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Editorial

Short-Term Practice of Pranayama Based Yoga Ensures Sympathovagal Balance and Facilitates Fetomaternal Outcomes in Gestational Diabetes in the 3rd Trimester of Pregnancy

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Gestational Diabetes Mellitus (GDM) is defined as any degree of glucose intolerance with the onset or first recognition during the present pregnancy at 24-28 weeks of gestation.[1] The prevalence of GDM in various regions of India ranges from 3.8% to 41%. In Tamil Nadu, the prevalence rate is 18.9%.[2]

Insulin resistance and β-cell dysfunction are the primary disorders associated with the pathogenesis of GDM. GDM typically arises from β-cell dysfunction against a backdrop of chronic insulin resistance during pregnancy. This leads to hyperglycemia and an increased glucose supply to the growing fetus. Genetic, epigenetic, and environmental factors also contribute to the development of GDM, with complex and evolving mechanisms. Additionally, factors such as adipose tissue expandability, low-grade chronic inflammation, gluconeogenesis, oxidative stress, and placental influences also contribute to the pathology of GDM.[3] Often, these impairments are present before pregnancy and can progress, increasing the risk of developing type 2 diabetes post-pregnancy.[4] In addition, several cross-sectional, retrospective and cohort studies have proven the connection between GDM and Cardiovascular Disease (CVD).[5]

Gestational diabetes is associated with sympathovagal imbalance in the form of impaired Heart Rate Variability (HRV) and Baroreflex Sensitivity (BRS), which were used as the early markers of sympathovagal imbalance in various disorders. Recently, we have reported that increase in LF-HF ratio, the marker of sympathovagal imbalance was prominently higher in GDM women at 36th week of pregnancy.[6]

Studies have reported that GDM negatively affects fetomaternal and neonatal outcomes. Maternal complications include a higher incidence of hypertension due to vascular dysfunction, development of type 2 diabetes, and vaginal tears. Fetal complications include macrosomia and shoulder dystocia, while neonatal complications involve asphyxia, hypoglycemia, kernicterus, and respiratory distress syndrome. Neonatal hypoglycemia results from maternal hyperglycemia and fetal hyperinsulinemia. Fetal hyperinsulinemia leads to macrosomia, as insulin is a known growth factor.

In developing countries, managing GDM is often ineffective due to socio-cultural factors, resulting in high maternal morbidity and mortality despite routine antenatal care. Most women with GDM, particularly milder cases, rely on dietary modifications, as pharmacological treatments are limited by concerns over side effects and a preference for alternative medicines. Given the significant fetomaternal morbidities and mortalities associated with GDM, therapeutic intervention is essential. Non-pharmacological therapies, such as yoga and slow pranayama, are valuable for high-risk pregnancies. Effective GDM management is crucial in India, where diabetes is prevalent and GDM frequently progresses to type 2 diabetes.

Several studies have also shown the direct effect of practice of pranayama on sympathovagal balance and fetomaternal outcomes. A study showed that a 2-month practice of various pranayama techniques decreased the Low Frequency (LF) of the heart rate variability spectrum (indicating a reduction in sympathetic drive to the heart), and increased the High Frequency (HF) of the HRV spectrum (indicating an increase in parasympathetic output to the heart), along with a reduction in the LF/HF ratio (indicating improved sympathovagal balance).[7] Many studies have reiterated the importance of pranayama for the maternal-fetal unit.[8,9]

A recent study sheds light on the promising effects of the short-course practice of yoga mainly slow pranayamas in pregnant women with GDM at 36th week of pregnancy. This study revealed that practice of yoga for about 2 weeks in the later part of 3rd trimester just prior to delivery was adequate to reduce cardiometabolic risks and fetomaternal outcomes in

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GDM patients.[10] This reduction in cardiovascular risks in GDM women could be due to facilitation of sympathovagal balance induced by HPA axis.

For healthcare practitioners, these findings highlight the importance of incorporating holistic practices like yoga into prenatal care for women with GDM. While conventional treatments are essential, pranayama-based yoga can serve as a beneficial adjunct therapy, enhancing physical, mental, and emotional well-being. For pregnant women, especially those with GDM, incorporating pranayama into their daily routine can be simple and effective. The practice is accessible, requiring no extensive equipment or space. By promoting sympathovagal balance and improving fetomaternal outcomes, pranayama offers a promising complementary approach to conventional GDM management strategies.

GDM women in later part of pregnancy, especially, those who are admitted to the hospital with high-risk with potential serious complications, need to adopt to a method which will be physically not harmful to them and growing fetus and also economically affordable. Yoga imparted at the bedside just few weeks before delivery is one of the best practices for such kind of interventions. Further research is needed to explore the long-term benefits and mechanisms of pranayama, but current findings provide a strong foundation for integrating pranayama-based yoga into prenatal care, particularly for those managing gestational diabetes.

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