

RESEARCH

Open Access



Knowledge, attitude, and practice of chronic insomnia management among general practitioners in China: a cross-sectional survey

Kang An¹, Zengxiang Wu¹, Lin Zhang¹, Yuqi Li², Zhenmei An^{3*} and Shuangqing Li^{1*†}

Abstract

Background Chronic insomnia is a common yet often overlooked issue in primary health care. This study investigated the knowledge, attitude, and practices of chronic insomnia management among general practitioners (GPs).

Methods A cross-sectional online survey was conducted among GPs providing routine care to adults with insomnia in health facilities at all levels in Sichuan Province, China. Additionally, we designed an online questionnaire that included basic information and knowledge, attitudes, and practices regarding chronic insomnia management.

Results We included 420 GPs, 66.2% of whom were female and 58.1% were from community health service centers. Total 198 (47.1%) GPs had received specific training and only 2 GPs (0.5%) correctly answered the knowledge-related questions. Furthermore, only 44 GPs (10.5%) demonstrated excellent practice behaviors, while most GPs (70.2%) expressed high demand for training in insomnia management. Insomnia training experience was associated with higher practice scores ($\beta = 3.318$, $p < 0.001$).

Conclusion This study established an association and correlation between knowledge, attitude, and practice scores in treating insomnia and the sociodemographic characteristics of GPs in China. Although knowledge and practice performance in this field need to be improved, they mostly displayed a positive attitude towards insomnia management. Thus, offering continuing education opportunities to GPs would be highly beneficial.

Keywords Insomnia, Knowledge-attitude-practice, General practitioner, Primary care, Adherence

[†]Zhenmei An, Shuangqing Li these authors have contributed equally to this work.

*Correspondence:
Zhenmei An
azmhxnfm@163.com
Shuangqing Li
lsqhjxk@126.com

¹General Practice Medical Center, West China Hospital, General Practice Ward/International Medical Center Ward, National Clinical Research Center for Geriatrics, Sichuan University, Chengdu 610041, Sichuan, China

²Southwestern University of Finance and Economics, Chengdu, Sichuan, China

³Department of Endocrinology and Metabolism, West China Hospital, Sichuan University, Chengdu 610041, Sichuan, China

Introduction

Chronic insomnia is the most common sleep disorder among adults with substantial negative social and economic consequences [1]. According to the ICSD-3 diagnostic criteria, chronic insomnia affects 9–12% of the population, while transient symptoms of insomnia ranges from 22 to 35% [2–5]. Although acute insomnia is more prevalent, it is typically short-term and often triggered by stress or significant life changes [6, 7]. Adverse effects of chronic insomnia on daily functioning include impaired work productivity, work absenteeism, decreased quality of life, and increased medical and societal costs [8–10]. In



addition, chronic insomnia is frequently associated with cardiometabolic diseases [11] and psychiatric disorders, particularly depression and anxiety [7, 12]. The Chinese Sleep Research Report 2023 reveals that the proportion of individuals with an average sleep duration of less than 7 h remains notably high at 25.9% [13], decreasing from 28.2% in 2021 [8]. This trend may be attributed to insufficient awareness of sleep health among both patients and physicians [14].

Primary care is the frontline treatment for patients with help-seeking insomnia. In primary healthcare, approximately 40% of patients report experiencing sleep problems [15]. General practitioners (GPs) consulted patients for sleep problems more frequently than other health professionals [16]. Notably, the management of insomnia by GPs occasionally deviates from the prevailing guidelines [17–19]. Two studies conducted in developed countries have reported deficits in knowledge related to insomnia care [20, 21]. In the Chinese healthcare setting, cross-sectional studies have uncovered a phenomenon of potentially inappropriate prescribing practices for insomnia by GPs, notably in the misuse of benzodiazepines (BZDs), indicating a gap in the mastery of relevant knowledge related to these medications [22, 23]. However, it is important to recognize that focusing solely on assessments of knowledge or attitudes may not adequately capture the multifaceted influences on clinical practice [24].

Sleep medicine education remains limited in medical training in China [25], with the majority of GPs receiving minimal or no training in this field during their medical or residency training. Despite the inclusion of sleep apnea topics in undergraduate textbooks at the beginning of the 21st century, comprehensive and systematic teaching on sleep disorders is scarce. This is a global issue, as a survey of 12 countries revealed that the average time dedicated to sleep education barely reaches 2.5 h, with 27% of these institutions providing no sleep education at all [26].

Despite the high prevalence and clinical significance of insomnia, Chinese GPs' ability to identify and manage patients with insomnia remains largely unknown. It is crucial to assess not only the knowledge and practices but also the attitudes of Chinese GPs towards insomnia management. Attitudes play a pivotal role in shaping clinical practices and decision-making processes, which can ultimately influence patient outcomes. Our study aims to evaluate the knowledge, attitudes, and practices of insomnia care among Chinese GPs and to provide recommendations for improvement in this regard.

Materials and methods

Survey distribution strategy

In this cross-sectional online study, we employed convenience and snowball sampling approaches to recruit GPs from the West China General Practice Network and West China Hospital-Community Health Service Center Alliance, which includes primary care facilities and hospitals. To overcome the limitations of online data collection, we requested that participants disseminate the website link and invite their colleagues to participate. The GPs were invited to participate in the online survey through the *Wenjuanxing* platform (<https://www.wjx.cn>) from May 1 to July 31, 2022. To encourage participation, we sent two reminders in July 2022 at least one week and two weeks before the survey was closed. A similar methodology was used in a previous study [27].

Eligible participants were GPs who (1) currently practiced in registered healthcare institutions at all levels in Sichuan, China; (2) prescribed psychotropic substances at level 2 independently; (3) managed patients with insomnia; and (4) provided informed consent to participate in the survey. We excluded the following groups from the study: (1) GPs who exclusively provided pediatric care. 2) Residents currently participating in residency training programs. This decision was made because they likely had limited or no experience in dealing with insomnia. The 10 GPs who participated in the pilot study were excluded from the main study to prevent any potential bias.

