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Systematic review of involuntary hospitalization and long-term compliance

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Abstract

Introduction:

Involuntary hospitalization can affect the most fundamental rights allowing the person to be deprived of their freedom of autonomy and decision-making and is frequent in psychiatric clinical practice. As any other medical intervention, it requires evidence-based justifications to be provided. However, there is still a lack of knowledge about long course of people compliance after being involuntarily hospitalized. In this article we review studies investigating the association between involuntary hospitalization and compliance over the long term after hospital discharge

Methods

Following PRISMA guidelines, we performed a systematic review of published articles obtained from a systematic search of PubMed, PsycINFO, EMBASE and CINAHL up to December 17th, 2022. We included studies that compared medication adherence or engagement of people with a diagnosis of mental disorder (defined using DSM-V, ICD-10 or other specified criteria) after involuntary hospitalization and people with a diagnosis of mental disorders after voluntary hospital admission. Discrepancies between the two independent researchers were resolved by consulting a third experienced researcher. Summary data were extracted from published reports. Quality assessment of included studies has been done. The study is registered with PROSPERO number CRD42022299437.

Result

Ten independent studies analyzing the association between involuntary hospitalization and the main indicators of compliance, engagement with services and medication adherence, were included in the systematic analysis. Three studies show that compliance is worse in people that have been involuntarily hospitalized and in the others no association is found. Just two of the ten studies show an association with improved compliance after involuntary admission. All included studies have prospective cohort observational design except one that it is retrospective. The range of time in which the outcomes are assessed after hospital discharge varies from first follow-up appointment to 96 months. Data loss at follow-up range between 0% and 73%. On average, the quality of the included studies is fair.

Conclusion

Although evidences carried out so far are weak, the data do not show a trend of improvements and do not seem to exclude the possibility of worse compliance after compulsory hospitalization. More appropriate methodologies and reliable assessment are needed in future research to provide scientific evidence on involuntary admission health effects

Keywords

Involuntary hospitalization, compliance, coercion, engagement, medication adherence, long term outcomes

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Disclosure:

The authors report no conflicts of interest

Data availability:

All data generated or analyzed during this study are included in this published article.

Geolocation information

Sardinia, Italy

Introduction

Involuntary hospitalization in psychiatric practice is commonly accepted as a necessary measure to provide an opportunity for individuals to receive treatment or emergency medications when specific clinical and legal criteria are met (UK Department of Health and Social Care, 2018).

However, has recently been born a movement that would like to change attitudes towards people with psychosocial, intellectual, and cognitive disabilities and limit the frequency to this practice with the implementation and promotion, as far as possible, of alternative actions (Funk and Drew, 2017).

The legal frameworks upon which mental health legislation is built differ internationally, but involuntary hospitalization is designed and transversally adopted since it's considered essential for the health of the person when they are unable to make decisions due to the presence of an acute phase of a psychiatric disorder (Ryan & Bartels, 2021).

Despite the insistence of many legislations on the need to respect the dignity of the person and to try to convince them as much as possible in the obligatory choices, the process of involuntary hospitalization consists factually of coercive measures that lead to the the person being deprived of their freedom of autonomy and decision-making (Chieze et al., 2021).

Today there is a heated debate on the legitimacy and effective usefulness of compulsory treatments, therefore involuntary commitment is often accused of being derived from the paternalistic attitudes that used to be the norm in medical care and comes under criticism on an ethical basis (Feiring and Ugstad, 2014) and in some cases accused of being an action of social control towards the "madman" (Conrad, 1992). In fact, the use of coercion measures as a medical practice represents a centuries-old debate about society's need to balance individuals' autonomy to decide with the right to be treated. The use of involuntary psychiatric hospitalization has been recognized by institutional organizations as "help[ing] restore health, and [can] even be life-saving", practice (UK Department of Health and Social Care, 2018) but it has also pointed out that this experience can be potentially traumatic, frightening and confusing. Feelings of anger and fear, injuries, emotional discomfort are commonly experienced side effects; furthermore, the use of this measure is estimated to have a negative impact on the quality of work of professionals and healthcare economic burden (Hallett et al., 2014; Papadopoulos et al., 2012). Although it seems that involuntary hospitalization is still largely used and increasing in high-income countries (Sheridan Rains et al., 2019; Lebenbaum et al., 2018), a negative relationship between coercive experience and future reluctance to engage with mental health care is known (Luciano et al., 2014). It should also be noted that additional restrictive

