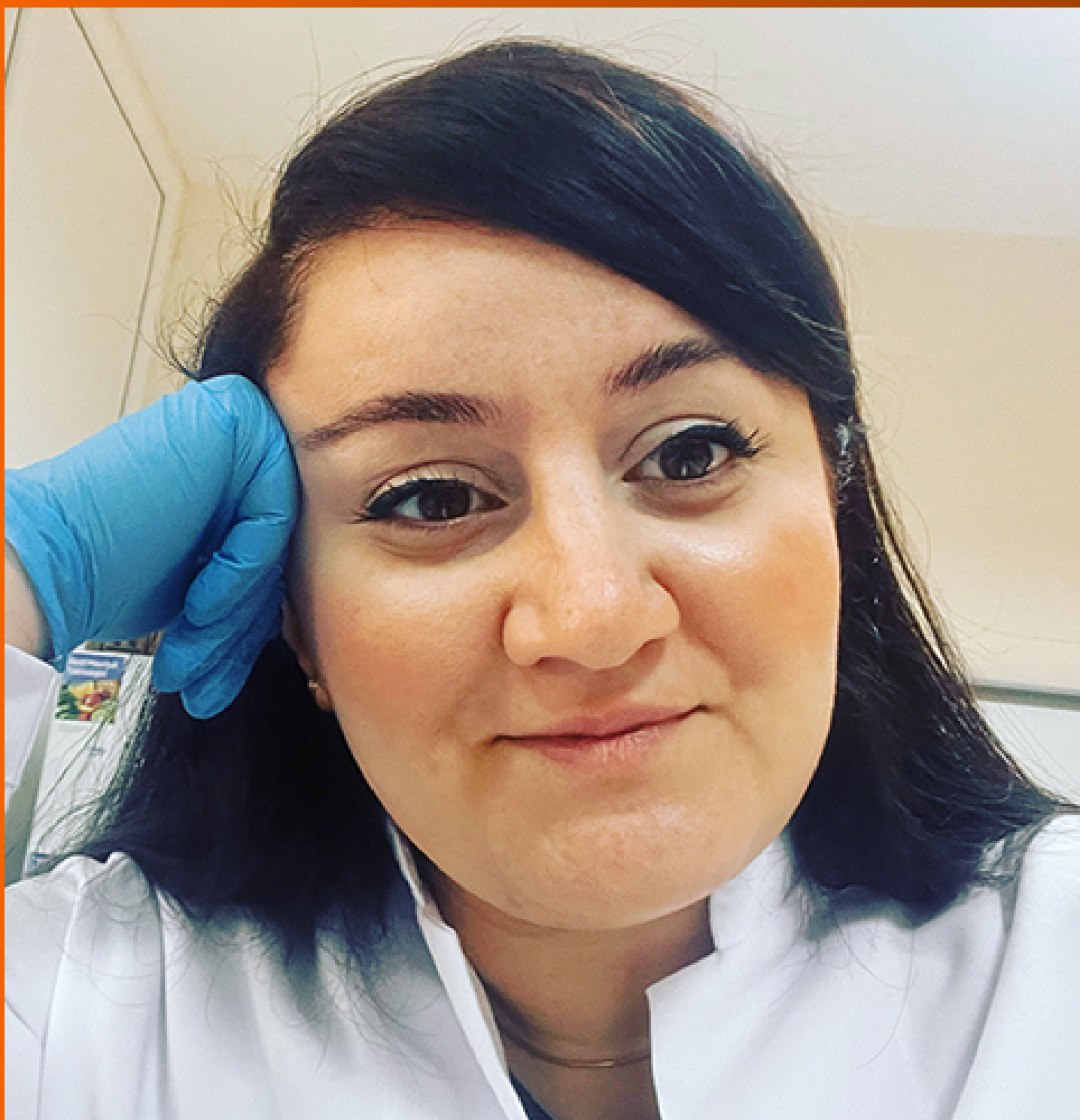


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World J Clin Cases 2024 October 16; 12(29): 6250-6334



EDITORIAL

- 6250 Post competency training in standardized training of resident physicians and integrated postgraduates
Zeng Y, Yang J, Zhang JW
- 6255 Solid pancreatic masses: What's hidden beneath? Insights into rare pancreatic lesions
Balaban DV
- 6258 Medical imaging for the diagnosis, recurrence and metastasis evaluation of clear cell sarcoma
Wang WJ, Wang X, Hui DM, Feng JB, Li CM
- 6262 Metastatic clear cell sarcoma of the pancreas: An overview
Ait Addi R
- 6266 Advancing the predictive accuracy of PNTML in rectal prolapse: An ongoing quest
Meng J, Wang ZG, Zhang LM, Chen DY, Wang Y, Bai HX, Ji CC, Liu DL, Zhao XF, Liu Y, Li BY, Wang L, Wang TF, Yu WG, Yin ZT
- 6271 Challenges in integrating traditional Chinese medicine and gut microbiota research for insomnia treatment
Bilal M, Nashwan AJ