Questionnaire development

A self-administered questionnaire was initially developed based on the Guide to Developing Knowledge, Attitude, and Practice Surveys (Authors: World Health Organization and Stop TB Partnership) [28] and adapted from published literature on physician perceptions of insomnia [23, 29–32]. The correct answers were aligned with the guidelines and recommendations of the Chinese Society of Neurology and the China Sleep Research Society [30].

The questionnaire was subjected to iterative rounds of review and validation. An expert panel comprising three GPs, and two sleep physicians participated in this process to enhance the accuracy and appropriateness. Their feedback led to iterative revisions ensuring the questionnaire's content validity. The questionnaire was deemed appropriate for the target population and comprehensive information was collected. A pilot study was conducted with ten GPs to assess the feasibility, comprehensibility, and time required to complete the questionnaire. The questionnaire was easy to complete. We analyzed the questionnaire's reliability after the expert review and pilot testing. This included calculating the Cronbach's alpha coefficient to measure internal consistency among the questionnaire items. In the questionnaire, the terms

“primary titles,” “intermediate titles,” and “senior titles” referred to distinct levels of professional qualifications within the Chinese healthcare system. Primary titles corresponded to Resident Physicians, intermediate titles included Attending Physicians and Lecturers, and senior titles represented the highest ranks, such as Professor, Associate Professor, Chief Physician, and Associate Chief Physician.

The final version of the anonymous questionnaire consisted of 30 questions on knowledge, attitudes, and practices related to the diagnosis and treatment of insomnia (refer to the Additional file 1 “Survey on General Practitioners’ Knowledge, Attitudes, and Practices Regarding Insomnia Management”). The questionnaire sought to identify gaps in knowledge regarding the diagnosis (K1 – K5) and treatment (K6 – K15) of insomnia, attitudes towards different clinical practices (A1 – A7), and current practices in patient inquiry, assessment, and patient education (P1 – P8). In addition, participants were asked to provide demographic information and work situations. Treatments included pharmacological interventions (e.g., benzodiazepines, non-benzodiazepines (non-BZD), traditional Chinese Medicine, and antidepressants), cognitive behavioral therapy for insomnia (CBT-I), and psychoeducation.

In the **knowledge** section, true/false questions were used for assessment. Each correct answer was assigned a score of one point, whereas incorrect answers were scored zero. The total possible score for the knowledge domain ranged from 0 to 15. The **attitude** section measures the degree of agreement on a 5-point Likert scale ranging from 5 (“strongly agree”) to 1 (“strongly disagree”). The third section evaluated the frequency of practices related to inquiry, assessment, doctor-patient communication, and patient education using a 5-point Likert scale that ranged from 5 (“always”) to 1 (“never”). For the attitude and **practice** sections, the total scores ranged from 7 to 35 points and 8 to 40 points, respectively.

Sampling

The sample size was estimated using an online sample-size calculator (www.calculator.net) [33].

$$n = \frac{\hat{p} \times (1 - \hat{p}) \times z^2}{\epsilon^2} \div \left(1 + \frac{\hat{p} \times (1 - \hat{p}) \times z^2}{N \times \epsilon^2} \right)$$

In this formula, z represents the z-score, ϵ represents the margin of error, \hat{p} represents the population proportion, n represents the sample size, and N represents the population size. The minimum effective sample size for this study was calculated to be $n=371$ based on a 50% response distribution, 95% confidence interval, $\pm 5\%$

margin of error and total number of GPs in Sichuan was 10,394 in 2015. Therefore, the sample size was 412, conservatively estimating the invalidity rate of the questionnaires as 10%.

Statistical analysis

Descriptive statistics were used to examine respondent characteristics and KAP (knowledge-attitude-practice) scores. KAP scores were computed by summarizing the scores for each question in the respective sections. Assumptions of normality of the residuals, linearity, homoscedasticity, and multicollinearity were assessed using graphical means and appropriate measures. Categorical variables were computed as frequencies (n) and percentages (%). Normally distributed data were presented as mean with SD, while non-normally distributed data were presented as median with interquartile range (IQR). Chi-Square tests were used to analyze the relationships between categorical data. A one-way ANOVA was conducted to explore the association between sociodemographic characteristics and mean knowledge scores related to insomnia. Differences in attitude scores across groups were assessed using the Kruskal–Wallis H and Mann–Whitney U tests. Moreover, we applied the Bonferroni correction for multiple comparisons, adjusting the significance level (type I error) to control for the inflated risks of false positives. Univariate and multiple linear regression analyses were employed to evaluate the significant associations between the independent variables and practice scores, which were the primary dependent variables. The independent variables included knowledge and attitude scores toward insomnia management. Additional covariates included age, sex, workplace, insomnia training, and professional title. Regression coefficients (β), their 95% confidence intervals (CI), and the actual p-values for each factor in the final model were reported. All statistical tests were performed using SPSS software (version 26.0, IBM Corporation). Statistical significance was set at $p < 0.05$.

Ethical consideration

This study was approved by the Ethical Committee of West China Hospital, Sichuan University, Chengdu, China (No. 2021–1778). Digital informed consent was obtained from all the participants.