interventions could be taken during involuntary hospitalization such as seclusion and restraint (Weich et al., 2017; Sashidharan et al., 2019). In addition, growing evidence indicates that factors outside of those specified in mental health legislation can affect and determine potentially systematically biased decisions around who needs involuntary treatment (Walker et al., 2019; Barnett et al., 2019). Attitudes and ethics of professionals, compliance with laws and policies, sociodemographic factors and public perceptions about the risk arising from mental illness are all factors that seem to influence professional choice on clinical measure to be adopted (Zinkler and Priebe, 2002). Being part of a minority ethnic group, receiving welfare benefits, gender, unemployment, are some of the main other sociodemographic factors that increase the risk of receiving compulsory health treatment (Walker et al., 2019; Barnett et al., 2019). Literature shows that annual involuntary hospitalization rates across the world have varied widely. Within Europe, the rate of involuntary hospitalization point to a large variation between different European countries, despite the small variation of relative prevalence of mental disorders (Sheridan Rains et al., 2019). The European median rate of involuntary hospitalization in 2019 was 106.4 (IQR 58.5 to 150.9) per 100 000 people, and it would seem, according to some authors, that the legal framework differences between countries about involuntary hospitalization have no relation to the annual rates (Sheridan Rains et al., 2019).

The debate around compulsory treatment should consider how much this measure can be effective in influencing persons' well-being or, on the other hand, the potential for this measure to be harmful and traumatic leading a person to distrust the health care system and avoid future treatments. For this reason, an important indicator of its impact should be subsequent adherence to treatments, which is also considered as central to compliance.

In psychiatric disorders, scarce compliance is the one of the major causes of treatment failure and relapse (Chaudri, 2004; Viguera et al., 1997), a greater knowledge of its prevalence, risk factors, cost and potentially severe consequences is a priority issue (Acosta et al., 2012). Consisting of failure to take medication, premature discontinuation of therapy, or deviation from the prescribed regimen (Farmer, 1999; Valenstein et al., 2002), lack of compliance can be the main barrier to reach optimal outcomes and one of the major public health challenges (Julius et al., 2009; Keith and Kane, 2003; Haynes et al., 2005). Adherence has been defined as: "the extent to which a person's behavior, taking medication, following a diet, and/or executing lifestyle changes, corresponds with agreed recommendations from a health care professional" by the World Health Organization (WHO, 2003). This set of active behaviors are based on concordance between clinicians and service users, therapeutic alliance and service engagement that are essential for treatment adherence (Misdrahi et al., 2012; Thompson and McCabe, 2012). Surprisingly there is little agreement on definitions or

measurements of treatment adherence in clinical practice routine (Sajatovic et al., 2010) despite being among the best known and frequently used compliance outcome.

Systematic reviews evaluating the association of involuntary hospitalization with compliance in the long term are mainly focused on the level of perceived coercion or on generic coercive measures set used in psychiatric care, not a single event (Luciano et al., 2014; Kallert et al., 2008).

To our knowledge, no previous systematic reviews assessing the association between involuntary psychiatric hospitalization and long-term compliance have been done. We aim to assess international evidence on this associations to improve the knowledge on long clinical course of compliance after discharge.

Methods

Search strategy and selection criteria

The systematic review is guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Moher et al., 2009) and is registered on Prospero with the number CRD42022299437 in 20/12/2021. Six search were performed: 1) “Coercion AND compliance”; 2) “Coercion AND treatment adherence”; 3) “Involuntary admission AND compliance”; 4) “Involuntary admission AND treatment adherence”; 5) “Involuntary hospitalization AND compliance”; 6) “Involuntary hospitalization AND treatment adherence”; on the following databases: PubMed/Medline (<https://pubmed.ncbi.nlm.nih.gov/>), EMBASE (<https://www.embase.com/>), PsycINFO (<https://www.apa.org/pubs/databases/psycinfo>), CINAHL (<https://www.ebsco.com/>).

Search cut-off date was 17 December 2022. Pre-specified inclusion criteria were: : (1) original research, published in a peer-reviewed journal; (2) published in English, French, Italian, Spanish (3) human comparative studies, comparing (4) people with diagnosis of mental disorder (defined using DSM 5, ICD-10 or other specified criteria) and an experience of involuntary hospitalization with (5) people with diagnosis of mental disorders voluntary admitted to the hospital; (6) specific compliance outcome such as medication adherence or engagement with services; (7) only studies evaluating the two outcomes after hospital discharge were selected; (9) >10 participants in each study arm; (10) no time restrictions.