ORIGINAL ARTICLE**Observational Study**

- 6275 Quran memorisation and heart rate variability: How do they correlate?
Ghazali AR, Abd Warif NM, A Yazit NA, Juliana N, Ishak I, Ibrahim FW, Mat Ludin AF, Harun D, Abd Rahman S, Che Wan Mohd Rozali WNA

SYSTEMATIC REVIEWS

- 6285 Spectrum of delayed post-hypoxic leukoencephalopathy syndrome: A systematic review
Srichawla BS, Garcia-Dominguez MA

CASE REPORT

- 6302 Recurrent acute pancreatitis as an initial presentation of primary hyperparathyroidism: A case report
Karim MM, Raza H, Parkash O
- 6307 Combination treatment with telitacept, mycophenolate mofetil and glucocorticoids for immunoglobulin A nephropathy: A case report
Shen Y, Yuan J, Chen S, Zhang YF, Yin L, Hong Q, Zha Y
- 6314 Ruptured venous aneurysm associated with a dural arteriovenous fistula: Two case reports
Kim YS, Yoon W, Baek BH, Kim SK, Joo SP, Kim TS

- 6320** Novel procedure for hepatic venous outflow block after liver resection: A case report
Higashi H, Abe Y, Abe K, Nakano Y, Tanaka M, Hori S, Hasegawa Y, Yagi H, Kitago M, Kitagawa Y
- 6327** Comprehensive interventions for adult cyclic vomiting syndrome complicated by superior mesenteric artery syndrome: A case report
Liu B, Sun H, Liu Y, Yuan ML, Zhu HR, Zhang W

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Challenges in integrating traditional Chinese medicine and gut microbiota research for insomnia treatment

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Abstract

The gut microbiome is an extensive variety of bacteria with a range of metabolic capabilities that can be pathogenic, beneficial, or opportunistic. Changes in the gut microbiota's composition can affect the link between gut integrity and host health as well as cause disruptions to numerous neurological systems. The second most prevalent mental health problem, insomnia has a negative social and economic impact. Currently, it is becoming increasingly obvious how crucial it is to preserve the delicate balance of gut microbiota to treat illness-related symptoms like insomnia. Although traditional Chinese medicine has proposed an effective strategy against insomnia through gut microbiota alteration in animal models, studies in human models are limited. This decreases the predictive value of the studies in terms of human outcomes. This editorial places an emphasis on cultural sensitivity rather than scientific reasoning that promotes the use of traditional Chinese medicine (TCM). We aim to emphasize the concern that promoting TCM could divert resources from conventional medical research, leading to suboptimal care.

Key Words: Gut microbiota; Insomnia; Traditional Chinese medicine; Microbial gut-brain axis; Cultural sensitivity; Sleep disorders

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Core Tip: This editorial outlines the limitations of the application of traditional Chinese medicine (TCM) in treating insomnia. The paucity of research on human models decreases the reliability of scientific reasoning which backs the efficacy of combined microbial gut-brain axis and TCM treatment for insomnia. This editorial also emphasizes the cultural sensitivity surrounding TCM use. We also discourage excessive fund allocation to TCM research as it could harm the research potential of Western medicine which is more effective against insomnia.

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INTRODUCTION

Insomnia is the second most common mental health issue. Self-reported sleep difficulties that persist in starting or maintaining sleep, together with associated dysfunction during the day, are the hallmarks of insomnia disorder. The interplay between sleep, the immune system, and the central nervous system is disrupted by insomnia, which may increase the risk of depression, infections, heart disease, gastrointestinal issues, and respiratory ailments[1]. Traditional Chinese medicine (TCM) has been used for decades to treat a wide range of illnesses, including insomnia. It has been suggested that TCM treats insomnia by modulating gut flora[2]. This can be explained by recent research, which demonstrated that insomnia is linked to dysregulation of the gut-brain axis, and disruptions in the gut microbiota may exacerbate the illness. The study focuses on the interaction between insomnia, TCM, and the microbial gut-brain axis and promotes the combination of TCM with the microbial gut-brain axis to holistically treat insomnia[3]. A lot of scientific evidence backs the effectiveness of these strategies in treating insomnia; however, there is relatively less research supporting the efficacy of TCM in comparison to Western medicine. We aim to highlight the limitations surrounding the widespread practical implementation of TCM in treating insomnia.

