Review Article

The Prevalence of Psychiatric Disorders in General Hospital Inpatients: A Systematic Umbrella Review

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Background: *To inform the future development of consultation-liaison psychiatry services, we need accurate information on the prevalence of psychiatric disorders in the general hospital inpatient setting. Systematic reviews have summarized the literature on specific aspects of this broad topic, but there has been no high-level overview that aggregates their findings and identifies gaps in the relevant literature.* **Objective:** *We aimed to produce a comprehensive overview of the field, summarizing the research literature on the prevalence of psychiatric disorders (i.e., interview-based psychiatric diagnoses) in general hospital inpatients. We did this using a systematic umbrella review (systematic review of systematic reviews), which is the best and most efficient method for summarizing a broad area of research.* **Methods:** *We searched Ovid Medline, Ovid Embase, Ovid PsycINFO, EBSCO CINAHL, and Scopus from database inception to September 2021 for systematic reviews that provided a pooled prevalence estimate, or prevalence range, for interview-diagnosed psychiatric disorders in general hospital inpatients. Two reviewers independently assessed articles and extracted data. The review is registered with PROSPERO, number CRD42019125574.* **Results:** *We screened 11,728 articles and included 10 systematic reviews in our umbrella review. We were able to extract pooled prevalence estimates from these as follows: major depression 12% to 20%, any anxiety disorder 8%, generalized anxiety disorder 5%, panic disorder 3%, delirium 15%. We were only able to extract a prevalence range for dementia, which was 3% to 63%. We found no systematic reviews from which we could extract prevalence data for the other psychiatric disorders that we included in our searches, indicating important gaps. From these data, we estimated that approximately one-third of inpatients have a psychiatric disorder.*

Conclusions: *Psychiatric disorders are very common in general hospital inpatients. While the planning of consultation-liaison psychiatry services will benefit from more research on the prevalence of each of the full range of disorders encountered in the inpatient setting, our findings indicate that we already know enough to justify increased and more population-based service provision.*

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INTRODUCTION

Psychiatric disorders are important in the general hospital inpatient setting as they complicate the delivery of medical care and are associated with poorer patient outcomes, longer hospital stays, increased rates of readmission, and higher health care costs.[1–5]

Consultation-liaison (C-L) psychiatry services that aim to address this psychiatric morbidity have been set up in many general hospitals.[6] To inform the future development of these services, we require accurate information on the prevalence of psychiatric disorders in the general hospital inpatient setting. It is therefore concerning that we have no comprehensive and systematic summary of the relevant research. Systematic reviews summarize the literature on specific aspects of this broad topic; for example, our group has published reviews of the prevalence of depression and anxiety in the inpatient setting.[7,8] However, to date, there has been no high-level overview that aggregates the findings from such reviews and identifies gaps in the systematic review literature.

We therefore aimed to produce a comprehensive and systematic overview that summarizes published research on the prevalence of psychiatric disorders (i.e., interview-based psychiatric diagnoses) in general hospital inpatients. We did this using a systematic umbrella review. This type of review is the best and most efficient way of summarizing a broad area of research.[9] An umbrella review involves identifying all the systematic reviews that contain relevant information and then extracting and collating data from them.[9,10] As a systematic review of systematic reviews, an umbrella review represents one of the highest levels of evidence synthesis available.

METHODS

Study Design

We conducted a systematic umbrella review (also called a meta-review, overview, or systematic review of systematic reviews). We used procedures that accorded with the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines and registered the study protocol with PROSPERO (number CRD42019125574).[11,12]

Search Strategy

We identified all relevant systematic reviews by searching Ovid Medline, Ovid Embase, Ovid PsycINFO, EBSCO CINAHL, and Scopus from database inception to September 2021. Searches were run for the combination of "prevalence", "general hospital inpatient", "psychiatric disorder" (which included major depression, bipolar disorder, generalized anxiety disorder, panic disorder, phobia, obsessive compulsive disorder, delirium, dementia, substance use disorders, schizophrenia, delusional disorder, acute stress disorder, adjustment disorder, post-traumatic stress disorder, somatoform [somatic symptom] disorders, factitious disorder, dissociative disorders, anorexia nervosa, bulimia nervosa, personality disorders), and "systematic review or meta-analysis" using both standardized subject terms and free-text terms, including synonyms and alternative spellings.

