *The use of seclusion and its effectiveness in adult psychiatric units remains controversial worldwide in which the process of seclusion can be attributable to increased risk of work-related accidents. Though, over the recent years, the reduction of both the frequency and duration of seclusion episodes through pharmacological and non-pharmacological interventions has become a priority for mental health services worldwide. However, there is a paucity of research and differences in professional opinions on the impact that non-pharmacological interventions will have on seclusion episode and on the less coercive and more acceptable non-pharmacological intervention.*
***Aim:*** *This systematic review (SR) aims to assess the impact of non-pharmacological Interventions on Seclusion Episodes in Adult Psychiatric Patients.*
***Method:*** *Using systematic review methodology, CINAHL plus Full Text, MEDLINE, PsychINFO, PubMed, and Embase databases searched between December 2020 and January 2021. Population, Intervention, Comparison, and Outcomes (PICO), the structured framework was used to frame the research question. PRISMA framework*

*was then utilised in conducting the systematic review. Only ten studies met the criteria for inclusion from one hundred and fifty potential studies yielded from searching the different databases and other sources. The quality of the ten eligible studies appraised utilizing an evidence-based librarianship (EBL) critical appraisal checklist. Data was systematically analyzed using narrative synthesis.*

***Results:*** *Ten studies were analyzed. All ten studies used different non-pharmacological interventions. The overall result post-analysis showed a reduction in the incidence of seclusion episodes across all studies with some statistically significant results reported in some of the studies.*

***Discussion:*** *The evidence from all the studies reviewed suggests that non-pharmacological intervention is an important process in reducing the incidence of seclusion. However, the different non-pharmacological interventions used in these studies present room for research improvement in the quality of evidence.*

***Implications for practice:*** *it is envisaged that the result of this SR will inform mental health nursing practice on the positive effect that non-pharmacological interventions have on the incidence of seclusion episodes. This will contribute to the body of knowledge in non-pharmacological interventions that exist within mental health settings and policy making in relation to same.*

***Keywords****: Seclusion episode, Pharmacological and Non-pharmacological Interventions, Psychiatric patients, Violence and Aggression, Physical Restraints, Verbal De-escalation, Treatment Outcomes.*

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## I. Accessible Summary

**What is known on the subject?**

- Over the recent years, the Irish mental health commission is committed to the reduction of both the frequency and duration of seclusion episodes in all their approved psychiatric centres. This has also become a priority for mental health services worldwide in terms of reducing restrictive practices.
- The use of seclusion and its effectiveness in adult psychiatric units remains a highly controversial intervention and the process of seclusion can be attributable to increased risk of work-related accidents.
- As a result, seclusion is deemed to be used as a last resort in managing challenging behaviors following other pharmacological or non-pharmacological interventions.
- There is a paucity of research and differences in professional opinions on the impact that non-pharmacological interventions have on seclusion episodes and on the non- pharmacological intervention that is less coercive and more acceptable intervention in mental health practice.
- Thus, the impact of non-pharmacological interventions on seclusion episodes needed to be reviewed and evidence collated on a regular basis to support the best evidence-based mental health practice and to highlight which non-pharmacological intervention that will be more recommended based on their impact on seclusion episodes in mental health settings.

**What the paper adds to existing knowledge?**

- The main aim of this systematic review was to assess the impact of non-pharmacological interventions on seclusion episodes in adult psychiatric patients utilizing the best available research evidence.
- Despite the limitations of this systematic review and the need for the cautious interpretation of the result, it is evidently seen from carrying out this systematic review that the impact that non-pharmacological interventions have on the incidence of seclusions without affecting ward safety cannot be under-estimated.
- The results from this systematic review indicated that non-pharmacological interventions could aid in the reduction of seclusion episodes.
- This systematic review did not only show the importance of non-pharmacological interventions but also demonstrated the need to develop a core strategy in which these non-pharmacological interventions will be embedded towards achieving a reduction in the incidence of seclusion episodes in an adult psychiatric unit.

**What are the implications for practice?**

- The result of this systematic review will inform mental health nursing practice on the positive effect that non-pharmacological interventions have on the incidence of seclusion episodes.
- It will contribute to the body of knowledge in non-pharmacological interventions that exist within mental health settings.
- It will improve service delivery and quality of patient care in adult mental health settings.

## II.Introduction

In adult mental health nursing, patients often presented with challenging behavior such as violence and aggression which usually have a negative impact on the safety of the environment (Allen *et al.* 2005, Zun & Downey 2008, Zeller & Wilson 2011, Garriga *et al*. 2016). These unmanageable challenging behaviors often result in the use of seclusion to manage the behaviors (Whittington *et al.* 2009, Knox & Holloman 2012). Seclusion is the process whereby a person is left in any room alone at any time with the exit door locked in such a way that the person cannot leave the room (Mental Health Commission 2009). Although, the effectiveness of seclusion in managing challenging behaviors in adult psychiatric unit remains controversial worldwide due to inadequate well-designed studies to support the practice (Meehan *et al.* 2004, Sullivan *et al.* 2004, Muralidharan & Fenton 2006, Stolker *et al.* 2006, Roberts *et al.* 2009, Kontio *et al.* 2012, Sailas & Fenton 2012). Therefore, the priority for psychiatric settings worldwide is the reduction or elimination of seclusion (Huckshorn 2006, Gaskin *et al.* 2007, Janssen *et al.* 2008, LeBel 2008, Steinert 2009, Cummings *et al.* 2010, Happell & Koehn 2010). This is because overuse of seclusion can negatively affect the recovery of patients and increases the risk of work-related accidents (Colaizzi 2005, Frueh *et al.* 2005, Robins *et al.* 2005, Bernstein 2008, Victorian State Government 2013). Thus, this has forced most psychiatric hospitals worldwide to look for alternatives for seclusion and/or ways of reducing seclusion through pharmacological or non-pharmacological interventions. However, the opinion of mental health nurses on the impact of non-pharmacological interventions on seclusion episodes is diverse. Due to these variations in opinions, it is important for this topic to be reviewed and evidence collated on a regular basis through systematic examination of the existing body of knowledge available on the topic to support the best evidence-based practice.

## III.Methods

**Objectives**

This systematic review aims to assess the impact of Non-Pharmacological Interventions on Seclusion Episodes in Adult Psychiatric Patients.

