Journal of Affective Disorders 241 (2018) 269–274

Contents lists available at ScienceDirect

Journal of Affective Disorders

journal homepage: www.elsevier.com/locate/jad

Research paper

Older men with bipolar disorder diagnosed in early and later life: Physical health morbidity and general hospital service use

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ARTICLE INFO

Keywords:
Bipolar disorder
Mania
Elderly
Morbidity
Diabetes
Stroke
Cancer
Renal disease
Dementia
Mortality
Health care

ABSTRACT

Background: Bipolar disorder (BD) has been associated with greater health morbidity burden, but it is unclear if this association is affected by age at the time of diagnosis and how this might impact on the use of general hospital services.

Methods: Cross-sectional study investigating the prevalence of common medical morbidities among participants with early (EOBD) and late onset diagnosis of BD (LOBD – age at diagnosis ≥ 60 years) derived from a community-representative sample of 37,183 men aged 65–85 years. Cohort study over a follow up period of up to 17.7 years investigating the hazard of general hospital use among older men associated with EOBD and LOBD taking into account age and prevalent medical morbidities.

Results: 250 older men had a recorded diagnosis of BD, 75 of whom had LOBD. Diabetes, stroke and diseases of the respiratory and digestive systems were more frequent in men with than without BD. There were no differences in the distribution of medical morbidities between men with EOBD and LOBD. The adjusted hazard ratio (HR) of contact with general hospital services was significantly higher among men with EOBD (HR = 1.33; 95%CI = 1.14, 1.54) and LOBD (HR = 1.27, 95%CI = 1.06, 1.51) compared with older men without BD. Older men with EOBD had the highest number of contacts with general hospital services during follow up, although men with EOBD and LOBD did not differ in the number of contacts due to episodes of mania or depression. The medical reasons for contact with general hospital services of men with EOBD and LOBD overlapped but were not identical.

Conclusions: Older men with BD experience greater health morbidity than men without BD. Older men with BD access hospital services for the management of physical morbidities earlier and more frequently than men without BD. Age at the time of diagnosis of BD has limited impact on the risk of contact with general medical services, although subtle differences in the physical morbidity of men with EOBD and LOBD warrant further investigation.

1. Introduction

Bipolar disorder (BD) is a disabling episodic mental health disorder that is associated with increased morbidity and premature mortality (Crump et al., 2013). This excess morbidity and mortality not only persists but might become more pronounced in old age (Almeida et al., 2016b), raising concerns about the potential impact of BD on health services as the population ages. The Clinical and Health Outcomes Initiative in Comparative Effectiveness for Bipolar Disorder (Bipolar CHOICE) found that 96% of 482 participants had at least one other medical comorbidity, with cardiometabolic diseases becoming more prevalent with increasing age (Sylvia et al., 2015). Moreover, the Lithium Treatment – Moderate Dose Use Study (LiTMUS) suggested that concurrent medical morbidity is associated with worse clinical outcomes (Kemp et al., 2014), and the Canadian Community Health Survey reported an increase in the use of health services by these patients (McIntyre et al., 2006).

Older age is the most robust predictor of the use of medical services, with people older than 65 years accounting for nearly half of all hospital bed-days in Australian hospitals, despite representing less than 15% of the population (AIHW, 2018) It is less clear how the presence of BD affects the use of general hospital services in later life, as increasing age could override the effects of BD on medical morbidity. Given the progressive ageing of the World's population, it seems important to

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https://doi.org/10.1016/j.jad.2018.08.035
Received 13 June 2018; Received in revised form 1 August 2018; Accepted 7 August 2018
Available online 09 August 2018
0165-0327/

understand how mental health disorders, such as BD, might affect physical health and the use of health services as people age. In addition, the Older Adult Task Force of the International Society for Bipolar Disorders has argued that the course of BD might be influenced by the age at the time of onset of symptoms, so that grouping older people into early (EOBD) and late onset (LOBD) may be clinically informative (Sajatovic et al., 2015). For example, BD is associated with increased risk of dementia and this increase in risk seems to be partly driven by the age at the time of onset of BD (Diniz et al., 2017). There is also evidence that EOBD and LOBD may have different clinical associations – use of substances (such as alcohol) is associated with EOBD but not LOBD (Almeida et al., 2018b).

We designed this study to investigate the prevalence of common medical morbidities among older men with early and late onset diagnosis of BD. We also sought to determine the risk of contact with general hospital inpatient or emergency services for men with EOBD and LOBD over a follow up period of 17 years, as well as the most frequent medical diagnoses associated with these contacts. We hypothesised that EOBD would be associated with greater medical morbidity than LOBD due to the longer duration of illness, and that the risk and frequency of hospital contacts would be greater in men with EOBD than LOBD.

2. Methods

2.1. Setting, design and participants

We used the electoral roll to recruit men aged 65–85 years living in the Perth metropolitan region (registration to vote is compulsory in Australia). Details about the rationale of the study and the steps involved in this process have been reported elsewhere (Almeida et al., 2016a; Norman et al., 2009). This study included only men because the cohort was initially assembled to investigate abdominal aortic aneurysm, which affects predominantly older men (Norman et al., 2009). A total of 38,173 eligible men were enrolled between April 1996 and November 1998. They were followed prospectively until they died or until 31 December 2013, whichever occurred first. The Ethics Committees of the University of Western Australia and of the Department of Health of Western Australia approved the study protocol and procedures.

