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TITLE

Identifying determinants for the application of physical or chemical restraint in the management of psychomotor agitation on the critical care unit.

An integrative review of the literature.

ABSTRACT

Aim

To identify key determinants which lead to the decision to apply physical or chemical restraint on the critical care unit.

Background

Psychomotor agitation and hyperactive delirium are frequently cited as clinical rationale for initiating chemical and physical restraint in critical care. Current restraint guidance is over a decade old and wide variations in nursing and prescribing practice are evident. It is unclear whether restraint use is grounded in evidence-based practice or custom and culture.

Study design

Integrative review.

Method

Seven health sciences databases were searched to identify published and grey literature (1995-2019), with additional hand-searching. The systematic deselection process followed PRISMA guidance. Studies were included if they identified physical or chemical restraint as a method of agitation management in adult critical care units. Quality appraisal was undertaken using Mixed Methods Appraisal Tool. Data was extracted, and thematic analysis undertaken.

Results

23 studies were included. Four main themes were identified: The lack of standardised practice; patient characteristics associated with restraint use; the struggle in practice; the decision to apply restraint.

Conclusions

There are wide variations in restraint use despite the presence of international guidance. Nurses are the primary decision-makers in applying restraint and report that caring for delirious patients is physically and psychologically challenging. The decision to restrain can be influenced by the working environment, patient behaviours and clinical acuity. Enhanced clinical support and guidance for nurses caring for delirious patients is indicated.

Relevance to clinical practice

Delirium and agitation pose a potential threat to patient safety and the maintenance of life-preserving therapies. Restraint is viewed as one method of preserving patient safety. However, use appears to be influenced by previous adverse experiences and subjective patient descriptors, rather than robust evidence-based knowledge. The need for a precise language to describe restraint and quantify when it becomes necessary is indicated.

Key words

Delirium, agitation, critical care, intensive care, nursing, decision-making, restraint.

Introduction

Delirium is a rapid onset, reversible, fluctuating condition characterised by inattention, changes in cognition, disordered sleep-wake cycle and increased or decreased psychomotor activity (American Psychiatric Association, 2013). It affects approximately 20-50% of mechanically ventilated patients (Krewulak et al., 2018). Of the three delirium subtypes (hyper and hypo-active, mixed), hyperactive delirium, although the least common, is the most obvious and clinically disruptive (Krewulak et al., 2018). Hyperactive delirium manifests as psychomotor agitation, hypervigilance, a disordered sleep-wake cycle and the presence of hallucinations and delusions (Cavallazzi et al., 2012). Delirium and agitation can be confused clinically. Whilst it is acknowledged that agitation is not typical of all types of delirium (Krewulak et al., 2018), it is less clear as to whether all agitation is symptomatic of delirium. However, the nursing challenges and actions to ensure patient and device safety are similar during the acute phase.

Delirious and agitated patients are at risk of disrupting life-sustaining therapies, for example, dislodging an endotracheal tube or vascular access devices. Chemical or physical restraint are often cited by staff as the main method of preserving patient safety (Benbenbishty et al., 2010). Restraint is defined in section 6(4) of the Mental Capacity Act (Department of Health, 2005) as the use of force, or threatened force, to make a person do something that they are resisting; or the restriction of freedom of movement. In critical care, chemical restraint, in the form of modern light sedation, is used to enable patients to tolerate therapies such as endotracheal intubation (Khan et al., 2014). However, extra sedative drugs, in the form of boluses or pro-re-nata drugs are also used to manage psychomotor agitation. Physical restraints are used alongside chemical restraint or in its place

(Bray et al., 2004). Physical restraints are designed to restrict freedom of movement. In the United Kingdom these commonly take the form of padded gloves or ‘mitts’. Internationally, four-point restraints are used (Luk et al., 2015).

However, the efficacy of restraint in improving patient and device safety is unproven. Physical restraint is associated with unplanned extubation (Ai et al., 2018), post-discharge distress and the exacerbation of delirium and agitation (Pan et al., 2018, Mehta et al., 2015). Additionally, periods of deep sedation have been linked to prolonged ventilation and impaired long-term recovery post-discharge (Jones, 2010, Zaal et al., 2015, Khan et al., 2014).