All references were exported (to Endnote X9; Thomson Reuters, New York, NY), and duplicates were removed following the method described by Falconer.[13] We provide full details of the searches used in the Appendix 1. We contacted the authors of relevant conference abstracts that we found through our database search in order to obtain any associated publications and also did both manual reference list searches and forward-citation searches for the articles we included.

Selection Criteria

We included reviews (in any language) if they met all the following criteria: (1) The review was systematic (defined as a review with clear objectives, predefined eligibility criteria, a systematic search strategy, reproducible methods, and a systematic presentation of findings); (2) it aimed to summarize the prevalence of 1 or more of the psychiatric disorders listed above, using data from diagnostic interview studies (which may have used structured or clinical interviews); (3) it included a pooled prevalence estimate or a prevalence range for the relevant disorder(s) in adult (aged 16 years or older) general hospital inpatients (i.e., patients who had been admitted to any general hospital units, not patients in other settings such as psychiatric hospitals, rehabilitation hospitals, or emergency departments); (4) the pooled prevalence estimate or prevalence range used data from at least 2 primary studies.

Data Extraction

In order to minimize bias, 2 researchers independently screened the titles and abstracts of all the articles identified by the searches, using EndNote and Excel, to determine which might meet our selection criteria. If an article was considered potentially relevant, 2 researchers then reviewed the full text, with the help of a translator where necessary (an electronic translator was

used in the first instance, and a person who was fluent in the relevant language was consulted if further clarification was required). Any disagreements about whether to include an article were resolved in discussion with a third researcher. Using a specially designed, standardized data-extraction form, 2 researchers independently extracted the following data from each included review: focus of the review; population studied; psychiatric disorder(s) studied; number and characteristics of primary studies of the prevalence of psychiatric disorders in general hospital inpatients; pooled prevalence estimate or prevalence range for general hospital inpatients; relevant author comments on the review's findings. Any disagreements about the data extracted were resolved in discussion with a third researcher.

Quality Assessments

To assess the quality of the reviews that we included, 2 researchers independently rated each review using the PASS quality checklist.[14] This checklist was designed by our group to help researchers, clinicians, and clinical decision-makers rapidly judge the quality of systematic reviews of the prevalence of medical conditions. It has 4 domains: **P**lanned with a clearly stated aim; **A**ll the relevant literature was considered; **S**election of included studies was unbiased and transparent; **S**ynthesis of data from included studies was unbiased and informative. Each of these domains has a small number of questions which can be scored as either "yes" or "no/unclear".

Data Synthesis

We described the characteristics of the systematic reviews and their findings in both narrative and table formats. We did not conduct a meta-analysis of the prevalence estimates extracted because this would have "double-counted" information from primary studies which were included in more than 1 review.