2.2. Study measures

We used the Western Australian Data Linkage System (WADLS) to retrieve clinical information about participants' contacts with health services. WADLS brings together information about inpatient and outpatient mental health services, hospital morbidity data, emergency departments and death registry (Holman et al., 2008). Clinical diagnoses in WADLS are recorded according to the guidelines of the International Classification of Diseases (ICD): ICD-8 from 1st January 1966 to 31st December 1969, ICD-9 from 1st January 1970 to 30th June 1999, and ICD-10 from the 1st July 1999. WADLS also records the start and end dates of all health events. The death registry provided the date of death of the participants who died during follow up.

We used the following ICD codes to establish the diagnosis of bipolar disorder (BD) among participants: 296.1 and 296.3 (ICD-8), 296.0, 296.1, 296.4, 296.5, 296.6, 296.7, 296.80 and 296.81 (ICD-9), and F30 or F31 (ICD-10). We considered that the date of onset of BD was the same as the date of the first ever contact with the diagnosis of BD. If the diagnosis of a depressive disorder occurred before the diagnosis of BD was established, then the date of contact with a depressive disorder was considered the date of onset of BD. The ICD codes that identified depressive episodes were: 296.0 and 300.4 (ICD-8), 296.2, 296.3, 311 and 300.4 (ICD-9), and F32, F33, F34.1 and F38.10 (ICD-10). As the earliest mental health records available were dated 1st January 1966, the minimum age of onset recordable for our cohort would have been 35 years (i.e., 30 years before the start of the study). Based on existing recommendations (Sajatovic et al., 2015), we used age 60 years or older to define BD with late onset (LOBD), so that all participants with onset of BD before age 60 years were grouped under the rubric 'early onset BD' (EOBD). Of note, the diagnoses of schizophrenia and delusional disorder (ICD codes 295, 297, F20, F22, F23, F25, F28 and F29) had precedence over the diagnosis of BD.

We calculated the age of participants (in years) by subtracting the date of birth from the date of enrolment into the study, and retrieved data on diabetes, hypertension, ischaemic heart disease, stroke, cancers (except skin cancer), chronic respiratory diseases, gastrointestinal and renal diseases and dementia using the following ICD codes recorded in WADLS:

- diabetes ICD-8 and 9 codes 249 and 250, and ICD-10 codes E08-13;
- hypertension ICD-8 and 9 codes 401–403 and ICD-10 codes I10 and I12;
- ischaemic heart disease ICD-8 and 9 codes 390–398, 402, 404, 410–429, and ICD-10 codes I00-09, I11, I13, I20-29, I50-51;
- stroke ICD-8 and 9 codes 430–434, 436–438, and ICD-10 codes I60-69;
- cancers ICD-8 and ICD-9 codes 140–209, and ICD-10 codes C00-C97;
- respiratory diseases ICD-8 and ICD-9 codes 490–496 and 507–519, and ICD-10 codes J00-09, J20-39, J40-47 and J60-99;
- gastrointestinal diseases ICD-8 and ICD-9 codes 520–537, 540–543, 5550–553, 555–589, and ICD-10 codes K00-K99;
- renal diseases ICD-8 and ICD-9 codes 580–589, and ICD-10 codes N00-07, N17-19 and N25-27;
- dementia ICD-8 code 290; ICD-9 codes 290, 294.1, 294.2, 331.0, 331.1, 331.2, 331.82; ICD-10 codes F00-F03, G30, G31.0, G31.1, G31.83.

2.3. Statistical analyses

We used the statistical software Stata 15.1 to manage and analyse the data (StataCorp LLC, Revision 8 May 2018). Descriptive statistics summarised categorical variables as counts and proportions (%), continuous variables as mean, range, and standard deviation of the mean (SD), and ordinal data as median and inter-quartile range (IQR). We used one-way analysis of variance to compare the ages of participants according to clinical group: no bipolar, bipolar with illness onset before and at or after age 60 years, as per advice of the Older Adult Task Force of the International Society for Bipolar Disorders (Sajatovic et al., 2015). Pearson chi-square statistic (X^2) was applied to examine differences in the cross-sectional distribution of health morbidities between men without BD and those with EOBD and LOBD. Similarly, Kruskal–Wallis non-parametric analysis of variance (X^2) was used to investigate between group differences in the number of contacts with health services during the follow up period. These analyses were followed by between group-comparisons using Mann–Whitney non-parametric test. Finally, we used Cox regression (Breslow method) to determine the hazard ratio (HR) of contact with general hospital services during the follow up period. In this model, we split and joined time-span sets according to the diagnosis of BD (including the age of onset), so that men without BD contributed data as controls until the time of diagnosis and as cases thereafter. We used age as the time scale in the Cox regression models in order to control as accurately as possible the effect of age on the risk of health contacts (Breslow et al., 1983). Similarly, we used Cox regression to determine the risk of health contacts associated with specific health disorders over time for men with EOBD and LOBD relative to men without BD. Alpha was set at 5% and all risk estimates were reported alongside their respective 95% confidence interval (95%CI).