**Research question**

Population, Intervention, Comparison, and Outcomes (PICO) was used as a structured approach framework in formulating the research question. The importance of structuring an SR question in a PICO format cannot be underestimated (Hasting & Fisher 2004, Schardt *et al*. 2007, Lockwood & Geum 2017). Thus, the research question for this SR was:

'**What is the Impact of Non-Pharmacological Interventions on Seclusion Episodes in Adult Psychiatric Patients?**

Population: Adult psychiatric patients.
Intervention: Non-pharmacological interventions.
Comparison: No comparison.
Outcome: Incidence of seclusion episodes.

**Outcomes measured.**

The primary outcome in relation to this systematic review was:

- Incidence of seclusion episodes

**Search Strategy**

The articles in this SR met the following eligibility criteria,

***The inclusion criteria were;***

- Any studies in which the target participants are adult patients aged from 18-65 years of any gender with no restrictions regarding country, ethnicity, and date of studies.
- Any studies in which the target non- pharmacological intervention(s) were aimed at adult psychiatric patients or staff such as staff training/educational modules.
- Studies that focused on both physical restraint and seclusion concurrently.
- Studies that focused on physical restraint and seclusion in which the data for the seclusion can be independently extracted.
- Any full-text English language articles that explore non-pharmacological intervention on the episodes of seclusion in any adult psychiatric setting that have access to seclusion rooms.
- Non-pharmacological interventions will be described as any approach that did not involve any pharmaceutical/pharmacological interventions. Examples of non- pharmacological interventions include, but not limited to structured framework, educational interventions, verbal de-escalation, different initiatives,

crisis management intervention or a combination of various non-pharmacological interventions and programs.
- The participants will have either a diagnosis of psychotic disorder or mood disorder as a primary or a differential diagnosis in respect of their admission status (voluntary or involuntary).

***The exclusion criteria were:***
- Studies that only sampled patients with learning disabilities, dementia, and autism spectrum disorder. Behavioral symptoms such as physical aggression/violence are frequent manifestations in this category of patients due to significant cognitive degeneration or impairment in the intellectual functioning (Ballard 2001, Harris 2006).
- Studies that focused on mechanical restraint and seclusion. These studies will be excluded, as the use of mechanical restraint is not practice in author's work environment and no policy in relation to it.
- Any research articles that only sampled people with poly substance abuse that have no diagnosis of mood or psychotic disorder.
- Studies done in child and adolescent settings.
- Non-English articles.
- Literature reviews, systematic reviews, systematic mapping studies, case reports and commentary papers
- Articles without full texts or abstract only paper.

**Search methods**

The topic of the research was initially divided into different aspects that were related to Non-Pharmacological Interventions as well as Seclusion. At first, a search was done using only the Cumulative Index to Nursing and Allied Health Literature (CINAHL) database via EBSCO host) to create appropriate key search terms. Below outlined the key search terms that were identified:
- Non-pharmacological intervention
- Time out
- Seclusion studies
- Psychiatric setting
- Reduction of seclusion
- Incidence of seclusion
- Non-pharmacological intervention studies
- Early interventions
- Behavioral crisis intervention
- Psychosocial
- Training
- Education in mental health
- Psychiatric nursing interventions
- Verbal de-escalation and seclusion
- Management of violence and aggression
- Violent/aggression reduction techniques
- Acute adult psychiatric unit
- Seclusion
- Psychotic disorders

After identification of the key search terms, an electronic search that aimed to be specific to the key search terms was conducted with the assistance of a health sciences librarian in December 2020 and January 2021 using electronic databases. This is to ensure that all available literature to answer the question is included. The databases listed below were used to identify eligible published literature pertaining to the key search terms (Table 1).
- CINAHL plus Full Text (1937 January 2021)
- MEDLINE (1946 to January 2021)
- APA PsychINFO (1800 to January 2021)
- ScienceDirect (1995 to January 2021)
- Embase (1974 to January 2021)
- Scopus (2004 to January 2021)

In order to further identify differences in spellings and subject terminologies, each aspect of the topic was searched separately for each database using the key search terms, their synonyms, and subject headings

(Cinahl Headings for CINAHL database, Medical subject headings (MeSH) for Medline, PsycInfo Index Terms for PsycINFO and Emtree in Embase). Boolean phrase of 'and/or/not', Truncation symbols such as the dollar sign ($), the asterisk (*) and wildcards symbols (#,?) were then used to link concepts and the key terms together. The title of any relevant articles selected was then searched in the Scopus database by clicking on the 'CITED BY' column to see any newer articles that have cited /referred to the selected articles since they were published. This was then joined to formulate a combined PRISMA (2020) flow diagram (Figure 1). The key search terms were additionally used to search Grey literature in Open Gray, HSE repository (Lenus), and ASLIB index of the thesis but yielded no result. A manual search of ResearchGate was also conducted and reference lists of eligible studies were additionally hand searched for more studies that were relevant by the first reviewer (Author) and second reviewer (author's supervisor). Overall, this yielded ten studies for potential inclusion.

**Data Extraction**

The data in the included studies that met the inclusion criteria were extracted by the first reviewer (Author) using the following data fields: author, date, title, source, country, aim, design, inclusion/exclusion criteria, participants, care setting, duration, intervention, primary/secondary outcome, measurements, results, ethics/conflicts of interest, study limitations, conclusion/recommendations, and Evidence-Based Librarianship (EBL) score. The second reviewer verified the extracted data. Authors were also emailed for more information pertaining to any missing data in their respective studies.

**Data Analysis and synthesis**

A narrative synthesis of results will be presented in a systematically organized way to ensure that the impact of the non- pharmacological intervention on seclusion episodes in an adult psychiatric setting is best captured across the years.

