INTRODUCTION

The widespread and international problem of aggression in healthcare is regularly highlighted not only by healthcare staff but also the media, researchers and healthcare organisations (Winstanley & Whittington 2002, Wells & Bowers 2002, Farrell *et al.* 2006). Although all healthcare professionals are at risk of aggressive interactions with patients, studies show that nurses are most often victims of verbal and physical violence (Wells & Bowers 2002). Risk is prevalent not only in psychiatric units but also in acute care settings with violence towards nurses being reported across all healthcare areas (Farrell et al. 2006).

Background

Nurses perceive and describe aggression in different ways and likewise researchers tend to use such terms as aggression, anger, hostility or violence interchangeably (Rippon 2000, Collins 1994). For the purpose of this systematic review, violence and aggression by patients will be generally defined as any incident that puts a healthcare worker at risk such as: verbal and physical abuse, threatening behaviours, assault or any type of behaviour that may cause healthcare workers to fear for their safety (Ayranci 2005).

Generally the patients most likely to exhibit aggressive behaviours in acute care settings are those diagnosed with psychiatric or personality disorders, dementia, acute confusion or drug-related problems (Gerberich et al. 2005). Unlike specially trained psychiatric nurses, registered nurses in acute care

settings are often expected to care for these patients with little knowledge and skill regarding appropriate and effective techniques for dealing with aggressive behaviours (Wells & Bowers 2002). The effects of such acts of aggression on healthcare staff can be considerable with nurses, after experiencing either verbal or physical aggression, frequently reporting feeling angry or emotionally hurt and often having increased sick leave (O'Connell et al. 2000).

Abundant literature exists on managing patient aggression, including interventions aimed at both patients and nursing staff. The majority of this information relates to patients admitted to psychiatric facilities. It is inappropriate to generalise the results of studies conducted in psychiatric settings to acute care facilities due to the differences in the specific types of care and training provided in each facility (Winstanley & Whittington 2004).

Some of the strategies for managing patient aggression include: staff training, seclusion, chemical restraint and/or mechanical restraint. Given the controversial nature of using any type of restraint, local and organisational policy should provide direction to all staff regarding appropriate use. The decision to use restraint in any form should only be taken after all possible alternative interventions have been exhausted (College of Nurses of Ontario 2009). The purpose of this review is to assist acute care nurses by analysing the current evidence to determine the most effective interventions for preventing and managing aggressive behaviours in patients admitted to an acute hospital setting.

THE REVIEW

Aim

The aim of this systematic review was to establish best practice in the prevention and management of aggressive behaviours in patients admitted to an acute hospital setting.

DESIGN

Types of studies

This review, conducted in 2008, selected studies published from 1990-2007. The review considered any randomised controlled trials (RCT) that evaluated the effectiveness of interventions for preventing and managing aggressive patients in acute hospital settings. In the absence of RCTs, other comparative quantitative research designs were considered for inclusion. Studies undertaken in any country were retrieved, however due to limited resources only those studies reported in English were included in the review.

Types of participants

This review included all studies with adult patients over the age of 18 who exhibited aggressive behaviours and were admitted to an acute hospital setting. Types of aggressive behaviours included: verbal abuse, non-verbal abuse, physical violence, threatening behaviours and assault. Studies with acute care nurses as the primary participants that investigated interventions to prevent or minimise patient aggression were also included.

Types of interventions

Studies were eligible for inclusion if the intervention evaluated could be used by nurses in acute settings to prevent or manage acts of aggression from patients in their care. All studies evaluating one or more of the following interventions were included: administration of “as required” prescribed medications, mechanical restraint, seclusion and clinician behaviours such as: verbal communication techniques, use of body language, prevention and recognition strategies, staff attitudes, knowledge and skills, environmental controls, setting of limits for patients and increase in staff numbers.

Types of outcome measures

The primary outcome of interest was patient aggression. Other outcomes for inclusion were: staff injuries, staff confidence, staff knowledge, staff attitudes, staff skill level, stress/anxiety levels among staff, patient injuries and early detection of aggressive behaviours.

SEARCH METHODS

The databases searched included; MEDLINE, CINAHL, psycINFO, Health source, Web of Science, EMBASE, the Cochrane Library including DARE (Database of abstracts of reviews of effects) and Pubmed. Table 1 details the results retrieved from each database. The search strategies for each database were extensive and included a combination of subject headings and keywords relating to nurse, patient, behaviour (aggression, violence, assault or abuse), setting (hospital, acute, emergency, critical care) and interventions (drug

therapy, restraint, staff training). The search for unpublished studies also included grey literature and dissertation abstracts.

