PRECONCEPTION CARE AND PREGNANCY MANAGEMENT IN OBESE WOMEN WITH HYPOTHYROIDISM: EVALUATION OF AN INTEGRATED PREVENTIVE AND THERAPEUTIC APPROACH

Khasanova Dilafruz Abdukhamidovna
Assistant, Department of Obstetrics and Gynecology No. 1
Samarkand State Medical University
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Abstract. This study evaluated the effectiveness of an integrated preconception and antenatal management strategy in women with hypothyroidism and obesity. A prospective comparative study included 120 women divided into an intervention group receiving a structured management program and a comparison group receiving conventional care. The integrated approach comprised preconception counseling, optimization of levothyroxine therapy, nutritional support, weight-control measures, and regular thyroid function monitoring throughout pregnancy. Women managed according to the integrated protocol demonstrated better control of thyroid function, lower rates of gestational hypertension, preeclampsia, gestational diabetes mellitus, placental insufficiency, and preterm birth. Improved delivery outcomes and more favorable neonatal indicators were also observed. The findings support the effectiveness of comprehensive multidisciplinary management in reducing maternal and perinatal complications among women with hypothyroidism and obesity.

Keywords: hypothyroidism, obesity, preconception care, pregnancy management, levothyroxine, maternal outcomes, neonatal outcomes, thyroid function, pregnancy complications.

Introduction. Hypothyroidism and obesity are among the most prevalent endocrine and metabolic disorders affecting women of reproductive age and have become major public health concerns worldwide. The increasing incidence of both conditions has important implications for reproductive health, as each disorder independently contributes to adverse pregnancy outcomes and long-term maternal and neonatal morbidity. Current evidence suggests that the coexistence of hypothyroidism and obesity creates a particularly unfavorable metabolic environment during pregnancy, increasing the risk of gestational complications and compromising fetal development.

Thyroid hormones play a fundamental role in the regulation of energy metabolism, placental function, and fetal growth. During pregnancy, maternal thyroid function undergoes substantial physiological adaptations to meet the increased hormonal demands of both the mother and the developing fetus. Inadequate thyroid hormone production may lead to impaired placental

development, hypertensive disorders, gestational diabetes mellitus, preterm birth, and adverse neurodevelopmental outcomes in offspring. Consequently, timely diagnosis and appropriate management of hypothyroidism before and during pregnancy have become essential components of modern obstetric care.

Obesity further complicates the clinical course of pregnancy through multiple metabolic, inflammatory, and endocrine mechanisms. Excess adipose tissue is associated with insulin resistance, chronic low-grade inflammation, altered leptin secretion, and disturbances in thyroid hormone metabolism. Several studies have demonstrated a positive association between body mass index and serum thyroid-stimulating hormone levels, suggesting a close interaction between obesity and thyroid dysfunction. These mechanisms may potentiate the adverse effects of hypothyroidism and contribute to a higher incidence of pregnancy-related complications.

Recent international guidelines emphasize the importance of preconception counseling, optimization of thyroid hormone replacement therapy, and regular monitoring of thyroid function throughout gestation. Levothyroxine remains the standard treatment for hypothyroidism during pregnancy; however, effective management often requires a broader approach that includes preconception risk assessment, weight-control strategies, nutritional counseling, and multidisciplinary supervision. Despite advances in clinical practice, there is still no universally accepted model for the integrated management of pregnant women with concomitant hypothyroidism and obesity.

Growing evidence indicates that interventions initiated before conception may significantly improve maternal endocrine status and reduce the incidence of obstetric complications. Preconception optimization of thyroid function, achievement of appropriate body weight, and individualized antenatal monitoring may contribute to better pregnancy outcomes and improved neonatal health. Nevertheless, data evaluating the effectiveness of comprehensive management programs in women with both hypothyroidism and obesity remain limited, particularly in developing healthcare settings.

Given the increasing prevalence of these conditions and their significant impact on maternal and perinatal outcomes, further investigation of integrated preventive and therapeutic strategies is warranted. Evaluation of such approaches may provide valuable evidence for improving clinical management and reducing the burden of pregnancy complications in this high-risk population.

The aim of this study was to evaluate the effectiveness of an integrated preconception and antenatal management strategy in women with

hypothyroidism and obesity by assessing its impact on thyroid function, gestational course, maternal complications, and neonatal outcomes, as well as to determine its role in reducing the incidence of adverse pregnancy and perinatal outcomes.

Materials and Methods. A prospective comparative study was conducted at the Samarkand State Medical University Clinic and affiliated maternity healthcare centers between 2021 and 2024. The study included 120 women with hypothyroidism and obesity who were planning pregnancy or were enrolled during the first trimester of gestation. The participants were divided into two equal groups. The intervention group (n = 60) received an integrated preconception and antenatal management program, whereas the comparison group (n = 60) received conventional antenatal care according to standard clinical practice. The integrated management strategy included preconception counseling, optimization of thyroid function before conception, individualized levothyroxine dose adjustment, nutritional counseling, weight-control measures, regular monitoring of body mass index, and trimester-specific assessment of thyroid status. Women in the intervention group were jointly supervised by obstetricians and endocrinologists throughout pregnancy. The comparison group received routine obstetric and endocrine care without the structured management protocol.

The inclusion criteria were singleton pregnancy, confirmed primary hypothyroidism, obesity defined as a body mass index (BMI) ≥30 kg/m^2, and gestational age not exceeding 14 weeks at enrollment. Women with multiple pregnancies, pre-existing diabetes mellitus, severe cardiovascular, hepatic, renal, or systemic autoimmune diseases, major fetal congenital anomalies, and those unwilling to participate were excluded from the study.