**Quality Appraisal**

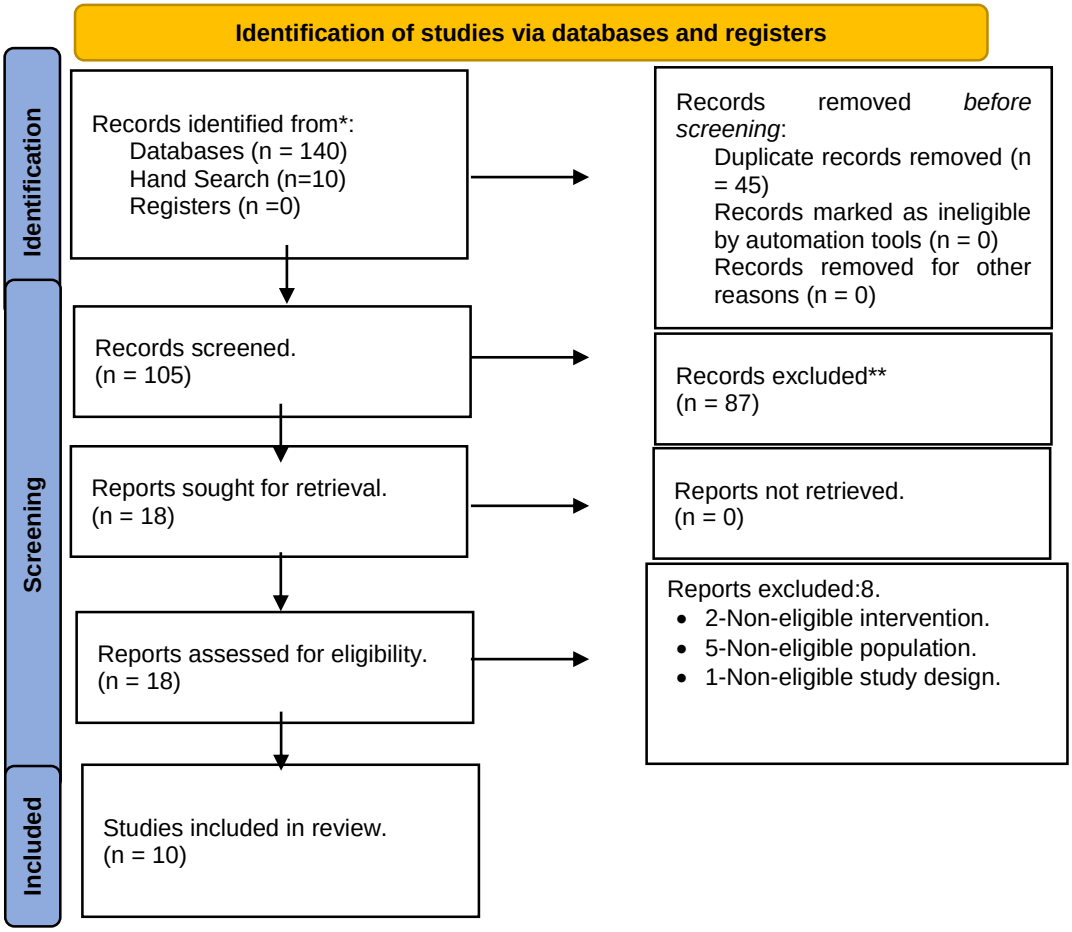
The importance of quality appraisal of research studies cannot be underestimated as it prevents inaccurate, biased conclusions of studies (Milner 2015). Thus, the quality of the studies that were included in this SR was appraised utilizing EBL critical appraisal checklist devised by (Glynn 2006). The quality appraisal was done in order to systematically examine and checked for the quality, reliability, and validity of the studies (Khan *et al.* 2003, Glynn 2006, Young & Solomon 2009). EBL critical appraisal checklist assesses the validity of studies in four main sections, namely population, data collection, study design, and results. For each section on the EBL critical appraisal checklist to be deemed valid, the calculated score for the section must not be <75%. Otherwise, the section of the study will be deemed invalid. Afterward, the overall validity of each study was calculated and determined. However, for the whole study to be deemed valid, the overall calculation score must be ≥75%. Additionally, the quality appraisal of the included study was also cross-checked by the other authors.

## IV.Results

**Results of the Search**

The combined PRISMA flow diagram (figure 1) below outlines the flow of article screening and selection through the systematic review. Firstly, identification of studies via databases, registers and other sources (Hand Search) was done and yielded a total of 150 papers. Following the review of titles, abstracts and after exact duplicates were removed, 105 published papers were screened. 87 published papers were excluded after screening as they were not relevant to the topic or no full texts available. Subsequently, a review of the 18 remaining full texts published papers were assessed for eligibility, however, 8 published papers were further excluded and deemed non-eligible with valid reasons (Pollard *et al.* 2007, Noorthoorn *et al.* 2008, Smith & Jones 2014, Blair *et al.* 2017, Mika-Julie *et al.* 2016, Andersen *et al.* 2017, Goulet *et al.* 2018, Mann-Poll *et al.* 2018). Finally, 10 articles were deemed to meet the inclusion criteria (Ching *et al.* 2010, Georgieva *et al.* 2010, Lee *et al.* 2010, Boumans *et al.* 2013, Putkonen *et al.* 2013, Chang *et al.* 2014, Jungfer *et al.* 2014, Yang *et al.* 2014, Hochstrasser *et al.* 2018, Haefner *et al.* 2020).

**FIGURE 1 PRISMA 2020 flow diagram for study selection** (Page et al., 2021)




## V.Characteristics of excluded studies

Eight full-text articles were further excluded as they were deemed non-eligible for inclusion in the SR (Pollard *et al.* 2007, Noorthoorn *et al.* 2008, Smith & Jones 2014, Blair *et al.* 2017, Mika-Julie *et al.* 2016, Andersen *et al.* 2017, Goulet *et al.* 2018, Mann-Poll *et al*. 2018). These eight articles were left out for essential reasons due to study designs, inadequate description in relation to the population criteria, unclear information in relation to some of the age categories of patient participants, missing detailed description of the study care setting, and missing data in the results section.

## VI.Characteristics of included studies

Ten studies met the inclusion criteria. Out of the ten studies, (N=3) studies were carried out in the United States, Switzerland(N=2), Netherlands(N=2), Australia(N=2), and Finland(N=1). The year of the included studies were 2020 (Haefner *et al.* 2020), 2018 (Hochstrasser *et al.* 2018), 2014 (Chang *et al.* 2014, Jungfer *et al.* 2014, Yang *et al.* 2014), 2013 (Boumans *et al.* 2013, Putkonen *et al.* 2013) and 2010 (Ching *et al.* 2010, Georgieva *et al.* 2010, Lee *et al.* 2010). Different study designs were utilized by each individual study with a minimum duration of two months and the longest duration of six years. All the studies were conducted in an adult psychiatric unit and the samples were primarily taken in a mental health hospital ward except for one that was conducted in an inpatient forensic mental health. Samples taken were either from staff, adult psychiatric patients, or both, depending on the study. The smallest sample size was N=8 and the largest was N=17359. All the studies implemented different non-pharmacological interventions coupled with the impact on incidents of seclusion episodes in the respective settings. Due to the different non-pharmacological interventions that were used in the selected studies, narrative syntheses were used to synthesize the results.