Result

Demographic characteristics

A total of 420 completed questionnaires were analyzed. As shown in Table 1, the study included healthcare professionals with a mean age of 38.6 y (± 8.7), representing a diverse age range of 20.0 to 74.0 y. Of the participants, 33.8% were male, and 66.2% were female participants. The majority worked in community health service

Table 1 Demographic characteristics of general practitioners (N=420)

Variable	Mean \pm SD (range) / Number (%)
Age (years)	38.6 \pm 8.7 (20.0–74.0)
Sex	
Male	142 (33.8)
Female	278 (66.2)
Workplace	
Community health service center	244 (58.1)
Secondary hospital	67 (16.0)
Tertiary hospital	109 (26.0)
Professional title	
Primary title	135 (32.1)
Intermediate title	189 (45.0)
Senior title	96 (22.9)
No. of patients with insomnia seen per week, median (IQR)	4 (2–10)
Insomnia training experience	
Yes	198 (47.1)
No	222 (52.9)
Which insomnia medications does your institution have available? (multiple choice)	
Benzodiazepines (e.g. estazolam, alprazolam, diazepam)	364 (86.7)
Non-benzodiazepines (e.g. zopiclone, eszopiclone, zolpidem)	167 (39.8)
Traditional Chinese medicine	141 (33.6)
Sedative antidepressants (e.g. doxepin, amitriptyline)	100 (23.8)
No insomnia medication available	20 (4.8)
Unclear	3 (0.7)

Notes: SD: standard deviation. IQR: interquartile range

centers ($n=244$, 58.1%), followed by those in secondary hospitals ($n=67$, 16.0%), and tertiary hospitals ($n=109$, 26.0%). In terms of professional titles, 32.1% had primary titles, 45.0% had intermediate titles, and 22.9% held senior titles. Participants reported encountering an average of 8 patients with insomnia per week (± 12.9 , ranging from 1.0 to 100.0). Almost half of the participants (47.1%) had received specific training in insomnia management. Regarding available insomnia medications, BZD were the most common (86.7%), followed by non-BZD (39.8%), traditional Chinese medicines (33.6%), and sedative antidepressants (23.8%). A small proportion (4.8%) reported having no insomnia medication available and 0.7% were uncertain about their availability.

Description of the KAP scores

The Cronbach's alpha coefficients for the attitude and practice scales were 0.944 and 0.897, respectively. Results for the original questionnaires were presented in eTable.1 through eTable.5 in the Supplement.

Knowledge

The knowledge of the GPs towards chronic insomnia management are presented in Fig. 1 and eTable 1 in the Supplement. The mean knowledge score was 9.12 ± 2.46 (median=9.50; minimum=0; maximum=15). Regarding diagnostic aspects, most participants (76.7%) provided incorrect answers related to sleep onset insomnia. Additionally, only 7.6% correctly recognized that the definition of reduced the total sleep time. In terms of therapeutic considerations, 45.5% of participants believed that drug treatment should be the first choice. Recognition of using antihistamines and melatonin as routine treatments garnered support from 73 (17.4%) participants. A noteworthy finding was that 243 (57.9%) participants believed that, when compared to non-BZD drugs, BZD are the preferred medication for insomnia treatment. However, a limited 101 (24.0%) answered correctly when asked about examples of BZD. We conducted a Chi-Square test to further analyze the associations between sex, workplace, professional title, and insomnia training experience with the preference for pharmacological versus non-pharmacological treatment (Question K6), as well as the preference for benzodiazepines versus non-benzodiazepine medications (Question K11). A significant difference was found in the preference for benzodiazepines versus non-benzodiazepine medications based on whether the participants had received insomnia training ($\chi^2=6.739$, $p=0.009$). No significant differences were observed for the other factors. There were no significant differences in the knowledge scores based on age, sex, or workplace status (eTable 4 in the Supplement). Knowledge scores differed significantly according to professional title ($p=0.024$). Among these, significant disparities in knowledge levels were observed between GPs with primary titles and those with senior titles ($P<0.001$). However, no statistically significant differences were noted between individuals with intermediate and senior titles ($P>0.05$) (eTable 4 in the Supplement).

Attitude

The results of the GPs' attitude are shown in Fig. 2 and eTable 2 in the Supplement. The median attitude score was 33 (range, 29–35) (minimum=7; maximum=35). The majority strongly agreed that GPs should be able to perform clinical assessments of insomnia (278, 66.2%), provide sleep hygiene education (287, 68.3%), and offer CBT-i (263, 62.6%) to patients with insomnia. Furthermore, a considerable proportion expressed a strong desire to receive relevant training for insomnia (295, 70.2%). Confidence in the ability to manage insomnia varied, with only 196 (46.7%) strongly agreeing that the GPs were confident (eTable 2 in the Supplement). The Kruskal-Wallis test revealed a statistically significant difference among participants with different professional