In the final step of the search strategy, hand-searching was undertaken of the reference lists of included studies. References were considered for inclusion based on the title. The full text of the paper was then retrieved if the article appeared relevant.

Table 1: Results for search of databases

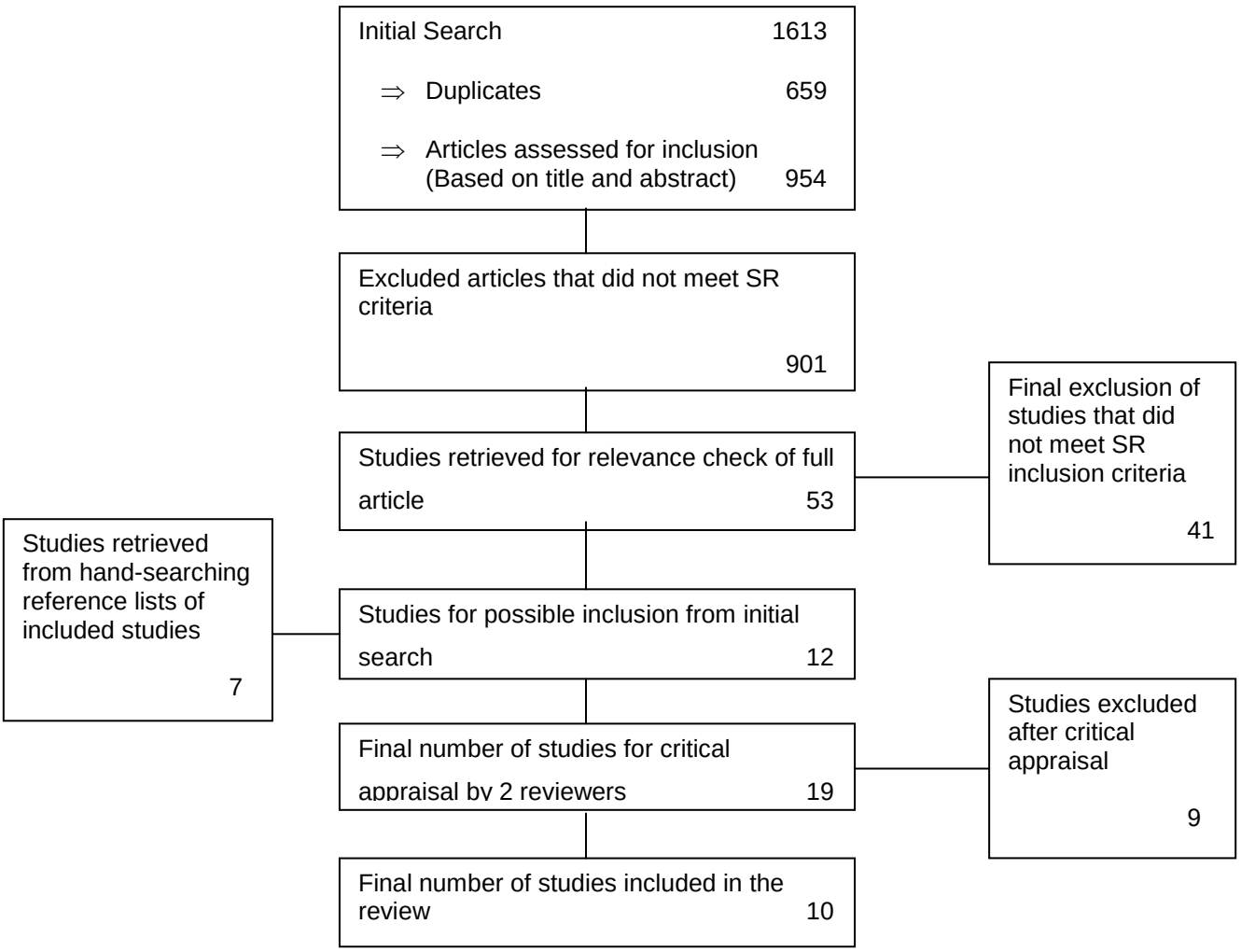
Database	***Records***
MEDLINE	361
PsychINFO	42
CINAHL	364
Health Source	113
Embase	116
Wed of Knowledge	226
Cochrane	28
Pubmed	363
Total	1613
Duplicates	659
Total (Duplicates Removed)	**954**