Critical care practitioners are bound by law and professional codes of conduct when engaging with delirious patients. Clinical guidance for chemical and physical restraint was issued in the United Kingdom (Bray et al., 2004) and America (Maccioli et al., 2003). Both papers emphasised that restraint should only be used where there is a clear clinical necessity and following failed attempts at using non-pharmacological methods to manage psychomotor agitation. In addition, updated guidance by Devlin et al. (2018) and Grounds et al. (2014) emphasised treatment and removal of the cause of agitation, light sedation, regular delirium screening, and non-pharmacological management methods above the use of restraint.

Chemical and physical restraint are widespread in critical care and bedside nurses are the main decision-makers in restraint management (Li and Fawcett, 2014). However, agitation can be subjectively interpreted, leading to challenges in identifying the point at which restraint becomes appropriate (Freeman and Teece, 2017) and subsequent wide variations in practice.

Aim

The purpose of this integrative review is to identify key determinants which lead to the decision to apply physical or chemical restraint on the critical care unit.

METHODS

Search strategy

An integrative review method was chosen as it allows for comprehensive understanding and formation of new perspectives of an emerging topic through the appraisal and synthesis of literature from diverse methodological backgrounds. A five-step strategy (Hopia et al., 2016) was followed (problem identification, literature search, data evaluation, data analysis, and presentation).

Study selection

An electronic database search (CINAHL, PsychInfo, Medline, Cochrane Library, Embase, PubMed, and ProQuest) was undertaken in December 2017 by the first author (AT). The search was repeated in May 2019 and one additional study was identified for inclusion.

Key search terms were identified within each facet (delirium, restraint, and clinical environment) of the search question (Table 1). Terms within facets were combined with the Boolean operator ‘or’. The searches within each facet were then combined using the Boolean operator ‘and’. The search was restricted to English language papers dating from 1995 onwards to reflect the increasing awareness of delirium from this period and the move towards lighter continuous sedation.

Following the removal of duplicate papers, and screening of titles and abstracts via Covidence, a dedicated literature screening package, the remaining

full-text papers were assessed for inclusion. One author (AT) conducted the search and screening process. The opinions of co-authors (JB & HS) were sought in the event of any queries as to whether a particular study should be included. All disagreements were resolved through discussion. Additional papers were identified through hand-searching reference lists of included papers.

Papers were included if they addressed the rationale and determinants for the application of chemical or physical restraint in the acute management of psychomotor agitation or hyperactive delirium in an adult (age >18 years old) critical care setting. Agitation and hyperactive delirium were searched concurrently because it was expected that the acute decision making regarding restraint use would be similar. Papers were excluded if they identified the use of restraint in settings other than critical care or included paediatric patients (<18 years old).

The Mixed Methods Appraisal Tool was used by one author (AT) to appraise studies meeting the inclusion criteria. The tool includes two general screening questions for all types of studies, then separate sets of prompts for qualitative and quantitative studies (Pluye et al., 2011), and has been piloted and tested for efficacy and reliability, with good inter-rater reliability scores (Pace et al., 2012). The Mixed Methods Appraisal Tool produces a descriptive summary of appraisal. Summary scores can be calculated, but were not used for this review because of their potential for masking flaws within different aspects of a paper. All included studies were found to meet the tool's basic screening questions as they had a clear aim, and the collected data allowed the authors to address the research question. Failure to meet this criteria would have led to exclusion from the review. Studies stemmed from various critical care specialities, and were therefore reflective of the heterogeneous patient population.

Following appraisal (AT), some limitations to the studies were identified. These included: Reduced generalisability due to single-centre studies (Fraser et al., 2000, Micek et al., 2005, Pisani et al., 2013, Aitken et al., 2009, Dolan and Looby, 2017, Choi and Song, 2003); potential under-reporting of restraint use (Choi and Song, 2003, De Jonghe et al., 2013) due to the use of staff self-report. Secondary analysis was undertaken in one study (Luk et al., 2014), although the authors sought to cross-check data with the original participants. One study sample contained 88% 'expert' nurses (Stinson, 2016) and was therefore not representative of the whole critical care nursing population. No studies were excluded following quality appraisal.

