ABSTRACT

Objective The objective of this study was to examine how published studies of inpatient to outpatient mental healthcare transition processes have approached measuring unnecessary psychiatric readmissions. Design Scoping review using Levac et al’s enhancement to Arksey and O’Malley’s framework for conducting scoping reviews. Data sources Medline (Ovid), Embase (Ovid), PsycINFO, CINAHL, Cochrane and ISI Web of Science article databases were searched from 1 January 2009 through 28 February 2019. Eligibility criteria for selecting studies We included studies that (1) are about care transition processes associated with unnecessary psychiatric readmissions and (2) specify use of at least one readmission time interval (ie, the time period since previous discharge from inpatient care, within which a hospitalisation can be considered a readmission). Data extraction and synthesis We assessed review findings through tabular and content analyses of the data extracted from included articles. Results Our database search yielded 3478 unique articles, 67 of which were included in our scoping review. The included articles varied widely in their reported readmission time intervals used. They provided limited details regarding which readmissions they considered unnecessary and which risks they accounted for in their measurement. There were no perceptible trends in associations between the variation in these findings and the included studies’ characteristics (eg, target population, type of care transition intervention). Conclusions The limited specification with which studies report their approach to unnecessary psychiatric readmissions measurement is a noteworthy gap identified by this scoping review, and one that can hinder both the replicability of conducted studies and adaptations of study methods by future investigations. Recommendations stemming from this review include (1) establishing a framework for reporting the measurement approach, (2) devising enhanced guidelines regarding which approaches to use in which circumstances and (3) examining how sensitive research findings are to the choice of the approach.

BACKGROUND

Care transition for individuals being discharged from inpatient mental healthcare to outpatient settings is a growing focus for many healthcare delivery systems. Drivers of this increased interest include inpatient treatment’s high-resource requirements (especially for longer and repeated inpatient stays), as well as individuals being able to better maintain family, work, educational and other responsibilities alongside outpatient treatment. Studies of inpatient to outpatient mental healthcare transition processes, both observational and interventional, are thus on the rise, and many of them use the rate of post-discharge readmissions as an individual-level outcome measure to assess the quality of transition. Readmission rate associated with a care setting is its proportion of individuals who are rehospitalised within a certain time period since their previous hospitalisation.

Strengths and limitations of this study

- Closely following Levac et al’s established methodological framework for conducting scoping reviews, this study performed a comprehensive search of how unnecessary psychiatric readmissions are measured by studies concerned with inpatient to outpatient mental healthcare transitions.
- Aligning to the purpose of scoping reviews to identify current gaps in knowledge and establish a new research agenda, this review does not assess the effectiveness of the approaches mentioned by the included studies in measuring unnecessary psychiatric readmissions.
- There may exist other approaches to unnecessary psychiatric readmissions measurement used (1) by studies not concerned with care transitions or (2) within individual healthcare organisations, which have not been publicly shared through the mechanism of peer-reviewed journal articles that are indexed by the databases included in our review.
- This scoping review is a critical step towards enabling the field to evaluate various care transition interventions’ comparative effects on unnecessary psychiatric readmission rates.
Defining readmission rate requires, at minimum, (1) specification of the time period (ie, readmission time interval), (2) classification of ‘re’hospitalisation (ie, related to the previous hospitalisation and therefore possibly unnecessary or preventable, as opposed to an unrelated hospitalisation due to a new care need), and (3) cases that should be included/excluded from consideration. These specifications are becoming more important now than ever, as healthcare policymakers, payers, and professional groups are increasingly paying attention to accurately identifying unnecessary readmissions and better incentivising their prevention.6–13 However, it is unclear whether and how the increasingly prevalent studies of inpatient to outpatient mental healthcare transitions are defining each of these aspects of the measure.

Also unclear is whether there is a shared understanding by the field regarding which definition is appropriate for which mental healthcare circumstances. 3M Health Information Systems’ Potentially Preventable Readmissions Classification System14 offers a widely used proprietary methodology for measuring readmissions. It is difficult to glean from its publicly available information, however, what constitutes a meaningful readmission time interval and any mental health-specific considerations that need to be made when measuring unnecessary psychiatric readmissions.

Without established approaches to measuring unnecessary psychiatric readmissions (which, if not uniform, ought to at least be made explicit as to how they relate to or differ from one another), various transitional interventions using the measure cannot be adequately assessed alongside one another. Establishing widely usable, accepted and comparable approaches to this measurement means setting clear definitional parameters as to what constitutes an unnecessary psychiatric admission. Thus, as a first step towards being able to evaluate the interventions’ comparative effects on unnecessary psychiatric readmission rates, we conducted a scoping review of peer-reviewed literature to delineate the current landscape of how published studies have approached measuring unnecessary psychiatric readmissions.

**METHODS**

We structured the scoping review according to Levac et al’s enhancement15 to Arksey and O’Malley’s six-stage methodological framework for conducting scoping reviews.16 The framework’s stages are (1) defining the research question, (2) identifying relevant literature, (3) study selection, (4) data extraction, (5) collating, summarising and reporting the results, and (6) consultation process and engagement of knowledge users. We aligned to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews17 (online supplemental file 1). Our team previously published a study protocol paper detailing the methods for this review18; briefly, they are summarised below.

**Stage 1: defining the research question**

Aligning the notion of ‘unnecessary readmission’ to Goldfield et al’s19 concept of ‘potentially preventable readmission’ (defined as a subsequent admission that occurs within the readmission time interval and is clinically related to a prior admission), the scoping review aimed to answer the following questions:

1. What durations are used as the unnecessary psychiatric readmission time interval?
2. What criteria are applied to designating a psychiatric readmission as unnecessary?
3. What risks are adjusted for in calculating unnecessary psychiatric readmission rates?