**Results of Primary Outcome**

All the studies assessed the impact of a variety of non-pharmacological interventions on seclusions incidents (See table 1). Therefore, a systematic and narrative summary of the results on the impact of the intervention on the incidence of seclusion follows:

**Table 1: Brief description of different types of non- pharmacological interventions used in the included studies.**

| Author | Country | Intervention | Result |
|---|---|---|---|
| Haefner et al. (2020). | USA | TeemSteps Verbal De-escalation: This educational tool is evidence-based. It is used to improve techniques for de-escalating patient's aggression, which in turn can lead to reduction in seclusion. | The rate of seclusion events showed no significant difference statistically (p=0.349), but the use of seclusion reduced in a clinically significant way. The pre-rate was 5.9%, and post rate was 4.4%. |
| Hochstrasser et al. (2018). | Switzerland | Implementation of open-door policy: During this intervention, previously locked psychiatric wards were permanently opened to enable a less restrictive ward environment. | Open-door policy as an intervention resulted in reduction of seclusion incidents from 8.2 to 3.5%. |
| Jungfer et al. (2014). | Switzerland | Implementation of a less restrictive policy: This intervention involved the changing of former closed wards to open wards. | There was a significant decrease in the overall percentage of patients that were subjected to at least one seclusion episode across all wards from 13.5 %(Analysis Period 1(AP1) to 10.6 %( Analysis Period 2(AP2). The seclusion percentage in AP2 was notably lower than during AP1; (AP1 (4 closed wards & 2 Open wards); AP2 (2 closed wards, 2 newly opened wards & 2 open wards). |
| Chang et al. (2014). | USA | Recovery Oriented Cognitive Therapy Training: This was aimed at helping individual psychiatric patients to actively participate in their own treatment and helps staff to develop techniques in preventing maladaptive behavior from escalating. | There was a reduction in the incidents of seclusion and restraint by more than half (from 19 to 7) during the 4 months following the completion of the training as opposed to the 4 months before the training. |
| Yang et al. (2014). | USA | Association of empathy of Nursing Staff: This is based on staff empathy skills and the ability of staff to engage with patients respectfully and therapeutically. | Findings showed that the higher the number of nursing staff with empathy ratings that was above average, the lower the use of seclusion and restraint (ratings of ≥4; odd ratio=.67, p<. 01). However, training on empathy showed no further benefit. |
| Boumans et al. (2014). | NETHERLANDS | Methodical Work Approach: This non-pharmacological intervention involved problems translation into goals, searching for ways of realizing the goals, establishment of an individualized plan, carrying out the plan, evaluating the plan and readjustment. | The number of seclusion incidents per 1000 patient days on the experimental ward reduced from 15 to three in the first quarter to the last quarter of the study period. Also, the number of hours spent in seclusion by patients reduced from 934 hours/1000 patient days to 62 hours/1000 patient days from first measurement to the last measurement in the experimental ward. The findings showed a statistically significant decrease in seclusion incidents (P<0.01) and the number of seclusion hours (P<0.01) on the experimental ward following the implementation of this intervention. |

| | | | |
|---|---|---|---|
| Putkonen et al. (2013). | FINLAND | Six Core Strategies: This intervention involved improvement in leadership, development of staff, how data is been used, involvement of consumers, analysis of seclusion and restraint usage coupled with post-event analysis. | The percentage of patient-days with seclusion-restraint declined from 30% to 15% in the intervention wards compared with 25% to 19% for control wards. The time for Seclusion-restraint decreased from 110 to 56 hours per 100 patient-days for intervention wards but went up from 133 to 150 hours for control wards. |
| Lee et al. (2010). | AUSTRALIA | Sensory modulation strategies and risk assessment tool (safety tool): This intervention involved purchasing and distribution of sensory resources, staff education and development of a safety tool (Alfred Psychiatry Safety tool that guide clinicians on how to interview service users about stress triggers and warning signs). | The findings of the study showed a reduction in the percentage of patients secluded. 26% (N=11) were secluded after completing the safety tool that was implemented compared to 65% (N=28) that had been secluded before the implementation of the safety tool. |
| Ching et al. (2010). | AUSTRALIA | Comprehensive Suite of Interventions: The comprehensive suite of interventions includes reviewing of existing seclusion practices, training of staff in the management of aggression and the implementation of evidence-based alternatives that include good leadership skills, use of data efficiently to inform practice, seclusion prevention tools and rigorous debriefings. | The results showed that seclusion episodes and the total hours of seclusion per month were significantly lower after the initial training and the start of the project, during phase 2. |
| Georgieva et al. (2010). | NETHERLANDS | Transfer of patients to psychiatric intensive care unit (PICU). PICU is intended for psychiatric patients that are acutely unwell and the patient's challenging behavior cannot be managed in a general acute psychiatric ward. | Patients had been kept in seclusion for 156 (SD=215) days during a mean hospitalization period of 386 (SD=221) days on average. However, the average seclusion time declined to 0.5 (SD=1) day per patient over a mean stay period of 349 (SD=167) days following the transfer of the patients to PICU. Seclusion usage falls from 40% to 0.1% of admission days spent in seclusion before transfer to the PICU. |

**Verbal De-escalation on Seclusion episodes**

Haefner *et al.* (2020) carried out a quasi-experimental design in the implementation of an evidence-based educational program (TeamStepps) in an adult inpatient psychiatric unit. Nurses (N=31) were informed of the importance of verbal de-escalation in reducing aggressive behavior that arises from patient's seclusion. The patient population on the unit that was targeted for this intervention was those that were admitted two months before the initiation of the educational program (N=388) and two months after the completion of the educational program (N=342). Following the completion of this program, chi-square test for independence was used in assessing each individual variable in which a p-value that is less than .05 represents a statistical significance. It was noted that there is no statistical difference in the seclusion rate of events pre and post the initiation of educational program (p=0.349). However, the TeamStepps educational program on verbal de-escalation showed a reduction that is clinically significant in the use of seclusion by psychiatric nurses. The pre-rate of seclusion was (N= 5.9%) and the post rate was (N=4.4%). The author concluded that nurse's education on verbal-de-escalation is important in reducing the incidence of seclusion episodes as supported by the result of the study.