Data analysis and synthesis

A convergent data-based synthesis was undertaken (Sandelowski et al., 2007). Synthesis at data-based level involves the use of a single synthesis method for all studies, necessitating data transformation. Descriptive data was extracted from the results of the quantitative studies (Heyvaert, 2017) to facilitate synthesis and analysis of the mixed study types included in this review.

An inductive thematic analysis (Braun and Clarke, 2006) was undertaken to code statements from each study which related to the use of all forms of restraint in the management of psychomotor agitation. Semantic coding was undertaken (AT) to identify statements in the data which had a meaningful relationship with the question. Coded statements were manually grouped together with others of a similar meaning, refocussing the data at a broader level. Over-arching themes were identified (AT) and checked (JB & HS). The process was iterative, with an emphasis on repeated checking of themes to prevent decontextualization from source data (Braun and Clarke, 2006).

RESULTS

The selected search strategy yielded 6951 papers following duplicate removal. 23 papers were included following a systematic deselection process following PRISMA guidance (Figure 1 & see supplementary file 1). Included papers consisted of 16 quantitative, 4 qualitative, and 2 mixed methods studies. The studies reflected international perspectives, including the USA (n=6), Canada (n=3), United Kingdom (n=3), mainland Europe (n=5), and Australia, South Korea, Egypt, South Africa, Jordan, and Turkey (n=1 per country). A summary of the findings, methodological approaches, and themes is displayed (Table 2).

Each study was based within critical care, with samples drawn from staff and/or patients. The thematic analysis generated four over-arching themes: The lack of standardised practice; patient characteristics associated with restraint use; the struggle in practice; the decision to apply restraint.

a) Theme 1: The lack of standardised practice or guidance

This theme featured in 18 of the papers analysed and describes the variations and inconsistencies in the use of restraint on a national, regional, hospital, and individual basis.

i) Practice variations

Researchers identified variation in the types of physical restraint applied, with the majority using commercial wrist or other limb restraints, whilst one unit used gauze bandages to tie patients' wrists (Kandeel and Attia, 2013). There was also a lack of standardisation of chemical restraint, with a variety of drugs administered, including Haloperidol (MacSweeney et al., 2010, Luk et al., 2014), opiates (Fraser et

al., 2000), and benzodiazepines (Luk et al., 2014, van der Kooi et al., 2015). Participants in multi-discplinary focus groups held by Palacios-Cena et al. (2016) and Kydonaki et al. (2019) described the lack of standardised and evidence-based agents for the management of agitated or delirious patients. This led to variation in dose and confusion amongst nursing staff (Palacios-Cena et al., 2016), and reliance on doctors' clinical preferences and a 'trial and error' approach (Kydonaki et al., 2019).

Variations in practice were found internationally (Benbenbishty et al., 2010, Martin and Mathisen, 2005) and nationally (van der Kooi et al., 2015, Luk et al., 2014). Benbenbishty et al. (2010) conducted a point prevalence study of physical restraint use in 34 general ICUs across Europe. There was widespread variation in the use of physical restraint, ranging from 100% in Italy, to 0% in the United Kingdom and Portugal in the units surveyed. Physical restraint was not used in the Norwegian unit, but was used in 39 of the 100 observations conducted in the United States (Martin and Mathisen, 2005). Variations were also found between different hospitals. In Canada, University-affiliated hospitals used fewer physical restraints (Luk et al., 2014), whilst 0-56% of ICU patients were restrained in the Netherlands (van der Kooi et al., 2015). In contrast, De Jonghe et al. (2013) found a lower level of practice variation within France, with 82% of ICUs restraining greater than 50% of ventilated patients.