**Stage 2: identifying relevant literature**

We conducted a comprehensive review of the existing literature and evidence base to systematically examine what is known about measuring unnecessary psychiatric readmissions. Working with our institutions’ librarians with extensive experience in building systematic and comprehensive search strategies, we iteratively developed our search strategy. In particular, we refined our search strategy to include terms that are often used interchangeably. For example, in addition to ‘readmission,’ our initial preliminary searches based on early iterations of the strategy helped us identify related terms to include, such as unnecessary hospitalisation, inappropriate hospitalisation, unplanned admission and unscheduled admission. We harvested search terms using benchmark article terms and subject headings, titles and abstracts of key articles, dictionaries, and synonyms and subject headings within Embase and PubMed’s Medical Subject Headings database. We used Boolean logic and proximity operators to combine and refine the search terms. The search strategy was initially formulated for Medline (Ovid) (table 1), then further tailored as appropriate for use with Embase (Ovid), PsycINFO, CINAHL, Cochrane and ISI Web of Science article databases. These sources include relevant journals within the fields of medicine, health services and the social sciences, and were selected to capture a comprehensive sample of literature.

**Stage 3: study selection**

We screened peer-reviewed articles published in English from January 2009 through February 2019. We set the review time frame to start in 2009, so that it follows the 2008 publication of Goldfield et al’s19 concept of ‘potentially preventable readmission,’ to which we align our notion of ‘unnecessary readmission’. We set the review time frame to end in February 2019, as we initiated our review tasks in March 2019. We included an article if it (1) concerns the adult mental health population, (2) measures psychiatric readmission rates, (3) is set in a healthcare context, (4) is conducted in (and explicitly mentions) the context of some care transition process that is either already being carried out (for non-intervention studies) or is being tested as an intervention (for intervention studies), and (5) specifies at least one readmission time interval used.
We excluded editorials and other articles that report on individual viewpoints. For each of the title/abstract and full-text screening phases, the criteria were initially applied to 10% of articles to be screened, where two screeners (CW and BK) first independently screened, then compared with one another their individual decisions on, whether each article meets the criteria. For articles for which the individual decisions differed, the screeners held discussions to reach consensus. The resulting shared understanding of the criteria was applied to screening the remaining articles, for which CW and BK each served as the primary screener for a distinct half of the articles. For articles that the primary screener deemed as needing additional discussion, the non-primary screener among CW or BK served as the secondary screener, and discussions were held to reach consensus.

Stage 4: data extraction

Data extraction from articles to be included in the scoping review used an Excel-based template. The template was piloted on 10% of articles to be reviewed, where CW served as the primary data extractor for half of the articles, and BK served as the secondary extractor, reviewing the same articles to verify and augment the extraction. The other half of the articles had BK as the primary data extractor and CW as the secondary extractor. For articles for which the primary and secondary data extractors did not agree on the extracted content were discussed to reach consensus. The resulting shared understanding of the approach to data extraction was applied to the remaining articles, for which CW and BK each served as the primary extractor for a distinct half of the articles. For articles that the primary extractor deemed as needing additional discussion, the non-primary extractor among CW or BK served as the secondary extractor, and discussions were held to reach consensus.

Stage 5: collating, summarising and reporting the results

Aligning to the specific questions that our scoping review aimed to answer (listed under the Stage 1: defining the research question section), we summarised findings along the dimensions of (1) readmission time interval, (2) unnecessary readmission definition and (3) case-mix adjustment approach used by our reviewed articles. We also assessed the extracted data for any prevalent trends in study characteristics across our reviewed articles, and independently reviewed the data to identify any emergent themes. We used constant comparison combined with consensus-building discussions to finalise notable trends and themes to be reported.

Stage 6: consultation process and engagement of knowledge users

We closely engaged our multidisciplinary research colleagues and partnered healthcare system representatives for each of stages 1 through 5 above. These
individuals we consulted have clinical and administrative expertise in mental healthcare services, as well as in how the services are structured and integrated to be delivered across different levels of the mental healthcare system. They included front-line practitioners, leadership of local, regional and national care networks, and health services researchers with expertise in care transitions and admissions data.

Patient and public involvement
Our consultants included patient representatives who helped shape the research team’s study steps. These representatives came to be involved with our work through the first author’s research centre (Center for Healthcare Organization and Implementation Research (CHOIR), a Department of Veterans Affairs Health Services Research and Development Center of Innovation)’s established Veteran Engagement in Research Group (VERG). VERG is a CHOIR-based community that is explicitly chartered to engage veterans and their family members as active partners in research through communication regarding opportunities to be involved, codevelopment of research ideas and collaboration on tasks. The representatives played a key role in helping us understand the current status of readmissions and formulating the questions that our scoping review focused on answering. They were consulted on developing the criteria for study selection and disseminating our findings to the larger healthcare community beyond the scientific community.

RESULTS
Characteristics of reviewed articles
The database searches identified 3478 unique articles (figure 1). Through screening the title and abstract for each of these articles, 762 were designated for full-text screening. The full-text screening found 67 articles to include in the review, containing information related to measurement of unnecessary psychiatric readmissions in the context of some care transition process.1 2 6 8 22–24

Included studies were conducted in 19 different countries—Australia, Brazil, Canada, China, Colombia, Denmark, Finland, France, Germany, Iran, Israel, Italy, Japan, Norway, Singapore, South Africa, Switzerland, the UK and the USA. Table 2 lists the characteristics of each included article. Table 3 presents a summary of findings from the included articles. The articles spanned original research to systematic reviews, and methods used included quantitative, qualitative and mixed-methods approaches. Seventeen of these articles reported on a randomised controlled trial of a care transition intervention.