RESULTS

Literature Overview

Figure 1 shows the full umbrella review flowchart. The searches identified 18,376 articles. After removing duplicates, we screened 11,728 titles and associated abstracts and then assessed 864 full papers for eligibility. We excluded the majority of these 864 articles because they were not systemat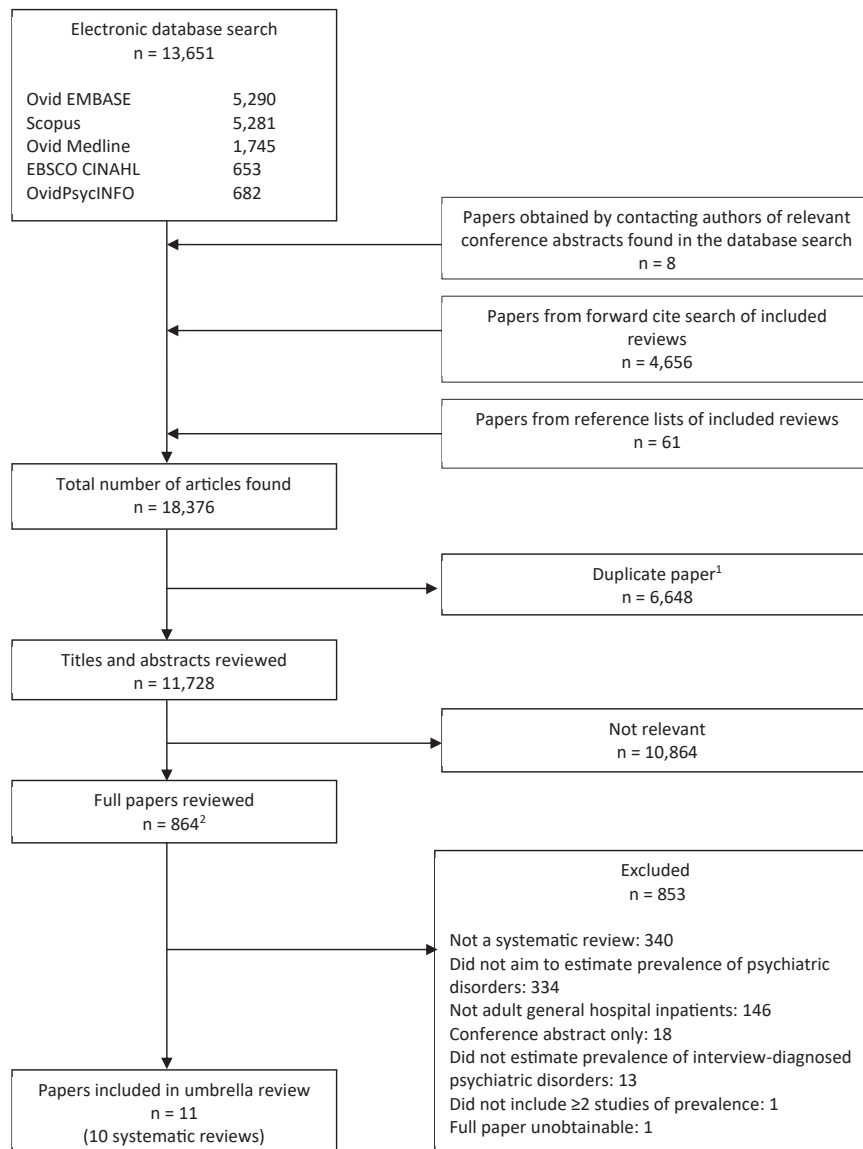ic reviews or they had not aimed to estimate the prevalence of a psychiatric disorder. We also excluded a smaller number of articles because, although they were systematic reviews, their prevalence estimates were not based on diagnostic interview studies (i.e., they included studies that used rating scales or medical records to determine the presence of psychiatric disorder). This screening process yielded 11 articles describing 10 systematic reviews (2 articles reported the same review), which met our selection criteria.[7,8,15–24]

The focus of each of the 10 reviews was generally broader than the prevalence of psychiatric disorders in general hospital inpatients (Tables 1–3). Consequently, only some of the primary studies that they summarized were relevant to this umbrella review. The prevalence estimates and ranges that we report below, and in the tables, refer to the subset of studies in each review that were specifically of general hospital inpatients.

Prevalence of Major Depression

We found 6 systematic reviews from which we could extract data on the prevalence of major depression in general hospital inpatients (Table 1). Their findings were reasonably consistent, with all the reported pooled prevalence estimates lying between 12% and 20%. One review reported a pooled prevalence of 12% in studies of general medical and surgical inpatients (and prevalence ranging from 2% to 56% in studies of patients in specialist units or with specific diagnoses).[7] The authors noted that there was substantial heterogeneity in the prevalence estimates of the primary studies, but despite a number of exploratory analyses, they were unable to adequately explain this. They concluded that the wide range was likely to be due to differences between the studies in the local populations (e.g., different national and local prevalence of depression), health care systems (e.g., different hospital types and admission pathways), patients (e.g., variability in the characteristics of patients admitted to general medical and surgical units), and methods (e.g., study inclusion criteria, how diagnostic criteria were applied, and the timing of assessments after hospital admission). Two reviews were of the prevalence of major depression in patients with cancer; these reported a pooled estimate of 12.3% and a prevalence range of 4% to 14% for patients with cancer in the inpatient setting.[17,19] Two reviews focused on studies of the prevalence of major depression after an acute myocardial infarction or a stroke.[20,21] They

FIGURE 1. Prevalence of Psychiatric Disorders in General Hospital Inpatients: systematic umbrella review flowchart,