Shift-by-shift, or rotational, practice variations were identified (Palacios-Cena et al., 2016, Luk et al., 2015, Turgay et al., 2009, Kydonaki et al., 2019). Nurses involved in the focus groups held by Palacios-Cena et al. (2016) noted that agitated or delirious patients received a different chemical treatment each shift according to the doctor's preference. Physical restraints were more commonly applied by nurses

working the night shift (Turgay et al., 2009, Luk et al., 2015) and sedations were increased overnight (Pisani et al., 2013, Kydonaki et al., 2019). Luk et al. (2015) indicated that 83% of all reported physical restraint was applied on the previous night shift. Similarly, Pisani et al. (2013) identified an increase in the dose of Lorazepam and Haloperidol during the evening and night shifts amongst their study group of 309 critical care patients. In contrast, Choi and Song (2003) found no significant association between restraint application and shift in their convenience sample of 52 patients.

ii) The impact of local restraint guidance

The presence of local restraint guidance varied between critical care units in Europe (Benbenbishty et al., 2010). Of 34 units, 9 provided local guidance. Smaller units were more likely to have a local policy and the presence of a policy was reported to have a non-significant association with lower restraint use (Benbenbishty et al., 2010). Where they were in place, local policies were found to be inconsistently read and used by staff. van der Kooi et al. (2015) identified that only 31% of nurses cited the guidance when choosing a method of restraint, despite a high prevalence of local protocols. 78% of nurses in the two English units surveyed by Freeman et al. (2016) had read their policy, however, they still expressed confusion as to the rationale for choosing either chemical or physical restraint as a first-line agitation management option.

Paucity of local guidance was associated with staff confusion regarding correct delirium and restraint management. Staff confusion was associated with indiscriminate use of physical and chemical restraint (Palacios-Cena et al., 2016, Fraser et al., 2000). Lack of local restraint guidance was linked to unsafe practice and limited knowledge (Langley et al., 2011, Suliman et al., 2017). Nurses

interviewed by Langley et al. (2011) demonstrated poor knowledge of the legalities surrounding restraint use. In addition, only five of the twenty participants knew that their hospital had a local restraint policy. These five participants displayed varying knowledge and interpretations of the policy. Suliman et al. (2017) linked poor staff knowledge to unsafe practice and patient injury.

b) Theme 2: Patient characteristics associated with restraint use

The use of chemical or physical restraint was linked to specific patient behaviour traits, clinical interventions or adjuncts. This theme also considers the potential exacerbation of delirious or agitated behaviour through the use of physical and chemical restraint. 19 studies contributed to this theme.

i) Behaviour

Behavioural attributes associated with the application of physical or chemical restraint are summarised below (Table 3). Agitation was cited as the primary reason for restraint, however, sedation and drowsiness were also identified (van der Kooi et al., 2015; Benbenbishty et al., 2010). Subjective descriptors of behaviour appeared more likely to trigger the use of restraint than the use of validated tools (Luk et al., 2014; Svenningsen et al., 2013; Micek et al., 2005). A minority of nurses cited ‘poor behaviour’ (Choi and Song, 2003) as a rationale for physical restraint. Previous drug use and psychosis were associated with difficult sedation, and a reluctance amongst staff to lighten continuous sedation without support from colleagues (Kydonaki et al., 2019).

ii) Presence of devices

Maintaining patient safety was the most commonly cited rationale for restraint. Medical devices are at risk of interference with implications for the administration of

life sustaining therapies. Therefore, agitated or delirious patients with such devices were more likely to be restrained (Luk et al., 2015; Turgay et al., 2009; Choi and Song, 2003; van der Kooi et al., 2015; Pisani et al., 2013). Oral intubation was associated with restraint use (Luk et al., 2015; Benbenbishty et al., 2010; van der Kooi et al., 2015). Physical restraints were justified in these studies as preventing self-extubation. Dolan and Looby (2017) found that that presence of an oral endotracheal tube was the primary rationale for triggering the use of physical restraint amongst nurses.

Other medical devices associated with restraint use include intravascular lines, such as those providing central venous and arterial access (Luk et al., 2015; Benbenbishty et al., 2010; van der Kooi et al., 2015), and naso-gastric tubes (Choi and Song, 2003). In contrast to endotracheal tubes and invasive lines, a naso-gastric tube is a non-life sustaining device. However, its presence was found to be statistically significant as a determinant of physical restraint (Choi and Song, 2003).

