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Interventions for people presenting to emergency departments with a mental health problem: a systematic scoping review

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Introduction

Mental health has been, and continues to be, an internationally recognised health priority.[1-3] Nearly half (45%) of Australians aged 16-85 will experience a common mental disorder.[4] For someone with a mental health problem, a busy emergency department (ED) can be the first, and often frequent, place to seek care.[5] The rate of presentations to public EDs resulting from a clinically diagnosable disorder that significantly interferes with an individual's cognitive, emotional or social abilities based on the Diagnostic and Statistical Manual of Mental Disorders (DSM) or International Classification of Diseases (ICD) criteria, is increasing at 3.8% per annum.[6] However, as many as one-third of people who present to the ED may have a mental health problem without an associated diagnosis[5] and the poor health outcomes of this population maybe attributable to ineffectively treated mental health problems and/or to other chronic medical conditions.[7] Diagnostic overshadowing, or the misattribution of physical symptoms to a mental health problem, is prevalent in ED settings and so the extent of poor physical health in people who present to the ED with mental health problems remains unclear.[8-10]

While is it clear that people with mental health problems typically remain in EDs for extended periods of time,[11, 12] the nature (i.e. target population, aim, and design) or effectiveness of mental health-related interventions commenced or delivered in the ED

remains poorly understood. A previous systematic review[13] evaluated the effectiveness of ED-based management interventions for mental health presentations and concluded that specialised care models for patients with mental health problems can reduce admissions to hospital, reduce re-presentation to the ED, and shorten ED length of stay (LoS). It was, however, focused on paediatric care and excluded pharmacological-based studies. Therefore it is important to understand what interventions can be effectively delivered in the ED for adults presenting with mental disorders, to improve health and social outcomes for this vulnerable group.

In this scoping review, we aimed to describe, synthesise, and evaluate the literature regarding the types of interventions commenced or delivered in the ED for people who present with a mental health problem. Underpinning questions included: What mental health definitions/descriptions are used in research regarding interventions commenced or delivered in the ED? What types of interventions commenced or delivered in the ED have been reported? What is the nature (target population, aim, design, and outcomes) of interventions commenced or delivered in the ED? What is the level (quality) of evidence supporting different types of interventions?

Methods

The Arksey and O'Malley's 6 stage scoping review framework[14] was used to guide this review.[15] Comparison of evidence across studies is complicated by system, environmental, and economic differences across countries, and by definitional issues. For this review, we use a broad definition of 'mental health problems' including substance use disorder and other related problems such as self-harm, poisoning and suicidal behaviour/ideation, as well as mental health problems that might arise from other neurological conditions such as traumatic

brain injury or stroke, which are not always captured within definitions of mental illness or mental disorder.[16] We applied the World Health Organization definition of 'Intervention', namely "an act performed for, with or on behalf of a person or population whose purpose is to assess, improve, maintain, promote or modify health, functioning or health conditions.[17]"

Data Sources and Search Strategy

An electronic literature search of eight databases was conducted. Data were limited to papers post-2006 (Jan 2006– July 2017) to reflect current ED staffing and service delivery processes. The search strategy applied to each database included the keywords listed in Table 1.

[Insert Table 1 here]

Study Selection

Specific inclusion and exclusion criteria are presented in Figure 1. Authors (MS, AJ) independently screened titles and abstracts of potentially relevant articles identified from the search strategy and then full text papers for inclusion (see Figure 1). Reference lists of included studies were screened for additional relevant articles (reference chaining). Articles retrieved through reference chaining did not include the search terms listed in Table 1 in either the title or abstract. The following terms did however appear alone or in combination: mental status, drug abuse, substance abuse, acute agitation, delirium, panic disorder, schizophrenia, self-harm, suicide, suicidal, self-poison, self-poisoning, evaluation, management, tool, treatment, therapy, or strategy.

Study themes

Delineation of interventions was established initially by two authors (MS and AJ) and discussed with the research team to aid clarification. Multiple collations and tabulations of the data were developed to enable assembling, organising and synthesis of the data in the literature.[14] This process of independent identification and comparison of recurrent patterns, helps ensure dependability and trustworthiness of the established themes.[14, 18] The final tabulation of intervention groups was informed by discussion with experienced clinical professionals[15] and academics.

Quality Assessment

Included studies were independently assigned a Level of Evidence (LoE) by two authors (MS, AJ) according to the National Health and Medical Research Council (NHMRC) Evidence Hierarchy.[19] NHMRC LoE ranged from Level I (high) to IV (lower) with many unable to be rated due to their design. Unrated studies were included in the data synthesis table (Table 2) and listed as 'unrated'. Where discrepancies arose, further independent assessment and consensus moderation was undertaken with other authors (MB, JC, MW).

Data Extraction

Information was extracted from papers into tables based on intervention type and included target group, study location, methodologies used, range of mental health problems targeted in the studies, interventions delivered, and summary of findings (see supplementary material Tables S1 and S2). This enabled a thematic summary of the studies which considered intervention type, the number of studies within the intervention type, methodologies, mental health problems targeted, nature of intervention, and summary of results (see Table 2).