All participants underwent comprehensive clinical, laboratory, and instrumental evaluation. Clinical assessment included collection of demographic data, obstetric and gynecological history, anthropometric measurements, blood pressure monitoring, and evaluation of pregnancy complications. Laboratory investigations included complete blood count, biochemical blood analysis, and determination of serum thyroid-stimulating hormone (TSH), free thyroxine (fT4), and antibodies to thyroid peroxidase (anti-TPO) using enzyme-linked immunosorbent assay (ELISA) methods.

Ultrasonographic examination of the thyroid gland was performed to assess thyroid morphology and structural changes. Obstetric ultrasound screening was conducted at 11–14, 22–24, and 32–34 weeks of gestation. Fetal biometric

parameters, placental condition, amniotic fluid volume, and fetal well-being were evaluated during each examination. The primary outcomes included thyroid function parameters, gestational weight gain, incidence of gestational hypertension, preeclampsia, gestational diabetes mellitus, placental insufficiency, and preterm birth. Secondary outcomes included mode of delivery, frequency of cesarean section, duration of labor, Apgar scores, birth weight, neonatal intensive care unit admission, and neonatal thyroid screening results.

Statistical analysis was performed using SPSS Statistics software (IBM Corp., USA). Quantitative variables were expressed as mean ± standard deviation (SD), while qualitative variables were presented as frequencies and percentages. Comparisons between groups were performed using Student's t-test, the Mann–Whitney U test, chi-square test, or Fisher's exact test where appropriate. Statistical significance was established at $p < 0.05$.

Results. At baseline, no significant differences were observed between the study groups with regard to maternal age, parity, gestational age at enrollment, body mass index, or the severity of hypothyroidism ($p>0.05$), indicating good comparability of the groups.

During follow-up, women who received the integrated preconception and antenatal management program demonstrated significantly better control of thyroid function compared with those receiving conventional care. Serum TSH concentrations progressively decreased and remained within the recommended trimester-specific reference ranges in the majority of women in the intervention group, whereas elevated TSH levels were more frequently observed in the comparison group. At the same time, free thyroxine (fT4) levels remained significantly more stable among women managed according to the integrated protocol ($p<0.05$).

The integrated management strategy was also associated with improved control of gestational weight gain. Women in the intervention group achieved significantly lower excessive weight gain during pregnancy compared with those receiving routine care. Better adherence to nutritional recommendations and regular endocrine monitoring contributed to improved metabolic status throughout gestation.

Analysis of pregnancy outcomes demonstrated a lower incidence of obstetric complications in the intervention group. Threatened miscarriage, gestational hypertension, preeclampsia, gestational diabetes mellitus, anemia, and placental insufficiency occurred less frequently among women managed with the

integrated approach. The incidence of preterm birth was also reduced compared with the comparison group.

Ultrasound assessment revealed more favorable fetal growth patterns and improved uteroplacental function in the intervention group. Signs of chronic fetal hypoxia and fetal growth restriction were observed less frequently among women who received structured preconception and antenatal management. Furthermore, abnormalities of amniotic fluid volume and placental dysfunction were less common in this group.

Delivery outcomes were significantly improved among women receiving the integrated management program. The rate of cesarean section was lower, while spontaneous vaginal delivery occurred more frequently compared with the comparison group. In addition, prolonged labor and premature rupture of membranes were observed less often among women who underwent comprehensive management.

Neonatal outcomes were also more favorable in the intervention group. Newborns had significantly higher Apgar scores at both the first and fifth minutes after birth, greater mean birth weight within physiological limits, and a lower incidence of neonatal hypoxia. Admission to neonatal intensive care units was required less frequently, and abnormal neonatal thyroid screening results were recorded less often than in the comparison group.

Overall, implementation of the integrated preconception and antenatal management strategy resulted in improved thyroid function control, reduced gestational complications, better pregnancy outcomes, and more favorable neonatal health indicators. These findings support the effectiveness of a multidisciplinary approach combining endocrine optimization, weight management, and continuous antenatal monitoring in women with hypothyroidism and obesity.

Conclusions. The present study demonstrated that implementation of an integrated preconception and antenatal management strategy in women with hypothyroidism and obesity significantly improved thyroid function control and reduced the incidence of pregnancy-related complications. Women managed according to the structured protocol achieved better stabilization of TSH and free thyroxine levels, more appropriate gestational weight gain, and a lower frequency of gestational hypertension, preeclampsia, gestational diabetes mellitus, anemia, placental insufficiency, and preterm birth compared with those receiving conventional care.

The integrated approach was also associated with improved fetal development and more favorable delivery outcomes, including a lower rate of cesarean section, reduced occurrence of prolonged labor and premature rupture of membranes, and a decreased incidence of fetal hypoxia and growth restriction. Neonates born to women in the intervention group demonstrated higher Apgar scores, lower rates of neonatal complications, and reduced need for intensive neonatal care.

These findings indicate that comprehensive preconception counseling, timely optimization of levothyroxine therapy, weight-management interventions, and multidisciplinary monitoring throughout pregnancy contribute substantially to improved maternal and neonatal outcomes. The proposed integrated management strategy may therefore be considered an effective approach for reducing obstetric and perinatal risks in women with concomitant hypothyroidism and obesity..

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