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┌─────────────────────────────────┐
│     Electronic database search   │
│           n = 13,651             │
│                                  │
│ Ovid EMBASE          5,290       │
│ Scopus               5,281       │
│ Ovid Medline         1,745       │
│ EBSCO CINAHL           653       │
│ OvidPsycINFO           682       │
└─────────────────────────────────┘
              ▲        ┌────────────────────────────────────────┐
              │        │ Papers obtained by contacting authors   │
              │────────│ of relevant conference abstracts found  │
              │        │ in the database search                  │
              │        │                n = 8                    │
              │        └────────────────────────────────────────┘
              │        ┌────────────────────────────────────────┐
              │────────│ Papers from forward cite search of      │
              │        │ included reviews                        │
              │        │              n = 4,656                  │
              │        └────────────────────────────────────────┘
              │        ┌────────────────────────────────────────┐
              │────────│ Papers from reference lists of included │
              │        │ reviews              n = 61             │
              │        └────────────────────────────────────────┘
┌─────────────────────────────────┐
│  Total number of articles found  │
│          n = 18,376              │
└─────────────────────────────────┘
              │        ┌────────────────────────────────────────┐
              │───────▶│ Duplicate paper[1]                      │
              │        │              n = 6,648                  │
              │        └────────────────────────────────────────┘
┌─────────────────────────────────┐
│   Titles and abstracts reviewed  │
│          n = 11,728              │
└─────────────────────────────────┘
              │        ┌────────────────────────────────────────┐
              │───────▶│ Not relevant                            │
              │        │              n = 10,864                 │
              │        └────────────────────────────────────────┘
┌─────────────────────────────────┐
│      Full papers reviewed        │
│           n = 864[2]             │
└─────────────────────────────────┘
              │        ┌────────────────────────────────────────┐
              │───────▶│ Excluded                                │
              │        │              n = 853                    │
              │        │                                         │
              │        │ Not a systematic review: 340            │
              │        │ Did not aim to estimate prevalence of   │
              │        │ psychiatric disorders: 334              │
              │        │ Not adult general hospital inpatients:  │
              │        │ 146                                     │
              │        │ Conference abstract only: 18            │
              │        │ Did not estimate prevalence of          │
              │        │ interview-diagnosed psychiatric         │
              │        │ disorders: 13                           │
              │        │ Did not include ≥2 studies of           │
              │        │ prevalence: 1                           │
              │        │ Full paper unobtainable: 1              │
              │        └────────────────────────────────────────┘
┌─────────────────────────────────┐
│ Papers included in umbrella      │
│ review        n = 11             │
│ (10 systematic reviews)          │
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[1]Duplicates of the same paper due to searching multiple databases and reference lists. [2]9 papers were translated using an electronic translator, none of these were included in the umbrella review.

reported somewhat higher prevalence estimates, of approximately 18%, for patients hospitalized with these conditions. A review of studies of the prevalence of depression in patients with burn injuries found a much lower prevalence of 4% in hospitalized patients. However, its authors emphasized that this estimate was likely to be "artifactual" as the 2 primary studies it included were of low quality.[22]

Prevalence of Anxiety Disorders

We found 2 systematic reviews from which we could extract information on the prevalence of anxiety disorders in general hospital inpatients (Table 2). Only 1 of these reviews reported pooled prevalence estimates using data from studies of a wide range of hospital units; these were 8% for any anxiety disorder, 5% for

TABLE 1. Systematic Reviews of the Prevalence of Major Depression in General Hospital Inpatients

Systematic review	Focus of review	Studies of general hospital inpatients included in the review		Prevalence of major depression	
		Study characteristics	Population	Range	Pooled estimate
Mitchell et al. (2011)[17]	Prevalence of depression, anxiety, and adjustment disorder in oncological, hematological, and palliative care settings (total 94 studies)	8 Studies Sample sizes: range 31 to 220, median 112,* total N = 933*	Patients with cancer in oncological and hematological units	-	12.3% (95% CI 6.6% to 19.4%)
Mitchell et al. (2017)[18]	Prevalence of poststroke mood disorders (total 108 studies)	31 Studies Sample sizes: range 20 to 423, median 103,* total N = 3838	Acute hospital inpatients who had experienced a stroke	-	18.1% (95% CI 14.4% to 22.1%)
Thombs et al. (2006a),[21] Bush et al. (2005)[20]	Prevalence and persistence of depression in survivors of acute myocardial infarction (total 24 studies)	8 Studies Sample sizes: range 70 to 9,279, median 245,* total N = 10,785	Patients hospitalized for acute myocardial infarction	16% to 27%	19.8% (95% CI 19.1% to 20.6%)
Thombs et al. (2006b)[22]	Prevalence and persistence of depression and clinically significant symptoms of depression in survivors of burn injury (total 18 studies)	2 Studies Sample sizes: range 45 to 95, median 70,* total N = 140	Patients hospitalized with (non–self-inflicted) burn injuries	4% to 4%	-
Walker et al. (2013)[19]	Prevalence of depression in patients with cancer (total 15 studies)	2 Studies Sample sizes: range 107 to 117, median 112,* total N = 224*	Inpatients with cancer	4% to 14%	-
Walker et al. (2018)[7]	Prevalence of depression in general hospital inpatients (total 60 studies)	General medical and surgical inpatients 31 Studies Sample sizes: range 65 to 993, median 215, total N = 9305 Inpatients in specialist units or with specific diagnoses 29 Studies Sample sizes: range 27 to 502, median 72, total N = 3235	General medical and surgical inpatients and inpatients in specialist units or with specific diagnoses	General medical and surgical inpatients 2.7% to 33.6% Inpatients in specialist units or with specific diagnoses 2% to 56%	General medical and surgical inpatients 12% (95% CI 10% to 15%)