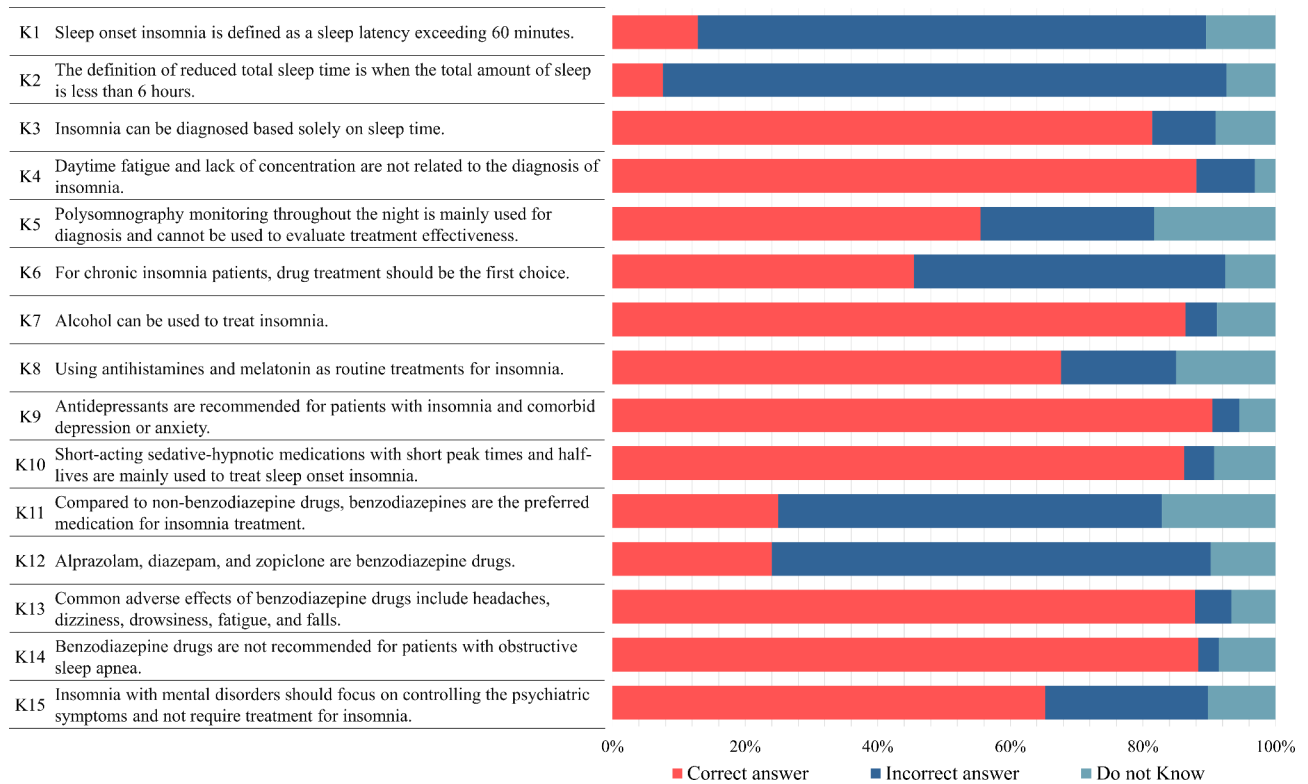


Fig. 1 General Practitioners' knowledge of insomnia management

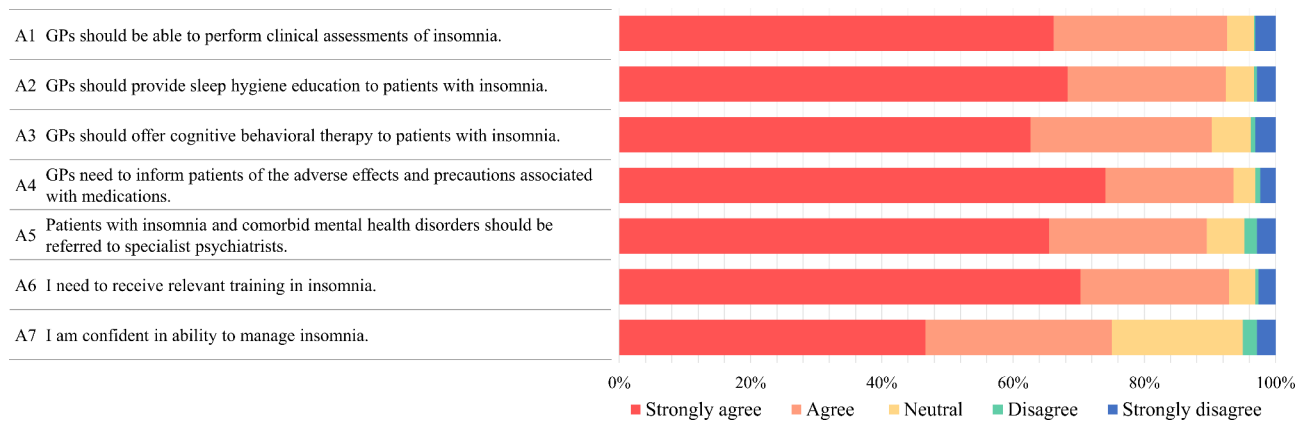


Fig. 2 General Practitioners' attitudes towards insomnia management

titles in attitude scores ($p=0.005$) in eTable 5 in the Supplement. After applying the Bonferroni correction, individuals with senior titles scored higher than those with primary titles (adjusted $p=0.003$). Furthermore, higher attitude scores were observed in tertiary hospitals than secondary hospitals (Median, 34.00 vs. 32.00; adjusted $p=0.038$).

Practice

Details of the self-reported practice are shown in Fig. 3 and eTable 3 in the Supplement. The results showed that the mean practice score was 28.08 ± 6.84 (median=28;

minimum=11; maximum=40). In terms of clinical practice, the findings highlight significant variations in GPs' approaches to insomnia management. Practices with the lowest frequency of "Always" responses include guiding patients to maintain a sleep diary (15.7%), prescribing medication only after evaluation (16.7%), and engaging in shared decision-making in treatment plans (18.6%). Conversely, the top three practices with the highest "Always" frequencies are as follows: recommending patients seek specialist care (38.6%), inquiring about the sleep status of patients (38.1%), and assessing whether other diseases

