Journal of Psychosomatic Research 76 (2014) 374–379

Contents lists available at ScienceDirect

Journal of Psychosomatic Research

Validity and reliability of the Brief Insomnia Questionnaire in the general population in Hong Kong

Ka-Fai Chung [a,*], Wing-Fai Yeung [a], Fiona Yan-Yee Ho [a], Lai-Ming Ho [b], Kam-Ping Yung [a], Yee-Man Yu [a], Chi-Wa Kwok [a]

[a] Department of Psychiatry, The University of Hong Kong, Hong Kong, China
[b] School of Public Health, The University of Hong Kong, Hong Kong, China

ARTICLE INFO

Article history:
Received 18 October 2013
Received in revised form 12 March 2014
Accepted 13 March 2014

Keywords:
Diagnosis
DSM-IV-TR
DSM-5
ICD-10
ICSD-2
Insomnia

ABSTRACT

Objectives: The Brief Insomnia Questionnaire (BIQ) was first validated in the U.S. for insomnia disorders according to the Diagnostic and Statistical Manual, Fourth Edition, Text Revision (DSM-IV-TR), International Classification of Diseases, Tenth Edition (ICD-10) and research diagnostic criteria/International Classification of Sleep Disorders, Second Edition (RDC/ICSD-2). We aimed to determine the validity and reliability of a Hong Kong Chinese version of the BIQ to derive the DSM-5 in addition to other insomnia diagnoses in a general population sample.
Methods: Probability subsamples of population-based epidemiological survey respondents (n = 2011) completed test–retest (n = 120) and clinical reappraisal (n = 176) interviews.
Results: Short-term test–retest reliability was moderate for most BIQ items (Pearson r > 0.40), except for the number of nights with problems staying asleep, amount of time awake, duration of sleep problems and sleep onset latency. The areas under the receiver operating characteristic curve for the DSM-IV-TR, DSM-5, ICD-10 and RDC/ICSD-2 insomnia disorder ranged from 0.76 to 0.86, indicating high individual-level concordance between BIQ and clinical-interview diagnoses. The use of super-normal control and BIQ symptom-level data further improves the diagnostic concordance. Prevalence estimates based on the BIQ dichotomous classification were comparable with estimates based on clinical interviews for the DSM-5, RDC/ICSD-2 and any of the DSM-IV-TR, ICD-10 and RDC/ICSD-2 insomnia disorders.
Conclusion: The Hong Kong Chinese version of the BIQ generates accurate prevalence estimates for insomnia disorders in the general population. Modification of the BIQ scoring algorithms and use of trained interviewers may further improve its diagnostic performance.

Introduction

Insomnia is a distressing and disabling condition that has significant public health implications. Epidemiological studies have reported the prevalence of insomnia ranging from 6% to 48% [1]. In Hong Kong, the point prevalence of insomnia in the general population was estimated to be 11.9% [2] and 39.4% in another study [3]. Estimates of insomnia prevalence vary widely due to 2 major sources of variability [4]. The first is criterion variance, which occurs when different sets of rules are used for diagnosis. There have been different definitions of insomnia symptoms, different frequency and duration criteria and differences in the definition of significant distress and daytime impairment. The criterion variability can be solved by using standardized diagnostic criteria. The best known diagnostic criteria for insomnia are the Diagnostic and Statistical Manual (DSM) of the American Psychiatric Association, the International Classification of Diseases (ICD) of the World Health Organization and the International Classification of Sleep Disorders (ICSD) endorsed by various national professional sleep societies, including the American Academy of Sleep Medicine. The other source of variability is information variance, which occurs when different levels and types of data are collected about an individual by different interviewers. The use of standardized diagnostic instruments can reduce information variance; however, these are quite lacking for the assessment of insomnia. The only diagnostic instrument that has been used is the Sleep-EVAL interview developed by Ohayon [5]. Although the Sleep-EVAL is fully structured and able to derive DSM and ICSD diagnoses, the system is generally not available to the research community.

Recently, a standardized questionnaire, the Brief Insomnia Questionnaire (BIQ), was developed for use in the America Insomnia Survey, an epidemiological survey of over 10,000 managed health care plan subscribers [6]. The BIQ is able to detect insomnia disorder according to the DSM, Fourth Edition, Text Revision (DSM-IV-TR) [7], ICD, Tenth Edition (ICD-10) [8] and research diagnostic criteria/ICSD, Second Edition (RDC/ICSD-2) [9,10], and it has an advantage over instruments

* Corresponding author at: Department of Psychiatry, The University of Hong Kong, Pokfulam Road, Hong Kong, China. Tel.: +852 22554487; fax: +852 28551345.
E-mail address: kfchung@hkucc.hku.hk (K.-F. Chung).

http://dx.doi.org/10.1016/j.jpsychores.2014.03.002
0022-3999/

designed for a single system, such as the Athens Insomnia Scale [11]; hence insomnia prevalence according to various standardized diagnostic criteria can be obtained by a single, easy-to-use, lay-administered questionnaire. With 2 additional questions and an extra item under the impairment section, the BIQ should be able to generate insomnia diagnosis according to the recent DSM-5 criteria [12]. A brief outline of the DSM-5 criteria is presented in Appendix A. The purpose of this study is to examine the validity and reliability of a Hong Kong Chinese version of the BIQ in a general population sample.