Restraint as a precautionary measure in maintaining patient safety was mentioned in two studies (Luk et al., 2015; Dolan and Looby, 2017). Staff did not identify a particular risk, rather restraint was applied with the aim of mitigating any factors which might compromise patient safety.

iii) Restraint use can exacerbate or pre-dispose delirium

Svenningsen et al. (2013) conducted a prospective cohort study across three mixed speciality ICUs. Fluctuations in sedation level, caused by the administration of bolus or increased doses of continuous sedative drugs to control agitation, were found to be significantly associated with delirium development ($p=0.001$).

Nurses linked the use of physical restraint to delirium in three studies (Freeman et al., 2016; Dolan and Looby, 2017; Suliman et al., 2017). This perceived association led some nurses to physically restrain a patient only as a last resort, acknowledging that addressing underlying causes and trialling non-pharmacological methods, such as reorientation or mobilisation, should be first-line actions (Dolan and Looby, 2017). Restrained patients were observed to exhibit heightened paranoia, psychomotor agitation and confusion (Kandeel and Attia, 2013).

c) Theme 3: The struggle in practice

The third theme explored the challenges and difficulties faced by nursing staff caring for patients with hyperactive delirium. These related to the patient, the clinical environment, and how this aspect of practice impacts on the nurse. This theme was drawn from 14 of the studies analysed in this review.

i) The influence of the working environment

The relationship between unit size and the use of physical restraint appears unclear. One study, which focussed on the use of physical restraint across 11 Egyptian ICUs, with capacities of 5-20 beds, found no significant association between unit size and prevalence of physical restraint use (Kandeel and Attia, 2013). The trend that larger units were more likely to use physical restraint featured in two studies (Benbenbishty et al., 2010, Luk et al., 2014).

Clinical acuity and the use of physical restraint was considered in one international study (Martin and Mathisen, 2005). The Nursing Manpower Use Score was used to objectively assess unit acuity, and found that the higher acuity Norwegian unit did not physically restrain any patients. However, the lower acuity

American unit was shown to use physical restraints on 39 of the 100 observed episodes (Martin and Mathisen, 2005).

Staffing ratios varied between 1:1 to 1:4 in the papers reviewed. Lower nurse to patient ratios were associated with the use of physical restraint (Benbenbishty et al., 2010, Martin and Mathisen, 2005, Dolan and Looby, 2017, Langley et al., 2011). Increased nursing vigilance or therapeutic management methods were identified as possible alternatives if staff were available (Dolan and Looby, 2017, Freeman et al., 2016).

Delirious patients were seen as unpredictable and required constant attention (Palacios-Cena et al., 2016). If a critical care nurse was ‘doubled’ (the nurse-to-patient ratio is less than 1:1), then this reduced their capacity for vigilance, and was associated with increased use of chemical and physical restraint (Dolan and Looby, 2017). The presence of multiple delirious patients on a poorly staffed unit led to perceived unsafe conditions and increased nursing reliance on restraint (Lopetrone, 2006). In contrast, decreased staffing ratios were not associated with an increased use of physical restraint in two studies (Kandeel and Attia, 2013, Luk et al., 2014). Nurses who completed surveys issued by Suliman et al. (2017) were evenly divided in their view of whether restraint was used as a substitute for sufficient staffing.

ii) The emotional and physical impact of delirium

Resentment towards delirious patients and subsequent dissatisfaction with clinical work was described by two small nursing cohort studies (Lopetrone, 2006, Langley et al., 2011). Caring for delirious patients was cited as a source of stress and unrest amongst staff in two further studies (Palacios-Cena et al., 2016, Freeman et al., 2016). Nurse participants in the focus groups held by Lopetrone (2006) shared

vivid memories of a violent attack by a delirious patient on a colleague. Their feelings of shock and fear, together with perceived lack of support from senior management, impacted on their decision-making with other delirious patients. This led them to prioritise their personal safety and increased their use of chemical and physical restraint. Nurses described the physical and emotional strain of caring for delirious patients, and a sense of being hardened and unwilling to engage and care (Lopetrone, 2006). These feelings were echoed by participants in interviews conducted by Langley et al. (2011), where medical and nursing staff commented on deteriorating standards of care and poor team cohesion.

iii) The relationship between nursing and medical staff

The delirious patient was considered to be a nursing, rather than medical, responsibility (Palacios-Cena et al., 2016). Nurses remarked on poor medical support (Freeman et al., 2016; Lopetrone, 2006), and expressed frustration at the anger and blame directed at them by medical staff in the event of patient-led accidental device removal (Langley et al., 2011). In a single-centre study, Palacios-Cena et al. (2016) identified that doctors did not view delirium as a medical emergency, and that they were slow to respond to nursing requests for intervention. Nurses surveyed by Freeman et al. (2016) stated the need for increased medical support and engagement with the care and management of agitated patients. In contrast, the doctors who responded to a national survey issued by MacSweeney et al. (2010) were largely in agreement that delirium requires active medical treatment, suggesting a potential willingness to engage with the care of such patients.

