The relationship between sleep patterns, quality of life and social and clinical characteristics in Chinese patients with schizophrenia

The relationship between sleep patterns, quality of life and social and clinical characteristics in Chinese patients with schizophrenia

Running head: Sleep patterns in schizophrenia

^{1,2} # Cai-Lan Hou, MD

³ # Yu Zang, MD

⁴ # Xin-Rong Ma, MD

⁵ Mei-Ying Cai, MD

⁶ Yan Li, MD

^{1*} Fu-Jun Jia, MD

This is the author manuscript accepted for publication and has undergone full peer review but has not been through the copyediting, typesetting, pagination and proofreading process, which may lead to differences between this version and the [Version of Record](#). Please cite this article as [doi: 10.1111/ppc.12186](#).

This article is protected by copyright. All rights reserved.

¹Yong-Qiang Lin, MD

³Helen F.K. Chiu, FRCPsych

^{7,8}Gabor S. Ungvari, MD, PhD

⁹Chee H. Ng, MD

²Bao-Liang Zhong, MD

⁵Xiao-Lan Cao, MD

² Man-lan Tam, BSc

^{2*}Yu-Tao Xiang, MD, PhD

1. Guangdong Mental Health Center, Guangdong General Hospital & Guangdong Academy of Medical Sciences, Guangdong Province, China;
2. Unit of Psychiatry, Faculty of Health Sciences, University of Macau, Macao SAR, China;
3. Shenzhen Key Laboratory for Psychological Healthcare & Shenzhen Institute of Mental Health, Shenzhen Kangning Hospital & Shenzhen Mental Health Center, Shenzhen, China;
4. Ningxia Mental Health Center, Ningxia Ning-An Hospital, Ningxia Province, China;
5. Guangzhou Yuexiu Center for Disease Control and Prevention, Guangdong Province, China;
6. Department of Psychiatry, Chinese University of Hong Kong, Hong Kong SAR, China;
7. The University of Notre Dame Australia / Marian Centre, Perth, Australia;
8. School of Psychiatry & Clinical Neurosciences, University of Western Australia, perth Australia
9. Department of Psychiatry, University of Melbourne, Melbourne, Victoria, Australia;

[#]These authors contributed equally to the paper.

*Address correspondence to Dr. Fu-Jun Jia, Guang Dong Mental Health Centre, Guangdong province, China. Fax: +86 20 81862664; Phone: +86 20 81888553; E-mail: jiafujun@126.com; or Dr. Yu-Tao Xiang, 3/F, Building E12, Faculty of Health Sciences, University of Macau, Avenida da Universidade, Taipa, Macau SAR, China. Fax: +853-2288-2314; Phone: +853-8822-4223; E-mail: xyutly@gmail.com

Acknowledgements

The study was supported by the Medical Science and Technology Research Foundation of Guangdong Province (Grant number: A2014011; C2014016) and the Start-up Research Grant (SRG2014-00019-FHS) and Multi-Year Research Grant (MYRG2015-00230-FHS) from University of Macau. The authors thank all the clinicians for their contribution to this study.

Disclosure/conflicts of interest

The authors had no conflicts of interest and any off-label or investigational use in conducting this study or preparing the manuscript.

Running head: Sleep patterns in schizophrenia

Author Manuscript

ABSTRACT

PURPOSE: To determine the pattern of sleep behaviour in schizophrenia patients treated in primary care.

DESIGN AND METHODS: Altogether 623 schizophrenia patients in 22 primary care services were recruited. Sleep duration and demographic and clinical characteristics were recorded.

FINDINGS: The mean expected total sleep time was 8.8 hours (SD: 1.8) and the mean actual total sleep time was 8.2 hours (SD: 2.1). The frequency of short, medium and long sleepers was 18.1%, 38.4% and 43.5%, respectively. Major medical conditions and any type of insomnia were independently associated with short sleep, while long sleep was associated with unemployment and use of second-generation antipsychotics.

PRACTICE IMPLICATIONS: More attention should be paid to sleep duration in this population group.

Key words: Schizophrenia, sleep duration, primary care

INTRODUCTION

In recent years the links between sleep patterns, health, morbidity and quality of life (QOL) have attracted increasing attention. A number of studies have found that both short and long sleep are closely associated with poor health outcomes including obesity (Chaput, Despres, Bouchard, & Tremblay, 2008), type 2 diabetes (Cappuccio, D'Elia, Strazzullo, & Miller, 2010), coronary heart disease (Cappuccio, Cooper, D'Elia, Strazzullo, & Miller, 2011), hypertension (Knutson et al., 2009), premature death (Cappuccio et al., 2010), depression (Buxton & Marcelli, 2010; Krueger & Friedman, 2009) and higher mortality risk (Grandner & Drummond, 2007; Tamakoshi & Ohno, 2004; Youngstedt & Kripke, 2004). Studies examining the association between sleep duration and QOL in Western settings have yielded inconsistent findings. For example, one study found that both short and long sleep were significantly associated with poor QOL in 3,834 people aged 60 and over (Faubel et al., 2009). In contrast, no association was found between sleep duration and QOL in another study of 273 people aged 40-64 (Jean-Louis, Kripke, & Ancoli-Israel, 2000). Ethnic differences and cross-cultural factors play a role in determining both QOL (Xiang, Weng, Leung, Tang, & Ungvari, 2008) and sleep problems (Gureje, Makanjuola, &

Kola, 2007; Ohayon & Partinen, 2002). Thus, the findings obtained in Caucasian populations in Western settings could not be generalized to those from different ethnic and cultural backgrounds.