* Calculated from data in the paper.

TABLE 2.   Systematic Reviews of the Prevalence of Anxiety Disorders in General Hospital Inpatients

Systematic review	Focus of review	Studies of general hospital inpatients included in the review		Prevalence of generalized anxiety disorder and panic disorder	
		Study characteristics	Population	Range	Pooled estimate
Walker et al. (2021)[8]	Prevalence of anxiety symptoms of clinically significant severity and anxiety disorders in general hospital inpatients (total 32 studies)	Any anxiety disorder 16 Studies Sample sizes: range 73 to 719, median 199,* total N = 3982	General hospital inpatients	Any anxiety disorder 2% to 29%	Any anxiety disorder 8% (95% CI 5% to 12%)
		Generalized anxiety disorder 11 Studies Sample sizes: range 45 to 719, median 128,* total N = 2649		Generalized anxiety disorder 0% to 21%	Generalized anxiety disorder 5% (95% CI 3% to 8%)
		Panic disorder 10 Studies Sample sizes: range 60 to 719, median 163,* total N = 2530		Panic disorder 0% to 6%	Panic disorder 3% (95% CI 2% to 4%)
Willgoss and Yohannes (2013)[23]	Prevalence of clinical anxiety and specific anxiety disorders in patients with chronic obstructive pulmonary disease (total 10 studies)	Any anxiety disorder 4 Studies Sample sizes: range 20 to 50, median 34,* total N = 138*	Inpatients with chronic obstructive pulmonary disease	Any anxiety disorder 10% to 55%	-
		Generalized anxiety disorder 3 Studies Sample sizes: range 38 to 50, median 39,* total N = 127*		Generalized anxiety disorder 10% to 33%	
		Panic disorder 4 Studies Sample sizes: range 20 to 50, median 39,* total N = 147*		Panic disorder 0% to 41%	

* Calculated from data in the paper.

TABLE 3. Systematic Reviews of the Prevalence of Delirium and Dementia in General Hospital Inpatients

Systematic review	Focus of review	Studies of general hospital inpatients included in the review		Prevalence of delirium	
		Study characteristics	**Population**	**Range**	**Pooled estimate**
Gibb et al. (2020)[15]	Trends in delirium occurrence in medical inpatients (total 33 studies)	25 Studies Sample sizes: range 60 to 1,925, median 225,* total N = 9231*	Patients admitted to acute medical or geriatric medicine units	-	15% (95% CI 14% to 16%)
				Prevalence of dementia	
				Range	**Pooled estimate**
Mukadam and Sampson (2011)[16]	Prevalence, associations and outcomes of dementia in older people admitted to the general hospital (total 14 studies)	14 Studies Sample sizes: range 108 to 2,000, median 203, total N = 4989*	General hospital inpatients aged ≥55 years	All studies 2.8% to 63.0% Geriatric units 26.8% to 63.0%	-

* Calculated from data in the paper.

generalized anxiety disorder, and 3% for panic disorder.[8] The authors noted that there was often a lack of clarity about when during the hospital admission the anxiety assessments had been conducted. They also noted that prevalence estimates may have been influenced by whether a diagnostic hierarchy had been used (i.e., whether an anxiety disorder was recorded if another disorder such as depression was also present) and how judgements had been made regarding the attribution of patients' symptoms to an anxiety disorder, rather than an adjustment disorder or their medical condition. The other review was of the prevalence of anxiety disorders in patients with chronic obstructive pulmonary disease.[23] This review reported prevalence ranges of 10% to 55% for any anxiety disorder, 10% to 33% for generalized anxiety disorder, and 0% to 41% for panic disorder. The authors suggested that these wide ranges may have resulted from differences in the characteristics of study participants (e.g., their mean ages, the percentage of female participants, and the severity of patients' pulmonary disease).