[Insert reference to supplementary material Table S1 here]

[Insert reference to supplementary material Table S2 here]

[Insert Table 2 here]

Results

A total of 2572 papers were sourced from all eight databases. Full-text screening identified 277 articles, grouped into seven broad interventional categories, from which to draw information to inform this review (see Figure 1).

[Insert Figure 1 here]

Mental health definitions

In exploring interventions it became clear that study key term descriptors varied widely. There was also a range of definitions of mental health problems used in included studies, which varied based on the population of interest. For example, some studies (n=19) used the ICD-10[20] definition for specific mental health diagnoses (which includes suicide attempt, psychiatric studies, and acute agitation), other studies (n=1) report using the ICD-9 definitions, and others (n=31) used the DSM-IV[21] criteria which includes psychiatric, panic disorder and delirium. One study used the DSM-V criteria[22], six studies used a combination of criteria (n = 5, DSM-IV and ICD-10; n = 1 DSM-III and ICD-9). Diagnoses are reported as described in the original article. Most studies were primarily descriptive in their definition, such as 'presence of suicidal thoughts, plans or behaviours, panic disorder, self-harm, depression, substance abuse, psychiatric illness, and actual or suspected mental health problem'. The most common mental health disorder(s), definition(s), and/or outcome(s)

measured included suicide and/or self-harm, depression and/or anxiety, substance use disorder, and delirium.

Types of interventions

The types of interventions in each paper were grouped into seven mutually exclusive areas (Table 2). The definitions of interventions varied and tended to be patient-focused interventions (e.g. information/education/psychotherapy/pharmacology), staff-focused interventions (e.g. education, triage/assessment processes) and hospital/organisational-focused interventions (e.g. introduction of referral processes/capacity to case manage). Some studies (n=13) focused on more than one area of intervention (i.e. staff *and* patient interventions), and many (n=105) outlined bundled interventions (e.g. patient education plus pharmacology plus psychotherapy).

Pharmacological interventions. Studies exploring pharmacological primarily focused on the management of acute agitation and behavioural disturbance. Interventions explored included drugs used for acute sedation such as haloperidol, promethazine, droperidol, and ketamine. Routes of administration including intravenous and intramuscular injections, and oral administration, were compared.

There were a number of high quality research studies, as well as a range of descriptive studies (Table 2). Descriptive evidence was primarily quantitative (Table 2). One study included a survey of staff perspectives. All studies reported equivalence with existing regimens or more positive (mostly physiological) health outcomes. Despite these broad physiological improvements, some studies also reported deleterious side effects from the

intervention medication regimens. Pharmacological papers were primarily focused on health outcomes; none reported patient or family perspectives of the therapies, and only one explored staff perceptions of such interventions.

Psychological-counselling interventions. Papers regarding interventions focused on psychological-counselling represented a wide international spread (see Table 2). The NHMRC LoE ranged from I to IV, and reflected the wide range of methodologies used and mental health problems explored using these ED-based interventions. Six papers were unrated, as they used a simple descriptive or qualitative methodology.

Studies included a range of counselling interventions which commonly included cognitive-behavioural-based psychotherapy (CBT) and motivational interviewing. While studies often included reports of positive symptom-reduction for people experiencing psychosis, mental health outcomes reported were often mixed. Mental health benefits were observed within a relatively short duration of the intervention, and with limited impact on re-presentations to EDs.

Triage-assessment-screening interventions. A number of studies (n=28) focused on interventions aimed at improving early identification and screening processes of mental health problems. These studies tended to focus on people presenting with suicidal ideation, self-harm, and delirium, although several examined dementia or broader groups such as those experiencing psychological distress. Studies tended to be of a lower LoE (see Table 2). Most studies focused on development and testing (trialing) of screening tools to be applied to

people with mental health problems presenting to EDs. Interventions targeted at or integrating triaging for physical health management, coupled with mental health management in this population, were very limited (n=2).

Educational/informational interventions. Relatively few studies (n=12) focused exclusively on provision of education and information to staff and/or patients. The available studies explored a wide range of mental health problems including self-harm, suicidal-ideation, mild traumatic brain injury, and alcohol and other drug use. Few studies (n=2) generated evidence around perception of, engagement with, satisfaction, or impact of the provision of information. Educational provision included written (brochure) and verbal education for consumers and staff. Most of the reported outcomes were positive, with improved awareness and insight as well as more positive staff attitudes reported.

Other interventions including institutionally focused case management. 'Other' interventions offered in EDs were reported in 28 papers and included the development of dedicated in-ED units and/or case managers and the use of targeted health information technologies. Studies focused on a range of mental health conditions including alcohol and other drug intoxication, and also on frequent presenters. Care processes varied from case management and dedicated care units to better use of health information to target care. These results must be interpreted with caution as the LoE was relatively low. ED initiated case management was found in many studies to improve ED performance indicators such as decreased re-presentation rates, length of stay and direct costs.