**Implementation of an open-door policy on Seclusion episodes**

This was an observational longitudinal six-year hospital wide study that was done by Hochstrasser *et al.* (2018). In this study, the incidence of seclusion and forced medication in a total of 17,359 inpatient cases that were admitted into the adult psychiatry department between the years 01/2010 and 12/2015 were examined. Six psychiatric wards that were closed previously were opened permanently. This was done to implement an open-door policy, which will, in turn, lead to a less restrictive policy. Thus, the proportion of beds available in the

closed ward persistently decreased from 45.6% in 2010 to 8.5% in 2015. This resulted in an increase in the percentage of cases that were admitted to the open psychiatric wards from 41.0% to 87%. To know the impact of an open-door policy on the incidence of seclusion and forced medication, both the treatment and clinical data were constantly recorded. Group comparisons were performed for the statistical analysis of the data by chi-square tests. All significance tests were two-tailed and p-values <.05 were deemed significant. The effect size $\eta_p^2$ was calculated and defined as follows; small (d=0.2-.49), Medium (d=0.5-.79), and large (d≥0.8). The findings during the period of observation showed that the percentage of seclusion dropped from 8.2% to 3.5% while the frequency reduced from a mean 0f 5.1 to 2.9 and seclusion duration from 27.1 to 18.2 hours. Therefore, the overall decrease of seclusion over time was significant with a large effect size of ($\eta_p^2$=.82; odds ratio: 0.88). This means that the probability for an admitted patient to be secluded decreased by 12% per year. Thus, the author concluded that the implementation of an open-door policy was linked with a continuous reduction of seclusion. This showed the potential benefit of the intervention in attaining a reduction in involuntary measures such as seclusion.

**Implementation of a less restrictive policy on Seclusion Episodes**

Jungfer *et al.* (2014) examined the effects that changing from closed to open wards will have on the incidence of seclusion and forced medication. The study was a two-year, longitudinal observational study with a total of 2838 inpatient cases. The observational period was divided into two analysis periods, which were analysis period one (AP1) and analysis period two (AP2). During AP1, there were two open wards and four closed while at AP2, the less restrictive policy was implemented, and thus the previously four closed beds in AP1 were reduced to two. Therefore, there were two open wards, and two closed wards in AP2. After implementation of the less restrictive policy, the comparison of the percentage of seclusions and forced medications during the two analysis periods were carried out using the chi-square tests. An exploratory analysis was also done to examine the clinical differences in both assessment periods. The tests were considered significant if the p-values <.05. Their findings showed a significant reduction in seclusion incidence from 15.9% in AP1 to 0.3% in AP2. In addition, the total percentage of patients that were secluded at least once across all the wards significantly reduced from 13.5% in AP1 to 10.6% in AP2 on a hospital-wide level.

**Recovery-Oriented Cognitive Therapy Training on Incidents of Seclusion**

Chang *et al.* (2014) conducted a six-month feasibility study of recovery-oriented cognitive therapy training (CT-R). This is to examine if the intervention would improve the attitudes of staff and patients' perceptions, which can consequentially decrease seclusion and restraint usage. Twenty-nine staff working on a 24 bed- locked urban psychiatric inpatient unit participated in the training. Seclusion and restraint incidents on the unit were tallied before and after the training. Also, prior to the training program, three measures; CT-R interview (four items self-report that assesses familiarity of the principles of CT-R), VOTE (24 items that assess beliefs in relation to working with patients in an inpatient unit), and attitudes toward working with people with psychosis (35-item questionnaire that assesses individuals perception of psychosis but edited to 19 items questionnaire by the authors) were administered to the participants. These measures were also re-administered following the completion of the training program. 100% of trainees (N=29) completed the pre-training measures while 86.2% (N=25) completed the three measures post-training. In comparison to pre-training measures, there was an increase (greater familiarity) that is statistically significant in the CT-R interview total score with a large effect size of (d=.73) post-training. In addition, the overall score on the VOTE revealed a reduction (improvement in attitudes) that is statistically significant with medium effect size (d= -.44) post-training while the total score of the Attitude Towards Working with people with Psychosis (d= -.11) showed no difference between pre-and post-training. Further results from the study revealed that seclusion and restraints decreased by more than half (from 19 to 7) over the four months after the training program compared to the four months before the training program. The raw value was given due to statistical power that was insufficient to test pre and post differences as data on seclusion and restraint were only available for a few months pre and post-training. The author concluded that the findings of the study provide evidence that recovery-oriented cognitive training can improve the therapeutic milieu of an acute psychiatric inpatient environment as seclusion incidents decreased.

**Association of Empathy of Nursing Staff on Seclusion Incidents**

In this study by Yang *et al.* (2014), the impact that nursing staff empathy skills, motivation, and empathy training will have on seclusion episodes were studied. Seclusion and restraint usage, as well as another variable such as empathy of 32 core nursing staff members examined over the period of 1098 nursing shifts every day of the week across the night, day, and evening shifts. In addition, 15 sessions of mindfulness-based empathy training were done with the nursing staff. The 32 nursing staff members were independently rated on their ability to engage empathetically with patients and the score ranges from 1=below average to 5=above average. Nursing staff with a mean rating of 4.0 or higher were deemed to have an ability that is above average and motivation to engage empathetically with patients. The number of staff who were trained coupled with the pre-post empathy-training

period were also included to know the impact of the training on incidents of seclusion and restraints. The authors' findings showed that the characteristics of the nursing staff had an overall effect that is significant on seclusion incidents (OR=.67, p<.01). This significant effect is due to the existence of a higher number of nursing staff that has empathy ratings that is above average. Empathy ratings that were above average were strongly linked with a reduction in the incidence of seclusion and restraint (ratings of ≥4; odd ratio=.67, p<.01). However, the empathy training provided showed only a small, non-significant effect. Though, no statistical value was given for this result. The conclusion by the authors was that employing and retaining nursing staff with above average empathy skills will lead to a reduction in the incidence of seclusion and restraint.