SEARCH OUTCOME

The search strategy identified a total of 1613 records. All citations were imported into the reference manager software "Endnote" and following the removal of duplicates, 954 records remained (see Table 1). Two reviewers then independently assessed all 954 records to determine those meeting the inclusion criteria with 901 found not relevant based on title and abstract. A further 41 of the remaining 53 records were excluded following review of the full article for the inclusion criteria. Hand searching yielded 7 additional studies,

resulting in a total of 19 relevant studies. Figure 1 displays the process used to identify relevant articles for inclusion.

Figure 1: Stages of searching and inclusion/exclusion of records for the review



QUALITY APPRAISAL

The methodological quality of the 19 remaining studies was critically appraised by two independent reviewers using the standardised critical appraisal instruments from the Joanna Briggs Institute (JBI). Any disagreements that arose between reviewers were resolved through discussion with a third

reviewer. The reviewers were not blinded to the authorship of the studies.

DATA EXTRACTION

Following critical appraisal, 10 studies were found to be of adequate quality for inclusion in the systematic review. Two reviewers independently carried out data extraction from these included studies using the standardised data extraction tool from JBI. Where there was disagreement between reviewers, a third reviewer was consulted.

SYNTHESIS

Reporting of results from the 10 included studies in this review will be presented according to study intervention. Meta-analysis could not be undertaken, as there was considerable variation in the measured outcomes in the trials identified. Therefore data is presented in a narrative summary. The interventions reported in the studies include: staff training programs, chemical restraint and mechanical restraint. Predominantly, the primary outcome measured in all studies was patient aggression. However, staff confidence, staff attitudes, staff knowledge and skills, frequency of patient aggression and restraint associated complications were additional outcomes considered in some studies.

RESULTS

Characteristics of included studies

The 10 included studies were published between 1992 and 2006. The levels of evidence of these studies ranged from Level 2 to Level 3 based on the JBI levels of evidence for effectiveness studies scale (see Table 2) (Joanna Briggs Institute 2008). The study settings were similar as they were all carried out in acute care facilities. The study participants were either patients or healthcare staff depending on the study design, setting and type of intervention examined.

Table 2. Joanna Briggs Institute Levels of Evidence of Effectiveness 2008

Levels of Evidence	Study Design
1	Systematic review (with homogeneity) of experimental studies (eg RCT with concealed randomisation) OR One or more large experimental studies with narrow confidence intervals
2	One or more smaller RCTs with wider confidence intervals OR Quasi-experimental studies(without randomisation)
3	a. Cohort studies (with control group) b. Case-controlled c. Observational studies(without control group)
4	Expert opinion based on explicit critical appraisal, or physiology bench research, or consensus

Staff training programs

Three studies investigated the use of staff training programs to reduce the incidence of aggressive behaviours in patients in acute care settings. Participants in all three studies consisted of healthcare workers from a variety of acute care settings including geriatric wards and emergency departments. One study also included psychiatric staff, however as the majority of participants

were acute care hospital workers this study was included in the review. Two of the studies were conducted in Australia and one in Sweden.

The paper by Grenyer et al. (2004), which showed effectiveness from the introduction of an aggression minimisation program, comprised two small pilot studies. Only the results of the second study will be reported as the first study did not meet the inclusion criteria for the systematic review. In the second study a pre-post test design was used to evaluate the effectiveness of an aggression minimisation program on experienced healthcare staff (n=48, 33 females, 15 males; mean age = 39.15, SD = 10.74), pre-selected by the pilot site to represent relevant health service occupational backgrounds. The study required staff to undertake 4 training modules. The numbers of participants for each module were: module 1=18, module 2=20, module 3=16 and module 4=10. At the conclusion of the program the outcomes assessed were: participants' satisfaction with the program, knowledge, attitudes towards managing aggression and confidence in dealing with aggressive incidents. All participants (n=48) in this study completed at least 1 module, while 7/48 attended 2 modules, 4/48 attended 3 and 5/48 participants attended all four modules.

