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Review

Influence of light exposure during early life on the age of onset of bipolar disorder

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ABSTRACT

Background: Environmental conditions early in life may imprint the circadian system and influence response to environmental signals later in life. We previously determined that a large springtime increase in solar insolation at the onset location was associated with a younger age of onset of bipolar disorder, especially with a family history of mood disorders. This study investigated whether the hours of daylight at the birth location affected this association.

Methods: Data collected previously at 36 collection sites from 23 countries were available for 3896 patients with bipolar I disorder, born between latitudes of 1.4 N and 70.7 N, and 1.2 S and 41.3 S. Hours of daylight variables for the birth location were added to a base model to assess the relation between the age of onset and solar insolation.

Results: More hours of daylight at the birth location during early life was associated with an older age of onset, suggesting reduced vulnerability to the future circadian challenge of the springtime increase in solar insolation at the onset location. Addition of the minimum of the average monthly hours of daylight during the first 3 months of life improved the base model, with a significant positive relationship to age of onset. Coefficients for all other variables remained stable, significant and consistent with the base model.

Conclusions: Light exposure during early life may have important consequences for those who are susceptible to bipolar disorder, especially at latitudes with little natural light in winter. This study indirectly supports the concept that early life exposure to light may affect the long term adaptability to respond to a circadian challenge later in life.

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1. Introduction

Environmental conditions during early life may amplify individual vulnerability to psychiatric disease later in life, especially in those with a genetic susceptibility to a specific disease (Bale et al., 2010; Gluckman et al., 2008; Rutter, 2005). Multiple studies have reported an association between bipolar disorder and stressful early life events such as gestational hunger (Brown et al., 2000), gestational influenza (Machon et al., 1997; Parboosing et al., 2013), childhood abuse (Daglas et al., 2014; Etain et al., 2008; Gilman et al., 2014) and early parental loss (Mortensen et al., 2003). Early life events that may induce circadian dysfunction are of particular

interest since bipolar disorder involves the disruption of many biological rhythms affecting the 24 h sleep–wake cycle, energy and alertness (Giglio et al., 2009; McClung, 2013; Murray and Harvey, 2010; Wirz-Justice, 2006). The most recognized symptoms of circadian disruption are ongoing sleep disturbances that increase prior to and during episodes (Murray and Harvey, 2010; Ng et al., 2015). However, the consequences of sleep and circadian disruption extend to include irregularity in daily routines, impaired functioning, vulnerability to stressors, and increased risk of episode recurrence (Frank et al., 2000; Giglio et al., 2010; Shen et al., 2008; Sylvia et al., 2009).

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