Duplicates across databases were excluded, as were articles repeating previously reported results of a trial or with based on overlapping samples. Titles and abstracts were inspected to exclude unrelated articles. Included articles were then carefully read to decide whether they matched the inclusion criteria. Discrepancies between the two blind researchers (GK and DG, concordance 83%)

were resolved consulting a third experienced researcher (GC). The references of the retrieved articles and of the extracted reviews on the topic were also scanned to identify potentially missed studies. At the end of this procedure, 10 independent studies were included in the systematic analysis (Figure 1: PRISMA Flow chart)

From the included studies, the two researchers who conducted the search extracted the following variables: authors and year of publication of the study; location of the study; design of the study; sample size and subsample group diagnosis; criteria and instrument to assess compliance; follow-up period. Quality assessment (Tab. 3) was rated according to the Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies (nhlbi.nih.gov/health-topics/study-quality-assessment-tools). Discrepancies in extraction of data were resolved by discussion within the research team.

Result

Overall, the included studies evaluating the relationship between involuntary hospitalization and compliance are 10. The evaluation of the studies revealed two main compliance indicators: engagement with service and medication adherence. In order to better understand the ways in which the authors of the included studies evaluated the outcomes and results, it was decided to divide the two outcomes into two separate tables (Tab 1, Tab 2) and descriptions. Five studies of the ten selected assess both outcomes; 3 have assessed only engagement with services and 2 only medication adherence. The results for engagement are summarized in table 1 which includes 8 studies and for medication adherence in table 2 which includes 7 studies. Author name, country, number of samples included, evaluation tools and data loss at follow-up are also shown in the two descriptive tables (Tab 1, Tab 2).

Studies are from different countries: Compton et al., 2006 and McEvoy et al., 1989 USA; O'Donoghue et al., 2015 Ireland; Jaeger et al., 2013 Germany; Opjordsmoen et al., 2010 Norway; Balikci et al., 2013 Turkey; Gutter et al., 2020 France; Sz mukler et al., 1981 England; Barbeito et al., 2013 Spain; De Haan et al., 2007 The Netherlands. All included studies have prospective cohort observational design except one (Gutter et al., 2020) that is retrospective. The range of time in which the outcomes are assessed after hospital discharge varies from the first follow-up appointment (not specified, Compton et al., 2006) to 96 months (Barbeito et al., 2013).

Data loss at follow-up range between 0% (Barbeito et al., 2013) and 73% (Jaeger et al., 2013).

The average of the quality rating of the studies evaluated with Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies (Tab 3) is 7.4/14 (0-4 poor/5-10 fair/11-14 good)

so overall the quality of the studies is fair. Only two studies out of all those included showed a good quality level (Jaeger et al., 2013; Barbeito et al., 2013).

Association between Involuntary hospitalization and engagement with services

We found 8 studies that analyze the relation between engagement with services in user after involuntary hospitalization, compared to engagement with services in user after a voluntary admission (Table 1).

Out of eight, two studies found an association between the experience of involuntary hospitalization and a lower engagement with services (Balikci et al., 2013 [QR: 6]; Szmukler et al., 1981 [QR: 5]).

Five studies found no association (O'Donoghue et al., 2015 [QR: 8]; Jaeger et al., 2013 [QR: 10]; Opjordsmoen et al., 2010 [QR: 7]; McEvoy et al., 1989[QR: 5]). Compton et al., 2006 [QR: 7];

Gutter et al., 2020 [QR: 6] instead found that involuntary first hospitalizations have a negative effect on short-term follow-up although engagement is later improved.

Overall outcome assessment, sample size, diagnosis, follow-up duration and losses at follow-up are widely heterogeneous.

Only O'Donoghue et al., 2015 and Jaeger et al., 2013 utilized standardized and validated instruments to assess outcomes (respectively Service Engagement Scale and Compliance Self-Rating Instrument). Opjordsmoen et al., 2010 calculated the rating of attendance at weekly psychotherapy sessions; Gutter et al., 2020 calculated rating of disengagement with services considering a lost to follow-up when users not respond to contacts and not respect scheduled clinical meetings for more than three consecutive months. Only in the study of Jaeger et al., 2013 the assessment is self-reported, in all the other studies the assessment is made by clinicians, furthermore Szmukler et al., 1981 not consider only visits in psychiatric services but also the General practitioner attendance.

Sample size of people had experience of involuntary hospitalization vary from 165 (Compton et al., 2006) to 24 (McEvoy et al., 1989).