In this study, participants rated their responses to the Collins Attitudes Toward Aggressive Behaviour Questionnaire using a 5-point Likert scale, from 1=strongly disagree to 5=strongly agree. Significant improvement was found between pre- and post-measurements for four out of eight items indicating

increased participant understanding of the reasons underlying acts of aggression and improved knowledge of aggression management strategies (Grenyer *et al.* 2004). The mean scores and standard deviations for these four items are displayed in table 3.

Table 3: Pre- and Post-test mean (standard deviation) and paired t (significance) for 4 items on the Collins Attitudes Toward Aggressive Behaviour Questionnaire (Grenyer et. al, 2004)

Attitude Item	***Pre (SD)***	***Post (SD)***	***Paired t (p)***
1. People strike out because they are afraid	3.49 (.85)	3.71 (.75)	2.47 *
2. People become violent because they feel the only way to protect themselves is to attack first	3.21 (1.01)	3.53 (.93)	2.46 *
3. People threaten staff to get their own way	3.47 (.96)	3.94 (.78)	2.95 **
4. I feel confident in my own ability to manage a person's behaviour as it becomes more aggressive	3.63 (.79)	4.03 (.59)	3.23 ***

* $p < 0.05$, ** $p < 0.01$, ***$p < 0.001$

Furthermore, confidence in managing patient aggression was evaluated by Thackrey's previously tested Confidence in Coping with Aggression Instrument (Thackrey 1987). Analysis of covariance comparing the pre- and post-test scores for those completing more then one module, controlling for the number of modules completed, found significantly greater confidence when more modules completed (ANCOVA F=4.03, p=0.04). Overall, the aggression minimisation program evaluated in this study was found to improve staff knowledge, skills, confidence and attitudes towards dealing with aggression in the workplace (Grenyer et al. 2004).

The next study by Arnetz and Arnetz (2000) investigating staff training programs was undertaken in multiple healthcare settings. This controlled prospective one-year study included a baseline questionnaire, the implementation of a violent incident register, a structured intervention program and a follow-up questionnaire. The study population was healthcare workers from 47 healthcare settings (intervention group n=356, control group n=333). The 47 participating work-sites were randomly assigned to either the control or intervention group. An initial background questionnaire was mailed to all healthcare staff at all participating worksites prior to the introduction of a violent incident form which required staff to report all violent incidents directed towards them over the 1-year study period. The intervention workplaces (n=24) followed a structured program for providing feedback, where circumstances concerning the incidents were discussed on a regular basis with healthcare staff.

The follow-up questionnaire at the conclusion of the 1-year study period indicated a significantly lower number of reported incidents of aggression during the course of the study by participants in both the intervention and control groups (62% n=455, χ^2=54.3, p<0.001). Compared with the control group, staff who participated in the program reported higher levels of: awareness of risk for violent situations (intervention group = 36%, control group = 29%, χ^2=8.6, p <0.05), how potentially violent situations could be avoided (intervention group = 34%, control group = 26%, χ^2=5.0, p <0. 05) and how to deal with aggressive patients (intervention group = 33%, control group = 25%, χ^2=10.4, p <0.05). Logistic regression confirmed an increased reporting of risk of violence in the

intervention group post-intervention (odds ratio 1.49; 95% confidence interval 1.07-2.06; P<0.05). Overall the structured feedback program for discussing incidents of violence improved staff knowledge of the risks of violence in the acute healthcare setting (Arnetz & Arnetz 2000).

The final study on staff training by Deans (2003) included investigated the effectiveness of a one-day aggression training program for ED nurses in one Australian emergency department. The study focused on increasing 40 emergency department nurses' knowledge, skills and attitudes in managing workplace violence and aggression using a one-group non-experimental pre- and post-test design. The study evaluated information collected from the nurses via a validated pre- and post-training questionnaire on: incidence of violence and aggression, confidence in managing violent situations and attitudes about violence and aggression. Thirty of the 40 (75%) nurses who attended the training completed the pre-test questionnaire two months prior to the program and 22 (55%) completed the post-test questionnaire three months following the training.

Chi-square tests and cross tabulations conducted on questions relating to the management of aggressive behaviours in the ED indicated that following the training workshop, nurses showed a significant improvement in knowledge and understanding for managing these situations (χ^2=4.18, p=0.04). Participants rated their knowledge (t(df=48)= -4.3, p=0.001) and skills (t(df=48)= -2.74, p0.006) higher as a result of the workshop. Nurses reported increased

confidence in dealing with aggression from pre-test 86% (26/30) to post-test 95% (21/22) however the researchers did not report significance levels. The study results indicated that with training, ED nurses can be better prepared to manage aggressive situations and ultimately reduce the incidence of aggression in the workplace (Deans 2003).