Referral and or follow-up interventions. A total of 36 papers considered 'referral/follow-up' interventions, primarily exploring ED-initiated referrals to crisis counselling and outpatient clinics and/or follow-up by ED staff via a range of contact modes (including face-to-face, text, and telephone). LoE was mostly moderate. This evidence explored patient and staff perspectives using a wide range of investigative techniques. While generally the impact of the intervention on episodes of suicide and self-harm was limited, outcomes reported included long lasting (>3 years) effects supporting positive thinking, reducing ED presentations, and health costs.

Mixed interventions – Non-substance/alcohol (NSA) misuse. Mixed interventions included a number of different foci that addressed either a form of substance misuse (commonly described as abuse; see section below) or some other issue. These NSA interventions included screening, behavioural therapies, information provision, pharmacological, and physical interventions. There was a wide range of international evidence regarding mixed interventions. These studies included data from people with violent and aggressive behaviours, panic disorder, and those with suicidal ideation and other forms of self-harm. Despite an array of high quality studies (~50% which were systematic reviews, RCTs, level III and IV studies, around 50% were unrated studies) that included a range of methodologies, outcomes typically had limited efficacy with poor adherence to the intervention and were often poorly sustained (by staff) in the ED setting. Some (n=18) reported positive patient outcomes (such as reduced symptom severity or re-presentations), while others (n=2) reported increased frequency or severity of deleterious patient outcomes (i.e. self-harming).

These interventions tended to focus on acute mental health crises. No studies included drew from qualitative data, despite the wide mixture of patient-focused initiatives examined.

Mixed interventions – Screening plus Brief Interventions for Substance Abuse (SBI-SA).
Almost half of the studies with interventions that included a mixture of components (n=41) focused on ED-based interventions related to the effects of substance misuse. Typically, these articles described and evaluated interventions to limit or reduce substance use, but also explored some of the related components of ED presentations associated with substance misuse such as intimate partner violence. 'Substances' most commonly referred to included alcohol, cannabis and opioid use, but interventions did not always specifically target a single substance. More than half of these studies came from the United States of America (n=26/41), with a reasonable international spread (see Table 2). Studies often included an 'in ED' screening and intervention component (typically some form of counselling with education) and then community follow-up from clinical staff. A range of follow-up processes were reported from generic text messages to 'booster' counselling via personal phone calls. While studies typically reported some shorter term (<12 month) positive outcomes in terms of substance use and associated ED re-presentations, they also typically reported high levels of attrition to follow-up and poor longer term adherence to treatment regimens. All studies focused on patients, not staff.

Mixed interventions – Screening Brief Intervention and Referral to Treatment (SBIRT).
The 31 papers that explored SBIRT interventions frequently focused on helping people manage alcohol misuse using a bundled intervention that included brief screening followed

by referral for treatment. Studies often drew on previously implemented interventions in the literature, typically introduced in new or increased combinations. The outcomes from these studies tended to be equivocal and of typically short (<2 years) duration. With all of the mixed interventions there was little or no attempt to differentiate the relative contribution of each component of the intervention.

Discussion

Our scoping review identified a relatively large volume of literature regarding interventions with similar components that were described in various ways and applied in various geographical locations. Complex, bundled interventions were applied, often with a limited or no description of the key components of, or did not disaggregate, the relative contributions of each element. The target population/s (patients and staff) were often not clearly defined and delineated (for patients) using varying clinical category descriptors. There was also variation in outcome measures used to report on intervention success – these included wait time, re-presentation to the ED, hospital admission, diagnosis and/or behaviour severity, behaviour recurrence, costs, patient and staff perceptions of the interventions, and/or of the effectiveness of the interventions. This variation, lack of comparability and ultimately generalisability to other EDs results creates confusion in the literature and adds to the difficulties with confidently recommending one intervention type over another.

Evidence of the relative contribution of intervention elements is challenging without clear description and measurement of the intervention components (e.g. hours of patient education by trained professional or hours of counselling and referral). Without succinct and

transparent description of the components in interventions (packages/bundles), transferability to (replication in) other settings is limited. Additionally, the low level of evidence (primarily simple descriptive studies) available in this area challenges the development of conclusions about effectiveness of interventions. Few studies reported on the cost-effectiveness of the intervention/s implemented, precluding evidence-based decision-making about resource allocation.

Interventions initiated in EDs tend to focus, understandably, on the patients. When undertaking research in the population group, several considerations are warranted. The first involves the interpretation of data from studies that vary in their study sample (i.e. studies with patients with mental health diagnoses – a narrow definition – or studies with patients where a broader definition (such as mental health problem) is used. Accurate, consistent reporting of selection criteria, efforts to minimise selection bias and increase comparability/generalisability are recommended.

