



The association between sleep dysfunction and psychosis-like experiences among college students



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ABSTRACT

Sleep problems are prominent and pervasive clinical issues experienced by many people with psychotic disorders, often causing distress and functional impairment. Sleep problems are also related to psychosis-like experiences (PLE; non-diagnosable phenomenon such as transient perceptual disturbances, unusual thoughts, periodic suspiciousness) in epidemiological studies. Prior studies in this field have used brief measures that precluded the ability to test (1) whether risk for psychosis-like experiences are related to specific sub-types of sleep disturbance, and (2) whether sleep disturbance is specifically related to clinically significant (i.e., distressing) psychosis-like experiences. The current project examined the relation between specific sleep issues, and PLEs and distress associated with PLEs, in a college sample. Participants ($N=420$) completed the Prodromal Questionnaire-Brief (PQ-B), which assesses PLEs and associated distress, and the Iowa Sleep Disturbances Inventory – extended version (ISDI-E), which assesses thirteen separate disturbed sleep domains. Symptoms of fragmented sleep, sleep hallucinations, and night anxiety significantly correlated with PLEs, and several sleep domains were significantly associated with PLE-related distress.

1. Introduction

Sleep disturbances are recognized as prominent and pervasive complaints reported by many people with psychotic disorders, with up to 80% of individuals with schizophrenia reporting some form of sleep difficulty (Cohrs, 2008). Sleep disorders often have a deleterious effect on the quality of life of these individuals by impacting tolerance to stress, impairing cognitive functioning, and exacerbating psychopathological symptoms (Hofstetter et al., 2005; Bromundt et al., 2011; Waters et al., 2011). As a result, sleep disturbances negatively affect functional outcomes and increase distress in people with schizophrenia (Green, Kern, and Heaton, 2004; Akerstedt, 2006; Wamsley et al., 2012; Manoach et al., 2015). A growing body of evidence suggests that recognizing and addressing early signs and symptoms of psychosis

leads to better outcomes (Millan et al., 2016); therefore, exploring sleep issues may inform our understanding of illness etiology across a continuum of severity, and possibly provide insight into intervention.

Current research suggest high rates of pervasive sleep problems among individuals who develop a diagnosable psychotic illness, with evidence suggesting these difficulties exist along all stages of the illness, often starting in prodromal stages, continuing throughout the first episode of psychosis and lasting throughout the life course (Cohrs, 2008; Lunsford-Avery and Mittal, 2013; Davies et al., 2016). In addition, there is evidence suggesting that individuals high in schizotypy, a personality measure of psychosis proneness, experience significantly more vivid dreams (including both nightmares and enjoyable dreams) (Claridge, Clark, and Davis, 1997). Furthermore, Koffel and Watson (2009) argue that schizotypy and these unusual sleep experi-

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ences may collectively belong to a common broader pathological domain.

Psychosis-like experiences (PLEs) are subthreshold expressions of psychosis (e.g., perceptual abnormalities, persecutory ideas, magical thinking) that occur in approximately 7.2% of the US population (Yung et al., 2009; Linscott and van Os, 2013). PLEs do not meet clinical threshold for symptoms of psychotic disorder in that they tend to be relatively mild and transient; however, etiological research has uncovered numerous shared risk factors across the continuum of psychosis severity, consistent with a common developmental pathway (Van Os et al., 2009). PLEs in some cases can develop into more severe expressions of psychosis (Kaymaz et al., 2012). Irrespective of future conversion to psychosis, PLEs may be clinically meaningful in their own right as they have been independently associated with impaired functioning (Yung et al., 2006; Kelleher et al., 2014), perceived need for help (Demmin, DeVlyder, and Hilimire, 2015), other psychiatric conditions (Kelleher et al., 2012), and suicidal ideation and behavior (Kelleher et al., 2013; DeVlyder et al., 2015).

Although current data clearly suggest high rates of sleep problems among individuals across the psychosis-spectrum (e.g., Cohrs, 2008), the literature is relatively less developed with respect to sleep problems among non-clinical populations presenting with PLEs. Reeve et al. (2015) recently conducted a comprehensive review of 66 studies examining the link between sleep dysfunction and PLEs in both community and clinical populations. The authors reported significant associations between PLEs and sleep dysfunction, most notably in regards to insomnia, such that increases in PLEs are associated with increases in insomnia related symptoms. A large international questionnaire study conducted by the World Health Organization (WHO) reported an association between PLEs and sleep dysfunction in adults (Koyanagi and Stickle, 2014). Although informative and noteworthy for its scale, this study was limited in the depth of assessment of both PLEs (only four questions) and sleep disturbances (single item assessment of sleep problems). Additionally, Oh et al. (2016) reported findings from the National Comorbidity Survey Replication, a large nationally representative study, suggesting associations between increases in PLEs and specific forms of insomnia, including problems falling asleep at night and waking up too early in the morning, after controlling for demographic factors and other psychopathological conditions (Oh et al., 2016).