Findings regarding the three research questions
Readmission time interval
We found wide variation in the readmission time intervals used by included studies, ranging from 7 days to 60 months. The most prevalent intervals were 1 month (including intervals specified as 28 or 30 days) and 12 months, used by 22 and 29 included studies (32.8% and 43.3%), respectively. Twenty studies (29.9%) used more than one readmission time interval (eg, 12 and 24 months), and eight studies (11.9%) used a unique interval that was not used by other included studies (eg, 210 days). Studies using the unit of ‘month’ for the readmission time interval did not address the variability of the number of days included in a month depending on the time of the calendar year.

Unnecessary readmission definition
Each of our included studies, per our inclusion criteria mentioned above, was a study conducted in the context of some care transition process that the study examined for potential association with unnecessary psychiatric readmissions (ie, readmissions that should be minimised). Only two included studies, however, reported within a single article,29 specified a criterion by which they excluded a readmission from being considered unnecessary—namely, when the readmission was deemed a component of their planned care transition process. Otherwise, included studies did not make explicit the criteria that they applied to designating a readmission as unnecessary.

Case-mix adjustment approach
Forty-nine of the included studies (73.1%) did not specify risk adjustments that they made in calculating readmission rates. The most prevalent variables for which adjustments were specified were clinical (including diagnosis), service use, and sociodemographic, specified by 12, 13 and 14 included studies (17.9%, 19.4% and 20.9%), respectively. Thirteen studies (19.4%) specified adjustments for more than one type of variable (eg, service use and sociodemographic). Adjustments for geographical area and insurance type variables were specified by two and three included studies (3.0% and 4.5%), respectively, and healthcare site variables and homelessness variables were specified as having been adjusted for by one included study (1.5%) each.

Additional findings from the review
Study setting
Forty-eight of the included studies (71.6%) were conducted in the setting of one or more freestanding psychiatric hospitals (nine of which also involved community settings), while 10 (14.9%) were conducted at general hospitals or healthcare systems offering inpatient psychiatric services. Three studies (4.5%) were conducted in community settings only (eg, not specific to or managed by one or more hospitals or healthcare systems), and psychiatric prison units and residential programmes were the focus of one included study (1.5%) each.

Target population
Each of our included studies, per our inclusion criteria, concerned the adult mental health population. Seventeen studies (25.4%) specified taking into consideration...
their population’s substance use diagnoses, while one and two studies (1.5% and 3.0%) specified considering their population’s medical diagnoses and both substance use and medical diagnoses, respectively. Seventeen studies (25.4%) focused specifically on one or more mental health disorder type (eg, depressive disorders, psychotic disorders). Six, three and three studies (9.0%, 4.5% and 4.5%) were on military veterans, Medicaid enrollees and male individuals, respectively. Individuals with experience of homelessness and justice-involved individuals were the focus of two studies (3.0%) each, and one study (1.5%) focused on individuals aged 65 and over.

**Sample size and comparisons conducted**

Sample size among the included studies varied widely, ranging from 23 to 60,254 participants among the studies that specified a sample size. Of the 13 studies (19.4%) that did not specify sample sizes, 7 were literature reviews and 2 were study protocols. Twenty-seven studies (40.3%) examined comparisons with usual care, while 20 studies (29.9%) did not have comparison groups.

**Voluntariness of readmissions**

Forty-eight studies (71.6%) did not specify whether they were differentiating between voluntary and involuntary readmissions. Of the remaining 19 studies (28.4%), 12