Most studies included clinical populations with psychotic diseases, Opjordsmoen et al., 2010 and Gutter et al., 2020 evaluated engagement after involuntary hospitalization in the first episode of psychosis; Jaeger et al., 2013 and Balikci et al., 2013 included only people with a diagnosis of schizophrenia; McEvoy et al., 1989 included people with diagnosis of schizophrenia or schizoaffective disorder. O'Donoghue et al., 2015; Compton et al., 2006 and Szmukler et al., 1981 included in the sample people with heterogeneous psychiatric diagnosis.

Compton et al., 2006 assessed the rating of attendance only at the first scheduled appointment after hospital discharge (timing not specified); the other studies followed user for a minimum of 12 months (O'Donoghue et al., 2015; Gutter et al., 2020; Szmukler et al., 1981) to a maximum of 42 months (McEvoy et al., 1989). McEvoy et al., 19989 and Balikci et al., 2013 considered the rating of psychiatric visit attendance for all the duration of the follow-up (respectively 42 and 24 month). Three studies (Balikci et al., 2013; McEvoy et al., 1989; Szmukler et al 1981) does not report rates of loss at follow-up measures; in the study of Jaeger et al., 2013 and Opjordsmoen et al., the losses are under the 20% of the sample, in the study of O'Donoghue et al., 2015 the losses are 35% of the voluntary group and 48% of the involuntary group; in the studies of Gutter et al., 2020 and Compton et al., 2006 the losses are respectively above 60% and 70% (considered in the outcome assessment for these two studies).

Association between involuntary hospitalization and medication adherence

We found 7 studies that compare user medication adherence after involuntary hospitalization, compared with user medication adherence after a voluntary admission (Table 2).

Out of seven two studies found an association between the experience of involuntary hospitalization and poor medication adherence (De Haan et al., 2007 [QR: 8]; Szmukler et al., 1981 [QR: 5]).

Four studies found no association. One, instead found that involuntary first hospitalizations is statistically associated with improvement in medication adherence (Barbeito et al., 2013 [QR: 12]).

Overall outcome assessment, sample size, diagnosis, follow-up duration and losses at follow-up are widely heterogeneous.

Three studies used validated instruments: O'Donoghue et al., 2015 the Self Engagement Scale (SES-adherence with medication subscale); Jaeger et al., 2013 Medication Adherence Self-Rating Scale (MARS); Barbeito et al., 2013 used the Morinsky-Green test. Four studies used rating of taking prescribed medications (Opjordsmoen et al., 2010; De Haan et al., 2007; Szmukler et al., 1981; McEvoy et al., 1989). Jaeger et al., 2013 also evaluated the levels of antipsychotics agents in serum sample to objectify the assumption of the drug, but they had lot of loss at 24-month follow-up of this assessment (>70% of the sample). In the study of O'Donoghue et al., 2015; De Haan et al., 2007; McEvoy et al., 1989; Szmukler et al., 1981 the assessment is made by clinicians, instead in the study of Opjordsmoen et al. 2010 and Barbeito et al., 2013 the assessment of the medication adherence is self-reported. Jaeger et al., 2013 used both a self-reported estimate and a serological dosage of the antipsychotic agent.

Sample size of people had involuntary hospitalization vary from 150 (Szmukler et al. 1981) to 12 (De Haan et al., 2007).

The studies of Opjordsmoen et al., 2010; Barbeito et al., 2013; and De Haan et al., 2007 included only people at first episode of psychosis; Jaeger et al., 2013 include people with a diagnosis of schizophrenia; McEvoy et al., 1989 included both schizophrenia and schizoaffective disorder; O'Donoghue et al., 2015 included people with diagnosis of schizophrenia or schizoaffective disorder; Szmukler et al., 1981 included in the sample people with heterogeneous psychiatric diagnosis.

Follow-ups range from 12 months (O'Donoghue et al., 2015; Szmukler et al., 1981) to 96 months (Barbeito et al., 2013) with different rates of losses at the end of the follow-up that vary from 6,1% of the total sample (Barbeito et al., 2013) to over 70% (Jaeger et al., 2013, for the serological dosage). Rates of losses at follow-up are higher in the involuntary hospitalized sample in the study of O'Donoghue et al., 2015; Jaeger et al., 2013; Barbeito et al., 2013 and lower in the study of Opjordsmoen et al., 2010.

Discussion

Overall, five of the ten included studies show that involuntary hospitalization have no association with engagement with services or medication adherence as measures of compliance assessed at follow-up, three studies show an association with worst compliance. Two of the ten studies show an association with improved engagement at one year or improved medical adherence. The hypothesis that involuntary hospitalization as medical procedure could have a positive effect on compliance outcomes, pivotal in recovery, it is not surrogated by sufficient elements. On the contrary it cannot exclude the possibility of worse compliance after compulsory hospitalization.

