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Review

Seasonality and bipolar disorder: A systematic review, from admission rates to seasonality of symptoms

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ABSTRACT

Introduction: Bipolar disorder (BD) is a severe mental disorder affecting 1–4% of the population worldwide. It is characterized by periods of (hypo)manic and depressive episodes. Seasonal patterns (SP) may be observed in admission rates, mood relapses and symptom fluctuations.
Methods: We conducted a systematic review of seasonality in BD, classifying studies based on seasonal admission rates to seasonality of symptoms assessments.
Results: Fifty-one papers were identified of which 32 addressed hospitalization rates by season, 6 addressed categorical diagnoses, and 13 explored symptom dimensions. Seasonal peaks for different BD mood episodes are observed worldwide and widely replicated. Manic episodes peak during spring/summer and, to a lesser extent, in autumn, depressive episodes peak in early winter and, to a lesser extent, summer, and mixed episodes peak in early spring or mid/late summer. There was a high frequency of SP for manic episodes (15%) and depressive episodes (25%), the latter being associated with a more complex clinical profile (BD II subtype, comorbid eating disorders, more relapses and rapid cycling). Finally, there was evidence for greater seasonal fluctuations in mood and behavior in individuals with BD than in those with unipolar depression or 'healthy' controls.
Limitations: Sample size, gender distribution, methodological quality and sophistication of the analytical approaches employed varied considerably.
Conclusions: There is evidence of seasonality in BD, with emerging evidence that climatic conditions may trigger BD symptoms or episodes. A better understanding of the underlying mechanisms would facilitate the development of personalized chronobiological therapeutic and preventive strategies.

Contents

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1. Introduction

Bipolar disorder (BD) is a severe multifactorial disorder with heterogeneous clinical presentations that often start during adolescence (Merikangas et al., 2007). The BD spectrum affects 1–4% of the population worldwide and is characterized by periods of elevated or depressed mood, with other associated psychological and neurovegetative disorders and symptoms (Phillips and Kupfer, 2013). Patients with BD may demonstrate abnormal chronobiological rhythms that affect mainly sleep and circadian rhythms, including before and during acute episodes, as well as during inter-episode periods (Etain et al., 2011). Several studies have highlighted the presence of infradian abnormalities, including a seasonality effect in BD (McClung, 2011). This seasonal variability appears to be common in BD, leading researchers to explore seasonal patterns across a range of clinical settings such as hospital admission rates through to individual symptom changes.

Scientific studies of seasonality in BD are complex, making use of multiple modalities, and no systematic review has been undertaken to date. We therefore summarize the findings from published studies that employed one of the following three approaches: examination of health service registries and seasonal rates of admission to hospital; categorical studies exploring the DSM specifier of a seasonal pattern of mood episodes; and a dimensional approach examining seasonal symptom variance.

2. Methods

2.1. Search strategy

We searched PubMed and Embase databases for publications between January 1st 1974 (the year of DSM-III publication; with ICD-9 being published in 1975) and May 31st 2013. The following MESH terms were used: bipolar disorder AND (season* OR seasonality OR seasonal OR seasonal pattern). We also used the 'related articles' function of the PubMed database, the reference list of selected articless, conference abstracts, and searched Google Scholar to identify additional articles. We included only published data written in English.

2.2. Definitions of bipolar disorder and seasonality

2.2.1. Bipolar disorder

BD was defined according to the International Classification of Diseases (ICD-9 or 10) or the Diagnostic and Statistical Manual of Mental Disorders (DSM-III, IV) criteria (APA, 2000, 1987). The clinical diagnosis of BD had to be performed by a psychiatrist, psychologist or clinical interviewer trained in the use of a DSM/ICD assessment schedule.

2.2.2. Seasonality

Seasonality was defined as "a driving force that has a major effect on the spatiotemporal dynamics of natural systems and their populations" (Stone et al., 2007).

2.3. Inclusion criteria

Studies of seasonality in BD were included in this review if they followed the BD and seasonality definitions detailed above, but also if they belonged to one of the following perspectives that ranged from classification based on seasonal admission rates to seasonal variations of symptoms, through seasonal patterns of depressive and/or (hypo) manic episodes, according to international classifications: 1) Health service utilization: these studies examined clinical data such as admission rates for mood episodes according to seasons of the year and/or local seasonal weather variations, 2) Categorical: DSM seasonal pattern specifier (SP), and 3) Dimensional: studies of seasonal variations in BD symptoms.

2.3.1. First level: health service utilization (admission rates)

The first level of seasonal variation concerned the use of BD health services and focused on the fluctuations of admission rates over the course of a year. The methodology used in such studies largely relied on data from hospital/clinic/case registries (international, national or local) to analyze the distribution of rates of admissions for specified BD mood episodes according to their polarity (depressive, manic and mixed) across different seasons. The observations were sometimes assessed alongside data pertaining to local climatic variables, such as hours of bright sunshine (insolation), day length (number of daylight hours), mean temperature, relative humidity, rainfall (pluviometric index) and air pressure (barometrics).