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**Figure 1** Flow chart of the scoping review. From Moher et al. Preferred Reporting Items for Systematic Reviews and Meta-Analyses: the PRISMA statement. PLoS Med. 2009;6:e1000097. For more information, visit www.prisma-statement.org.
| Author(s) | Publication year | Country | Design | Health care context and setting | Study target population | Diagnoses and comorbidities | Care transition process category | Sample size | Control | Voluntariness of readmissions | Re-admission time interval | Criteria for designating a readmission as unnecessary | Criteria for excluding a readmission from being considered unnecessary | Risk adjustments to calculating readmission rates |
|----------|------------------|---------|--------|--------------------------------|------------------------|---------------------------|-------------------------------|------------|--------|-----------------------------|--------------------------|--------------------------------|--------------------------------|----------------------------------|
| Baeza et al. | 2018 | Brazil | Observational | Hospital(s) | Adults | Mental health disorders | Outpatient follow-up | 401 | No control | Unspecified | 12 months | Unspecified | Unspecified | Unspecified |
| Bankedeh et al. | 2014 | Iran | Randomised controlled trial | Hospital(s) | Adults | Bipolar I and schizoaffective disorders | Outpatient follow-up | 123 | Usual care | Unspecified | 12 months | Unspecified | Unspecified | Unspecified |
| Barker et al. | 2011 | UK | Observational | Community setting(s) | Adults | Mental health and substance use disorders | Outpatient follow-up | Unspecified | Historical control(s) | Both voluntary and involuntary | 7 days–12 months | Unspecified | Unspecified | Unspecified |
| Botha et al. | 2018 | South Africa | Quasi-experimental | Psychiatric hospital(s) | Adults (male) | Serious mental illnesses | Outpatient follow-up | 120 | Patients who had been discharged on non-recruitment days during the same time period | 90 days | Unspecified | Unspecified | Unspecified |
| Burns et al. | 2016 | South Africa | Quasi-experimental | Psychiatric hospital(s) | Adults (male) | Psychotic disorders | Outpatient follow-up | 330 (study 1 of 2); 330 (study 2 of 2) | Patients without community treatment orders | 12 months (study 1 of 2); 36 months (study 2 of 2) | Unspecified | Unspecified | Unspecified | Unspecified |
| Bursac et al. | 2018 | USA | Quasi-experimental | Psychiatric hospital(s) | Adults (male and just-relialed) | Mental health disorders | Care coordination; community liaison; discharge planning; patient education | 30 | Patients who are frequently rehospitalised and participate in the services pre-intervention | 15 days | Unspecified | Unspecified | Unspecified |
| Callaly et al. | 2010 | Australia | Observational | Psychiatric hospital(s) | Adults | Mental health disorders | Outpatient follow-up | 115 | No control | Unspecified | 28 days | Unspecified | Unspecified | Unspecified |
| Chen et al. | 2019 | China | Randomised controlled trial | Psychiatric hospital(s) | Adults | Bipolar I disorder | Patient education | 140 | Usual care | Unspecified | 12 months | Unspecified | Unspecified | Service use variables |
| Clibbens et al. | 2018 | Various (predominantly middle-income to high-income countries) | Rapid review | Community setting(s) and psychiatric hospital(s) | Adults | Mental health disorders | Discharge planning | Various | Various | Various | Unspecified | Unspecified | Unspecified |
| Cumbe et al. | 2018 | Canada | Observational | Community setting(s) and psychiatric hospital(s) | Adults (with a history of homelessness) | Mental health disorders | Outpatient follow-up | 497 | No control | Unspecified | 2, 6, 12 months | Unspecified | Unspecified | Service use and sociodemographic variables |
## Table 2 Continued

| Author(s) | Publication year | Country | Design | Healthcare context and setting | Study/target population | Diagnoses and comorbidities | Care transition process category | Sample size | Control | Voluntariness of readmissions | Readmission time interval | Criteria for designating a readmission as unnecessary | Criteria for excluding a readmission from being considered unnecessary | Risk adjustments in calculating readmission rates |
|-----------|------------------|---------|--------|--------------------------------|-------------------------|----------------------------|-------------------------------|-------------|---------|----------------------------|-------------------------|---------------------------------|-------------------------------------------------|-------------------------------------------------|
| Dixon et al   | 2009            | USA     | Randomized controlled trial | Health care system(s) | Adults (military veterans) | Serious mental illnesses | Community liaison; discharge planning; outpatient follow-up; patient education | 195        | Usual care | Unspecified | 6 months | Unspecified | Unspecified | Healthcare site variables |
| Denil et al   | 2016            | Various (Australia, Canada, Colombia, Egypt, Germany, Ireland, Israel, Japan, Malaysia, New Zealand, Saudi Arabia, Taiwan, UK, USA) | Systematic review | Community setting(s) and psychiatric hospital(s) | Adults | Mental health disorders | Various | Various | Various | Both involuntary and voluntary | Various (11 days; 1–12 months; more than 1 year) | Unspecified | Unspecified | Various variables (including clinical, service use and sociodemographic) |
| Faurholt-Jepsen et al | 2017      | Denmark | Randomized controlled trial | Psychiatric hospital(s) | Adults | Unipolar and bipolar disorders | Patient education | To be determined (study not completed at time of publication) | Usual care | Unspecified | 3, 6 months | Unspecified | Unspecified | Unspecified | Service use and sociodemographic variables |
| Fullerton et al | 2016         | USA     | Observational | Various | Adults (Medicaid enrollees) | Mental health; substance use and medical disorders | Outpatient follow-up | 320:37 | Patients with similar propensity scores who did not receive intermediate services | Usual care | Unspecified | 90 days | Unspecified | Unspecified | Unspecified | |
| Glacco et al   | 2018            | Various (Australia, Japan, Switzerland, UK) | Systematic review | Psychiatric hospital(s) | Adults | Mental health disorders | Various | Various | Various | Both involuntary and voluntary | Various (0–2 months; 12, 24 months; unspecified) | Unspecified | Unspecified | Unspecified |
| Gruzdins et al | 2011            | Israel  | Observational | Psychiatric hospital(s) | Adults | Mental health disorders | Outpatient follow-up | 908 | No control | Unspecified | 180 days | Unspecified | Various variables |
| Habit et al | 2008            | USA     | Quasi-experimental | Psychiatric hospital(s) | Adults | Mental health and substance use disorders | Information provided | Unspecified | No control | Unspecified | 30 days | Unspecified | Unspecified | |
| Hannah et al   | 2014            | USA     | Randomized controlled trial | Psychiatric hospital(s) | Adults | Mental health and major medical (e.g., diabetes, asthma, cancer) disorders | Outpatient follow-up | 40 | Usual care | Unspecified | 30 days | Unspecified | Unspecified | |
| Hengartner et al | 2018          | Switzerland | Pilot/exploratory | Psychiatric hospital(s) | Adults | Mental health and substance use disorders | Patient education | 29 | Usual care | Unspecified | 7 days | Unspecified | Unspecified | |
| Hengartner et al | 2017          | Switzerland | Secondary analysis following a randomised controlled trial | Psychiatric hospital(s) | Adults | Mental health and substance use disorders | Community liaison; discharge planning; outpatient follow-up; patient education | 151 | Usual care | Both involuntary and voluntary | 12 months | Unspecified | Unspecified | Unspecified |
| Hengartner et al | 2016          | Switzerland | Randomized controlled trial | Psychiatric hospital(s) | Adults | Mental health and substance use disorders | Community liaison | 151 | Usual care | Unspecified | 3, 12 months | Unspecified | Unspecified | |
| Hemmann et al | 2018            | Various (Finland, Germany, Hungary, the Netherlands, Sweden) | Systematic review | Various | Adults | Mental health disorders | Patient education | Various | Various | Various | Unspecified | Various (0–6, 12, 18, 24 months) | Unspecified | Unspecified | |
| Hutchinson et al | 2019       | USA     | Observational | Various | Adults (Medicaid enrollees) | Mental health and substance use disorders | Community liaison; outpatient follow-up | 1724 | Usual care | Unspecified | 30 days | Unspecified | Unspecified | Diagnosis, geographical area, service use and sociodemographic variables |
| Kidd et al   | 2016            | Canada  | Quasi-experimental | Psychiatric hospital(s) | Adults | Serious mental illnesses | Community liaison; outpatient follow-up | 23 | No control | Unspecified | 1, 6 months | Unspecified | Unspecified | |