The overall results from the three studies investigating the use of well-designed staff training programs to prevent and manage patient aggression in acute care settings indicate staff can be prepared to manage incidents of patient aggression through increasing knowledge, skills, attitudes and confidence (Deans 2003, Grenyer et al. 2004, Arnetz & Arnetz 2000).

Chemical restraint

Six studies examined the effectiveness of pharmacological treatments to manage aggressive behaviours in the acute hospital setting. Five of the studies were conducted in the United States of America (USA) and one in Australia. The first study by Richards et al (1998) investigated the use of droperidol versus lorazepam for agitated patients in the emergency department. In this RCT, violent and aggressive patients were randomised to receive either lorazepam (<50kg = 2mg IV, >50kg = 4mg IV) or droperidol (<50kg = 2.5 mg IV, >50kg = 5mg IV). A six-point sedation scale was used to evaluate the sedation effects of the administered drug. Sedation scores were recorded at time intervals (0, 5, 10, 15, 30 and 60 minutes). One hundred patients received lorazepam and 102 were administered droperidol. Both drugs had similar sedation profiles at 5

minutes. Table 4 shows comparisons between sedation scores and time intervals for patients receiving either droperidol or lorazepam however these results were not statistically significant.

Table 4: Comparison of sedation scores between patients (mean ± SD) (Richards et al. 1998)

Drug	***n***	***0 min***	***5 min***	***10 min***	***15 min***	***30 min***	***60 min***
Lorazepam	100	5.3 ± 0.7	4.7 ± 0.6	4.1 ± 0.8	3.5 ± 0.8	2.9 ± 0.7	2.5 ± 0.7
Droperidol	102	5.6 ± 0.6	4.8 ± 0.7	2.8 ± 0.9	2.0 ± 0.6	1.6 ± 0.5	1.5 ± 0.5

Patients receiving droperidol had lower sedation scores when measured at 10 to 60 minutes compared to those patients who received lorazepam. The study drug could be repeated once at 30 minutes if the sedation was judged inadequate either by the use of a validated sedation scoring system or by the attending physician. More repeat doses of lorazepam (40) were given then droperidol (8) at 30 minutes. No adverse effects from either study drug were reported. The study concluded that droperidol produced more rapid and better sedation then lorazepam at the doses used in this study. Lorazepam was more likely to require repeat dosing than droperidol (Richards *et al.* 1998).

A similar study by Knott et al (2006) used a RCT to compare the use of intravenous droperidol and midazolam for sedation of acutely agitated patients in the emergency department. The study was double-blinded. Patients either received 5mg intravenously of midazolam or droperidol (2.5mg if <50kg) every 5 minutes until sedated. Seventy-four patients received midazolam while 79

received droperidol. Survival analysis showed no significant difference in time to sedation (hazard ratio 0.86; 95% CI 0.61-1.23; p=0.42). Median time to sedation was 6.5 minutes for midazolam (median dose 5mg) and 8 minutes for droperidol (median dose 10mg), (p=0.075; effect size 1.5 minutes; 95% CI 0-4 minutes). At 5 minutes, 33 of 74 (44.6%) patients from the midazolam group were adequately sedated when assessed using a six-point agitation scale compared with 13 of 79 (16.5%) patients from the droperidol group, a difference of 28.1% (95% CI 12.9% to 43.4%; p<0.001). By 10 minutes, 41 of 74 (55.4%) from the midazolam group were sedated compared with 42 of 79 (53.2%) of patients who received droperidol, a difference of 2.2% (95% CI - 14.9% to 19.3%; p=0.91). Eleven adverse events occurred in the midazolam group and 10 in the droperidol group, with the most serious requiring active airway management for three patients who had received midazolam. At the conclusion of the study there was no difference between the onset of adequate sedation of agitated patients using either midazolam or droperidol, although patients sedated with midazolam may have an increased need for active airway management.

