Evaluation of the Relationship Between Sleep Quality and Gut Microbiota in Pregnant Women Based on Current Literature

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Abstract

Introduction: The pregnancy period is one of the times in a woman's life when sleep-related problems are most frequently experienced. It has been determined that sleep quality is poorer in approximately 86% of healthy pregnant women (1).

The microbiota refers to the living organisms residing in our bodies, which are thought to play a role in the body's normal functioning, hormonal regulation, and many other areas. The bacteria, viruses, and fungi within our flora make up our microbiota. The gut microbiota, in particular, has a wide range of influence due to the metabolites it produces, the genetic materials it contains, and the environmental conditions it affects (2).

Objective: In recent years, growing attention has been given to the relationship between the microbiota and a wide range of diseases, with efforts underway to identify new therapeutic approaches. In this study, we aim to review the current literature exploring the influence of gut microbiota on sleep quality in pregnant women.

Method: This research was conducted using the documentary analysis method. Two subject-matter experts reviewed the current literature on the relationship between gut microbiota and sleep quality in pregnant women to define the scope of the study. A literature search was carried out using the keywords “sleep quality and gut microbiota during pregnancy” in the Google Scholar and PubMed databases.

Findings: Neurotoxic metabolites such as ammonia and D-lactic acid produced by the gut microbiota can negatively affect brain function, sleep quality, and stress responses (3). It is considered that the consumption of certain metabolites by the gut microbiota may contribute to insomnia and cognitive decline (4). Alcohol consumption during pregnancy can also lead to significant changes in the gut microbiota (5). During the postpartum period, individuals with chronic fatigue syndrome have been found to exhibit a reduced diversity in their gut microbiota compared to normal postpartum women(6). Estrogen and progesterone, secreted during and before pregnancy, may also influence the gut microbiota, thereby exerting physiological effects on pregnancy and regulating weight gain (7). Supplementation with Lactobacillus rhamnosus HN001 during pregnancy has been shown to improve gut microbiota composition, resulting in a reduction in postpartum depression (8). Considering the link between depression and sleep, it can be inferred that gut microbiota may also play a role in this regard. In an animal experiment, the introduction of lactulose to pregnant mice led to improvements in gut microbiota, accompanied by increased small intestinal permeability and enhanced immunoglobulin absorption from the large intestine (9). Another study found that reduction of sleeping hours affects the gut microbiota and is associated with adverse metabolic health outcomes (10). Stress, infections, and antibiotic use during pregnancy can disrupt the gut microbiota, potentially leading to neurodevelopmental disorders in the infant (11). Similarly, disruptions in gut microbiota have been found to trigger stress in mothers (12). Since stress is known to negatively impact sleep quality, these findings support the idea that disrupted gut microbiota during pregnancy may lead to reduced sleep quality.

Conclusion: The influence of gut microbiota on sleep is being increasingly substantiated by more robust findings. Its impact on the pregnancy process has also recently become a subject of growing interest, with ongoing research in this area. Based on the studies conducted so far, it has been observed that gut microbiota can influence sleep quality in pregnant women. Therefore, enhancing and diversifying the gut microbiota may have a positive effect on sleep problems during pregnancy. Another study found that probiotic supplementation in adults was effective in improving sleep quality and reducing stress levels (13). Building on these findings, the effects of probiotic supplementation in pregnant women could be investigated. Additionally, the emerging concept of the microbiota–gut–brain axis (14) could be studied in pregnant women to explore its connection with sleep problems during pregnancy. Although gut microbiota is thought to play a role in sleep quality during pregnancy, there is still an insufficient number of studies with adequate scale and detail to draw definitive conclusions. Further large-scale and comprehensive research is needed to deepen understanding in this area.

Keywords

Pregnancy, Sleep Quality, Gut Microbiota, Sleep Disorders, Microbiota changes during Pregnancy.