

## Abstract

**Objectives:** Circadian sleep-wake disturbances are common in patients with schizophrenia. Delayed sleep-wake phase disorder (DSWPD) is an important circadian rhythm sleep-wake disorder characterized by a chronic pattern of significantly delayed major sleep period resulting in symptoms of sleep-wake disturbances and distress or functional impairment. Little is known about the impacts and correlates of DSWPD in schizophrenia. This study aimed to examine the socio-demographic characteristics, clinical features, sleep-wake parameters and functioning in patients with schizophrenia and co-morbid DSWPD.

**Methods:** In this cross-sectional study, 66 patients diagnosed with schizophrenia were recruited consecutively from an adult psychiatric out-patient clinic in Hong Kong. All patients completed structured clinical interviews, questionnaires on chronotype, sleep, symptomatology and functioning, neurocognitive assessments and 1-week sleep diary and actigraphy. They were categorized into three groups – 22 with DSWPD, 22 with delayed sleep phase (DSP) and 22 controls with normal sleep-wake phase (NSWP). Between-group comparisons with post-hoc analyses among three groups were employed. With social and occupational functioning assessment scale (SOFAS) as the primary outcome, differences in SOFAS between DSWPD and non-DSWPD groups were analysed by ANCOVA with potential covariates being controlled.

**Results:** Compared to DSP and control groups, schizophrenia patients with DSWPD were associated with the highest unemployment rate, most irregular social rhythms, most severe sleep-onset insomnia, worst sleep quality and most prominent negative symptoms. Their social and occupational functioning remained significantly worse after controlling for duration of illness, symptomatology and sleep quality.

**Conclusions:** DSWPD is an important comorbid sleep disorder in schizophrenia. It has significant negative associations with symptomatic and functional recovery. In clinical practice, better awareness, early identification and targeted treatment for DSWPD are essential in patients with schizophrenia.

**Keywords:** Delayed sleep-wake phase disorder, Circadian rhythm sleep-wake disorder, Schizophrenia, Social and Occupational functioning.