The next study by Battaglia et al (1997) was double-blinded and set in the emergency departments of five university/general hospitals. Participants (n=98) who exhibited psychosis or aggressive behaviours were randomly assigned to receive intramuscular injections of lorazepam (2mg), haloperidol (5mg) or both in combination. Patients in each of the three treatment groups received 1-6 injections of the same study drug within 12 hours, based on clinical need. Each

group was evaluated hourly until 12 hours after the last dose. Efficacy was assessed using the following validated tools: the Agitated Behaviour Scale (ABS), a modified Brief Psychiatric Rating Scale (MBPRS), Clinical Global Impressions (CGI) scale and an Alertness scale.

The results from study were analysed using a one-way analysis of covariance (ANCOVA) with baseline as the covariant. Means were used to compare the three treatment groups. Effective symptom reduction was achieved in each treatment group with significant ($p<0.01$) mean decreases in agitated behaviour from baseline at every hourly ABS evaluation. Significant ($p<0.05$) mean differences on the ABS (hour 1) and MBPRS (hours 2 and 3) suggest that tranquillisation was most rapid in patients receiving the combination treatment. The results indicated that the combination treatment of lorazepam plus haloperidol is the treatment of choice for acute psychotic agitation (Battaglia et al. 1997).

Another study by Nobay et al (2004) also used a prospective, double-blind randomised design to investigate chemical restraint of violent and/or severely agitated patients in an urban community teaching emergency department. This study compared the use of three medications for chemical restraint: midazolam, haloperidol and lorazepam. Participants (n=111) in the study were randomised to receive intramuscular midazolam (5mg), lorazepam (2mg) or haloperidol (5mg). The mean difference for time to sedation and time to arousal are displayed in table 5.

Table 5: Mean differences in time to sedation and arousal between study drugs (Nobay et al. 2004)

	Mean Difference in Time to Sedation (minutes)	***Mean Difference in Time to Arousal (minutes)***
Midazolam[#] vs. lorazepam	13.9 (95% CI = 5.1 to 22.8; p=0.0026)	135.3 (95% CI = 89 to 182, p<0.0001)
Midazolam[#] vs. haloperidol	9.9 (95% CI = 0.5 to 19.3, p=0.0388)	44.6 (95% CI = 9 to 80, p=0.0250)
Haloperidol[#] vs. lorazepam	4.0 (95% CI = 8.2 to 16.3, p=0.5124)	90.7 (95% CI = 38 to 144, p=0.002)

[#]Drug with fastest time to sedation and arousal

The results of the study indicated that midazolam had a significantly shorter time to onset of sedation and a more rapid time of arousal than lorazepam or haloperidol. Time to arousal for midazolam was significantly shorter than for both haloperidol and lorazepam ($p<0.05$) (Nobay *et al.* 2004).

The study by Thomas et al (1992) was set in an ED and investigated droperidol versus haloperidol for agitated and combative emergency department patients. The study was also a prospective, double-blind, randomised control design however it was only carried out on those patients who were already physically restrained and required further chemical restraint. Study participants (n=68) were randomly assigned to receive either haloperidol intramuscularly (IM) (5mg), droperidol IM (5mg), haloperidol IV (5mg) or droperidol IV (5mg). All patients were rated on a five-point combativeness scale at 5, 10, 15, 30 and 60 minute intervals after the study drug was given. IM droperidol decreased combativeness to a significantly greater extent than IM haloperidol at 10 ($p=0.006$), 15 ($p=0.01$) and 30 ($p=0.04$) minutes. There was no significant

difference between the two drugs when given by the IV route (p=0.78). Results indicated that when given in equal IM doses, droperidol had a more rapid effect than haloperidol in treating aggressive and agitated patients in the ED.

The last study investigating chemical restraint, by Fraser et al (2000), looked at the frequency, duration, severity and treatment of agitation in patients in the intensive care setting. The study utilised a prospective cohort design and was conducted in a tertiary 10-bed multidisciplinary ICU. Sixty-seven (52%) participants had been allocated to the younger (<65yrs) patient group with 63 (48%) in the elderly (>65yrs) group. The agitated behaviour of the patients was documented according to causes, severity, frequency, duration and treatment. One hundred and thirty patients were studied for 916 patient-days. Nurses and physicians recorded agitated behaviours in 92 patients (70.8%) during 534 patient-days. Severe or dangerous behaviour was recorded in 60 patients (46.1%) during 273 patient-days.