A second concern regarding the focus on the patient is that few studies involved patients' family, carers and significant others, despite increasing recognition that family-centred care provides a holistic and efficient care experience, achieving better health outcomes for people who present to the ED with mental health problems.[23-25] Further research is required to understand the dynamics between people with mental health problems who attend the ED and their social support networks (or lack thereof). This is particularly critical as interventions that are likely to have longer-term positive patient impacts, such as behaviour modification techniques and substance misuse reduction, may be initiated in the ED but typically also include specialist mental health team, outpatient or community care

continuity,[26] that can be supported by engagement and partnership with family.[27-29] Moreover, empowering family/carers to manage mental health conditions is likely to impact re-presentations to EDs, reducing the volume of demand on ED services.[30]

Just as the study population must be clearly defined and comparable across studies, the study aims, intervention focus (i.e. pharmacological, counselling, education) and outcomes must also be clearly described and standardised, when possible. Research can be driven by established research agendas that preference surveillance, screening, interventions, workforce, research infrastructure, and knowledge translation.[31] However, without equally explicitly described interventions and subsequent outcomes, meta-analytic studies and the development of high quality, transferable and translatable interventions will remain difficult. It is also important to consider outcomes that extend beyond the traditional patient-outcome focused studies which tend to measure and report service-based outcomes such as re-presentation rates or adherence to programs. Other patient outcomes such as acceptability, approval, or satisfaction warrant consideration.

ED staff have historically been trained to manage illness and trauma. Policy changes such as the deinstitutionalisation of people with mental health problems, along with societal increases in mental health issues, has seen an increase in the number of people presenting to EDs with mental health problems.[32] Some ED staff report feeling poorly prepared for caring for patients with mental health problems.[27, 33] As such, it is paramount that ED staff be trained and skilled at recognising and caring for people with mental health problems who present to the ED[34, 35] and that training and skill development reflect evidence-based best

practices. This could include utilization of some of the intervention groups identified in this review and also via interventions developed to address some of the gaps identified herein.

Implications for research and practice

To inform further research and effective translation of evidence into practice, it is important that standardised definitions/descriptors are used to define specific sample populations (e.g. mental health problem/illness/disorder/diagnosis/condition). Interventions also could consider including not only the patient or staff, but a combination of both, along with the patient's family, so that care delivery is patient- and family-centred. This study provides the initial framework classifying and defining ED interventions for future studies in the hope of increasing consistency of outcome measurement to enable meta-analytic studies in the future. This research demonstrates the strength and weaknesses of what is currently known about a variety of interventions. Thus, a comprehensive mental health program within EDs is likely to draw upon this range of proven strategies which may be compiled into broad strategy/care bundle/care policy documents and processes.

Study limitations

This scoping review had a number of limitations, including that, as a scoping review, it was primarily descriptive in nature. Moreover, the search terms used to collect relevant literature could have biased the sample, despite independent reviewing, input from clinical experts cognisant of the relevant literature and extensive review (hand-searching) of associated reference lists. The search applied may also have missed interventions described as 'models of care', however, the development of search criteria with input from experienced clinical professionals and academics, and the careful review of reference lists from the extensive list

of manuscripts sourced, limits this risk. The range of study outcomes precluded a meta-analytic data synthesis. The study was based on interventions in EDs that were reported in published literature and this does not capture unpublished interventions that are used in clinical practice. The literature was confined to that published in English – perhaps predisposing to primarily anglo-centric data that is heavily weighted by literature from the USA and little from the developing world. A qualitative evidence rating scale was not applied so the quality of evidence for qualitative studies is not described.

Conclusion

There is a large body of disconnected evidence around ED interventions used to support people with mental health problems, who represent a small but important component of ED care. The unique nature of care required for these patients, some of whom require sedation and long hospital stays, has resulted in a variety of interventions. Some of these interventions involve the need for staff specifically trained in mental health to work in the ED. A lack of coherent, multifaceted, person-centred care may hamper the capacity to effectively care for this vulnerable population. Care delivery for this patient group requires a comprehensive approach that is based on building capability amongst ED staff and integrating ED care with specialist care where appropriate. Such a comprehensive approach may be based on an understanding of the intervention components identified in this article.