Nurses felt that their requests for physical or chemical restraint were misinterpreted by doctors (Langley et al., 2011; Lopetrone, 2006). In contrast, doctors believed that they felt patients were restrained for the benefit of the nurse,

and expressed frustration at nurses' demands for an impossible solution to agitated delirium (Palacios-Cena et al., 2016). This led the doctors in this study to avoid engagement with nursing staff caring for delirious patients, which added further conflict and tension to the relationship.

d) Theme 4: The decision to apply restraint

The final theme explores how nurses made the decision to use chemical or physical restraint. The subthemes suggested that rapid clinical decisions are made using either validated tools or the nurse's own judgement. Intrinsic staff factors, such as the impact of experience and education, and healthcare professionals' beliefs about where the ultimate responsibility for the decision to restrain falls were also explored. This theme was drawn from 19 studies.

i) Nursing intuition and clinical judgement, or use of an assessment tool?

Physical restraint was seen as a clinical necessity by some doctors and nurses (Freeman et al., 2016; De Jonghe et al., 2013), with 61% of nurses stating that there was no effective alternative (Suliman et al., 2017). In addition, physical restraint was seen as convenient, and essential in allowing nurses to attend to multiple clinical tasks (Choi and Song, 2003; Turgay et al., 2009). Participants in two studies likened the use of restraint to a 'balancing act', where the potential negative impact of physical restraint was weighed against the 'stakes' of treatment interference (Langley et al., 2011; Dolan and Looby, 2017). The decision to restrain was also based on perceived clinical need. Nurses expressed feelings of being under pressure to make a rapid decision (Palacios-Cena et al., 2016). In an emergency, nurses favoured treatment, in this case sedative drugs, which they were certain would work from previous clinical experiences (Palacios-Cena et al., 2016).

The Confusion Assessment in the Intensive Care Unit (CAM-ICU) is a validated tool used to screen for the presence of delirium in critical care patients. A positive score was linked to the use of physical restraint by two studies (Micek et al., 2005, Freeman et al., 2016). CAM-ICU positive patients were also found to receive greater doses of sedation (Micek et al., 2005, Svenningsen et al., 2013). Agitation scores featured in four studies (Luk et al., 2015; Luk et al., 2014; Martin and Mathisen, 2005; Svenningsen et al., 2013). Typically, a higher score indicates greater levels of psychomotor agitation, which was associated with the use of chemical or physical restraint. However, some nurses openly rejected screening tools as a method of identifying delirium or quantifying agitation in favour of their own intuition (Lopetrone, 2006). Subjective descriptors for psychomotor agitation and assumptions about 'typical' delirious behaviour were used by nurses as rationale for their use of restraint (Palacios-Cena et al., 2016).

ii) Who is responsible for making the decision?

Nurses were the primary decision maker when applying physical restraints (De Jonghe et al., 2013; Choi and Song, 2003; Suliman et al., 2017; Turgay et al., 2009; Kandeel and Attia, 2013). Doctors rarely suggested restraint, and showed a lack of awareness of which patients were restrained (van der Kooi et al., 2015, Freeman et al., 2016). Nurses applied physical restraints, and sought a written prescription from doctors later (Langley et al., 2011). Physical restraint required a prescription on one unit (Palacios-Cena et al., 2016). However, this was poorly adhered to and restraint use remained indiscriminate and frequently un-prescribed.