Sleep problems and poor QOL are commonly reported in patients with schizophrenia in China. Yet, very limited studies on sleep and QOL have been conducted in this population. In one study, 36% of 505 Chinese patients with schizophrenia reported insomnia; and poorer sleep patterns were associated with poor QOL (Xiang, Weng, et al., 2009). Despite the harmful effects of short and long sleep there has been no previous study that examined the sleep patterns in patients with schizophrenia and their associations with clinical characteristics and QOL.

Due to the limited number of psychiatrists in China (Ng, 2009), primary care physicians and community nurses receive regular basic mental health training in psychiatric hospitals enabling them to provide maintenance treatment and care including psychoeducation that involves sleep hygiene, for clinically stable patients. Considering the associations between sleep patterns and health outcomes and the impact of ethnical and cultural factors on sleep patterns, it is important to examine sleep patterns and their relations with demographic and clinical factors and QOL in schizophrenia.

This issue has clinical significance for nursing staff as they often have to deal with the consequences of poor sleep (Xiang, Weng, et al., 2009). Yet, the patterns and correlates of short and long sleep in patients with schizophrenia treated in primary care in China have not been studied.

The objectives of this cross-sectional study were to investigate the prevalence of short and long sleepers (short sleep is defined as sleep time <7 hours/day; medium sleep: 7-8 hours/day; and long sleep: >8 hours/day), and the associations with socio-demographic and clinical correlates, and QOL in patients with schizophrenia treated by primary care physicians in Guangzhou, China. Due to the harmful consequences of short and long sleep (Xiang et al., 2008), we hypothesized that medium sleepers would have higher QOL than short and long sleepers.

METHODS

Study design and participants

This survey was a cross-sectional survey initiated by the Guangdong Mental Health Center that was carried out between August 1, 2013 and July 31, 2014. Inclusion criteria included subjects with ICD-10 diagnosis of

schizophrenia (based on a review of medical records and a clinical interview), age 18 years or older, receiving treatment from primary care physicians and having the ability to understand the contents of the interview.

The study protocol was approved by the Ethics Committees of Guangdong General Hospital. All patients provided written informed consent.

All community-dwelling patients with schizophrenia who have presented to any of a total of 92 primary care services in Guangzhou are registered. Twenty-two of the 92 primary care services in Guangzhou were chosen using a random numbers table. An attempt was made to contact all patients treated in the selected primary care services by telephone to provide a detailed description about the study. If patients agreed to participate, one of three psychiatrists, each with more than 5-years of clinical experience, made an appointment to conduct an interview at the local primary care service. The interview lasted around 40-60 minutes.

Assessments

Basic socio-demographic and clinical characteristics including age, sex, marital and employment status, education, health insurance, family history of psychiatric disorders, age of onset, duration of illness, number of hospitalizations, body mass index (BMI) and major medical conditions affecting the cardiovascular, respiratory, digestive, hematological, endocrine, urinary, connective tissue, and nervous systems were collected based on a review of medical records and a clinical interview using a data collecting form designed for the study. Information on medication prescriptions including first-generation and second-generation antipsychotics (FGAs and SGAs) and benzodiazepines were recorded from the medical records. Doses of antipsychotic drugs were converted into chlorpromazine equivalent milligrams (CPZeq) (APA, 1997; Kane et al., 1998; Woods, 2003).

Psychotic symptoms were measured with the three subscales of the Brief Psychiatric Rating Scale (BPRS): positive (conceptual disorganization, suspiciousness, hallucinatory behavior, and unusual thought content), negative (emotional withdrawal, motor retardation, blunted affect, and disorientation), anxiety and tension (Overall & Beller, 1984; Zhang, 1983). Depressive symptoms were evaluated with the 10-item

Montgomery-Asberg Scale (MADRS)–Chinese version (Montgomery & Asberg, 1979; Zhong, Wang, Chen, & Wang, 2011). Extrapyrarnidal side effects were evaluated with the Simpson-Angus Scale of Extrapyrarnidal Symptoms (SAS) (Simpson & Angus, 1970; Zhu, 1998). QOL was assessed with the validated Chinese version of the Medical Outcomes Study Short Form 12 (SF-12) (Lam, Tse, & Gandek, 2005). A higher score on SF-12 indicates better QOL.