**Methodical Work Approach on Seclusion Incidents**

In this two years prospective study of a quasi-experimental, non-equivalent control group carried out by Boumans *et al.* (2014), the impact that a methodical work approach will have on the incidence of seclusion in adult psychiatric settings was examined. The methodical work approach (as briefly described in table 1) was implemented in an experimental ward, which was a 21 bed Intensive Care Inpatient Unit, and a control group was also formed from three different wards. The data from the three control wards were merged. All coercive measures were monitored by an electronic registration system (Argus). For statistical analysis, the records obtained from the Argus system were calculated per 1000 patients' days for all the participating wards. The number of incidents of seclusion and the number of hours patients stayed in seclusion were used to measure outcome measures between the experimental and the control ward. The results of the study showed that the number of seclusion incidents per 1000 patient days on the experimental ward reduced from 15 to three in the first quarter to the last quarter of the study period. This is in contrast with the control ward in which the number of incidents of seclusion per 1000 patient days increases from 11 to 12 in the first quarter to the last quarter of the study. Additionally, the number of hours spent in seclusion by patients reduced from 934 hours/1000 patient days to 62 hours/1000 patient days from first measurement to the last measurement in the experimental ward. On the contrary, in the control ward, 398 hours were spent in seclusion in the first measurement, 356 hours at the last measurement, and 1016 hours spent in seclusion in the third quarter. The findings showed a statistically significant decrease in seclusion incidents (P<0.01) and the number of seclusion hours (P<0.01) on the experimental ward compared to the control ward following the implementation of this intervention. The authors concluded that seclusion incidents in an adult psychiatric unit could be reduced by the implementation of the methodical work approach.

**Six Core Strategies on Seclusion Incidents**

Putkonen *et al.* (2013) carried out a cluster-randomized controlled trial to examine if prevention of seclusion and restraint is feasible without increasing violence in the psychiatric care of patients diagnosed with schizophrenia. In a secured adult psychiatric hospital, four high-security wards with a total of 88 beds were randomly allocated to two equal groups (intervention wards; N=50 beds and control wards; N=38 beds). The staff in the intervention wards trained in the application of six core strategies in the prevention of seclusion-restraint. (See table 1). Six months of intervention that were done under supervision, were followed up after the training. Seclusion-restraint durations and the number of patient-days with seclusion, restraint, or room observation were collected for the two groups (intervention and control wards) from computerized hospital registers monthly. The analysis was done to compare the monthly incidence rate ratios (IRRs) of coercion and violence per 100 patient days. The findings in the intervention wards showed that the percentage of patient-days with seclusion-restraint reduced from 30% to 15%, IRRs=.88, 95% confidence interval (CI) =.86-.90, p<.001 compared with 25% to 19% for the control wards (IRR=.97, CI=.93-1.01, p=.056). In addition, seclusion-restraint time was reduced from 110 to 56 hours per 100 patient-days for the intervention wards (IRR=.85, CI=.78-.92, p<.001). In contrast, the hours increased from 133 to 150 hours for the control wards (IRR=1.09, CI=.94-1.25, p=.24). The authors concluded that seclusion can be prevented by using the six core strategies intervention in a secured adult psychiatric hospital.

**Sensory Modulation Strategy and Safety Tools on Seclusion Incidents**

In this pilot study, Lee *et al.* (2010) examined the impact that sensory modulation strategies and risk assessment tool (safety tool) will have on the incidence of seclusion in a 30-bed adult psychiatric acute unit. The files of patients were audited for indications on the impact on seclusion use and feedback gathered from the clinical staff. Completed statistics on the seclusion episode before and after implementation of safety tools compared. The findings of the study showed a reduction in the percentage of patients secluded in which only 26% (N=11) were secluded after completing the safety tool that was implemented compared to 65% (N=28) that had been secluded before the implementation of the safety tool. Whereas most staff in the study found the sensory resources moderately helpful. The authors concluded that the findings highlighted the significant role that sensory modulation strategies and tools for risk assessment (safety tool) play in reducing the incidence of seclusion.

**Comprehensive Suites of Interventions on Seclusion Incidents**

Ching *et al.* (2010) study that was done in a secure inpatient forensic mental health hospital aimed to determine if a comprehensive suite of non-pharmacological interventions (Briefly described in appendix 1) will reduce the incidents of seclusion. The study lasted for 28 months in which 141 participants participated in the study. The participants in the study include all the patients and all the clinical staff that use seclusion on the five units. To get a baseline measurement, non-parametric tests were used to analyze the data relating to pre-post measurements of therapeutic climate, attitudes of staff towards seclusion, staff confidence in the management of aggression, frequency, and duration of episodes of seclusion, and the incidence of aggression. In phase one of the study (before participation in the training for the comprehensive suite of interventions), 73 participants took part in the non-parametric tests while 68 participants took part in the non-parametric test in phase two (post interventions). The study findings showed that in phase two, the incidence of seclusion episodes and the overall hours of seclusion monthly were significantly lower following the initial training and the beginning of the project. M=13.57, SD=5.70 and Md= 13.50 compared to M=48.36, SD=31.19 and Md= 46 in Phase one of the study. The authors, therefore, concluded that reduction of seclusion incidence is possible through a comprehensive suite of interventions.

**Transfer to PICU on Seclusion Incidents**

In a 28 months retrospective study carried out by Georgieva *et al.* (2010), the effect that transfer of patients to psychiatric intensive care unit (PICU) will have on the incidence of seclusion were investigated. Eight patients participated in the study and the effect that their transfer to PICU has on their episodes of seclusion was evaluated. The participants in the study had stayed in seclusion at different periods of time. Seven and 517 days were the shortest and longest days spent in seclusion respectively by the participants. The number of days in seclusion before and after admission to the PICU was compared. The findings showed that on average, patients had stayed in seclusion for 156 (SD=215) days during a mean period of hospitalization of 386 (SD=221) days. However, the average time of seclusion reduced dramatically to 0.5 (SD=1) day per patient over a mean stay period of 349 (SD=167) following a transfer of patients to PICU. The use of seclusion was nearly eliminated, falling from 40% to 0.1% of admission days spent in seclusion before transfer and during their stay in PICU respectively. As concluded by the authors, the priority in a PICU should be seclusion reduction as the findings of the study showed that total elimination of seclusion is possible.