The study indicated no age related differences in frequency, severity and duration of agitation. Opiates, benzodiazepines and haloperidol were administered during 72%, 62% and 29% of agitated patient-days respectively. Haloperidol was administered more often to elderly patients (p=0.015), otherwise no between group differences in treatment were noted. Daily dosing requirements were less in the elderly for intermittent intravenous lorazepam, haloperidol and morphine but not for midazolam (p=0.15). When these dosages were corrected for body mass, no statistical differences between

young and elderly were found. Adverse events associated with pharmacological management of agitated behaviour was found in 41 patients (44.6%). Adverse events included: excessive sedation (19.2%), haemodynamic instability (12%), aggressive behaviour (7.6%) and respiratory depression (4.4%). Elderly patients experienced an adverse event more frequently (p=0.05) and had a greater incidence of excessive sedation (p=0.17). This study demonstrates that agitation is frequent in ICU patients and that frequency, onset, duration, severity and treatment are similar for elderly and younger patient cohorts (Fraser et al. 2000).

The results from the six studies investigating chemical restraint of aggressive patients in the acute care setting reveal that droperidol and midazolam have a more rapid and better sedation effect than lorazepam and haloperidol (Knott et al. 2006, Battaglia et al. 1997, Richards et al. 1998, Thomas et al. 1992, Nobay et al. 2004). However the use of midazolam may result in greater need for active airway management (Knott et al. 2006).

Mechanical Restraint

Zun (2003) conducted a prospective, observational study to investigate the effects of mechanical restraints on consecutive patients who presented to an inner-city ED in one USA hospital. Data was collected over a 1-year period. The ED nurses and physicians were required to complete a restraint checklist that included: the reason for restraint, restraint duration, method and number of restraints, the additional use of chemical restraint and the complications

resulting from the use of the restraints. Data from 298 patients was collected over the 1-year period. The mean age of patients was 36.5 years (ranging from 14-89 years). The most frequently restrained age group was 31-40 (29.4%), followed by 21-30 (25.3%), 41-50 (22.3%). Elderly patients (>61 years) were least frequently restrained (5.2%) and 68.2% of restrained patients were male. Psychosis was the most frequent diagnosis of patients who required restraint (33%). One hundred and six patients (40.3%) had more than one reason for needing restraint including: agitation, violence, disruptive behaviour, confusion, dementia and alcohol/drug intoxication.

Patients were restrained for a mean of 4.8 hours ranging from 0.2-25.0 hours. Patients were most frequently restrained with 2 restraints (59%), in the supine position (86%) and 29.1% had additional chemical restraint added. Twenty complications were recorded over the 1-year study period (7%). The most common complication was patients getting out of the restraints (10) and the remaining complications included: vomiting (3), injuring others (2), spitting (2), injuring self (1), increased agitation (1) and other (1). Complications were not correlated with age, gender, number of restraints, diagnosis or restraint time ($p<0.05$). Overall, this study demonstrated a low rate of minor complications from the use of mechanical restraints (Zun 2003).

DISCUSSION

The main interventions for managing aggressive behaviours in acute care settings were: staff training programs, chemical restraint and mechanical

restraint. There were no studies of sufficient quality that evaluated the use of multiple interventions to manage acts of aggression. Furthermore no studies were identified that investigated patient aggression prevention strategies in acute care settings.

All three included studies investigating staff training programs for increasing healthcare workers' confidence in managing aggressive incidents demonstrated some benefits for staff working in acute areas. The study by Grenyer et al (2004) suggested that staff training programs contribute to helping staff achieve a safer workplace. Studies by Arnetz & Arnetz (2000) and Deans (2003) concluded that a structured program improved healthcare workers' knowledge of risks of acts of aggression, increased nurses' confidence and skills in managing behaviours and may have also decreased the amount of aggressive incidents encountered by staff.

Findings from these three studies are similar to other reports in the literature suggesting that with some basic training, nurses can be more prepared to manage aggressive situations (Beech & Leather 2006, Nachreiner *et al.* 2005). This is achieved by raising the awareness of nurses to the nature of the problem of aggression in the acute care setting and developing knowledge, skills and attitudes in managing the behaviour (Wells & Bowers 2002).