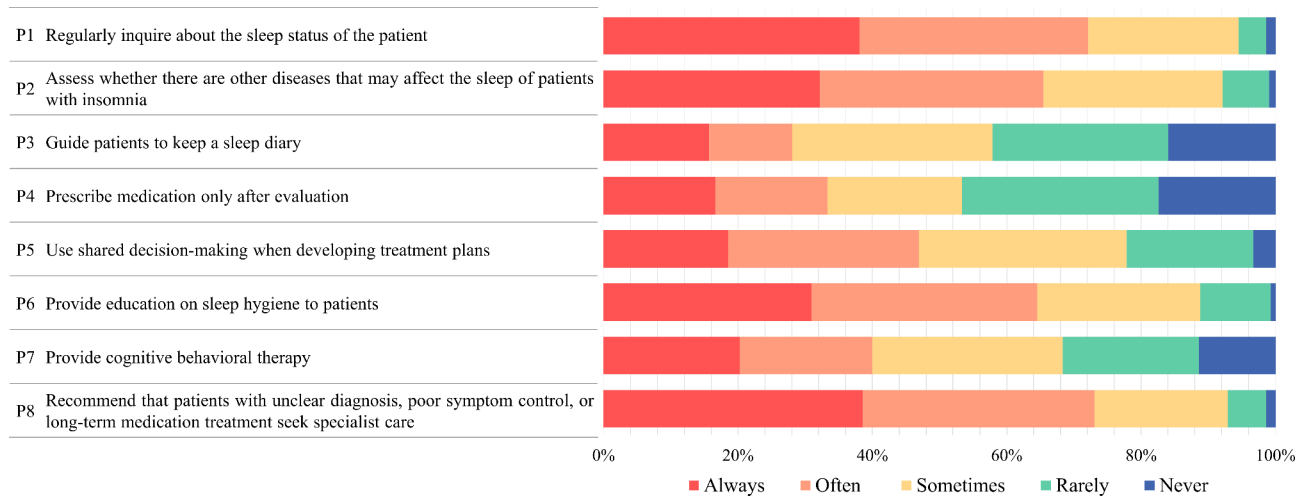


Fig. 3 General Practitioners' self-reported practices in insomnia management

Table 2 Multiple linear regression analyses of practice scores for general practitioners

Variable	Univariate analysis			Multiple linear regression*		
	β	95% CI	P Value	β	95% CI	P Value
Knowledge scores	0.005	(-0.263–0.273)	0.970	-0.158	(-0.418–0.103)	0.235
Attitude scores	0.253	(0.131–0.375)	<0.001	0.238	(0.118–0.359)	<0.001
Workplace						
Community health service center	Reference			Reference		
Secondary hospital	0.822	(-1.010–2.654)	0.378	1.249	(-0.521–3.020)	0.166
Tertiary hospital	2.726	(1.195–4.256)	0.001	2.811	(1.272–4.350)	<0.001
Insomnia training experience						
No	Reference			Reference		
Yes	3.468	(2.195–4.741)	<0.001	3.318	(2.047–4.590)	<0.001
Age (years)						
≤ 30	Reference			Reference		
31–40	0.409	(-1.315–2.133)	0.641	1.232	(-0.679–3.144)	0.206
41–50	0.899	(-0.872–2.670)	0.319	2.382	(0.284–4.479)	0.026
≥ 51	1.207	(-1.296–3.710)	0.344	2.408	(-0.301–5.117)	0.081
Sex						
Female	Reference			Reference		
Male	-0.168	(-1.557–1.220)	0.812	0.069	(-1.285–1.424)	0.920
Title						
Primary title	Reference			Reference		
Intermediate title	-0.229	(-1.747–1.290)	0.767	-1.055	(-2.779–0.669)	0.230
Senior title	0.200	(-1.599–1.999)	0.827	-2.172	(-4.362–0.018)	0.052

Notes: β : Unstandardized regression coefficient. 95%CI: 95% confidence interval. Multiple linear regression*: adjusted for: age, sex, title, and workplace. F for model: 5.712; $p < 0.01$. Adjusted R^2 : 0.11

may be contributing to insomnia (32.1%) (eTable 3 in the Supplement).

Factors associated with knowledge, attitudes, and practices

A multiple linear regression analysis was conducted to control for potential confounding variables, including age, sex, title, and workplace (Table 2). Insomnia training experience was associated with higher practice scores ($\beta = 3.318$, [95% CI, 2.047–4.590]; $p < 0.001$). Higher

attitude scores were significantly associated with the increase in practice scores ($\beta = 0.238$, [95% CI, 0.118 to 0.359]; $p < 0.001$), whereas knowledge scores did not show a significant relationship with practice scores. There was statistically significant difference between practice scores from GPs in tertiary hospitals and those from community health service centers (mean, 29.96 vs. 27.24; $\beta = 2.726$, [95% CI, 1.195 to 4.256]). The estimated difference from the multiple linear regression analyses was 2.811 (95% CI, 1.272 to 4.350; $p < 0.001$).

Discussion

Chronic insomnia disorder is a prevalent condition that presents considerable challenges in its evaluation and management within primary care owing to constraints in resources and support [34]. This cross-sectional study revealed that GPs in Sichuan Province exhibited a low level of knowledge, maintained positive attitudes towards insomnia management, and self-reported low compliance with relevant clinical guidelines in their practice. Total 174 participants exceeded a score of 70 with the maximum score being 90. This study is the first to evaluate the KAP of Chinese GPs in the management of insomnia in primary care settings.

The study findings indicate a limited understanding among participants regarding the treatment and diagnosis of insomnia. Nearly half of GPs were assessed infrequently or not at all before prescribing medication. While existing literature has explored treatment pathways for patients with insomnia in primary care [35, 36], this lack of knowledge could lead to the overprescription of BZDs, as GPs may either be unaware of or underestimate the associated risks [37, 38]. Moreover, studies have demonstrated that practitioners often do not assess insomnia in clinical settings, or they may make decisions based on patient requests [39]. Reasons include time pressure, especially during initial consultations [40]; workload [41]; and knowledge regarding the diagnosis of insomnia symptoms [23, 42], which may interact to impair professional decision-making [43, 44]. In addition, patient-related factors may hamper accurate assessment of insomnia complaints. Indeed, patients may not spontaneously share information about insomnia symptoms with their physician [45]. Professor Rowan's team believes that this may be compounded in chronic insomnia cases or masked by a comorbid disorder, including depression, anxiety, or chronic pain [46].