It is also important to underline that despite its huge centrality on treatments success there is little agreement on definitions, measurements of treatment adherence in clinical practice routine (Sajatovic et al., 2010) especially in reference to its long-term trend following involuntary admission. However, as emerges from the analysis of the included studies, together medication-taking and engagement are the two main outcomes with which compliance is commonly operationalized and they are considered as integral parts of modern recovery-oriented approaches (McGuire et al., 2001; Berk et al., 2004; Dixon et al., 2016). Despite the centrality of drop out in compliance measurement, some authors did not report any drop out data (McEvoy et al., 1989, Szmukler et al., 1981, Balikci et al., 2013). Only one author partially specified the composition of data loss in his study (i.e. adverse events, voluntary abandonment) (O'Donoghue et al., 2015). In

other studies data loss at follow-up range between 6.4% and 73% (O'Donoghue et al., 2015, Jaeger et al., 2013, Opjordsmoen et al., 2010, Gutter et al., 2020, Compton et al., 2006, Barbeito et al., 2013, De Haan et al., 2007) as reported in Table 1 and 2.

Large number of losses at follow-up, especially in involuntary hospitalization groups, should contribute to poor compliance rating calculation when Outcome Measures Tool are different from that obtained from rating of visit attendance, however, only two studies of those included considered this data either as an outcome or as part of the composite outcome (Gutter et al., 2020; Compton et al., 2006). It is therefore presumable that scarce compliance results are underestimated as well as those on medication adherence.

Design of the included studies are all observational which is commonly considered methodologically lower than randomized controlled trial (RCT) more adequate to ensure the effectiveness. None of them can report ratings of visit attendance or medication adherence before the hospital admission so none of them compare the compliance before and after the coercive episode which would make the results more reliable; but the fact that the effectiveness of this procedure cannot be investigated through a more rigorous methodological model further undermines the justification for its use. Furthermore, the voluntary nature of participation in the studies can determine a selection bias in which the people most inclined to engage with services could provide consent to be included in the studies. On the other hands it is likely that people who have undergone involuntary hospitalization already tended to have poor compliance known as risk factor for involuntary admission (Walker et al., 2019).

While some studies have focused on the relationship between health outcome and perceived coercion during hospitalization (Luciano et al., 2014; Kallert et al., 2008), others stated that the formal act of involuntary admission is to be considered a separate entity from the perceived coercion during hospitalization (O'Donoghue et al., 2011) and has been found that the level of perceived coercion is not associated with treatment adherence following discharge, nor does it predict services engagement at the follow-up (Bindman et al., 2005; Rain et al., 2003). Some authors have found that users frequently report a good level of engagement immediately before discharge (O'Donoghue et al., 2011), however it is reasonable to assume that people's attitudes can be strongly vitiated by the nature of the physician-patient relationship itself if one has got the power to deny some rights to the other. Self-reported evaluations could be flawed for the same reason.

Although the evaluation of this and other ethical aspects around the use of coercive measures in medical practice is important and has been indeed widely debated in many reviews on the topic (Chieze et al., 2021), it is legitimate to assume that the debate should also include a careful

evaluation of scientific aspects especially when some medical practices deny rights of freedom of movement and autonomy.

For this reason, there is a need for more structured and intentional data collection with a greater diversity of study design in order to grow the existing evidence and literature on the topic. Notably, few studies on this issue were available especially considering the importance it has, and moreover all included studies in the present review, except for Barbeito et al., 2013, took place in higher-income countries, aspects that can make understanding of the object under study incomplete or partial.

Some recent studies are also showing that there is a positive relationship between mental health workers' perception of respect of human rights and job satisfaction in mental health services and the level of appreciation of the treatments and awareness of the rights of the users (Carta et al., 2022).

Quality of mental health services assessment and the users' well-being and professionals also passes through respect for human rights and assessments can be carried out through a model that values and promote them in services (Funk and Drew, 2017; Moro et al., 2022; Carta et al., 2020; Cossu et al., 2022). Although involuntary hospitalization is still a widely used and continues to increase in frequency in some countries (Sheridan Rains et al., 2019), the justification for the use of this coercive measures requires scientific evidence on its health effects.