Other community-based studies of PLE and sleep focused on children or young adolescent samples (Nishida et al., 2008; Oshima et al., 2010; Lee et al., 2012; Fisher et al., 2014; Jeppesen et al., 2015; Taylor et al., 2015; Thompson et al., 2015); however, younger aged participants are known to report a higher rate of PLE symptoms relative to older individuals (Kelleher et al., 2012), despite a lack of more overt, behavioral evidence for these symptoms (Hlastala and McClellan, 2005). Additionally, many of the reported studies examined total sleep dysfunction or focused on singular broad concepts of sleep problems such as lack of sleep, or length of sleep, omitting the inclusion of potentially important confounding variables such as depressive symptoms, age, or drug use despite their known effect on both sleep dysfunction and presence of PLEs (Kaneita et al., 2006). In one noteworthy study, Sheaves et al. (2016) examined sleep disturbance and multiple markers of severe mental illness (SMI), including PLEs, in a large sample of college-aged students. The authors reported that symptoms of insomnia, frequency of nightmares, and circadian phase delay correlated with general sub-threshold symptoms of SMI. Although these results are useful in highlighting associations between sleep disturbance and markers of mental illness in the college-aged population, more nuanced examinations of specific psychopathological symptoms, such as PLEs separated from other symptoms of serious mental illness, are still needed to extend this work.

Thus, gathering a more comprehensive picture of specific sleep disturbances' (e.g., probing for insomnia, lassitude, and parasomnia) association with PLEs, as well as PLE related distress, and including

potentially confounding variables may facilitate a more nuanced understanding of the relation between sleep disturbances and PLEs. In addition, research is needed on the experiences of young adults, as research suggests that PLEs tend to be more distressing and clinically significant in this population relative to younger children or adolescents (Kelleher et al., 2012; Zammit et al., 2013). Further, it is particularly important to evaluate such symptoms in college students as they are a group of young adults especially vulnerable to dysregulated sleep schedules (Brown, Buboltz, and Soper, 2002).

The present study seeks to address gaps in the understanding of PLEs and sleep dysfunction using a comprehensive measure of PLEs, including PLE-associated distress, as measured by the Prodromal Questionnaire-Brief (PQ-B; Loewy and Cannon, 2010; Loewy et al., 2011), and sleep, as measured by the Iowa Sleep Disturbances Inventory, Extended version (ISDI-E; Koffel, 2011), among a large group of young adults, while controlling for age, gender, drug use, and depressive symptoms. We examined sleep dysfunction through an inclusive assessment of insomnia symptoms and factors affecting insomnia (initial insomnia, fragmented sleep, anxiety at night, light sleep, irregular sleep), lassitude (fatigue, non-restorative sleep, excessive sleep) and parasomnia (nightmares, movement at night, sensations at night, sleep paralysis, sleep hallucinations; Koffel and Watson, 2010). Based on evidence suggesting associations between insomnia and PLEs (Reeve et al., 2015), we predict that abnormalities in this domain of sleep function will be associated with increased PLEs. In addition, based on research suggesting significant distress as a result of sleep dysfunction in individuals with schizotypal personality disorder (individuals who often exhibit PLEs; Levin and Fireman, 2002), we predict that sleep dysfunction will be associated with increased PLE distress.

2. Methods

2.1. Participants

Participants ($N=420$) were undergraduate students recruited between November 2010 and May 2014 from introductory psychology courses at the University of Maryland, Baltimore County (UMBC). Participants were recruited as part of a larger study aimed at assessing undergraduate emotional, behavioral, and personality characteristics. Eleven participants (2.6%) were excluded from the study due to failure to complete any of the questionnaires, leaving a final analyzed sample of $n=409$, with some variability in completion rate across the various measures. Inclusion criteria noted that all participants must be over the age of 18. There were no additional exclusion criteria. All participants were offered extra credit for their participation in the study.

2.2. Procedure

The YouthFIRST Laboratory at UMBC conducted this study and the protocol was approved by the UMBC Institutional Review Board. Prior to participation, all participants received an overview of the study and consented to their involvement. Relevant for this study, all participants completed a demographics and drug history questionnaire as well as the Prodromal Questionnaire-Brief (PQ-B; Loewy and Cannon, 2010; Loewy et al., 2011), the Iowa Sleep Disturbances Inventory (ISDI-E; Koffel, 2011), and the Beck Depression Inventory-II (BDI-II; Beck et al., 1996).

2.3. Measures

2.3.1. The Prodromal Questionnaire-Brief

The PQ-B is a 21-item questionnaire examining psychosis-like experiences and associated distress within the past month. The majority of items on this measure were adapted from the Schizotypal Personality Questionnaire (SPQ; Raine, 1991), a questionnaire with a

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