The presence of insomnia during the past month was evaluated (X. Liu & Zhou, 2002; X. Liu, Uchiyama, Okawa, & Kurita, 2000) by asking three questions: “*Do you have difficulties in falling sleep?*” for difficulty initiating sleep (DIS); “*Do you have the difficulties in maintaining sleep and wake up often?*” for difficulty maintaining sleep (DMS); and for early morning wakening (EMA) “*Do you wake up in the midnight or early morning and have difficulties in falling sleep again?*” If patients answered “often” to at least one of the three questions, they were classified as “having insomnia”.

There is no gold standard definition of short and long sleep. In this study the criteria proposed by Heslop et al. (Heslop, Smith, Metcalfe, Macleod, & Hart, 2002) were used. These have also been used in other surveys: (Grandner & Kripke, 2004; Xiang, Ma, et al., 2009) short sleep: <7

hours/day; medium sleep: 7-8 hours/day; and long sleep: >8 hours/day.

To measure expected and actual **total sleep time** in the past month, patients were inquired about the following questions: '*How many hours of sleep per night do you think you need?*' and '*How many hours do you sleep each night on average?*'

The three interviewers underwent an inter-rater reliability exercise on the use of the following assessment tools in 10 patients with schizophrenia prior to the main study. The inter-rater reliability of the rating instruments and the assessment of insomnia and sleep duration yielded excellent agreement (Intra-class correlation coefficients and sleep duration and kappa values >0.90).

Statistical analysis

Data were analyzed using SPSS 20.0 for Windows. Comparisons among short, medium and long sleepers in terms of demographic and clinical variables were conducted with chi-square tests and analysis of variance (ANOVA), as appropriate. QOL were compared between the above three groups using analysis of covariance (ANCOVA) after controlling for the

potentially confounding effects of variables that significantly differed between them in univariate analyses. Multinomial logistic regression analysis was used to determine the independent demographic and clinical correlates significantly associated with short or long sleep. Short or long sleep was the dependent variable, while the demographic and clinical characteristics that significantly differed in the univariate analyses (age, education, marital and employment status, major medical conditions, insomnia, duration of illness, positive and anxiety symptoms and use of FGAs and SGAs) were entered as independent variables. Statistical significance was set 0.05 (two-tailed).

RESULTS

Of the 656 community-dwelling patients with schizophrenia screened, 634 met study entry criteria and were invited to participate in the study. Eleven (1.7%) patients did not complete the interview, thus 623 patients (98.2%) were included in the final analysis. The frequency of short, medium and long sleep in the whole sample were 18.1% (n=113), 38.4% (n=239) and 43.5% (n=271), respectively. The actual mean total sleep time in the whole

sample was 8.2 (SD=2.1) hours, while the expected total sleep time was 8.8 (SD=1.8) hours. The actual total sleep time was 5.0 (SD=1.0) hours, 7.6 (SD=0.4) hours and 10.1 (SD=1.2) hours in the short, medium and long sleep groups, respectively. The mean age of patients in the whole sample was 47.7 (SD: 10.3) years; male sex accounted for 54.7% of the whole sample.

Table 1 shows the socio-demographic and clinical characteristics of the whole sample, separately for the 3 groups of sleep duration, and the comparison between the groups in relation to QOL. There were significant differences between the three groups in terms of age, education, marital and employment status, major medical conditions, insomnia, duration of illness, positive and anxiety symptoms and use of FGAs and SGAs (all p values < 0.05). After controlling for the variables that were significantly different between the three groups in above univariate analyses, there were no significant differences in either the mental ($F_{(15,613)}=0.58$, $P=0.55$) or the physical domain ($F_{(15,613)}=0.54$, $P=0.58$) of QOL between short, medium and long sleepers.

Table 2 displays the demographic and clinical correlates independently associated with sleep duration. Multinomial logistic regression analyses

revealed that compared to medium sleepers, short sleep was significantly associated with major medical conditions and any type of insomnia, while long sleep was associated with use of SGAs and unemployment.

DISCUSSION

To the best of our knowledge, this was the first survey that examined short and long sleep and their associations with clinical features and QOL in patients with schizophrenia. There were no associations between QOL and sleep patterns in this study. Short and long sleepers accounted for the majority (18.1% and 43.5%, respectively) of the study sample. These figures are inconsistent with other studies reported from China and elsewhere. For example, short and long sleepers respectively made up 13.9% and 21.4% of patients with schizophrenia in China (Xiang, Ma, et al., 2009), 19.7% and 7.6% in the USA (Kripke, Garfinkel, Wingard, Klauber, & Marler, 2002), and 13.8% and 5.4% in Japan (Heslop et al., 2002). The discrepancy in findings across studies could be due to differences in definitions of short and long sleep, the severity of illness and use of psychotropic medications.