Limits

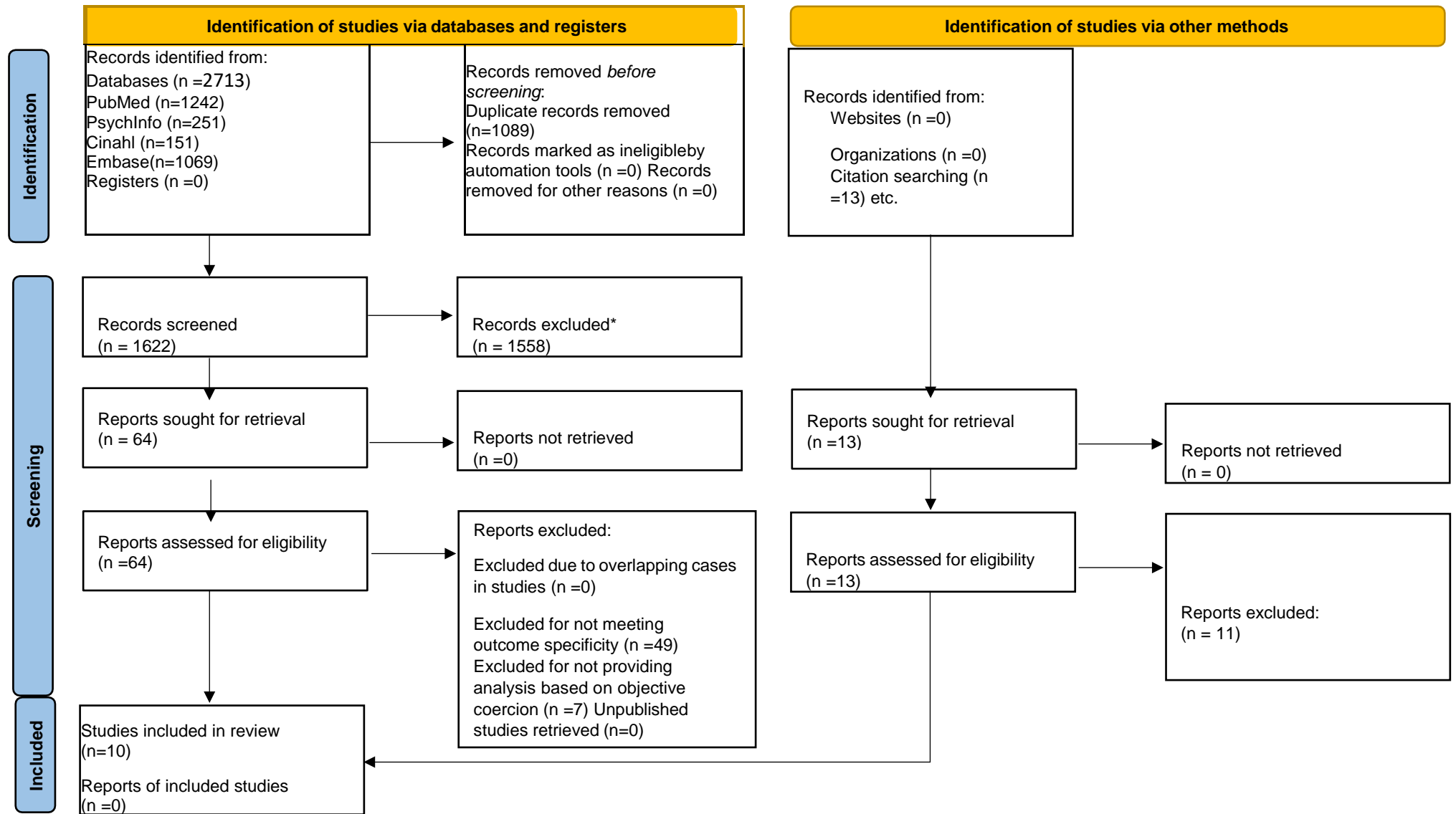
In the present study we considered the voluntary hospitalization event as a single event, however it is not known whether additional coercive measures were used during hospitalization (for example mechanical or chemical counting or isolation) that could have further influenced the results of the included studies. Furthermore, we wanted to enhance the role of data loss in compliance which, however, is not always comparable to the drop-out data and it has not always been possible for us to understand in what proportion data was made up of people not available due to adverse events, relapses or actual voluntary abandonment.

Conclusion

From the systematic review of the literature does not emerge a trend of improvement in compliance after involuntary hospitalization. Although studies carried out so far show evident methodological weaknesses due to observational design, drop-out high frequency and poorly reliable assessment tools, the data seem not to exclude the possibility of a lower adherence to treatment after compulsory admission or no association at all. Given the importance of the topic, it is necessary that

future studies using appropriate methodologies provide scientific evidence on involuntary treatment health effects.