The overall attitude of GPs towards insomnia management appears to be largely positive. Most individuals express a positive attitude towards the provision of behavioral therapy, but their practice is less common. There are limitations to the use of CBT-i in this primary care setting, which are not associated with an attitude among professionals but rather with other barriers, such as limited knowledge [47]. These findings align with recent results from other studies conducted in primary care settings. Regarding knowledge about CBT-i, only 28.8% of Spanish physicians reported being familiar with it [48]. When patients present with insomnia to GPs in Australia, few (0.8%) receive a referral for specific non-drug therapy, despite these treatments having the highest level of evidence for effectiveness [49]. Patient preference might also be contributing factors. Patients often prefer pharmacological therapies over non-pharmacological ones [50].

In this study, no correlation was observed between the knowledge level and practice of Chinese GPs. Enhancing knowledge and skills alone may prove insufficient to resolve this issue. Other factors such as the working environment, training opportunities, and time pressures may play a role in influence the application of professional knowledge in practice. Time pressure adds to the complexity of insomnia care delivered by GPs in China. The average duration of general practitioner consultations in China, approximately 5.4–5.6 min, was shorter than reported in studies from other countries [40, 51]. GPs allocated the least time to discussing medicine use and counseling. Furthermore, these barriers likely reflect a lack of education in the training curriculum, and a lack of access to continuing education and professional development for primary care physicians [26, 52]. For example, Mindell et al. [26] reported that the average time spent on sleep education in medical schools across countries was 2.5 h. China has no provision for formal education on this subject. The absence of education regarding sleep disorders can have severe clinical consequences.

Limitation

To the best of our knowledge, this study is the largest investigation on this topic to date. However, it has several limitations. First, this study adopted a cross-sectional design, which prevented us from drawing causal conclusions. Further investigations are warranted to explore the knowledge and attitudes of GPs and the reasons for their lack of clinical practice. Data were collected using a self-reported questionnaire, which may have resulted in recall bias and reporting errors. Voluntary participation and anonymity were adopted as strategies to mitigate the risk of reporting errors. Second, insomnia awareness in China is suboptimal, and medical and social care need to be improved. Therefore, these findings may not be generalizable to other countries. In addition, the findings from Sichuan Province may not be regarded as representative of all China. However, it is worth noting that the Western General Practice Network covers hundreds of medical facilities, and our findings are likely to be representative of the perspectives and knowledge of most GPs responsible for insomnia care in the country. The present study excluded GPs without clinical experience as it was based on a KAP survey. Future research can employ qualitative research methods such as in-depth interviews and focus group discussions to explore the obstacles and challenges in insomnia management among GPs without clinical experience.

Conclusion

In summary, GPs in Sichuan Province are not sufficiently prepared to address chronic insomnia. However, the overall knowledge of this topic is limited. Despite a

positive attitude, the GPs' reported practices revealed low adherence to the practice guidelines. Attitudes and training played a significant role in shaping GPs' practice behaviors. Further research is necessary to comprehensively evaluate the effects of these factors. There is a pressing need for educational programs on insomnia tailored to GPs in primary care to enhance their knowledge of and proficiency in managing this prevalent and significant disorder.

Abbreviations

GPs	General practitioners
CBT-i	Cognitive Behavioral Therapy for Insomnia
BZD	Benzodiazepam
CI	Confidence interval
IQR	Interquartile range

Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s12875-024-02615-x>.

Supplementary Material 1

Supplementary Material 2

Acknowledgements

The authors would like to thank all the general practitioners who had participated in this study.

Author contributions

Kang An: Conceptualization, Formal analysis, Visualization, Writing - original draft. Zengxiang Wu: Investigation, Data curation, Writing - original draft. Lin Zhang, Yuqi Li: Investigation, Data curation, Writing - original draft. Shuangqing Li: Resources, Supervision, Funding acquisition, Writing - review & editing. Zhenmei An: Supervision, Project administration, Writing - review & editing. All gave final approval and agree to be accountable for all aspects of work ensuring integrity and accuracy.

Funding

This study was supported by Community Health Association of China (Grant number 2021-2-045).

Data availability

All data and materials are available. The datasets generated for this study are available by contacting the corresponding author.

Declarations

Ethics approval and consent to participate

All methods were carried out in accordance with relevant guidelines and regulations. This study was approved by the Ethics Committee of West China Hospital, Sichuan University, Chengdu, China (No. 2021 – 1778). Informed consent to participate was obtained from all subjects involved in the study.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

Conflict of interest

The authors declare that they have no competing interests.