Method

Sample

The study population consisted of Hong Kong residents older than 18 years and able to communicate in Cantonese or Mandarin Chinese languages. The randomization process was divided into 2 parts: randomization of telephone numbers and selection of respondents in households. Telephone numbers in Hong Kong are listed in telephone directories automatically unless the customers request their numbers be withheld. As of September 2012, the fixed telephone line density in Hong Kong was 102 lines per 100 households, which was among the highest in the world [13]. We selected telephone numbers randomly from computerized residential telephone directories with no stratification applied and generated some unlisted numbers by adding and subtracting 1 and 2 from the selected numbers [14]. Duplicate numbers were screened out. Within each household, respondents were randomly selected by asking to speak to the person who was going to celebrate his/her next birthday. This technique is commonly used to overcome respondent selection bias associated with administering the survey to the household member most likely to answer the phone. A recent review detected no significant differences in demographic distribution between "next birthday" and true probability samples [15]. Verbal consent was obtained from all participants and all procedures used in this study were reviewed and approved by the local institutional review board.

Procedure

A fully-structured lay-administered telephone interview was conducted by the Public Opinion Programme, The University of Hong Kong. We successfully interviewed 2011 respondents from July 24 to December 6, 2012. The overall response rate was 64.3%. There were 1019 refusals at household or respondent-levels and 97 partial responses. The first section included an introduction and verbal consent, followed by the Hong Kong Chinese version of the BIQ, and then sociodemographics, including age, gender, occupation and level of education. The last section consisted of verbal consent to another telephone interview on their sleep problem. In most cases, the telephone interview could be completed within 15 min. We initially planned to generate 2 subsamples of 200 subjects each for the purpose of clinical reappraisal and test–retest. In line with the original BIQ validation study [6], we planned to oversample BIQ positives with 80 cases, 65 subthreshold cases and 55 non-cases in each subsample. Initially, we randomly allocated the respondents for clinical reappraisal and test–retest in a ratio of 1:1; in the mid-stage of the survey, we noticed that the number of cases and subthreshold cases might not be sufficient for re-interview and therefore allocated the remaining cases and subthreshold cases for clinical reappraisal only. The final clinical reappraisal subsample consisted of 73 cases, 51 subthreshold cases and 52 non-cases, which allowed a Cohen's kappa (κ) of 0.7 with 2-sided 95% confidence interval (CI) of 0.1 [16]; for the test–retest subsample, it consisted of 34 cases, 23 subthreshold cases and 63 non-cases, which could yield a power of 0.9 to detect a Pearson correlation of 0.3 [17]. Table 1 presents the sociodemographic characteristics of the total sample and subsamples compared to the population census data. There were higher proportions of females in the total sample and subsamples, but the clinical reappraisal subsample was very similar to the census population in educational level despite a slightly lower mean age, while the test–retest subsample was similar to the census population in mean age, but had slightly more participants with secondary school education or higher. The telephone-based clinical reappraisal interviews were conducted in a blinded manner 2–14 days after the first interview by 2 senior authors

Table 1
Socio-demographic characteristics of the total sample and subsamples compared to censes population data.

Variables	Hong Kong general population aged ≥ 18 yr (N = 5,999,455)[a]	Total sample (N = 2011)	Test–retest subsample (N = 120)	Clinical reappraisal subsample (N = 176)
Age in yr, mean (SD)	46.51 (17.2)	52.20 (17.9)	48.69 (16.7)	42.29 (17.5)
Sex, male/female	1/1.18	686/1325 (1/1.93)	45/75 (1/1.67)	57/119 (1/2.09)
Education, N (%)				
Primary	23.7%	520 (26.0)	19 (15.8)	41 (23.3)
Secondary	48.1%	993 (49.7)	62 (51.7)	84 (47.7)
Tertiary	28.3%	484 (24.2)	39 (32.5)	51 (29.0)
Marital status, N (%)				
Never married	28.8%	415 (20.9)	32 (26.7)	39 (22.2)
Married	60.1%	1432 (72.1)	77 (64.2)	127 (72.2)
Divorced	4.1%	60 (3.0)	8 (6.7)	6 (3.4)
Cohabited, separated or widow	7.0%	80 (4.0)	3 (2.5)	4 (2.3)
Occupation, N (%)[b]				
Professional and associate professional	22.0%	313 (15.8)	29 (24.4)	35 (19.9)
Skilled and semi-skilled worker	26.1%	406 (20.4)	21 (17.6)	34 (19.3)
Unskilled worker	11.8%	80 (4.0)	4 (3.4)	3 (1.7)
Retired	18.0%	530 (26.7)	28 (23.5)	39 (22.2)
Students	2.5%	123 (6.2)	11 (9.2)	17 (9.7)
Homemakers/others	17.5%	475 (23.9)	23 (19.3)	44 (25.0)
Unemployed	2.1%	60 (3.0)	3 (2.5)	4 (2.3)
Income, N (%)[b]				
No income	40.3%	960 (51.1)	50 (45.0)	85 (49.4)
<$10,000	23.2%	368 (19.6)	18 (16.2)	35 (20.3)
$10,000–19,999	20.0%	288 (15.3)	28 (25.2)	25 (14.5)
$20,000–29,999	7.3%	141 (7.5)	7 (6.3)	11 (6.4)
>$30,000	9.2%	122 (6.5)	8 (7.2)	16 (9.3)

[a] Population census 2011; occupation and income data based on population aged ≥20 yr.
[b] Difference from total N reflects omissions on reporting forms; income in HK$.