In this study, the mean actual total sleep time was 8.2 hours, which is slightly shorter than the expected total sleep time (8.8 hours), but was considerably longer than the reported figures in general populations in China and other countries. For example, the mean total sleep time was as 7.1 hours in Hong Kong (Ko et al., 2007), 7.8 hours in Beijing (Xiang, Ma, et al., 2009), 7.8 hours in men and 7.4 hours in women, respectively in Japan (Amagai et al., 2004) and 6.9 hours in the USA (Grandner & Kripke, 2004). Apart from the confounding effects due to differences in sampling, interview methods and study periods, longer actual total sleep time and more frequent long sleep duration found in schizophrenia may be attributed to the effects of sedation caused by psychotropic medications, and the low employment rate (65.3%).

In China, psychotic patients are traditionally perceived by the public as threats to social order. For this reason they are often kept away from their workplace (by both employers and families) for long periods even if they are clinically stable. At the same time, they are generally provided with full public health insurance, together with basic living expenses provided by their organizations or the local government. These factors discourage such patients to return to the workforce which may in part account for the low

employment rate in people with schizophrenia (Xiang et al., 2008).

Furthermore, patients with schizophrenia usually have less vocational, recreational and physical activities (N. Li, Chen, & Deng, 2012), which might also contribute to the longer actual total sleep time. In this study, long sleep was associated with use of SGAs and less employment. Certain SGAs, such as clozapine, olanzapine or quetiapine, have potent sedative effect (Shah, Sharma, & Kablinger, 2014). Unemployed patients had longer sleep duration, which may be related to the sedative effects of certain antipsychotics and psychiatric symptoms, such as anhedonia (Horan, Kring, & Blanchard, 2006; Miller, 2004).

Compared to medium sleepers, short long sleepers were more likely to be associated with major medical conditions, which is consistent with other studies (Alvarez & Ayas, 2004; Gottlieb et al., 2005; Patel et al., 2004). This finding was evident despite the confounding effect of the long sleepers in this study were significantly younger in age. However, it should be noted that the relationship between short sleep and major medical conditions are bidirectional; major medical conditions also shorten sleep duration (Xiang, Ma, et al., 2009). Previous studies in the West found that both short and long sleepers had significantly more insomnia than medium sleepers

(Grandner & Kripke, 2004). However this study revealed that any type of insomnia was more common only in short sleepers, consistent with the results of our previous study (Xiang, Ma, et al., 2009).

The medium and long sleepers more frequently received SGAs, which probably increased the risk for metabolic syndrome, and as such may have biased the association between short sleep and BMI. A number of studies (Gangwisch, Malaspina, Boden-Albala, & Heymsfield, 2005; Gupta, Mueller, Chan, & Meininger, 2002; Hasler et al., 2004; Heslop et al., 2002; Kripke et al., 2002; Singh, Drake, Roehrs, Hudgel, & Roth, 2005; von Kries, Toschke, Wurmser, Sauerwald, & Koletzko, 2002; Vorona et al., 2005) have found that short sleep was associated with elevated body mass index (BMI). However, there was no significant association between short sleep and increased BMI in this study. Moreover, most demographic and clinical characteristics except for employment, use of SGAs, major medical conditions and insomnia were not independently associated with sleep patterns.

Due to harmful consequences of short and long sleep, it was assumed that medium sleepers would have higher QOL than short and long sleepers. However, there were no associations between QOL and sleep duration. This

unexpected result may be partially explained by the relative insensitivity of SF-12 to detect subtle QOL changes. In addition, there are no items of SF-12 measuring sleep. To the best of our knowledge, there are no sleep-specific QOL measures adopted in China. Some other QOL measures with more items on health, such as the World Health Organization Quality-of-Life Scale (WHOQOL-BREF) (WHO, 1998) and the 36-Item Short Form Health Survey (SF-36) (L. Li, Wang, & Shen, 2002), should be used in future studies. Furthermore, patients treated in primary care are clinically stable, which may decrease the influence of psychopathology and sleep duration on QOL.

The strengths of this study include the large and randomly selected sample. However, the results should be interpreted with caution due to several limitations. First, this was a cross-sectional survey, thus the causality of sleep pattern and other variables could not be examined. Second, only clinically stable schizophrenia patients treated in primary care were included from one major Chinese city, thus the results may not be generalized to more acute patients or clinical settings. Third, some important variables, such as the level of awareness of sleep hygiene measures, were not examined. In addition, due to logistic reasons, data of

major medical conditions were only recorded by a review of medical records, rather than following a comprehensive physical and laboratory examination, which precluded the exploration of the association between sleep patterns and individual medical conditions. Fourth, some patients may have to access to hypnotic drugs from pharmacies or psychiatric outpatient clinics that may not have been recorded in the medical records. Fifth, the sleep ratings were self-reported. Finally, the data were collected by either a review of medical records or an interview, therefore potential record bias could not be excluded.