Prevalence of Delirium

We only found 1 systematic review from which we could extract data on the prevalence of delirium in general hospital inpatients. This reported a pooled prevalence of 15% at the time of hospital admission (Table 3).[15] The primary studies in this review were of patients who had been admitted to acute medical or geriatric medicine units (including stroke, respiratory, and oncology units). The authors of the review noted that there was a wide range of prevalence estimates in the primary studies. They also commented that many of these primary studies had excluded patients who were severely ill or lacked capacity to consent, suggesting that the reported pooled prevalence may be an underestimate.

Prevalence of Dementia

We also found only 1 systematic review of the prevalence of dementia in general hospital inpatients (Table 3).[16] This review did not determine a pooled prevalence estimate but reported a wide prevalence range (2.8% to 63.0%) from studies of patients aged ≥55 years who had been admitted to medical and surgical units. The authors of the review noted that higher prevalence estimates were reported by studies done in geriatric units and of older patients (the prevalence range in studies done in geriatric units was 26.8% to 63.0%). They commented that (1) few primary studies had screened patients for delirium or depression to determine whether these were the cause of the participants' cognitive impairment and that this may have led to an overestimate of dementia prevalence; (2) many studies had excluded patients who were severely ill, had communication difficulties, or were unable to consent

to participation, which may have led to an underestimate of dementia prevalence.

Prevalence of Other Psychiatric Disorders

We found no systematic reviews from which we could extract a pooled prevalence estimate or prevalence range for the other psychiatric disorders included in our searches (bipolar disorder, phobia, obsessive compulsive disorder, substance use disorders, schizophrenia, delusional disorder, acute stress disorder, adjustment disorder, post-traumatic stress disorder, somatoform [somatic symptom] disorders, factitious disorder, dissociative disorders, anorexia nervosa, bulimia nervosa, or personality disorders). We are therefore unable to report on the prevalence of these disorders.

Quality of the Systematic Reviews and of the Primary Studies They Included

Systematic Reviews

The full quality assessments of the 10 systematic reviews, using the PASS checklist, are shown in Table 4. In summary, the quality of the reviews was variable. They all had clearly stated aims and had considered all the relevant literature. However, it was often unclear exactly how these primary studies had been selected for inclusion and how the data extracted from them had been synthesized in the review.

Primary Studies Included in the Systematic Reviews

The reviews report limitations in the quality of the primary literature. The primary studies included were generally small, with median sample sizes ranging from 34 to 245. Although 3 of the 10 reviews had excluded primary studies that did not meet their basic quality criteria, the authors noted that many of the studies included still had important methodologic shortcomings.[7,8,19] Of the remaining 7 reviews, 1 reported that the primary studies they summarized all had substantial methodologic limitations[22]; the others assessed their primary studies to be of only moderate quality. Examples of methodologic shortcomings in the primary studies, described by review authors, include small samples, often recruited from single centers; convenience sampling; exclusion of patients with severe medical problems, documented history of psychiatric disorder, or lacking capacity to consent to participation; poor participation rates; lack of standardized application of diagnostic criteria; and lack of clarity regarding the timing of assessments in relation to the date of hospital admission.

DISCUSSION

Main Findings

We aimed to produce a comprehensive and systematic overview of the research literature on the prevalence of psychiatric disorders in general hospital inpatients, summarizing the data from relevant systematic reviews. We were able to include data from 10 reviews in our systematic umbrella review. The pooled prevalence estimates extracted from these reviews for each disorder were as follows: major depression 12% to 20%, any anxiety disorder 8%, generalized anxiety disorder 5%, panic disorder 3%, delirium 15%. For dementia, we were only able to extract a prevalence range, which was 3% to 63%. The authors of the 10 reviews noted substantial variability in the prevalence estimates reported by the primary studies they included. We found no systematic reviews from which we could extract prevalence data for the other psychiatric disorders that we included in our searches, indicating important gaps in the literature.