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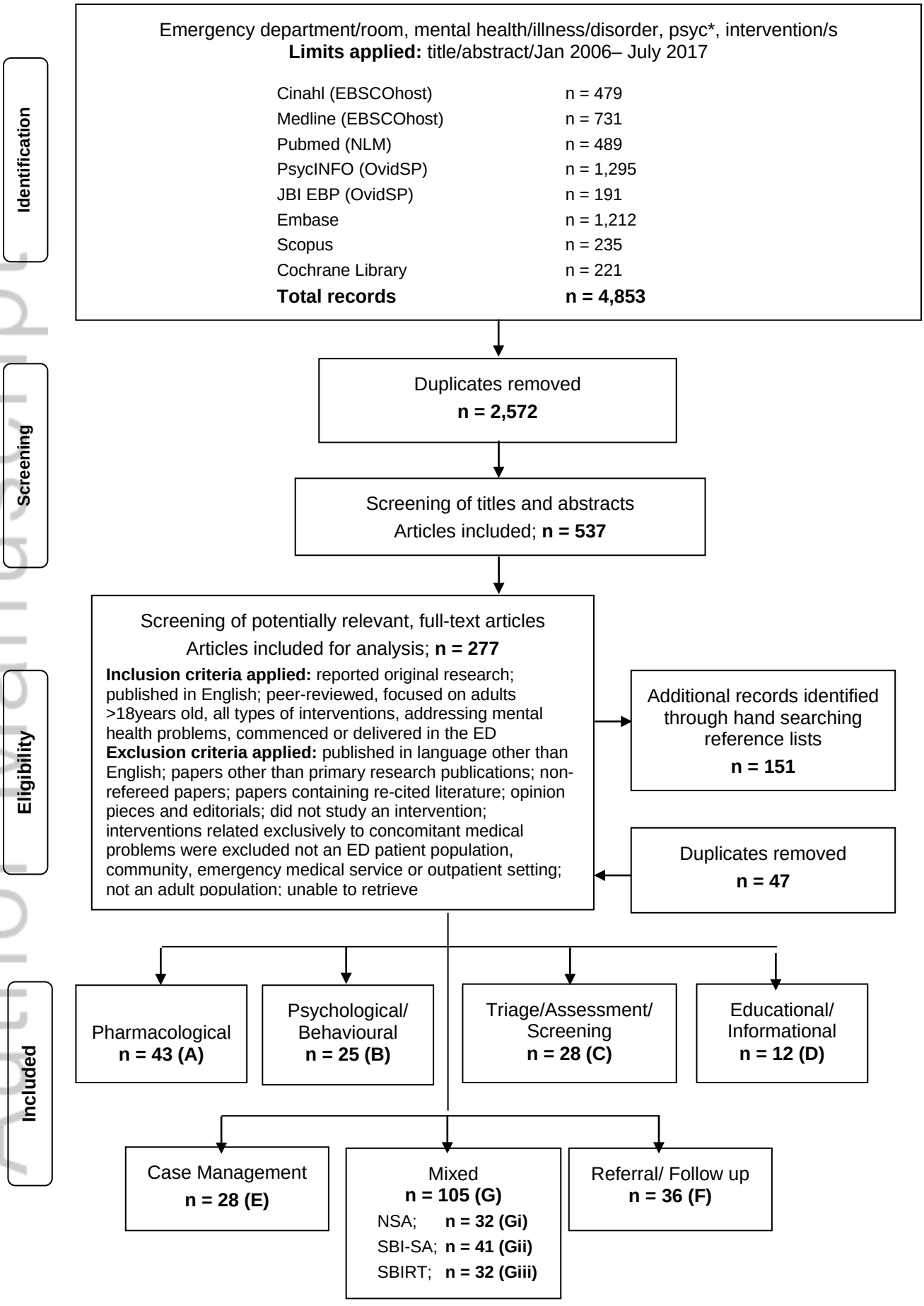

ED, emergency department; JBI, Johanna Briggs Institute; EBP, Evidence Based Practice; NSA, Non-substance/alcohol misuse; SBI-SA, Screening and Brief Interventions - Substance Abuse; SBIRT, Screening, Brief Interventions and Referral to Treatment

Figure 1. Representation of the process of developing the data set to inform this scoping review, using the PRISMA minimum set of items for reporting. Full reference lists and summary tables of included studies, based on intervention type (A-G) are presented in supplementary Tables S1 and S2.