Fig. 1



*excluded blind by two researchers (DG, GK); discrepancies resolved consulting a third experienced researcher (GC) . From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71. For more information, visit: <http://www.prisma-statement.org/>

Tab.1

| Association between Involuntary hospitalization and Engagement | | | | | | | | | |
|---|----------------|--|------------------------------------|---|----------------------------|---|-----------------------------------|---|--|
| Author/Year | Country | Design | Sample | Diagnosis | Follow-up in months | Outcome Measures Tool | Evaluator | Loss to follow-up | Result |
| O'Donoghue; 2015 | Ireland | Prospective cohort observational study | TOT 161 79 IH 82 VH | Psychotic disorder: 47 Affective disorder: 47 | 12M | Service Engagement Scale (SES) (availability;collaboration;help-seeking) | Clinicians | 35% VH 48,1% IH | Not statistically associated. |
| Jaeger; 2013 | Germany | Prospective cohort observational study | TOT 374 84 IH 290 VH | Schizophrenia: 374 | Baseline-6-12-18-24M | Compliance Self-Rating Instrument (CSRI) | Self reported | Tot sample 19,8% at 24M | Not statistically associated. |
| Opjordsmoen; 2010 | Norway | Prospective cohort observational study | TOT 217 IH 126 VH 91 | First Episode Psychosis: 197 | 24M | Rating of attendance at weekly psychotherapy sessions | Clinicians | 6,4-10,4% IH 13,2-14,3% VH | Not statistically associated. |
| Balikci; 2013 | Turkey | Prospective cohort observational study | TOT 132 57 IH 75 VH | Schizophrenia: 132 | 24M | Rating of attendance at visits | Clinicians | Not reported | Statistically associated with poor engagement. |
| Gutter; 2020 | France | Retrospective | TOT 136 71 IH 47 VH 18 OP | First Episode Psychosis: 136 | 1-3-12M | Rating of disengagement with services (>3M=loss to follow-up). | Clinicians | 61,8 % at 12 M (value used as outcome) | Involuntary hospitalization is statistically associated with poor engagement at 1M and 3M; and better engagement at 12 M |
| Compton; 2006 | USA | Prospective cohort observational study | TOT 221 165 IH 56 VH | Schizophrenia or other psychotic disorder: 141 Major Depressive Disorder: 36 Bipolar Disorder: 28 Others: 16 | Not specified | Attendance of the first scheduled community mental health appointment after hospital discharge. | Clinicians | 72 % IH 70 % VH (value used as outcome) | Not statistically associated. |
| McEvoy; 1989 | USA | Prospective cohort observational study | TOT 52 24 IH 28 VH | Schizophrenia or schizoaffective disorder: (number not specified) | 1M-28M-42M | Rating of attendance at visit | Clinicians | Not reported | Not statistically associated. |
| Szmukler; 1981 | England | Prospective cohort observational study | TOT 250 150 IH 100 VH | Schizophrenia: 70 Depression: 25 Mania: 22 Undiagnosed major mental illness: 51 Organic: 11 Other: 65 | 12M | Rating of attendance at visit | Clinicians , Clinical Staff | Not reported | Statistically associated with poor engagement. |