TCM AND GUT MICROBIOTA FOR INSOMNIA

Integration of microbial gut-brain axis

The impact the gut bacteriome has on the brain has been evidenced by numerous studies conducted in recent decades and has sparked an unprecedented amount of interest among investigators worldwide. Since the field's inception in the early 2000s, numerous studies have advanced our understanding of the gut-brain axis by revealing the functional, causative, correlative, and mechanistic roles of the gut microbiota in host behavior and brain development[4]. The study mentions research that demonstrated that Suanzaoren Decoction could ameliorate the intestinal flora disorder caused by stress in sleep-deprived rats, decrease the number of harmful bacteria, increase the number of beneficial bacteria, and enhance the structure of intestinal flora[3]. In a similar vein, the majority of the studies conducted to date focus more on bacteria and the gut-brain axis and devote less attention to other microbes in the gastrointestinal tract. Other important members of gut microbiota include archaea, parasites, viruses, yeasts, and other fungi, but existing literature lacks data on these[4]. Their potential role in affecting the structure and function of the brain to expand our understanding of insomnia warrants further research. Another noteworthy research gap to highlight here is that the research mentioned in the study is conducted on rats, and animal studies are unreliably predictive of human outcomes. The unreliability of animal experimentation undermines the scientific arguments in favor of combining TCM treatments with the microbial gut-brain axis for insomnia. The complexity of gut microbiota and the human brain is not fully understood; thus, applying this theory in TCM treatments can eventually fail to improve human health reliably[5].

Economic considerations

Around 90% and 50% of insomnia patients in Japan and the United States, respectively, opt for pharmacotherapy. Drugs used for insomnia treatment include benzodiazepines and benzodiazepine-like drugs, melatonin receptor agonists, orexin receptor antagonists (ORAs), antidepressants, antihistamines, and anticonvulsants. Yue *et al*[5] conducted a network meta-analysis based on 69 double-blind studies with 20 individual drugs and 17319 patients. They concluded that ORAs are the best recommendation for insomnia treatment. Head-to-head efficacy trials of medicines widely used to treat insomnia are uncommon, and their efficacy and tolerability are rarely, if ever, thoroughly assessed. Consequently, carefully planned head-to-head pairwise trials, including these medicines, are required across a range of clinical groups [6]. Acupuncture, which has demonstrated effectiveness against insomnia, is a low-cost method, especially in areas where such traditional practices are already established. However, the development of TCM research has greatly affected the attention of researchers to increasing evidence quality, gathering data, and exploring evaluative techniques adaptive to TCM knowledge and theories[7]. This attempt and further research on combining the microbial gut-brain axis with TCM could divert resources and funds from conventional medical research and treatment that have stronger evidence of efficacy than TCM.

Cultural considerations and safety concerns in the use of TCM

According to research, belief in traditional Chinese cultural values, such as confucianism, affects the decision between Western medicine and TCM, with those adhering to these values having a more positive attitude towards TCM. Studies have shown that attitudes towards the application of TCM are not influenced by logical reasoning and rational cognition, rather it is based on cultural and emotional factors. However, cultural sensitivity should not come in the way of scientific reasoning[8]. Safety issues have arisen as a result of the extensive usage of Eastern medicine, particularly concerning herbal remedies. These include a poor quality control system and the adulteration of herbal remedies, which put patients at unnecessary risk. Toxic pollutants, heavy metals, pesticides, and other hazardous elements that are ingested, collected, and manufactured into pharmaceutical preparations can be found in TCM. Certain TCM and Indian herbal medicine formulations have been found to have significant concentrations of heavy metals such as lead, mercury, and arsenic[8]. Addressing quality control holds utmost importance to ensure that cultural practice does not compromise on the medical standards.

Summary

Recent research largely focuses on the gut bacteriome, overlooking other microbes that could influence neurological systems and affect sleep-wake balance. Even though TCM and acupuncture are low-cost methods, promoting TCM and microbial gut-brain axis research could distract investments from conventional medicine, which has greater efficacy evidence. Rather than logical reasoning, TCM preference is due to cultural values and emotional factors. TCM increases the risk of exposure to toxic pollutants and heavy metals due to poor quality control.

CONCLUSION

The integration of the microbial gut-brain axis with TCM for treating insomnia offers promising but complex possibilities. While the gut-brain connection is supported by numerous studies, the current focus on bacteria and the reliance on animal models present limitations. Economic considerations and the need for rigorous research and quality control highlight the challenges of validating TCM within modern medical frameworks. Cultural beliefs play a significant role in the preference for TCM, yet safety concerns and regulatory challenges must be addressed to ensure that traditional practices meet contemporary medical standards. A balanced approach that combines the strengths of TCM with scientific rigor could provide a holistic and effective treatment for insomnia.

FOOTNOTES

Author contributions: Bilal M and Nashwan AJ contributed to manuscript conceptualization, writing, editing, and literature review; all authors have read and approved the final manuscript.

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