Chemical restraint requires the presence of a prescription prior to administration. However, critical care nurses are able to titrate infusions according to need, and administer boluses of sedative drugs via existing infusions and pro re nata

prescriptions. Perceived agitation or anxiety were cited as rationale for sedation boluses (Aitken et al., 2009).

iii) Professional factors impacting on nurse decision-making

The duration of a nurse's critical care experience was not found to have a significant impact on their use of physical restraints (Stinson, 2016; Choi and Song, 2003; Suliman et al., 2017). However, experienced critical care nurses felt they were 'well-versed' in chemical restraint (Lopetrone, 2006), suggesting that more experience led to greater knowledge of interventions. In addition, expert critical care nurses were more likely to have engaged in formal learning about restraint practice in their basic curriculum (Stinson, 2016).

A need for formal nursing education regarding the use of physical restraints was expressed (Freeman et al., 2016; Palacios-Cena et al., 2016). Poor knowledge and lack of education was associated with neglecting to assess underlying causes of delirium and agitation (Aitken et al., 2009, Freeman et al., 2016), uncertainty regarding the correct interventions (Palacios-Cena et al., 2016), and unsafe practice (Suliman et al., 2017). Nurses who had received educational input demonstrated improved knowledge and safer restraint practice (Aitken et al., 2009, Suliman et al., 2017).

DISCUSSION

This integrative review provides an overview of the determinants leading to the decision to employ chemical and physical restraint in the management of hyperactive delirium and psychomotor agitation. Current clinical guidance is over a decade old (Bray et al., 2004, Maccioli et al., 2003). Twenty of the twenty-two studies included in this review date from after this guidance was published. This review adds knowledge

regarding the identified rationales and determinants for restraint use in clinical practice and suggests that guidance is not consistently followed. Previous studies have highlighted uncertainties regarding the efficacy of physical restraint in preserving patient safety (Freeman et al., 2018) and the impact of nurses' beliefs on restraint use (Via-Clavero et al., 2018). This review builds on these studies by exploring how the decision to apply restraint is made through an identification of patient, nurse and environment-centred determinants and influences.

Wide variations in rationale for restraint were revealed internationally. Professional body guidance is available in the United Kingdom and United States (Bray et al., 2004, Maccioli et al., 2003) but appears absent for the remainder of the world. Guidance states that physical restraint must only be used to support optimal patient care and preserve safety, and that it must never be used as an alternative for adequate staffing, or as a replacement for identifying the underlying cause of the agitated state (Bray et al., 2004, Maccioli et al., 2003). Patient safety and prevention of medical device interference were found to be the dominant reasons for restraint application. However, restraint was often justified using subjective behaviour descriptors such as restlessness, confusion, and poor behaviour (Benbenbishty et al., 2010, Choi and Song, 2003, Luk et al., 2015). 'Stereotypical' delirious behaviour was cited in one study (Palacios-Cena et al., 2016). This shows a concerning lack of knowledge amongst staff regarding delirium types and manifestations, as hyperactive delirium is the least common presenting state (Krewulak et al., 2018). Subjective diagnosis of delirium is associated with significant under-detection (van Eijk, 2012) and delays the appropriate treatment of underlying causes.

The use of subjective descriptors further emphasises the lack of objective clinical guidance for staff caring for agitated or delirious patients. It is difficult to quantify at

what point the use of restraint becomes clinically necessary (Freeman and Teece, 2017). Hurlock-Chorostecki and Kielb (2006) demonstrated how education and culture change reduced reliance on physical restraints on their unit. Delirium and sedation management form part of the new UK National Standards for Adult Critical Care Nurse Education (Critical Care National Network Nurse Leads Forum, 2016). However, the use of physical restraint is not mentioned. It is important that critical care nurses are aware of how and when different forms of restraint should be used, and are offered support from senior staff when making such decisions.