In conclusion, long and short sleepers account for approximately two thirds of Chinese patients with schizophrenia treated in primary care. Given that sleep behavior is a risk factor for major medical conditions, all disciplines including nursing staff should pay more attention to the issue of sleep duration in patients with schizophrenia. Regular screening of sleep duration and investigation of medical conditions should be routine part of nursing care for schizophrenia in the community. Longitudinal studies examining the relationship of sleep patterns with employment status, use of antipsychotics and major medical conditions are warranted.

Author Manuscript

This article is protected by copyright. All rights reserved.

REFERENCES

- Alvarez, G. G., & Ayas, N. T. (2004). The impact of daily sleep duration on health: a review of the literature. *Progress in Cardiovascular Nursing*, **19**(2), 56-59.
- Amagai, Y., Ishikawa, S., Gotoh, T., Doi, Y., Kayaba, K., Nakamura, Y., & Kajii, E. (2004). Sleep duration and mortality in Japan: the Jichi Medical School Cohort Study. *Journal of Epidemiology*, **14**(4), 124-128.
- APA. (1997). *Practice Guideline for the Treatment of Patients with Schizophrenia*. Washington, DC: American Psychiatric Press.
- Buxton, O. M., & Marcelli, E. (2010). Short and long sleep are positively associated with obesity, diabetes, hypertension, and cardiovascular disease among adults in the United States. *Soc Sci Med*, **71**(5), 1027-1036. doi: 10.1016/j.socscimed.2010.05.041
- Cappuccio, F. P., Cooper, D., D'Elia, L., Strazzullo, P., & Miller, M. A. (2011). Sleep duration predicts cardiovascular outcomes: a systematic review and meta-analysis of prospective studies. *Eur Heart J*, **32**(12), 1484-1492. doi: 10.1093/eurheartj/ehr007

Cappuccio, F. P., D'Elia, L., Strazzullo, P., & Miller, M. A. (2010). Quantity and quality of sleep and incidence of type 2 diabetes: a systematic review and meta-analysis. *Diabetes Care*, **33**(2), 414-420.

doi:10.2337/dc09-1124

Chaput, J. P., Despres, J. P., Bouchard, C., & Tremblay, A. (2008). The association between sleep duration and weight gain in adults: a 6-year prospective study from the Quebec Family Study. *Sleep*, **31**(4), 517-523.

Faubel, R., Lopez-Garcia, E., Guallar-Castillon, P., Balboa-Castillo, T., Gutierrez-Fisac, J. L., Banegas, J. R., & Rodriguez-Artalejo, F. (2009). Sleep duration and health-related quality of life among older adults: a population-based cohort in Spain. *Sleep*, **32**(8), 1059-1068.

Gangwisch, J. E., Malaspina, D., Boden-Albala, B., & Heymsfield, S. B. (2005). Inadequate sleep as a risk factor for obesity: analyses of the NHANES I. *Sleep*, **28**(10), 1289-1296.

Gottlieb, D. J., Punjabi, N. M., Newman, A. B., Resnick, H. E., Redline, S., Baldwin, C. M., & Nieto, F. J. (2005). Association of sleep time with

diabetes mellitus and impaired glucose tolerance. *Archives of Internal Medicine*, **165**(8), 863-867.

Grandner, M. A., & Drummond, S. P. (2007). Who are the long sleepers? Towards an understanding of the mortality relationship. *Sleep Med Rev*, **11**(5), 341-360.

Grandner, M. A., & Kripke, D. F. (2004). Self-reported sleep complaints with long and short sleep: a nationally representative sample. *Psychosomatic Medicine*, **66**(2), 239-241.

Gupta, N. K., Mueller, W. H., Chan, W., & Meininger, J. C. (2002). Is obesity associated with poor sleep quality in adolescents? *Am J Hum Biol*, **14**(6), 762-768.

Gureje, O., Makanjuola, V. A., & Kola, L. (2007). Insomnia and role impairment in the community : results from the Nigerian survey of mental health and wellbeing. *Social Psychiatry and Psychiatric Epidemiology*, **42**(6), 495-501.

Hasler, G., Buysse, D. J., Klaghofer, R., Gamma, A., Ajdacic, V., Eich, D., . . . Angst, J. (2004). The association between short sleep duration and

-
- obesity in young adults: a 13-year prospective study. *Sleep*, **27**(4), 661-666.
- Heslop, P., Smith, G. D., Metcalfe, C., Macleod, J., & Hart, C. (2002). Sleep duration and mortality: The effect of short or long sleep duration on cardiovascular and all-cause mortality in working men and women. *Sleep Med*, **3**(4), 305-314.
- Horan, W. P., Kring, A. M., & Blanchard, J. J. (2006). Anhedonia in schizophrenia: a review of assessment strategies. *Schizophrenia Bulletin*, **32**(2), 259-273. doi:10.1093/schbul/sbj009
- Jean-Louis, G., Kripke, D. F., & Ancoli-Israel, S. (2000). Sleep and quality of well-being. *Sleep*, **23**(8), 1115-1121.
- Kane, J. M., Aguglia, E., Altamura, A. C., Ayuso Gutierrez, J. L., Brunello, N., Fleischhacker, W. W., . . . Schooler, N. R. (1998). Guidelines for depot antipsychotic treatment in schizophrenia. European Neuropsychopharmacology Consensus Conference in Siena, Italy. *European Neuropsychopharmacology*, **8**(1), 55-66.
- Knutson, K. L., Van Cauter, E., Rathouz, P. J., Yan, L. L., Hulley, S. B., Liu, K., & Lauderdale, D. S. (2009). Association between sleep and blood