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| Author(s) | Publication year | Country | Design | Health care context and setting | Study/target population | Diagnoses and comorbidities | Care transition process and category | Sample size | Control | Voluntariness of readmissions | Re-admission time interval | Criteria for designating a readmission as unnecessary | Criteria for excluding a readmission from being considered unnecessary | Risk adjustments in calculating readmission rates |
|-----------|------------------|---------|--------|--------------------------------|-------------------------|-----------------------------|---------------------------------|------------|--------|----------------------------|--------------------------|---------------------------------|---------------------------------|---------------------------|
| Kim et al. | 2011            | USA     | Observational | Hospital(s) | Adults (military veterans) | Mental health and substance use disorders | Outpatient follow-up | 534 | No control | Unspecified | 84 days (other than study period) | Unspecified | Unspecified | Diagnosis, insurance type, and sociodemographic variables |
| Kivela et al. | 2014          | Various (UK, USA) | Systematic review | Community setting(s) | Adults | Serious mental illnesses | Outpatient follow-up | Various | Usual care | Unspecified | Various (1-12, 12 months) | Unspecified | Unspecified | Unspecified |
| Kolbasovsky | 2009           | USA     | Quasi-experimental | Psychiatric hospital(s) | Adults | Mental health disorders | Community liaison; outpatient follow-up; patient education | 652 | Historical control(s) | Unspecified | 30 days | Unspecified | Unspecified | Diagnosis, insurance type, and sociodemographic variables |
| Kundylke et al. | 2016        | Canada | Observational | Psychiatric hospital(s) | Adults | Schizophrenia | Outpatient follow-up | 1913 | No physician follow-up | Unspecified | 210 days | Unspecified | Unspecified | Unspecified |
| Lay et al. | 2015            | Switzerland | Randomised controlled trial | Psychiatric hospital(s) | Adults | Mental health and substance use disorders | Patient education; outpatient follow-up | 238 | Usual care | Involuntary | 12 months | Unspecified | Unspecified | Unspecified |
| Lay et al. | 2012            | Switzerland | Randomised controlled trial | Psychiatric hospital(s) | Adults | Mental health disorders | Patient education; outpatient follow-up | To be determined (details not available at time of publication) | Usual care | Both involuntary and voluntary | 12, 24 months | Unspecified | Unspecified | Unspecified |
| Lee et al. | 2015            | China | Quasi-experimental | Psychiatric hospital(s) | Adults | Mental health and substance use disorders | Outpatient follow-up | 210 | Usual care | Unspecified | 6, 12, 18 months | Unspecified | Unspecified | Unspecified |
| Lieu and Liu | 2013           | China | Systematic review | Psychiatric hospital(s) | Adults | Mental health and substance use disorders | Outpatient follow-up | 140 | Usual care | Unspecified | 12, 24 months | Unspecified | Unspecified | Unspecified |
| Matesi et al. | 2017          | Italy | Observational | Psychiatric hospital(s) | Adults | Mental health and substance use disorders | Patient education | 52 | Not taking part in any psychoeducation groups/rehabilitation activities | Both involuntary and voluntary | 6 months | Unspecified | Unspecified | Unspecified |
| McDonagh et al. | 2018       | USA     | Quasi-experimental | Hospital(s) | Adults (military veterans) | Mental health disorders | Care coordination; patient education | Unspecified | No control | Unspecified | 30 days | Unspecified | Unspecified | Unspecified |
| Nubukpo et al. | 2016         | France | Observational | Psychiatric hospital(s) | Adults | Mental health and substance use disorders | Outpatient follow-up | 330 | No control | Unspecified | 24 months | Unspecified | Unspecified | Unspecified |
| Otto et al. | 2018           | USA | Observational | Psychiatric hospital(s) | Adults | Mental health disorders | Care coordination; patient education | 60254 | No control | Both involuntary and voluntary | 30 days | Unspecified | Diagnosis and service use variables |
| Passley-Clarke et al. | 2018     | USA | Quasi-experimental | Psychiatric hospital(s) | Adults | Mental health disorders | Psychiatric education | 216 patients | 2 staff | No control | Unspecified | 30 days | Unspecified | Unspecified |
| Prez et al. | 2017           | Colombia | Observational | Psychiatric hospital(s) | Adults | Mental health disorders | Outpatient follow-up | 224 | No control | Unspecified | 12 months | Unspecified | Unspecified | Unspecified |
| Procchia et al. | 2014        | USA | Randomised controlled trial | Psychiatric hospital(s) | Adults | Mental health disorders | Psychiatric education | 224 | Usual care | Both involuntary and voluntary | 3, 6, 12, 18 months | Unspecified | Unspecified | Clinical variables |
| Rabovsky et al. | 2012         | Switzerland | Randomised controlled trial | Psychiatric hospital(s) | Adults | Mental health disorders | Patient education | 87 | Open social activity group | Unspecified | 12 months | Unspecified | Unspecified | Unspecified |
| Reis et al. | 2018           | Norway | Randomised controlled trial | Community setting(s) and psychiatric hospital(s) | Adults | Mental health disorders | Community liaison; outpatient follow-up | 41 | Usual care | Voluntary | 12 months | Unspecified | Unspecified | Unspecified |
| Rothbard et al. | 2012         | USA     | Quasi-experimental | Psychiatric hospital(s) | Adults | Mental health disorders | Outpatient follow-up | 176 | Usual care | Involuntary | 12 months | Unspecified | Unspecified | Unspecified |
### Table 2 Continued