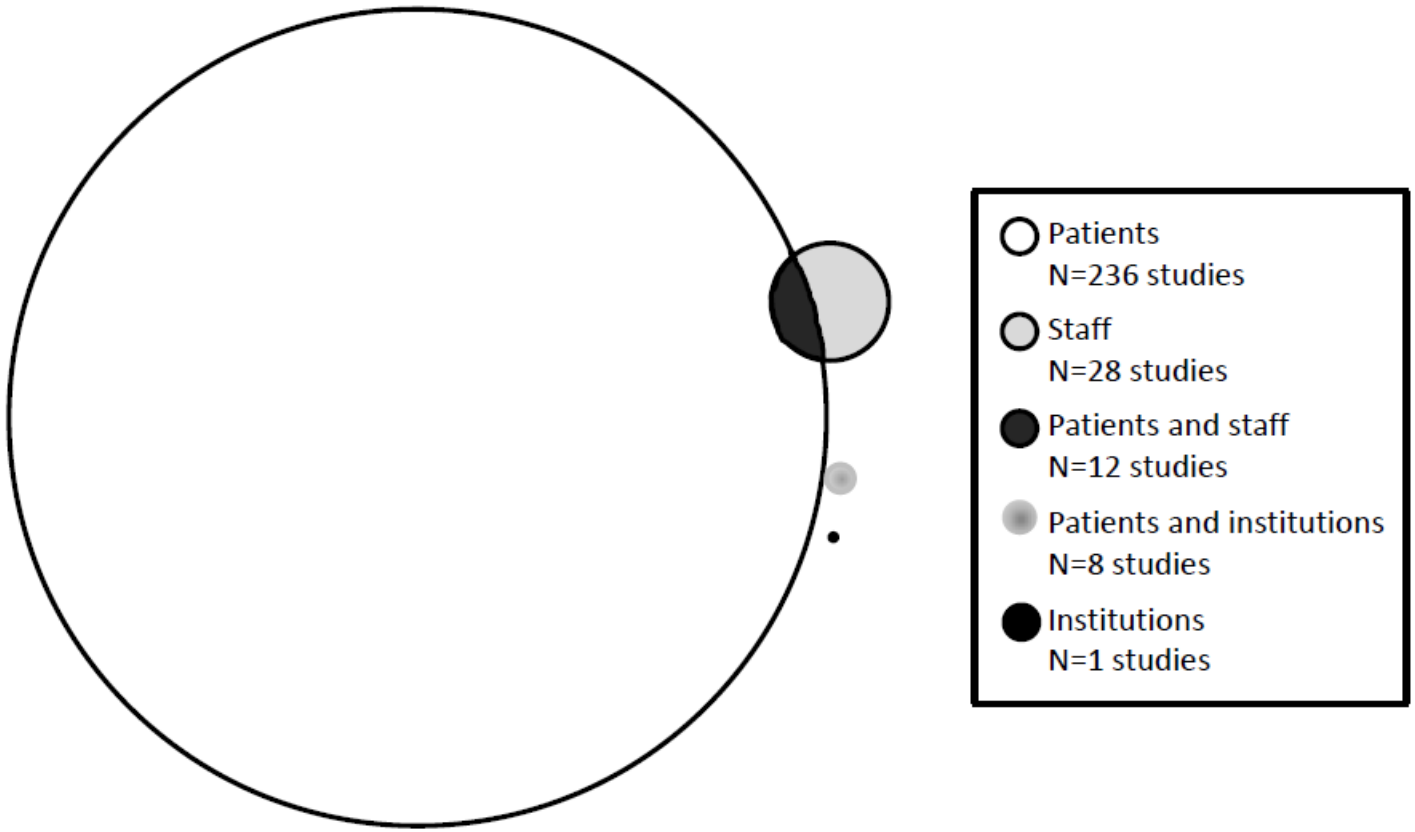

Figure 2. Schematic representation, to scale, of the focus of published studies exploring mental health interventions delivered in Emergency Departments.

Table 1. Study search strategy applied to health databases.

Search number	Search criteria used
Search #1	(emergency department [Title/Abstract] OR emergency room [Title/Abstract] AND (2006 [Date - Publication] : 2017 [Date - Publication]))
Search #2	((mental health [Title/Abstract] OR mental illness [Title/Abstract] OR mental disorder [Title/Abstract] OR psyc* [Title/Abstract]) AND (2006 [Date - Publication] : 2017 [Date - Publication]))
Search #3	((intervention [Title/Abstract]) OR interventions [Title/Abstract])) AND (2006 [Date - Publication] : " 2017 [Date - Publication]))
Search #4	#1 AND #2 AND #3

#2 MeSH tree 'mental disorder' comprises a wide range of problems including anxiety disorders, phobias, bipolar disorder, depression, mood disorders, personality disorders, psychotic disorders and substance related disorders.

Table 2. Summary of literature regarding the interventions commenced or delivered in the ED for people who present with a mental health problem.

Theme	Number of studies included and target focus/outcome group	Level of evidence	Study locations	Methodologies used	Mental health problems targeted in studies	Interventions delivered in ED	Summary of findings
A. Pharmacological	43 studies 42 patient focused 1 staff focused	5 level I (Cochrane reviews) 2 level I (systematic reviews 12 level II (RCT) 5 III-2 5 III-3 13 unrated †	USA 15 Australia 14 Brazil 5 Italy 2 Iran 2 Hong Kong 1 India 1 Korea 1 Netherlands 1 UK 1	Quantitative: Systematic reviews with meta-analysis, Blinded and non-blinded RCTs, Descriptive studies, (retrospective chart audits and prospective observational studies), Staff survey	Acute agitation, Behavioural disturbance	Primarily drugs for acute sedation such as midazolam, lorazepam, haloperidol, promethazine, droperidol, risperidone and ketamine. Routes of administration (orally, intravenously or, intramuscularly) were also compared	Equivalence with existing regimens or a more positive outcome reported with droperidol. Negative physiological side effects (e.g. decreased blood-oxygen saturation or over-sedation), increased need for active airway management reported in some studies using midazolam and lorazepam
B. Psychological-counselling	25 studies 23 patient focused 1 staff focused 1 patient and staff focused	1 level I (Cochrane review) 1 level I (systematic review 6 level II (RCT) 6 level III-1 3 level III-2 2 level IV 6 unrated †	USA 7 UK 4 Canada 5 France 2 Australia 1 Brazil 1 Ireland 1 Netherlands 1 New Zealand 1 Norway 1 Thailand1	Quantitative: Systematic reviews with meta-analysis, Blinded and non-blinded RCTs, Comparative interventional/ observational, Secondary analysis from RCT, Chart audit	Self-harm, Suicide, PTSD, Alcohol and other drug, Violence (including intimate partner violence), Panic, Depression, Schizoaffective	Cognitive-behavioural-based psychotherapy (CBT), Emotion-regulation group-based psychotherapy, Specialist counselling, Motivational Interviewing (MI), Blended (MI) and	Studies often report mixed outcomes depending on participant group Limited impacts on suicide or self-harm, re-presentation with problem solving therapy or psycho-education, however, some symptom reduction with cognitive-behavioural-based psychotherapy (CBT)