pressure in midlife: the CARDIA sleep study. *Arch Intern Med*,

169(11), 1055-1061. doi:10.1001/archinternmed.2009.119

Ko, G. T., Chan, J. C., Chan, A. W., Wong, P. T., Hui, S. S., Tong, S. D., . . .

. Chan, C. L. (2007). Association between sleeping hours, working hours and obesity in Hong Kong Chinese: the 'better health for better Hong Kong' health promotion campaign. *Int J Obes (Lond)*, **31**(2), 254-260.

Kripke, D. F., Garfinkel, L., Wingard, D. L., Klauber, M. R., & Marler, M. R.

(2002). Mortality associated with sleep duration and insomnia.

Archives of General Psychiatry, **59**(2), 131-136.

Krueger, P. M., & Friedman, E. M. (2009). Sleep duration in the United

States: a cross-sectional population-based study. *Am J Epidemiol*,

169(9), 1052-1063. doi:10.1093/aje/kwp023

Lam, C. L., Tse, E. Y., & Gandek, B. (2005). Is the standard SF-12 health

survey valid and equivalent for a Chinese population? *Quality of Life Research*, **14**(2), 539-547.

-
- Li, L., Wang, H.M., & Shen, Y. (2002). Development of psychometric tests of the Chinese version of the SF-36 Health Survey Scales (in Chinese). *Chinese Journal of Preventive Medicine*, *36*, 109-113.
- Li, N., Chen, Y., & Deng, H. (2012). Cross-sectional assessment of the factors associated with occupational functioning in patients with schizophrenia. *Shanghai Archives of Psychiatry*, *24*, 222-230.
- Liu, X. , & Zhou, H. (2002). Sleep duration, insomnia and behavioral problems among Chinese adolescents. *Psychiatry Research*, *111*(1), 75-85.
- Liu, X., Uchiyama, M., Okawa, M., & Kurita, H. (2000). Prevalence and correlates of self-reported sleep problems among Chinese adolescents. *Sleep*, *23*(1), 27-34.
- Miller, D. D. (2004). Atypical antipsychotics: sleep, sedation, and efficacy. *Prim Care Companion J Clin Psychiatry*, *6*(Suppl 2), 3-7.
- Montgomery, S. A., & Asberg, M. (1979). A new depression scale designed to be sensitive to change. *British Journal of Psychiatry*, *134*, 382-389.

Ng, C. H., Ma, H., Yu, X., Chiu, H., Fraser, J., Chan, S., et al (2009).

China-Australia-Hong Kong tripartite community mental health training program. *Asia-Pacific Psychiatry*, **1**, 90-97.

Ohayon, M. M., & Partinen, M. (2002). Insomnia and global sleep dissatisfaction in Finland. *Journal of Sleep Research*, **11**(4), 339-346.

Overall, J. E., & Beller, S. A. (1984). The Brief Psychiatric Rating Scale (BPRS) in geropsychiatric research: I. Factor structure on an inpatient unit. *Journal of Gerontology*, **39**(2), 187-193.

Patel, S. R., Ayas, N. T., Malhotra, M. R., White, D. P., Schernhammer, E. S., Speizer, F. E., . . . Hu, F. B. (2004). A prospective study of sleep duration and mortality risk in women. *Sleep*, **27**(3), 440-444.

Shah, C., Sharma, T. R., & Kablinger, A. (2014). Controversies in the use of second generation antipsychotics as sleep agent. *Pharmacological Research*, **79**, 1-8. doi: 10.1016/j.phrs.2013.10.005

Simpson, G. M., & Angus, J. W. (1970). A rating scale for extrapyramidal side effects. *Acta Psychiatrica Scandinavica. Supplementum*, **212**, 11-19.

-
- Singh, M., Drake, C. L., Roehrs, T., Hudgel, D. W., & Roth, T. (2005). The association between obesity and short sleep duration: a population-based study. *J Clin Sleep Med, 1*(4), 357-363.
- Tamakoshi, A., & Ohno, Y. (2004). Self-reported sleep duration as a predictor of all-cause mortality: results from the JACC study, Japan. *Sleep, 27*(1), 51-54.
- von Kries, R., Toschke, A. M., Wurmser, H., Sauerwald, T., & Koletzko, B. (2002). Reduced risk for overweight and obesity in 5- and 6-y-old children by duration of sleep--a cross-sectional study. *International Journal of Obesity and Related Metabolic Disorders, 26*(5), 710-716.
- Vorona, R. D., Winn, M. P., Babineau, T. W., Eng, B. P., Feldman, H. R., & Ware, J. C. (2005). Overweight and obese patients in a primary care population report less sleep than patients with a normal body mass index. *Archives of Internal Medicine, 165*(1), 25-30.
- WHO. (1998). Development of the World Health Organization WHOQOL-BREF quality of life assessment. The WHOQOL Group. *Psychological Medicine, 28*(3), 551-558.