| Author(s) | Publication year | Country | Design | Health care context and setting | Study/Target Population | Diagnoses and comorbidities | Care transition process category | Sample size | Control | Voluntariness of readmissions | Re-admission time interval | Criteria for designating a readmission as unnecessary | Criteria for excluding a readmission from being considered unnecessary | Risk adjustments in calculating readmission rates |
|-----------|------------------|---------|--------|---------------------------------|--------------------------|-----------------------------|-------------------------------|-------------|---------|-------------------------------|--------------------------|---------------------------------|---------------------------------|------------------------------------------------|
| Rowley et al | 2014 | UK | Pilot/exploratory | Psychiatric hospital(s) | Adults (male) | Mental health, substance use and medical disorders | Care coordination; discharge planning | 50 staff | No control | Unspecified | 1 month | Unspecified | Unspecified | Unspecified |
| Shaffer et al | 2016 | USA | Quasi-experimental | Community setting(s) | Adults | Mental health disorders | Community liaison; outpatient follow-up | 1-49 | Historical control(s) | Unspecified | 30, 31-180 days | Unspecified | Unspecified | Unspecified |
| Shimada et al | 2014 | Japan | Non-controlled | Psychiatric hospital(s) | Adults | Schizophrenia | Outpatient follow-up | 4-4 | Group | Unspecified | 12 months | Unspecified | Unspecified | Unspecified |
| Simpson et al | 2011 | UK | Pilot/exploratory | Psychiatric hospital(s) | Adults | Mental health disorders | Outpatient follow-up | 46 | Usual care | Unspecified | 1, 3 months | Unspecified | Unspecified | Unspecified |
| Sledge et al | 2010 | USA | Randomised controlled trial | Psychiatric hospital(s) | Adults | Severe mental illnesses | Outpatient follow-up | 7-4 | Usual care | Unspecified | 9 months | Unspecified | Unspecified | Unspecified |
| Sloan et al | 2016 | USA | Pilot/exploratory | Hospital(s) | Adults (military veterans) | Mental health and substance use disorders | Outpatient follow-up | 1-409 | Patients discharged while in the continuity of care model | Unspecified | 30 days | Unspecified | Unspecified | Unspecified |
| Taylor et al | 2016 | USA | Observational | Psychiatric hospital(s) | Adults (Medicaid enrollees) | Mental health disorders | Patient education | 195 | Usual care | Both involuntary and voluntary | 30 days | Unspecified | Unspecified | Unspecified |
| Thambyrajah et al | 2014 | Singapore | Observational | Various | Adults | Mental health disorders | Community liaison | 88 | No control | Unspecified | 12 months | Unspecified | Unspecified | Unspecified |
| Thomas and Richens | 2013 | Various (UK, USA) | Systematic review | Various | Adults | Mental health disorders | Outpatient follow-up | Various | Various | Voluntary | Various: 0-2, 27-42 months | Unspecified | Unspecified | Unspecified |
| Tomlin et al | 2014 | USA | Secondary analysis following a randomised controlled trial | Residential programmes | Adults (with experience of homelessness) | Severe mental illnesses | Community liaison | 1-50 | Usual care | Unspecified | 13-3-8 months | Unspecified | Unspecified | Unspecified |
| Tomko et al | 2013 | USA | Observational | Hospital(s) | Adults | Mental health and substance use disorders | Patient education; outpatient follow-up | 5-04 | Patients excluded from the discharge medication service (eg, due to being part of other treatment teams) | Unspecified | 30 days | Unspecified | Unspecified | Unspecified |
| Valmaki et al | 2017 | Finland | Randomised controlled trial | Psychiatric hospital(s) | Adults | Psychotic disorders | Information provision; patient education | 1-139 | Usual care | Both involuntary and voluntary | 12 months | Unspecified | Unspecified | Unspecified |
| Valdés and Doleajew | 2016 | Denmark | Research database construction | Community setting(s) | Adults | Depressive disorders | Outpatient follow-up | 5-040 | Not applicable (study is on constructing a research database) | Unspecified | 30 days | Unspecified | Unspecified | Unspecified |
| Ving et al | 2013 | Various (USA, other high-income countries) | Systematic review | Various | Adults | Mental health disorders | Various | Various | Various | Various: 0-6, 6-24 months | Unspecified | Unspecified | Unspecified |
| Vijayaraghavan et al | 2015 | USA | Observational | Community setting(s) | Adults | Mental health and substance use disorders | Outpatient follow-up | 4-063 | No control | Unspecified | 30 days | Unspecified | Unspecified | Unspecified |
| Von Wyler et al | 2013 | Switzerland | Randomised controlled trial | Psychiatric hospital(s) | Adults | Mental health disorders | Community liaison; discharge planning | 1-60 | Usual care | Unspecified | 3, 12 months | Unspecified | Unspecified | Unspecified |
| Wong | 2015 | China | Observational | Hospital(s) | Adults (aged 65 and over) | Mental health disorders | Outpatient follow-up | 3-88 | No control | Unspecified | 1, 3, 6, 12, 18, 24 months | Unspecified | Unspecified | Unspecified |
| Xiao et al | 2015 | China | Observational | Psychiatric hospital(s) | Adults | Schizophrenia | Outpatient follow-up | 8-76 | No control | Unspecified | 12 months | Unspecified | Unspecified | Unspecified |
Open access studies specified considering both voluntary and involuntary readmissions, while four and three studies considered only voluntary and involuntary readmissions, respectively. Guided by Burke et al’s Ideal Transition in Care (ITC) framework, we assigned our included studies’ associated care transition processes to six categories:

- **Care coordination** (e.g., among different provider disciplines, interprofessional treatment teams and/or clinics), aligned to ITC’s ‘coordinating care among team members’ component.
- **Community liaison** (e.g., arranging for community-based case management services and/or enlisting help of social/community/informal supports), aligned to ITC’s ‘enlisting help of social and community supports’ component.
- **Discharge planning** (e.g., collaborative preparation with the patient and their family), aligned to ITC’s ‘discharge planning’ component.
- **Information provision** (e.g., reminders (e.g., via telephone and/or postcards) to attend upcoming appointments), aligned to ITC’s ‘complete communication of information’ and ‘availability, timeliness, clarity and organisation of information’ components.
- **Outpatient follow-up** (e.g., home visits, peer support and care teams, handovers, medication safety and monitoring, including telephone contacts), aligned to ITC’s ‘outpatient follow-up’ component.
- **Patient education** (e.g., for self-management, including telephone check-ins, discharge planning, ITC’s ‘educating patients to promote self-management’ component.

Forty-four studies (65.7%) care transition processes exhibited outpatient follow-up, 24 (35.8%) exhibited patient education, and 11 (16.4%) exhibited both outpatient follow-up and patient education. The category of information provision was least prevalent and exhibited by care transition processes of two included studies (3.0%). Twenty-six studies (38.8%) care transition processes exhibited more than one of the six categories.

| Author(s) | Publication year | Country | Design            | Healthcare context and setting | Study/target population | Diagnoses and comorbidities | Care transition process category | Sample size | Control | Voluntariness of re/admissions | Readmission time interval | Criteria for designating a readmission as unnecessary | Criteria for excluding a readmission from being considered unnecessary | Risk adjustments in calculating readmission rates |
|-----------|------------------|---------|-------------------|-------------------------------|-------------------------|-----------------------------|--------------------------------|-------------|---------|-------------------------------|------------------------|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------|
| Yates et al⁹⁰ | 2010 | USA | Non-controlled intervention | Psychiatric hospital(s) | Adults (justice-involved) | Mental health and substance use disorders | Patient education | 1-45 | No control | Unspecified | 6-60 months | Unspecified | Unspecified | Unspecified |
| Zisman-Ilani et al⁹¹ | 2018 | Israel | Quasi-experimental | Psychiatric hospital(s) | Adults | Mental health disorders | Discharge planning | 101 | Usual care | Unspecified | 6-12 months | Unspecified | Unspecified | Unspecified |
| Zuehlke et al⁹⁲ | 2016 | USA | Quality improvement | Hospital(s) | Adults (military veterans) | Mental health disorders | Care coordination; discharge planning | 352 patients; 27 staff | No control | Unspecified | 30 days | Unspecified | Unspecified | Unspecified |
adjustment approach), and the included studies’ setting, target population, sample size, comparisons conducted, voluntariness of readmissions or categories of care transition processes.

**DISCUSSION**

As healthcare systems increasingly focus on enhancing inpatient to outpatient mental healthcare transitions, care transition interventions in support of this effort are being actively observed, devised and tested. Unnecessary psychiatric readmissions is a commonly measured outcome for these investigations. However, conducting valid comparisons across different investigations is only possible if either (1) the measurement is approached in a standardised way or (2) deviations in approaches are made explicit. Our scoping review thus focused on examining how peer-reviewed published studies on care transition interventions have approached measuring unnecessary psychiatric readmissions.

The 67 articles included in our review varied widely in their reported readmission time intervals used. Only one article reported a criterion for not considering a readmission as unnecessary (ie, preventable/avoidable). The readmission rate as an outcome. Hence, the limited details with which these specifications are reported are a noteworthy gap identified by this scoping review, and one that can hinder both the replicability of conducted studies and adaptations of study methods by future investigations.