Theme	Number of studies included and target focus/outcome group	Level of evidence	Study locations	Methodologies used	Mental health problems targeted in studies	Interventions delivered in ED	Summary of findings
				Qualitative: Focus groups, Interviews	disorder, Bipolar disorder, Acute agitation	Problem Solving Therapy or a Psycho-educational imaginal exposure, Therapeutic breathing exercises, Music listening	Mixed reductions over time for both alcohol and other drug consumption and consequences Seclusion better than physical restraint for acutely agitated patients Reduced depression and hopelessness with psychotherapy and group based problem solving therapy Reduced impact PTSD with cognitive-behavioural intervention psychoeducation and motivational interviewing
C. Triage-assessment-screening	28 studies 24 patient focused 2 staff focused 1 patient and staff focused 1 patient, staff and family focused	1 level I (systematic review) 1 level III-1 1 level III-2 7 level IV 18 unrated †	USA 14 Australia 4 Canada 4 UK 3 Switzerland 2 France 1	Quantitative: Scoping review, Quantitative, Comparative, Observational, Descriptive – prospective and retrospective case report	Psychological distress /mental illness (ICD - 10), Delirium, Suicide/ self-harm, DSM-IV, Intoxication	Screening tools (alcohol and risk; confusion), Cognitive assessments, Suicide risk, Patient safety assessments, Telehealth, Patient flow strategies, Staff survey	Previous triage/presentation is a positive risk factor for mental illness Limited number of tools and limited staff adherence and diagnostic-predictive capacity Staff adherence to effective screening/flow decrease LOS and increase identification of patient risk – and increases staff satisfaction
D. Educational/ Informational	12 studies	1 level III-1 2 level III-2	USA 6 Australia 2	Quantitative: Comparative,	Mental illness, Mild traumatic	Social work program for	Outcomes such as ED presentations were positive

Theme	Number of studies included and target focus/outcome group	Level of evidence	Study locations	Methodologies used	Mental health problems targeted in studies	Interventions delivered in ED	Summary of findings
	3 patient focused 9 staff focused	1 level III-3 6 level IV 2 unrated †	Canada 1 Switzerland 1 UK 1 Japan 1	Interventional, Observational, Prospective pre-post studies, Descriptive	brain injury, Aggression, Suicidal attempt and violent behaviour, Self-harm, Alcohol and other drugs	patients, Brochure/self- help manual for patients, Staff training, Staff educational development	except for two alcohol-related interventions and staff management of patient aggression (but was positive where staff attitude did change)
E. Case management	28 studies 13 patient focused 2 staff focused 4 patient and staff focused 8 patient and institutionally focused 1 institutionally focused	3 level I (systematic reviews) 4 level II (RCT) 1 level III-2 3 level III-3 2 level IV 15 unrated †	USA 12 Canada 5 Australia 7 Austria 1 Denmark 1 Japan 1 Switzerland 1	Quantitative: Comparative Retrospective, Observational Mixed methods Qualitative: Focus groups, Interview	Mental illness, Alcohol and other drugs, Altered mental status, Suicide, Frequent presentations, Mental health emergency examination order	Development of dedicated units, Case management, Targeted use of health information technologies	Reductions in ED visitation, admission times and ED costs Parallel patient management (outside the main patient flow) have been successful CM not effective at reducing the incidence of repetition of suicide attempts
F. Referral ± follow-up	36 studies 34 patient focused 2 both patient and staff	9 level II (RCT) 9 level III-2 1 level III-3 5 level IV 12 unrated †	USA 11 UK 4 Australia 4 Iran 3 France 3 Canada 2 Denmark 2	Quantitative: Blinded and non-blinded RCT, Comparative interventional/ observational studies,	Self-harm, Suicidal ideation and suicide, Substance abuse, Depression, Psychosis, Epilepsy	Outreach from ED via crisis / outpatient clinics, ED follow-up via: Phone Letter Postcard	Generally there were long-lasting (> 3years) effects on suicidal thoughts and improve hopes and interests, and reduced ED presentations, but limited reduction in the rate of