Received: 12 November 2023 / Accepted: 2 October 2024

Published online: 12 October 2024

References

1. Belfer SJ, Bashaw AG, Perlis ML, et al. A Drosophila model of sleep restriction therapy for insomnia. *Mol Psychiatry*. 2021;26(2):492–507. <https://doi.org/10.1038/s41380-019-0376-6>.
2. Chung KF, Yeung WF, Ho FY, et al. Cross-cultural and comparative epidemiology of insomnia: the Diagnostic and statistical manual (DSM), International classification of diseases (ICD) and international classification of sleep disorders (ICSD). *Sleep Med*. 2015;16(4):477–82. <https://doi.org/10.1016/j.sleep.2014.10.018>.
3. Benbir G, Demir AU, Aksu M, et al. Prevalence of insomnia and its clinical correlates in a general population in Turkey. *J Neuropsychiatry Clin Neurosci*. 2015;69(9):543–52. <https://doi.org/10.1111/pcn.12252>.
4. Kronholm E, Partonen T, Härmä M, et al. Prevalence of insomnia-related symptoms continues to increase in the Finnish working-age population. *J Sleep Res*. 2016;25(4):454–7. <https://doi.org/10.1111/jsr.12398>.
5. Amaral O, Garrido A, Pereira C, et al. Sleep patterns and insomnia among Portuguese adolescents: a cross-sectional study. *Aten Primaria*. 2014;46(Suppl 5):191–4. [https://doi.org/10.1016/s0212-6567\(14\)70090-3](https://doi.org/10.1016/s0212-6567(14)70090-3).
6. Kay-Stacey M, Attarian H. Advances in the management of chronic insomnia. *BMJ*. 2016;354:i2123. <https://doi.org/10.1136/bmj.i2123>.
7. Perlis ML, Posner D, Riemann D, Insomnia, et al. *Lancet*. 2022;400(10357):1047–60. [https://doi.org/10.1016/s0140-6736\(22\)00879-0](https://doi.org/10.1016/s0140-6736(22)00879-0).
8. eBioMedicine. A good night's sleep is more important than you think. *EBioMedicine*. 2023;90:104575. <https://doi.org/10.1016/j.ebiom.2023.104575>.
9. Cao XL, Wang SB, Zhong BL, et al. The prevalence of insomnia in the general population in China: a meta-analysis. *PLoS ONE*. 2017;12(2):e0170772. <https://doi.org/10.1371/journal.pone.0170772>.
10. Redeker NS, Caruso CC, Hashmi SD, et al. Workplace Interventions to Promote Sleep Health and an Alert, Healthy Workforce. *J Clin Sleep Med*. 2019;15(4):649–57. <https://doi.org/10.5664/jcsm.7734>.
11. Grandner MA. Addressing sleep disturbances: an opportunity to prevent cardiometabolic disease? *Int Rev Psychiatry*. 2014;26(2):155–76. <https://doi.org/10.3109/09540261.2014.911148>.
12. Morin CM, Benca R. Chronic insomnia. *Lancet*. 2012;379(9821):1129–41. [https://doi.org/10.1016/s0140-6736\(11\)60750-2](https://doi.org/10.1016/s0140-6736(11)60750-2).
13. Wang J, Zhang Y, Zhang Y. Chinese Sleep Research Report 2023. Beijing: Social Sciences Academic; 2023.
14. Khan A, Patel J, Sharma D, et al. Obstructive sleep apnea screening in patients with Atrial Fibrillation: missed opportunities for early diagnosis. *J Clin Med Res*. 2019;11(1):21–5. <https://doi.org/10.14740/jocmr3635>.
15. Bollu PC, Kaur H. Sleep Medicine: Insomnia and Sleep. *Mo Med*. 2019;116(1):68–75.
16. Morin C, Leblanc M, Daley M, et al. Epidemiology of insomnia: prevalence, self-help treatments, consultations, and determinants of help-seeking behaviors. *Sleep Med*. 2006;7(2):123–30. <https://doi.org/10.1016/j.sleep.2005.08.008>.
17. Soyka M, Longo DL. Treatment of Benzodiazepine Dependence. *N Engl J Med*. 2017;376(12):1147–57. <https://doi.org/10.1056/NEJMra1611832>.
18. Geense WW, van de Glind IM, Visscher TLS, et al. Barriers, facilitators and attitudes influencing health promotion activities in general practice: an explorative pilot study. *BMC Fam Pract*. 2013;14:20. <https://doi.org/10.1186/1471-2296-14-20>.
19. Sinnema H, Terluin B, Wensing M, et al. Systematic tailoring for the implementation of guideline recommendations for anxiety and depressive disorders in general practice: perceived usefulness of tailored interventions. *BMC Fam Pract*. 2013;14:94. <https://doi.org/10.1186/1471-2296-14-94>.
20. Benca RM, Bertisch SM, Ahuja A, et al. Wake Up America: National Survey of Patients' and Physicians' Views and Attitudes on Insomnia Care. *J Clin Med*. 2023;12(7). <https://doi.org/10.3390/jcm12072498>.
21. Linder S, Duss SB, Dvořák C, et al. Treating insomnia in Swiss primary care practices: a survey study based on case vignettes. *J Sleep Res*. 2020;30(1):e13169. <https://doi.org/10.1111/jsr.13169>.
22. GENG JY, HUANG YF, LIU YL. Factors associated with potentially inappropriate prescribing among elderly adults in a community outpatient clinic. *Chin Gen Pract*. 2022;25(16):1969–77. <https://doi.org/10.12114/j.issn.1007-9572.2022.0164>.
23. Lu B, Du J. Survey on knowledge, attitude and prescribing of benzodiazepines among general practitioners. *Chin J Gen Pract*. 2021;20(3):845–50. <https://doi.org/10.3760/cmaj.cn114798-20201101-01117>.
24. Andrade C, Menon V, Ameen S, et al. Designing and conducting knowledge, attitude, and practice surveys in Psychiatry: practical Guidance. *Indian J Psychol Med*. 2020;42(5):478–81. <https://doi.org/10.1177/0253717620946111>.