Discussion of Main Findings and Relevant Literature

The prevalence estimates described above are both substantial and higher than those reported in the general population.[25–28] Of the disorders we sought evidence about, major depression was the focus of the greatest number of reviews. Although these reviews had addressed different clinical populations, their findings were similar. The prevalence estimates were 2 to 4 times the average 12-month general population prevalence of 5% as reported in international studies.[25] The reviews of anxiety disorders also found them to be common in general hospital inpatients, but with a prevalence only modestly higher than that in the general population,[26] perhaps because diagnostic criteria for anxiety disorders require symptoms of relatively long duration that are judged not to be attributable to a medical condition.[8] The prevalence of delirium, estimated at almost 1 in 6 inpatients, was unsurprisingly high but might have been even higher if the relevant systematic review had included studies done in surgical and intensive care units. Dementia, as might be expected, was found to

TABLE 4. PASS Quality Assessment of Systematic Reviews Included in the Umbrella Review

Domain	Question	Gibb et al. (2020)[15]	Mukadam and Sampson (2011)[16]	Mitchell et al. (2011)[17]	Mitchell et al. (2017)[18]	Thombs et al. (2006a),[21] Bush et al. (2005)[20]	Thombs et al. (2006b)[22]	Walker et al. (2013)[19]	Walker et al. (2018)[7]	Walker et al. (2021)[8]	Willgoss and Yohannes (2013)[23]
P Planned with a clearly stated aim	Does the review aim specify the patient population and the condition being studied and include the word "prevalence"?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
A All the relevant literature was considered	Is there a detailed, replicable search strategy?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
S Selection of included studies was unbiased and transparent	Did the criteria for including studies clearly define the patient population, setting, and condition?	Yes	Yes	Yes	Yes	No/Unclear	No/Unclear	Yes	Yes	Yes	No/Unclear
	Was study selection done by ≥2 reviewers independently with a procedure for dealing with disagreements?	Yes	No/Unclear	No/Unclear	No/Unclear	Yes	Yes	Yes	Yes	Yes	No/Unclear
	Is there a clear description of how the included studies were selected from all those found by the searches?	Yes	No/Unclear	Yes	Yes	No/Unclear	No/Unclear	Yes	Yes	Yes	Yes
S Synthesis of data from included studies was unbiased and informative	Was data extraction done by ≥2 reviewers independently with a procedure for dealing with disagreements?	Yes	No/Unclear	Yes	No/Unclear	Yes	Yes	Yes	Yes	Yes	Yes
	Was a quality assessment done for each included study?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No/Unclear
	For each included study, is there a description of the sample characteristics, how the presence of the condition was assessed, and the prevalence estimate?	No/Unclear	Yes	No/Unclear	No/Unclear	Yes	Yes	Yes	Yes	Yes	Yes
	Is the method for synthesizing data from the included studies clear, with acknowledgement of the possible effects of heterogeneity and study quality on prevalence?	Yes	Yes	Yes	Yes	No/Unclear	No/Unclear	Yes	Yes	Yes	No/Unclear

have a very wide estimated prevalence range that was noted to be particularly high in geriatric units.

We found no systematic reviews from which we could extract prevalence data for other psychiatric disorders. This lack of reviews is particularly concerning for disorders which we know are common from clinical experience and primary studies in the general hospital setting; for example, substance use and adjustment disorders.[29,30] We also did not have sufficient data to be able to comment on the relative prevalence of psychiatric disorders in different hospital units. This is because reviews (and primary studies included in these) have tended to study either samples of patients with specific medical conditions or samples from a combination of units.

Strengths and Limitations of This Umbrella Review

The strengths of this umbrella review include (1) the use of information from systematic reviews, the highest level of evidence available; (2) data from systematic reviews of interview-based studies, in order to provide pooled prevalence estimates and ranges for definite psychiatric diagnoses; (3) the use of a comprehensive, sensitive search for articles on a wide range of psychiatric disorders with no restriction on language; (4) clearly defined inclusion criteria in order to minimize bias in article selection; (5) article selection and data extraction by 2 reviewers, working independently with a procedure for dealing with disagreements, to minimize bias.