## VII.Results of Quality Appraisal

The quality of the included studies was methodologically assessed using the EBL quality appraisal checklist (See Appendix 1). Ten studies were appraised by focusing on the four sections of the EBL namely, population, data collection, study design, and results. Each respective question was answered by ticking the 'Yes', 'No', 'unclear' or N/A as relevant in answering the question. Afterward, the calculation of each section established the validity of that section, and then the overall calculation of all the sections established the validity of the study. The mean validity EBL score for all the studies was 70.93 % (S. D=14.37). The minimum score was 50% (Haefner *et al.* 2020 & Yang *et al.* 2014) while the highest score was 94.4% (Hochstrasser *et al.* 2018). 50%(N=5) of the studies scored ≥ 75% meaning that they were valid (Hochstrasser *et al.* 2018, Chang *et al.* 2014, Jungfer *et al.* 2014, Boumans *et al.* 2013, Putkonen *et al.* 2013). Whereas the other 50% of the studies (N=5) scored ≤ 75% which indicated that they were invalid (Haefner *et al.* 2020, Yang *et al.* 2014, Ching *et al.* 2010, Georgieva *et al.* 2010, Lee *et al.* 2010). In addition, the results for the validity of the included studies for the quality appraisal were presented in table 2 below:

| Validity of Included studies (%) and omissions identified in each category | | | | | |
|---|---|---|---|---|---|
| **Author** | **Validity (%) in each category** | | | | **Overall Results %** |
| | **Population** | **Data Collection** | **Study Design** | **Results** | |
| **Haefner *et al.* (2020).** | 16.6%<br>(Not valid)<br>Unclear if informed consent was obtained and inclusion/exclusion criteria not outlined. | 50%<br>(Not valid)<br>Data collection method not clearly described. | 50%<br>(Not valid)<br>Unclear if the methodology utilized was appropriate. | 100%<br>(Valid) | 50%<br>(Not valid) |
| **Hochstrasser *et al.* (2018).** | 100%<br>(Valid) | 100%<br>(Valid) | 75%<br>(Valid)<br>Unsure of the face validity of the study. | 100%<br>(Valid) | 94.4%<br>(Valid) |
| **Chang *et al.* (2014).** | 66.6%<br>(Not valid)<br>Inclusion and exclusion criteria not outlined definitively. | 71.4%<br>(Not valid)<br>Unclear on how inter/intra observer bias was reduced. | 100%<br>(Valid) | 80%<br>(Valid)<br>Results cannot be generalized. | 78.2%<br>(Valid) |

| Validity of Included studies (%) and omissions identified in each category | | | | | |
|---|---|---|---|---|---|
| **Author** | **Validity (%) in each category** | | | | **Overall Results %** |
| | **Population** | **Data Collection** | **Study Design** | **Results** | |
| **Jungfer *et al.* (2014).** | 66.6%<br>(Not valid)<br>Unclear if informed consent was obtained. | 83.3%<br>(Valid)<br>Unclear if data collection instrument was validated. | 100%<br>(Valid) | 80%<br>(Valid)<br>Unclear if confounding variables were accounted for. | 80.9%<br>(Valid) |
| **Yang *et al.* (2014).** | 0 %<br>(Not valid)<br>sample size not large enough, unclear if informed consent was obtained and exclusion /inclusion criteria not outlined. | 66.6%<br>(Not valid)<br>unclear if the instrument used in data collection was validated and the instrument not included in the publication. | 60%<br>(Not valid)<br>Unclear of the face validity of the study and if the methodology utilized was appropriate for the study. | 80%<br>(Valid)<br>No suggestions provided for further areas of research. | 50%<br>(Not valid) |
| **Boumans *et al.* (2013).** | 75%<br>(Valid)<br>Inclusion/ exclusion criteria not outlined. | 71.4%<br>(Not valid)<br>unclear if the instrument used in data collection was validated. | 100%<br>(Valid) | 100%<br>(Valid) | 84%<br>(Valid) |

| Validity of Included studies (%) and omissions identified in each category | | | | | |
|---|---|---|---|---|---|
| **Author** | **Validity (%) in each category** | | | | **Overall Results %** |
| | **Population** | **Data Collection** | **Study Design** | **Results** | |

| | | | | | |
|---|---|---|---|---|---|
| **Putkonen *et al.* (2013).** | 71.4%<br>(Not valid)<br>Inclusion and exclusion criteria not outlined. | 66.6%<br>(Not valid)<br>Data collection instrument not included in the publication. | 100%<br>(Valid) | 80%<br>(Valid)<br>No suggestions given for further areas to research. | 78.2%<br>(Valid) |
| **Ching *et al.* (2010).** | 50%<br>(Not valid)<br>Unclear if the study population was a general representation of all eligible participants. | 100%<br>(Valid) | 40%<br>(Not valid)<br>Research methodology not clearly stated at a level that will allow replication. | 100%<br>(Valid) | 73.9%<br>(Not valid) |
| **Georgieva *et al.* *(*2010).** | 50%<br>(Not valid)<br>Unclear if informed consent was obtained. And inclusion/exclusion criteria not outlined definitively. | 75%<br>(Valid)<br>Unclear outcome measure. | 40%<br>(Not valid)<br>Nil Ethical approval. | 75%<br>(Valid)<br>Results cannot be generalized. | 57.8%<br>(Not valid) |
| **Lee *et al.* (2010).** | 50%<br>(Not valid)<br>Unclear if informed consent was obtained. | 66.6%<br>(Not valid)<br>Instrument for data collection not included. | 60%<br>(Not valid)<br>Ethical approval not obtained. | 75%<br>(Valid)<br>Nil suggestions on further research. | 61.9%<br>(Not valid) |

## VIII.Discussion

Upon analysis of the overall result of the ten studies included in this SR, the findings of all the ten studies showed a reduction in the incidence of seclusion episodes whether statistically significant or not without a rise in adverse events (Ching *et al.* 2010, Georgieva *et al.* 2010, Lee *et al.* 2010, Boumans *et al.* 2013, Putkonen *et al.* 2013, Chang *et al.* 2014, Jungfer *et al.* 2014, Yang *et al.* 2014, Hochstrasser *et al.* 2018, Haefner *et al.* 2020). Even though all the studies showed a reduction in the incidence of seclusion episodes, it is worth mentioning that there were noticeable differences at the level of significance of the results. In Haefner *et al.* (2020), there was no statistical difference in the incidence of seclusion pre and post-initiation of the verbal de-escalation educational program (p=0.349) but there was a reduction that was clinically significant in relation to the incidence of seclusion as the pre-rate of seclusion was (N= 5.9%) and the post-rate was (N= 4.4%). This result also echoed the effectiveness of verbal de-escalation in reducing patients' aggression, which consequentially decreases the incidence of seclusion (Fagan-Pryor *et al.* 2003, Ilkiw-lavalle & Grenyer 2003, Sullivan *et al.* 2005).

