Empowering Sleep Health: A Culturally Tailored Online Intervention for Black Pregnant Women

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Background:
Black pregnant women experience maternal mortality rates 7.6 times higher than their white counterparts in New Jersey, alongside significantly higher severe maternal morbidity rates. These shocking and unacceptable rates of death are primarily driven by systemic racism, low access to care, and higher rates of severe morbidities like hemorrhage and preeclampsia. One mechanism ripe for intervention that predicts maternal mortality and morbidity and related risk factors is sleep disturbance. Sleep disturbance affects up to 78% of pregnant individuals and is associated with adverse maternal and infant outcomes, including preterm birth, gestational diabetes, cesarean delivery, postpartum depression, and child developmental delays. Black pregnant women experience disproportionately poorer sleep quality during pregnancy and in general, in part due to aforementioned systemic factors. However, sleep disturbance is fairly easily treated using Cognitive Behavioral Therapy for Insomnia (CBT-I) and related behavioral sleep treatments. However, behavioral sleep interventions for this population remain scarce due to structural barriers, limited access, lack of awareness related to structural racism, and lack of tailored resources.

Objective:
This project aims to develop and pilot-test a culturally tailored, digital single-session intervention (SSI) incorporating CBT-I principles and AI personalization to improve sleep self-efficacy, sleep quality, and mental health among Black pregnant women.

Methods:
The study will recruit approximately 60 Black pregnant women in their second trimester. First, iterative focus groups (n = 20) will inform cultural tailoring of the intervention using stakeholder feedback. The finalized intervention will then be piloted in a sample of 50 participants using a pre-post design with a 1-month follow-up. Measures include sleep quality (PSQI), insomnia severity (ISI), depression symptoms (EPDS), motivation, perceived control, and satisfaction. Quantitative outcomes will be analyzed using paired t-tests and repeated-measures ANOVA, and qualitative data will undergo thematic analysis.

Innovation:

The intervention integrates four novel components:

1. cultural tailoring grounded in lived experiences of Black pregnant women,
2. AI-adapted digital delivery,
3. a scalable single-session behavioral intervention format, and
4. behavioral sleep skills beyond traditional sleep hygiene education.

Expected Results:

We anticipate improvements in sleep knowledge and motivation immediately post-intervention and improvements in sleep quality, insomnia severity, and depressive symptoms at one month, alongside high acceptability and engagement.

Impact:

This project addresses a critical maternal health disparity by providing accessible, non-pharmacologic behavioral care. Findings will support future large-scale funding applications and establish a scalable model for culturally tailored digital behavioral health interventions targeting perinatal populations.