-
- Woods, S. W. (2003). Chlorpromazine equivalent doses for the newer atypical antipsychotics. *Journal of Clinical Psychiatry*, **64**(6), 663-667.
- Xiang, Y. T., Ma, X., Lu, J. Y., Cai, Z. J., Li, S. R., Xiang, Y. Q., . . . Ungvari, G. S. (2009). Relationships of sleep duration with sleep disturbances, basic socio-demographic factors, and BMI in Chinese people. *Sleep Med*, **10**(10), 1085-1089.
- Xiang, Y. T., Weng, Y. Z., Leung, C. M., Tang, W. K., Lai, K. Y., & Ungvari, G. S. (2009). Prevalence and correlates of insomnia and its impact on quality of life in Chinese schizophrenia patients. *Sleep*, **32**(1), 105-109.
- Xiang, Y. T., Weng, Y. Z., Leung, C. M., Tang, W. K., & Ungvari, G. S. (2008). Subjective quality of life in outpatients with schizophrenia in Hong Kong and Beijing: relationship to socio-demographic and clinical factors. *Quality of Life Research*, **17**(1), 27-36.
- Youngstedt, S. D., & Kripke, D. F. (2004). Long sleep and mortality: rationale for sleep restriction. *Sleep Med Rev*, **8**(3), 159-174.
- Zhang, M. Y., Zhou, T. J., Tang, S. H., Chi, Y. F., Xia, M. L., Wang, Z. Y. (1983). The application of the Chinese version of the Brief Psychiatric

Rating Scale (BPRS) (in Chinese). *Chinese Journal of Nervous and Mental Diseases*, 9, 76-80.

Zhong, B.L., Wang, Y., Chen, H.H., & Wang, X.H. (2011). Reliability, validity and sensitivity of Montgomery-Åsberg Depression Rating Scale for patients with current major depressive disorder (in Chinese). *Chinese Journal of Behavioural Medicine and Brain Sciences*, 20, 85-87.

Zhu, C.M. (1998). The Chinese version of the Rating Scale for Extrapyramidal Side Effects (in Chinese). In M.Y. Zhang (Ed.), *The manual of rating instruments in psychiatry* (pp. 202-205). Hunan, China: Human Science and Technology Press.

Table 1. Socio-demographic and clinical characteristics of the study sample

	Total sample (n=623)		Short sleepers (n=113)		Medium sleepers (n=239)		Long sleepers (n=271)		Statistics ^a		
	N	%	N	%	N	%	N	%	÷2	df	p
Male sex	341	54.7	60	53.1	136	56.9	145	53.5	0.74	2	0.69
Married	221	35.5	51	45.1	83	34.7	87	32.1	6.009	2	0.049
Employed	407	65.3	76	67.3	168	70.3	163	60.1	5.99	2	0.049
No health insurance	150	24.1	24	21.2	53	22.2	73	26.9	2.18	2	0.33
Family history of psychiatric disorders	162	26.0	24	21.2	58	24.3	80	29.5	3.44	2	0.17
Living with others	569	91.3	100	88.5	223	93.3	246	90.8	2.43	2	0.29
Current smoker	149	23.9	33	29.2	60	25.1	56	20.7	1.75	2	0.17
Major medical condition (s)	238	38.2	60	53.1	87	36.4	91	33.6	13.40	2	0.001
On FGAs	232	37.2	50	44.2	101	42.3	81	29.9	11.21	2	0.004
On SGAs	380	61.5	53	46.9	131	54.8	198	73.4	30.97	2	<0.001
On benzodiazepines	142	22.8	29	25.7	61	25.5	52	19.2	3.54	2	0.17
DIS	128	20.5	56	49.6	31	13.0	41	15.1	71.5	2	<0.001
DMS	122	19.6	51	45.1	32	13.4	39	14.4	57.3	2	<0.001
EMA	110	17.7	49	43.4	26	10.9	35	12.9	63.1	2	<0.001
Any type of insomnia	180	28.9	72	40.0	47	26.1	61	33.9	81.9	2	<0.001
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	F	df	P