IH=Involuntary hospitalized
VH=Voluntary hospitalized
OP= Outpatient practice

Tab. 2

| Association between Involuntary hospitalization and medication adherence | | | | | | | | | |
|--|-----------------|--|---|--|----------------------------------|---|--|---|--|
| Author/Year | Country | Design | Sample | Diagnosis | Follow-up in months | Outcome Measures Tool | Evaluator | Loss to follow-up in months | Result |
| O'Donoghue; 2015 | Ireland | Prospective cohort observational study | TOT 161 79 IH 82 VH | Psychotic disorder: 47 Affective disorder: 47 | 12M | Service Engagement Scale (SES) (adherence with treatment) | Clinicians (participant key worker) | 35% VH 48,1% IH | Not statistically associated. |
| Jaeger; 2013 | Germany | Prospective cohort observational study | TOT 374 84 IH 290 VH (Blood tests: TOT 299 71 IH 228 VH) | Schizophrenia: 347 | Baseline-6-12-18-24M | Medication Adherence Rating Scale (MARS) Serum levels of the antipsychotic agent | Clinicians Self reported | MARS at 24M: Tot sample 19,8% Blood tests at 24M: 73,3% IH 70,6% VG | Not statistically associated. |
| Opjordsmoen; 2010 | Norway | Prospective cohort observational study | TOT 217 IH 126 VH 91 | First Episode Psychosis: 217 | 24M | Rating of taking prescribed medication | Self reported | 6,4-10,4% IH 13,2-14,3% VH | Not statistically associated. |
| Barbeito; 2013 | Spain | Prospective cohort observational study | TOT 98 56 IH 42 VH | First Episode Psychosis: 98 | Baseline-12M-24M-36M-48M-60M-96M | Morisky-Green test (MGT) | Self reported | 10,7% IH at 96M 0% VG at 96M | Involuntary hospitalization is statistically associated with improvement in medication adherence |
| De Haan; 2007 | The Netherlands | Prospective cohort observational study | TOT 119 12 IH 105 VH | First Episode Psychosis: 119 | Every 6M X 60M | Three point scale: percentages of medication taken/ those prescribed | Clinicians | Tot sample 18,5% at 60M | Involuntary hospitalization is statistically associated with medication non-adherence |
| McEvoy; 1989 | USA | Prospective cohort observational study | TOT 52 24 IH 28 VH | Schizophrenia or schizoaffective disorder (not specified) | Baseline-1M-28M-42M | Rating of taking prescribed medication | Clinicians | . Not reported | Not statistically associated. |
| Szmukler; 1981 | England | Prospective cohort observational study | TOT 250 150 IH 100 VH | Schizophrenia:70 Depression: 25 Mania: 22 Undiagnosed major mental illness': 51 Organic: 11 Other: 65 | 12M | Rating of taking prescribed medication | Clinicians Social workers Community nurses Probation officers | Not reported | Involuntary hospitalization is statistically associated with medication non-adherence |

IH=Involuntary hospitalized
VH=Voluntary hospitalized

Tab. 3

| Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies (nhlbi.nih.gov/health-topics/study-quality-assessment-tools) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---------------------|---------------|----------------------|-------------------|------------------|------------------|-----------------|-------------------|------------------|------------------|
| | O'Donoghue; 2015 | Jaeger; 2013 | Opjordsmoen; 2010 | Barbeito; 2013 | De Haan; 2007 | Balikei; 2013 | McEvoy; 1989 | Szmukler; 1981 | Gwitter; 2020 | Compton; 2006 |
| 1. Was the research question or objective in this paper clearly stated? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 2. Was the study population clearly specified and defined? | No | No | Yes | Yes | Yes | Yes | Yes | No | Yes | Yes |
| 3. Was the participation rate of eligible persons at least 50%? | Yes | No | Yes | Yes | Yes | NR | Yes | NR | No | Yes |
| 4. Were all the subjects selected or recruited from the same or similar populations? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 5. Was a sample size justification, power description, or variance and effect estimates provided? | NR | NR | NR | NR | NR | NR | NR | NR | NR | NR |
| 6. For the analyses in this paper, were the exposure(s) of interest measured prior to the outcome(s) being measured? | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| 7. Was the timeframe sufficient so that one could reasonably expect to see an association between exposure and outcome if it existed? | Yes | Yes | Yes | Yes | Yes | Yes | No | Yes | Yes | No |
| 8. For exposures that can vary in amount or level, did the study examine different levels of the exposure? | Yes | Yes | No | Yes | Yes | Yes | No | Yes | Yes | Yes |
| 9. Were the exposure measures (independent variables) clearly defined, valid, reliable, and implemented consistently across all study participants? | Yes | Yes | No | Yes | No | No | No | No | No | No |
| 10. Was the exposure(s) assessed more than once over time? | No | Yes | No | Yes | No | No | No | No | No | Yes |
| 11. Were the outcome measures (dependent variables) clearly defined, valid, reliable, and implemented consistently across all study participants? | Yes | Yes | No | Yes | No | No | No | No | No | No |
| 12. Were the outcome assessors blinded to the exposure status of participants? | No | No | No | Yes | No | No | No | No | No | No |
| 13. Was loss to follow-up after baseline 20% or less? | No | Yes | Yes | Yes | Yes | No | NR | NR | No | No |
| 14. Were key potential confounding variables measured and adjusted statistically for their impact on the relationship? between exposure(s) and outcome(s) | No | Yes | No | No | No | No | No | No | No | No |
| QUALITY RATING 0-4 poor/5-10 fair/11-14 good; NR=Not reported; NA= Not Applicable | 8/14 fair | 10/14 good | 7/14 fair | 12/14 good | 8/14 fair | 6/14 fair | 5/14 fair | 5/14 fair | 6/14 fair | 7/14 fair |

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