25. Yang Y, Han F, Li Y, et al. Exploration of standardized sleep medicine fellowship training in Peking University Health Science Center. *Natl Med J China*. 2021;101(22):1638–41. <https://doi.org/10.3760/cmaj.cn112137-20210219-00435>.
26. Mindell JA, Bartle A, Abd Wahab N, et al. Sleep education in medical school curriculum: a glimpse across countries. *Sleep Med*. 2011;12(9):928–31. <https://doi.org/10.1016/j.sleep.2011.07.001>.
27. An K, Zhang L, Qiao RJ, et al. Training needs and curriculum of continuing medical education among general practitioners in Tibet, China: a cross-sectional survey. *Front Public Health*. 2022;10:914847. <https://doi.org/10.3389/fpubh.2022.914847>.
28. Partnership WHO/ST. Accessed March 22, Advocacy, communication and social mobilization for TB control: a guide to developing knowledge, attitude and practice surveys. <https://iris.who.int/handle/10665/43790>. (2022).
29. Chinese Sleep Research Society. Chinese guidelines for the diagnosis and treatment of Insomnia. *Chin Med J (Engl)*. 2017;97(24):1844–56. <https://doi.org/10.3760/cma.jissn.0376-2491.2017.24.002>.
30. Chinese Society of Neurology, Sleep Disorder Society, Chinese Society of Neurology. Guideline for the evaluation and treatment of insomnia in Chinese adults(2017). *Chin J Neurol*. 2018;51(5):324–35. <https://doi.org/10.3760/cma.jissn.1006-7876.2018.05.002>.
31. Neves IT, Oliveira JSS, Fernandes MCC, et al. Physicians' beliefs and attitudes about benzodiazepines: a cross-sectional study. *BMC Fam Pract*. 2019;20(1):71. <https://doi.org/10.1186/s12875-019-0965-0>.
32. Cook JM, Marshall R, Masci C, et al. Physicians' perspectives on prescribing benzodiazepines for older adults: a qualitative study. *J Gen Intern Med*. 2007;22(3):303–07. <https://doi.org/10.1007/s11606-006-0021-3>.
33. Maple Tech, International LLC. Accessed April 02, Sample Size Calculator. <https://www.calculator.net/sample-size-calculator.html>. (2022).
34. Ng L, Cunnington D. Management of insomnia in primary care. *Aust Prescr*. 2021;44(4):124–28. <https://doi.org/10.18773/austprescr.2021.027>.
35. Oldenhof E. Role of the prescriber in supporting patients to discontinue benzodiazepines: a qualitative study (71, Pg e517, 2021). *Br J Gen Pract*. 2021;71(711):445–45. <https://doi.org/10.3399/bjgp21X717353>.
36. Cunnington D, Junge MF, Fernando AT. Insomnia: prevalence, consequences and effective treatment. *Med J Aust*. 2013;199(8):S36–40. <https://doi.org/10.5694/mja13.10718>.
37. Srisurapanont M, Garner P, Critchley J, et al. Benzodiazepine prescribing behaviour and attitudes: a survey among general practitioners practicing in northern Thailand. *BMC Fam Pract*. 2005;6(1):27. <https://doi.org/10.1186/1471-2296-6-27>.
38. Agarwal SD, Landon BE. Patterns in Outpatient Benzodiazepine Prescribing in the United States. *JAMA Netw Open*. 2019;2(1):e187399. <https://doi.org/10.1001/jamanetworkopen.2018.7399>.
39. Kennedy KM, O'Riordan J. Prescribing benzodiazepines in general practice. *Br J Gen Pract*. 2019;69(680):152–53. <https://doi.org/10.3399/bjgp19X701753>.
40. Zhong CW, Luo ZJ, Liang CY, et al. An overview of general practitioner consultations in China: a direct observational study. *Fam Pract*. 2020;37(5):682–88. <https://doi.org/10.1093/fampra/cmaa039>.
41. Li Q, Xie P. Outpatient workload in China. *Lancet*. 2013;381(9882):1983–84. [https://doi.org/10.1016/S0140-6736\(13\)61198-8](https://doi.org/10.1016/S0140-6736(13)61198-8).
42. Youngren WA, Miller KE, Davis JL. An Assessment of Medical Practitioners' knowledge of, experience with, and treatment attitudes towards Sleep disorders and nightmares. *J Clin Psychol Med Settings*. 2019;26(2):166–72. <https://doi.org/10.1007/s10880-018-9574-7>.
43. Pottie K, Thompson W, Davies S, et al. Deprescribing benzodiazepine receptor agonists evidence-based clinical practice guideline. *Can Fam Physician*. 2018;64(5):339–51.
44. Miles A, Elliott J, The European Society for Person Centered Healthcare (ESPCHE). - raising the bar of health care quality in the Century of the patient. *J Eval Clin Pract*. 2014;20(6):729–33. <https://doi.org/10.1111/jep.12317>.
45. Bartlett DJ, Marshall NS, Williams A, et al. Predictors of primary medical care consultation for sleep disorders. *Sleep Med*. 2008;9(8):857–64. <https://doi.org/10.1016/j.sleep.2007.09.002>.
46. Ogeil RP, Chakraborty SP, Young AC, et al. Clinician and patient barriers to the recognition of insomnia in family practice: a narrative summary of reported literature analysed using the theoretical domains framework. *BMC Fam Pract*. 2020;21(1):1. <https://doi.org/10.1186/s12875-019-1070-0>.
47. Omvik S, Pallesen S, Bjorvatn B, et al. Patient characteristics and predictors of sleep medication use. *Int Clin Psychopharmacol*. 2010;25(2):91–100. <https://doi.org/10.1097/YIC.0b013e328334e5e6>.
48. Navarro Bravo B, Robla Parra C, Andrés-Pretel F. Knowledge and attitudes of Primary Care Physicians and nurses about cognitive behavioral therapy for Insomnia. *J Sleep Disord Med Care*. 2018;1(2). <https://doi.org/10.16966/2577-882x.107>.
49. Cunnington D. Non-benzodiazepine hypnotics: do they work for insomnia? *BMJ*. 2013;346(02 1):e8699–99. <https://doi.org/10.1136/bmj.e8699>.
50. Blane D, Williams C, Morrison J, et al. Cognitive behavioural therapy: why primary care should have it all. *Br J Gen Pract*. 2013;63(607):103–04. <https://doi.org/10.3399/bjgp13X663235>.
51. Zhong CW, Luo ZJ, Liang CY, et al. Comparison of general practitioner consultations among Chinese patients with different reasons for visits: a multithreshold investigation. *Lancet*. 2020;396:S14–14. [https://doi.org/10.1016/S0140-6736\(20\)32434-X](https://doi.org/10.1016/S0140-6736(20)32434-X).
52. Conroy DA, Ebben MR. Referral practices for cognitive behavioral therapy for Insomnia: a Survey Study. *Behav Neurol*. 2015;2015:819402. <https://doi.org/10.1155/2015/819402>.

Publisher's note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.