Age (years)	47.7	10.3	51.3	11.3	48.0	9.2	45.8	10.4	12.0	2	<0.001
Education (years)	10.3	2.9	9.6	3.1	10.3	2.8	10.4	2.8	3.2	2	0.03
Age of onset (years)	25.7	9.6	26.9	10.2	26.1	10.1	24.7	8.6	2.6	2	0.07
Duration of illness (years)	22.0	11.1	24.4	12.8	21.8	10.2	21.1	11.0	3.5	2	0.02
Number of hospitalizations	2.2	2.6	2.3	3.0	1.9	2.3	2.3	2.6	10.3	2	0.22
BPRS positive	6.2	3.2	7.0	3.7	5.8	2.9	6.2	3.1	5.6	2	0.004
BPRS negative	6.3	3.5	6.6	3.8	6.3	3.5	6.2	3.4	0.5	2	0.58
BPRS anxiety	3.2	1.7	3.5	1.8	3.0	1.4	3.2	1.8	3.5	2	0.03
MADRS	10.3	9.5	14.3	10.9	9.6	9.2	9.3	8.8	12.6	2	<0.001
SAS total	12.8	5.0	13.9	5.9	12.6	4.7	12.6	5.0	2.9	2	0.055
CPZeq	428.1	472.5	432.8	558.7	423.2	426.5	430.4	473.8	0.02	2	0.97
BMI	24.6	4.9	23.8	5.1	24.6	4.7	24.9	5.0	2.07	2	0.12
SF-12 physical	56.9	18.9	56.3	19.3	58.1	18.0	55.8	19.5	0.9	2	0.37
SF-12 mental	51.5	20.5	49.9	20.5	51.6	19.3	52.1	21.4	0.4	2	0.62

Bolded values are $p < 0.05$; a: comparison between short, medium and long sleepers;

BMI=body Mass Index; BPRS=Brief Psychiatric Rating Scale; CPZeq=chlorpromazine equivalent milligrams;

DIS=Difficulty initiating sleep; DMS=Difficulty maintaining sleep; EMA=Early morning awakening;

FGAs=first-generation antipsychotics; MADRS=Montgomery-Asberg Depression Scale; SAS=Simpson and Angus Scale of Extrapyramidal Symptoms; SF-12=Medical Outcomes Study Short Form 12, SGAs=second-generation antipsychotics

Table2. Socio-demographic and clinical correlates independently associated with short or long sleep (Multinomial logistic regression analysis with medium sleep as the reference group) (n=623)

	Short sleepers vs. medium sleepers			Long sleepers vs. medium sleepers		
	p	OR	95% CI	p	OR	95% CI
Age (years)	0.67	1.007	0.97-1.04	0.39	0.98	0.96-1.01
Education (years)	0.47	0.96	0.88-1.05	0.65	1.01	0.95-1.08
Illness length (years)	0.97	1.00	0.97-1.02	0.56	1.006	0.98-1.02
BPRS positive	0.23	1.05	0.96-1.15	0.06	1.07	0.99-1.14
BPRS anxiety	0.60	0.95	0.81-1.12	0.60	1.03	0.91-1.17
MADRS total	0.56	1.009	0.97-1.04	0.22	0.98	0.96-1.01
Married	0.24	1.37	0.80-2.34	0.80	1.05	0.70-1.58
Employed	0.50	0.82	0.47-1.45	0.02	0.62	0.41-0.94
On FGAs	0.73	1.09	0.65-1.83	0.08	0.70	0.47-1.04
On SGAs	0.87	0.95	0.55-1.64	<0.001	2.09	1.38-3.17
Major medical conditions	0.009	2.002	1.18-3.37	0.74	0.93	0.63-1.38
Any type of insomnia	<0.001	5.95	3.42-10.34	0.35	1.25	0.77-2.01

Bolded values are p<0.05; BPRS=Brief Psychiatric Rating Scale; FGAs=first-generation antipsychotics; MADRS=Montgomery-Asberg Depression Scale; SGAs=second-generation antipsychotics

Minerva Access is the Institutional Repository of The University of Melbourne

Author/s:

Hou, C-L;Zang, Y;Ma, X-R;Cai, M-Y;Li, Y;Jia, F-J;Lin, Y-Q;Chiu, HFK;Ungvari, GS;Ng, CH;Zhong, B-L;Cao, X-L;Tam, M-I;Xiang, Y-T

Title:

The Relationship Between Sleep Patterns, Quality of Life, and Social and Clinical Characteristics in Chinese Patients With Schizophrenia

Date:

2017-10-01

Citation:

Hou, C. -L., Zang, Y., Ma, X. -R., Cai, M. -Y., Li, Y., Jia, F. -J., Lin, Y. -Q., Chiu, H. F. K., Ungvari, G. S., Ng, C. H., Zhong, B. -L., Cao, X. -L., Tam, M. -I. & Xiang, Y. -T. (2017). The Relationship Between Sleep Patterns, Quality of Life, and Social and Clinical Characteristics in Chinese Patients With Schizophrenia. PERSPECTIVES IN PSYCHIATRIC CARE, 53 (4), pp.342-349. <https://doi.org/10.1111/ppc.12186>.

Persistent Link:

<http://hdl.handle.net/11343/291725>