Variation in definitions used, or even variation in the level of measurement details reported, would be less of a concern if there were patterns to the variation that indicate different specifications’ prevalence among subgroups of investigations (eg, for different diagnoses, for different study settings, for different types of care transition interventions, for different lengths of inpatient stay). For instance, if these patterns were present, there may be clinically appropriate reasons (even if not reported in detail) to guide future investigations’ decisions for which specifications of time interval, unnecessariness criteria and risk adjustments to use when measuring unnecessary psychiatric readmissions. However, as noted above, this scoping review identified no perceptible trends in associations between the specifications and study characteristics. This gap in knowledge makes it difficult for future studies of care transition interventions to make informed decisions about how to measure unnecessary psychiatric readmissions in light of their specific study’s characteristics.

These findings point to several directions in which future research can proceed to address the identified gaps. One direction is to establish a framework that studies can standardly use to specify and report their
approaches to measuring unnecessary psychiatric readmissions. Such a framework is imperative for subsequent development of a precise and shared taxonomy, which studies can use to describe their approaches so that their similarities and differences can be clearly understood. A second direction is to devise enhanced guidelines regarding readmission intervals, definitions ofunnecessaryness and risk adjustments that are especially relevant for specific study contexts (eg, particular target populations, types of intervention and/or lengths of inpatient stay). Both clinical and measurement expertise ought to be reflected in the development of such guidelines. Especially when applied to studying the impact of an intervention on readmissions, the guidelines can be extended to encompass important additional requirements regarding the intervention process, such as including intervention fidelity and the handling of the timing of implementing key intervention components (eg, time interval measurement should be appropriately adjusted in cases for which readmission is part of the intervention design). A third direction is to conduct empirical data-based investigations into how sensitive research findings are to specific choices of intervals, definitions and adjustments that are used for readmissions measurement. For example, if conclusions of studies using the measure are altered when using one definition ofunnecessaryness versus another, the aforementioned framework and guidelines should focus on requiring studies to justify their choice of definition.

Four limitations must be noted regarding this scoping review. First, the review does not assess the appropriateness of the unnecessary psychiatric readmissions measurement approaches used by the included studies (eg, whether a study’s measurement approach was adequate in light of the study’s research objectives). However, this closely aligns to the purpose of scope reviews to (1) identify a current state of knowledge in the literature, (2) elucidate any gaps and (3) establish a new research agenda. Thus, the purpose of our scoping review was not to collate empirical evidence regarding which measurement approaches are appropriate for which types of studies concerned with care transition interventions. The main motivation for conducting this review is rather to make explicit the work that is still needed to establish clearly defined and comparable measurement approaches, so that studies of care transition interventions that report unnecessary psychiatric readmissions as an outcome can be appropriately compared alongside one another.

Second, there are alternative categorisations possible for data of each of our extracted domains (eg, ‘serious mental illnesses’ can be further specified into individual diagnoses), which can impact how our review’s findings are interpreted. We decided on the categorisations that we used by balancing two considerations: (1) where possible, we adhered closely to the terminologies used by the included studies themselves in referring to the categories for which we were extracting data; (2) we sought close feedback through our consultation process on the breadth versus specificity of our categorisations in order to allow the audience to comprehend our findings at a high level and also seek desired additional information by accessing our cited included studies.

Third, limiting the included studies to those concerning care transition interventions (as recommended by peer reviewers of our protocol to ensure feasibility of our review, given the widespread use of readmissions as a measure) could have led to findings that are less widely applicable to studies that measure unnecessary psychiatric readmissions but are not conducted in the context of care transition interventions. Additional reviews of such studies can be expected to identify, to varying extents, similar issues of studies using different definitions of unnecessary psychiatric readmissions and reporting limited details surrounding their choice of definition. Our recommendations above for future work (establishing a reporting framework, devising guidelines for measuring unnecessary readmissions and investigating the sensitivity of research findings to varied specifications of the readmissions measure) can in turn be applicable to psychiatric readmissions beyond those that are considered in the context of care transition interventions. Further, understanding how those other studies trend in their approaches to measuring unnecessary psychiatric readmissions, similarly to or differently from our included studies, will be important for establishing widely usable, accepted and comparable approaches to this measurement. It will be important for us and others to be mindful of the care transition focus of our search when building on this review in future research.

Fourth, there may exist unnecessary psychiatric readmissions measurement approaches that individual healthcare organisations use to assess their care transition interventions, which have not been publicly shared through the mechanism of peer-reviewed journal articles that are indexed by the databases included in our review. Other grey literature and non-English articles may also describe approaches that we did not include. As our research moves forward from this review to examine the evidence for appropriate measurement approaches, we will specifically plan for soliciting expert knowledge (as we have done through this scoping review’s consultation process) from a wide range of healthcare researchers, practitioners, industry leaders and certainly individuals experiencing psychiatric readmissions to maximise our opportunity to learn of additional potential measurement approaches existent in the field.

CONCLUSIONS
Findings from this scoping review enable an increased understanding of how peer-reviewed published studies on care transition interventions have approached measuring unnecessary psychiatric readmissions. The articles included in our review varied widely in their reported readmission time intervals used, and they provided limited details regarding which readmissions they considered unnecessary and which risks they accounted for in
their measurement. For studies of care transition interventions that report unnecessary psychiatric readmissions as an outcome to be replicable, adaptable and appropriately comparable alongside one another, recommended steps for the field include (1) establishing a framework that studies can standardly use to specify and report their approaches to measuring unnecessary psychiatric readmissions, (2) devising enhanced guidelines regarding readmission intervals, definitions of unnesscessariness and risk adjustments that are especially relevant for specific study contexts (eg, particular target populations and/or types of intervention), and (3) conducting empirical data-based investigations into how sensitive research findings are to specific choices of intervals, definitions and adjustments that are used for measurement.

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