Theme	Number of studies included and target focus/outcome group	Level of evidence	Study locations	Methodologies used	Mental health problems targeted in studies	Interventions delivered in ED	Summary of findings
	focused		Spain 2 China 1 Hong Kong 1 New Zealand 1 Switzerland 1 Taiwan 1	Prospective and retrospective pre-post studies Cross-sectional studies, including surveys Qualitative: Narrative analysis, Interviews, Focus group		In-person Email/texting	suicidal attempts Limited impacts on episodes of self-harm, but some reports of reduced ED presentations Reductions in self-poisoning were associated with substantial savings to healthcare
Gi. Mixed Interventions - Non-substance/alcohol misuse (NSA)	33 studies 30 patient focused 1 staff focused 2 patient and staff focused	1 level I (systematic reviews) 5 level II (RCT) 3 level III-1 5 level III-2 2 level IV 13 unrated †	USA 13 Canada 8 Australia 4 UK 3 International 2 (Brazil, India, Sri Lanka, Iran, China) China 1 Iran 1 Japan 1	Quantitative: Blinded and non-blinded RCTs, Comparative interventional/ observational, Quasi-experimental, Surveys, Review Qualitative: Interviews	Suicide, Deliberate self-harm, Violent and aggressive behaviours, Panic disorder	Studies tended to have bundled interventions that included combinations of some or all of the following components: Screening, problem solving therapy, cognitive therapy, patient support including referral, risk management, improved access to primary care, information leaflet, follow-up phone call and/or letter, pharmacological therapy, mixed	Outcomes were typically limited with level of evidence for efficacy generally low, reductions in return ED visits, length of ED stay, and cost savings Typically poor adherence to intervention (staff and patients) and positive outcomes were poorly sustained Some deleterious effects, e.g. repeat self-harm reported more common in those who received the intervention

Theme	Number of studies included and target focus/outcome group	Level of evidence	Study locations	Methodologies used	Mental health problems targeted in studies	Interventions delivered in ED	Summary of findings
						physical and chemical restraint	
Gii. Mixed Interventions- **S**creening and **B**rief **I**nterventions - **S**ubstance **(including** alcohol/substance) **A**buse (SBI-SA)	41 studies 38 patient focused 2 staff focused 1 patient and staff focused	4 level I (systematic reviews) 15 level II (RCT) 10 level III-1 3 level III-2 1 level III-3 1 level IV 7 unrated †	USA 26 Switzerland 4 Australia 3 Germany 2 Spain 2 UK 2 Canada 1 South Africa 1	Quantitative: Systematic reviews with meta-analysis, Blinded and non-blinded RCTs, Comparative, Interventional, Case control, Cohort studies, Secondary RCT analyses, Pre-post descriptive, Cross-sectional survey Qualitative: Narrative review	Alcohol abuse ± marijuana use ± Intimate partner violence, Prescription opioid overdose risk, Substance use disorder	Screening and brief interventions, Peer-counsellor, Motivational Interviewing (MI), blended MI and Problem Solving Therapy (MI-PST), or a Psycho-educational Control Group (CG), Educational enhanced usual care, Follow-up interviews, Brief advice ± a generic/ tailored message booklet, Follow-up telephone booster counselling, Text-messages, "Change talk" speech content	Some effectiveness in reducing alcohol and marijuana use in the short-term (<12 months) and some effectiveness >12 months, half the odds of experiencing an alcohol-related injury, CBI reported to CBI patients increase, readiness, confidence, and help-seeking Many lost to follow-up
Giii. Mixed Interventions - **S**creening, **B**rief **I**ntervention and **R**eferral to **T**reatment (SBIRT) - **(including a**lcohol/substance)	31 studies 29 patient focused 1 staff focused 1 patient and staff focused	3 level I (systematic reviews) 8 level II (RCT) 1 level III-1 5 level III-2 6 level IV 8 unrated †	USA 20 UK 3 Poland 3 France 2 Canada 1 New Mexico 1 New Zealand 1	Quantitative: Blinded and non-blinded RCTs, Comparative, Interventional, Case – control, Observational Cohort, Chart review,	Alcohol and other substance abuse disorders, including risky and dependent drinkers	These all included a bundled intervention that included Screening and brief intervention and referral to treatment, and combinations of some or all of the following	Typically intensive, but not onsite or limited duration interventions, reported a significant reduction in alcohol consumption longer term (> 6-12 months). Staff and patient perceptions were largely positive

Theme	Number of studies included and target focus/outcome group	Level of evidence	Study locations	Methodologies used	Mental health problems targeted in studies	Interventions delivered in ED	Summary of findings
				Audit, Simple descriptive Quasi-experimental, Survey and review Qualitative: Interview, chart review, comment audit		components: Thiamine replacement, motivational/ negotiation interviewing, case management intervention, referral brochure, computer assisted educational movies	

† Note: unrated studies typically included qualitative or simple descriptive components (NHMRC, 2009)

CBI, cognitive behavioural intervention; ED, emergency department; LOS, length of stay (in ED); NHMRC, (Australian) National Health and Medical Research Council; PTSD, post-traumatic stress disorder; RCT, randomized controlled trial, UK, United Kingdom; USA, United States of America

Interventions for people presenting to emergency departments with a mental health problem: a systematic scoping review

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