Despite staff placing emphasis on patient safety, and taking steps to manage psychomotor agitation, studies have shown that critical care nurses perceive delirium to lack clinical importance (Devlin et al., 2008, Scott et al., 2013, Zamoscik et al., 2017). Patients with hyperactive delirium are unpopular amongst nurses (Williams, 2007). Failure to engage with delirious patients may stem from the challenge these patients present to the bedside nurse (Zamoscik et al., 2017, Yue et al., 2015, Mc Donnell and Timmins, 2012). Staff report experiences of emotional and physical exhaustion stemming from caring for delirious patients, especially over long shifts (Yue et al., 2015). It is possible that unit culture, workload and usual practices impact on the use of restraint with delirious patients. Palacios-Cena et al. (2016) and Lopetrone (2006) described how restraint is a first-line treatment for delirious patients in preference to engaging with patients' psychological needs or ensuring adequate staffing to permit vigilance. However, physical and chemical restraint has been associated with the development or exacerbation of delirium (Mehta et al., 2015, Pan et al., 2018) and therefore does not reflect evidence-based practice. Further research is indicated to explore how unit customs and nurses' perceptions of delirium and agitation impact on restraint use.

This review indicated that nurses are the primary decision-makers in the management of restraint. However, nurses expressed confusion (Palacios-Cena et al., 2016), and revealed the use of unsafe restrictive practice (Suliman et al., 2017). This suggests the need for greater support and guidance from critical care doctors and senior nursing management. However, some nurses perceived junior doctors to devalue delirium in favour of focussing attention on other body systems (Zamoscik et al., 2017). This view contrasts to MacSweeney et al. (2010), where consultant intensivists showed awareness of the importance of delirium diagnosis and management. The clinical reality of caring for a patient with hyperactive delirium is a challenge for the nurse. Greater medical engagement with objective goal-setting, bedside guidance, and the presence of a management plan for acute agitation, could reduce nurses' confusion and increase confidence. However, it must also be understood that doctors are unable to offer a 'quick fix' for delirium. Again, the need for continuous clinical education and support for all staff is highlighted, together with further research into how nurses quantify when agitation is at a level which necessitates restraint.

Strengths and limitations of the review

This review has drawn upon a diverse range of studies in an attempt to explore and understand the use of chemical and physical restraints in critical care. The search and synthesis were undertaken using established methods, and appraisal was guided by a validated tool. The review has identified several areas of practice which require further research.

The review was complicated by the difficulty in separating delirium and agitation in the literature. The decision was made to include papers relating to the use of all

forms of restraint in the management of delirium and agitation, as the first-line clinical decision making would be similar. However, it is recognised that delirium has specific complications, which could be exacerbated by restraint use. In addition, one researcher had primary responsibility for the review and appraisal processes, which could potentially limit objectivity.

CONCLUSION

This review has highlighted the complexities of nurse decision-making in the use of restraint to manage hyperactive delirium. It suggests that the decision to restrain is influenced by unit culture and previous experience with agitated patients. Nurses were shown to be the primary decision-maker, but also that they experienced the care of delirious patients as emotionally and physically challenging. There is evidence to indicate that nurses require greater support at the bedside to manage patients with hyperactive delirium and psychomotor agitation, and facilitate the use of non-pharmacological and therapeutic management methods. Both doctors and senior nurses should provide this support to junior staff to promote consistent and evidence-based management. The large variations in practice evidenced in this review indicate the need for clear guidance and precise language to describe the appropriate and safe use of restrictive practices in critical care. A change in unit custom and culture is necessary to enable delirium to be seen as having equal importance as other forms of organ failure.

Relevance to clinical practice

Delirium and psychomotor agitation pose a potential threat to patient safety and the maintenance of life-preserving therapies and treatments. However, delirium is perceived as having lower clinical importance than other forms of organ failure, and

patients are described as being unpopular, which could lead to lack of nursing and medical engagement. Restraint is considered to be a method of preserving patient safety. However, its use can have adverse consequences for patients in the short and longer-term. There is a lack of standardised education and clinical guidance regarding the use of restraint, and support from senior nursing and medical staff appears to be lacking. This has resulted in wide variations in restraint practice locally, nationally, and internationally, and the influence of unit custom and practice on restraint use. The need for a precise language to describe restraint and quantify when it becomes clinically necessary is indicated.

What does this paper contribute to the wider global clinical community?

- Restraint use is frequently based on unit culture and previous experience rather than objective needs assessment, education, or adherence to clinical guidance.
- Nurses are the principle decision-makers in managing restraint, but lack decision support from doctors and senior staff.
- An objective method for describing restraint and quantifying when it is indicated is currently lacking, leading to large variations in practice.

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