Although the literature highlights the need to educate staff in the prevention and management of aggression (Beech & Leather 2006, Nachreiner et al. 2005,

Badger & Mullan 2004), often little or no training is provided by employers (McGowan *et al.* 1999). Grenyer et al (2004) highlighted the difficulties faced by employers in relation to releasing staff for these types of training programs including increased costs. Other research has found training courses vary considerably in length and content and many fail to equip staff with specific knowledge and strategies for managing aggressive patients (Grenyer et al. 2004, Farrell & Cubit 2005). There are few reports of intervention studies evaluating staff training programs designed specifically for acute care nurses to manage and reduce the risk of aggressive incidents (Deans 2003, Grenyer et al. 2004, Arnetz & Arnetz 2000).

The use of specific pharmacological interventions to chemically restrain patients indicates effectiveness in managing aggressiveness in the acute hospital setting. The responsibility for deciding which pharmacological intervention is chosen to chemically restrain an aggressive patient will be made by the medical officers on the ward, department or unit where the patient is admitted (Thomas et al. 1992). Similarly a review of the evidence on the safety and efficacy of medications currently used for rapid tranquillisation in psychiatric and ED settings found no gold standard approach to treatment (Pratt et al. 2008). The included studies in this review indicate that droperidol and midazolam were found to be most effective in sedating aggressive patients (Knott et al. 2006, Thomas et al. 1992, Richards et al. 1998). However droperidol was voluntarily withdrawn from use in the UK by the manufacturer in 2001 due to concerns

regarding the medication's safety as an oral treatment for chronic conditions (Pratt et al. 2008).

The use of chemical restraint can have serious adverse effects for the patient and therefore close monitoring is warranted (Thomas et al. 1992). Decreased respiratory depression was commonly associated with the use of intravenous midazolam (Knott et al. 2006). It would be inappropriate to use midazolam to manage patients in an acute ward setting where close monitoring is limited due to staffing levels and patient acuity. The risks to patients should be considered prior to the initiation of pharmacological therapy for agitation and/or aggression (Riker et al. 1999).

Despite the seemingly common use of some form of mechanical restraint in both mental health and acute care settings (Nelstrop et al. 2006, Allen et al. 2003, Bonner et al. 2002), there is very little published research on the efficacy of restraints on staff or patients (Bonner et al. 2002) or the use of control and restraint techniques in the acute sector. A systematic review by Nelstrop et al investigating the safety and effectiveness of restraint and seclusion as interventions for the short-term management of violence in adult psychiatric inpatient settings and EDs concluded that there was insufficient evidence to support the safe use of these practices for patients in either of these settings (Nelstrop et al. 2006). None of the studies in this systematic review met the inclusion criteria for the current systematic review.

An earlier descriptive study which surveyed nurses about incidents of patient aggression found that chemical and mechanical restraint were the most common combination of interventions used to manage the behaviour (Zernike & Sharpe 1998). Given that specific interventions have positive effects on patient aggression it would be reasonable to infer that the use of multiple interventions may result in improved patient outcomes. Further studies are needed to investigate the effectiveness of interventions to prevent and manage aggressive patients in the acute hospital setting.

During the process of conducting the review the following limitations were identified. There are significant ethical issues in developing and conducting studies in this area including gaining informed consent from someone who is agitated and at risk of aggression. Therefore this has implications for conducting high quality RCTs and consequently the quality of the included studies in this review. A systematic review of qualitative studies would contribute to the current knowledge base however this was beyond the scope of this systematic review.

Recommendations for practice

Overall there is no strong evidence to support the implementation of interventions to prevent and manage patient aggression in acute care settings. However there is limited evidence to support the use of staff training, chemical and mechanical restraint. The following considerations and interventions relating to the management of aggressive behaviours in acute hospitalised

patients have been researched in the clinical area and have implications for clinical practice.

- Administration of medications helps to reduce the incidence of aggressive behaviours in patients in the acute setting and reduces the risk of harm to patients and staff. (Level 2)
- A staff training program on managing patient aggression improves self-efficacy and assists in managing aggressive patients. (Level 3). Further research in the acute care setting is needed.
- Mechanical restraints are effective in reducing harm to patients and staff and have minimal complications when used for short periods of time (Level 3). Further research in the acute care setting is needed.

CONCLUSION

The evidence for acute care nurses from this systematic review on educational programs and the use of chemical and mechanical restraint provides some guidance in managing patient aggression in the acute care setting. More high-quality research in this area would assist in determining whether different interventions would result in improved patient outcomes and less incidents of aggression towards acute hospital staff.

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