The main limitations of the review are (1) the variable and sometimes limited quality of both the systematic reviews and the primary studies they summarized; (2) variation in the types of diagnostic interviews (different types of structured interviews and also clinical interviews) and the way that diagnostic criteria were applied in the primary studies; (3) the variable, and often unclear, timing of the psychiatric assessments in relation to the hospital admission date in the primary studies; (4) the different ways that reviewers defined "general hospitals" and "general hospital inpatient units"; (5) the use of an umbrella review approach which limited our inclusion of information from primary studies to only those that had been included in published systematic reviews; (6) our focus on only interview-diagnosed psychiatric disorders means that we did not include information on the prevalence of clinically significant symptoms as measured using rating scales.

Implications for Clinical Practice

While substantial variation is likely between hospitals and hospital units, it is clear from our findings that psychiatric disorders are very common in the general hospital inpatient setting. The data that we have summarized indicate this is the case for major depression, anxiety disorders, delirium, and dementia. There are also a number of other disorders that have not yet been the subject of a systematic review but which we expect from clinical experience to be common in this setting. These include adjustment disorder, substance use disorders, somatoform (somatic symptom) disorders, and post-traumatic stress disorder. While we do not have sufficient data to tell us the total prevalence of psychiatric disorders in the general hospital inpatient setting, we can make a conservative estimate of it by simply adding the lowest pooled estimates for the disorders for which we do have data. This addition suggests that as many as one-third of inpatients have a psychiatric disorder. Although such a crude calculation must be interpreted with caution as it makes the questionable assumption of no comorbidity between disorders,[31] it is still likely to be a substantial underestimate as it does not include either dementia (for which we do not have a pooled prevalence estimate) or any of the psychiatric disorders for which we have no systematic review data; nor does it include other presentations, including subthreshold disorders, which may nevertheless require psychiatric consultation.[32] This estimate of one-third of patients is reasonably consistent with the findings of primary studies of the prevalence of "all psychiatric disorders" (variously defined) in this setting.[33–35]

These high prevalence estimates present a challenge for C-L psychiatry. We know that, although many of the third of patients who have psychiatric disorder need a psychiatric consultation,[36] referral rates to C-L psychiatry services are relatively low and typically less than 6%.[37] We also know that the patients who are referred tend to be those with conspicuous disorders, such as hyperactive delirium, rather than those with less obvious problems such as depression.[37] We therefore need to develop C-L psychiatry services to better meet the need identified by this review. This could be done by providing more population-based care, using screening to systematically identify patients with psychiatric disorders, as done by proactive and integrated approaches.[38] We might also tailor services to better serve patients with the common, but currently less frequently

referred, disorders, such as major depression.[39] The sheer scale of the need we have highlighted also suggests that, in addition to providing direct care, C-L psychiatry has an important role in educating other general hospital clinicians to provide psychiatric care themselves, as advocated more than half a century ago.[40]

Implications for Future Research

While we are able to report some clear findings, our umbrella review also highlights the limitations of the existing literature. Consequently, there is an urgent need for more and better research. We need high-quality systematic reviews that study the psychiatric disorders for which we currently lack pooled prevalence estimates. These reviews should be designed to meet the basic quality criteria we have described in our PASS checklist and specifically focus on the general hospital inpatient setting.[14] We also need more, and better quality, primary studies of the prevalence of psychiatric disorders in the general hospital inpatient setting, especially in clearly specified hospital units. These studies would ideally exclude fewer patients by using recruitment protocols that allow patients who are unable to consent for themselves to take part; have clearly specified procedures for the application of diagnostic criteria, especially for disorders that require symptoms of relatively long duration (such as anxiety disorders) or collateral information (such as dementia); study a clearly specified list of psychiatric disorders; and report the timing of the assessments in relation to hospital admission.

CONCLUSIONS

We provide a summary of the prevalence of psychiatric disorders in general hospital inpatients, as described in relevant systematic reviews. Although the data are surprisingly limited, they do indicate that major depression, anxiety disorders, delirium, and dementia are common in this setting, and it is likely that at least a third of general hospital inpatients have a psychiatric disorder. While future planning of C-L psychiatry will benefit from more research, we already know enough to justify well-resourced psychiatric services for patients who have been admitted to general hospitals. These services should be developed to address both the scale and profile of need in the units that they serve.

SUPPLEMENTARY DATA

Supplementary data related to this article can be found at https://doi.org/10.1016/j.jaclp.2022.04.004.

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