Also, Ching *et al. (*2014) only gave the raw value of the result that showed the reduction in the incidence of seclusion from 19 to 7. This is due to the insufficiency of the statistical power to test pre and post differences in the study. Yang *et al.* (2014) also reported no significant effect on the incidence of seclusion after the empathy training provided but there was a significant effect in the reduction in the incidence of seclusion due to characteristics of the nursing staff with above-average empathy ratings(OR=.67, p<.01). However, it is important to highlight that despite these study findings showing a non-statistical significance, a reduction in the incidence of seclusion episodes was still reported. These further compliments the aims of various mental health strategies worldwide on the need to the reduce incidence of seclusion episodes (Sailas & Fenton 2012). Furthermore, Boumans *et al.* (2014) result indicated that the difference in the reduction of seclusion incidents in the experimental ward was statistically significant from the control ward (P<0.01). Likewise, other studies showed some level of reduction that is significant in seclusion incidents (Ching *et al.* 2010, Lee *et al.* 2010, Putkonen *et al.* 2013, Jungfer *et al.* 2014, Hochstrasser *et al.* 2018). The most notable results appear to be Georgieva *et al.* (2010), where seclusion usage fell from 40% of admission days spent in seclusion to 0.1% before and after transfer to PICU respectively. Thus, seclusion usage was nearly eliminated in this study. Due to this significant result, the impact of the transfer of patients to PICU on the incidence of seclusion warrants further research. Evidently, from the results of this SR, all non-pharmacological interventions used reduced the incidence of seclusion in an adult psychiatric unit.

However, it must be acknowledged that following critical appraisal of all the studies using the EBL appraisal checklist, only 50%(N=5) of the included study after their overall validity calculation were deemed valid as they scored ≥ 75% (Hochstrasser *et al.* 2018, Chang *et al.* 2014, Jungfer *et al.* 2014, Boumans *et*

*al.* 2013, Putkonen *et al.* 2013). Whereas the other 50%(N=5) were deemed to be invalid after their overall validity calculation as they scored ≤ 75% (Haefner *et al.* 2020, Yang *et al.* 2014, Ching *et al.* 2010, Georgieva *et al.* 2010, Lee *et al.* 2010). The limitations of this SR that are sufficient to affect the interpretation of this SR were:

- Limited number of studies used in the SR.
- The number of the percentages of the studies that were deemed invalid on the EBL checklist after their overall validity calculation.
- The lack of a control group in most of the study.
- The exclusion of studies that focused on mechanical restraint and seclusion.

Additionally, research designs utilized by some of the studies posed methodological issues as some of the studies had a pre-post data design that was observational and retrospective in nature, these designs were but with limitations (Haber 2018).

On the contrary, it is vital to highlight that Hochstrasser *et al.* (2018), scored highly on the critical appraisal checklist (94.4%) with a large sample size of 17359 inpatient cases, Boumans *et al.* (2014) used a control group with a total sample size of 678, Jungfer *et al.* (2014), used a big sample size of 2838, and Putkonen *et al.* (2013), utilized a randomized control trial. All included studies were done across different countries with an overall result showing reduction in the incidence of seclusion episodes. As a result, it may be argued that the adds strengths to this SR and enhances the generalizability of this SR findings.

It is important to highlight that a good methodological controlled experimental study design in a psychiatric setting may prove difficult to achieve, in this subject area due to difficulty in randomization, blinding, and diverse organization culture that exists in different psychiatric settings (Gaskin *et al.* 2007). Therefore, the interpretation of this SR result needed to be treated cautiously as further rigorous research that focused on specific interventions needed to be done in a more controlled setting. Thus, the implications for potential future researchers following the findings of this SR relates to the evaluation of the specific components in some of the non-pharmacological interventions using a rigorous research methodology as it is difficult to know which aspect of the intervention makes the greatest impact on the incidence of seclusion.

## IX.Conclusion

The main aim of this SR was to assess the impact of Non-pharmacological Interventions on seclusion episodes in adult psychiatric patients utilizing the best available research evidence. Despite the limitations of this SR and the need for the cautious interpretation of the result, it is evidently seen from carrying out this SR that the impact that non-pharmacological interventions have on the incidence of seclusions cannot be under-estimated. This is because the results from this SR indicated that non-pharmacological interventions could aid in the reduction of seclusion episodes. This SR did not only show the importance of non-pharmacological interventions but also demonstrated the need to develop a core strategy in which these non-pharmacological interventions will be embedded towards achieving a reduction in the incidence of seclusion episodes in an adult psychiatric unit. Although, the fact remains that a rigorous research design is needed to address methodological issues pertaining to the effectiveness of the components of each intervention as most of the interventions were multi-faceted. However, in the meantime, it is envisaged that the result of this SR will inform mental health nursing practice on the positive effect that non-pharmacological interventions have on the incidence of seclusion episodes. This will contribute to the body of knowledge in non-pharmacological interventions that exist within mental health settings.

## X.Relevance of The Paper to Mental Health Nursing

In adult psychiatry setting, the use of seclusion can negatively affect both patients and staff. Thus, Non-pharmacological interventions have been shown to have a positive effect on the incidence of seclusion episodes in adult psychiatric settings and thus eliminates the profound risk of injury, adverse physical/psychological effects and traumatization of patients, staff and observers associated with seclusion episodes. The most notable and likely recommended non-pharmacological interventions is transfer of patients to psychiatric intensive care unit (PICU) as it has been shown to have a greater impact on seclusion episodes. Seclusion episodes were nearly eliminated after transfer to PICU. This study may serve as an awareness to different mental health stakeholders by providing data to incorporate in seclusion reduction strategies and by providing information to target future quality initiative such as establishment of Psychiatric intensive care units in the mental health settings in the quests to reduce the use of seclusions in mental health facilities.

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