**MATERNAL POSITIONS IN ELECTRONIC FETAL MONITORING: IMPACT AND EVALUATION**

**Trial registration:** In addition, clinical trials were registered (ClinicalTrials.gov ID: NCT05863156).

The American College of Obstetricians and Gynecologists (ACOG) states that electronic fetal monitoring can be conducted in the semi-Fowler position, where the individual lies on their back with their head elevated at a 30-degree angle, or in the sitting or lateral side-lying position.[8] The woman's position during EFM greatly influences the indication of fetal reactivity.[4] Few articles in the literature focus on less commonly used positions and assess the utilization and effects of right and left lateral positions, semi-Fowler positions, and sitting positions.[1] Emphasis has been placed on the need for investigations into different positions to ensure maternal comfort, maternal, and fetal well-being.[4,10] Thus, this study was conducted to evaluate the impact of various positions on maternal comfort, maternal blood pressure, and fetal health during antenatal electronic fetal monitoring.

**Research Hypotheses:**

**H1:** The semi-Fowler position during electronic fetal monitoring will result in significantly higher maternal comfort compared to the left lateral and right lateral positions.

**H2:** The semi-Fowler position will result in a significantly shorter duration of cardiotocography (CTG) compared to the left lateral and right lateral positions.

**H3:** The semi-Fowler position will produce statistically significant improvements in fetal health indicators, such as fetal heart rate accelerations and fetal movements, during CTG compared to the left lateral and right lateral positions.

**H4:** Maternal systolic and diastolic blood pressure will vary significantly based on the maternal position during CTG, with the semi-Fowler position providing a more stable blood pressure profile than the left lateral and right lateral positions.

**Methods**

**Study Design:** This study was conducted at the pregnancy monitoring polyclinic of an obstetrics hospital in Istanbul between December 2021 and January 2023. It employed an experimental design as a randomized controlled trial with two intervention groups and one control group to evaluate the impact of maternal and fetal health based on the position of the pregnant woman during electronic fetal monitoring. The study analysis followed the Consolidated Standards of Reporting Trials (CONSORT) reporting guideline.

**Study Population:** The study's universe consisted of 12.000 individuals registered for electronic fetal monitoring at a hospital obstetrics polyclinic in the last year. The G*Power 3.1.9.4 program was used to calculate the study sample size. Calculations indicated an effect size of d:0.5 (medium) at a confidence interval (CI) of 95%. The sample size was initially set at 210 individuals but was increased by 15% to 240 to account for potential participation refusals.

**Randomization:** Participants were assigned to intervention and control groups using a computer-generated random sequence from random.org(www.randomizer.org). Allocation concealment was maintained by an independent researcher who was not involved in the data collection process. A total of 240 participants were randomly allocated into three groups: 60 participants in the right lateral position (Intervention 1), 60 in the semi-Fowler position (Intervention 2), and 120 in the left lateral position (Control group).

**Inclusion Criteria:** Participants met several inclusion criteria, including being over the age of 18, aged 35 or younger, in the late third trimester (34th-40th gestational week), having fetal biometric measurements corresponding to the 34th-40th gestational week, having a single fetus, no maternal or fetal risk factors affecting pregnancy, normal vital signs before the procedure, not fasting for more than 2 hours before the procedure, and accepting the suggested positioning.

**Data Collection Tools:**

**Information Questionnaire:** This questionnaire comprised 35 items covering the pregnant women's sociodemographics, obstetric data, vital signs (blood pressure-BP, pulse, temperature, and oxygen saturation-$SPO_2$) before, during, and after CTG. It also included fetal monitoring findings assessed four times during the procedure (at 0-5 min., 6-10 min., 11-15 min., 16-20 min.) along with the position of the pregnant woman.

**General Comfort Questionnaire-Short Form (GCQ-SF):** Developed by Kolcaba in 2006, this questionnaire measures comfort across sub-dimensions of relief, ease, and transcendence. It contains both positive and negative items, with negative items scored in reverse. Scores are calculated by dividing the total score by the number of items, resulting in values between 1 (low comfort) and 6 (high comfort).[11-13]

**Procedure:** Electronic fetal monitoring at the hospital was performed by midwives and nurses, with each session lasting 20 minutes. Pregnant women were assigned numbers upon arrival, and random assignment to groups was done with the support of an independent clinic midwife and nurse, ensuring a single-blinded design. The same midwife and nurses conducted all procedures throughout the study.

The intervention group, comprising 120 pregnant women, was further divided into two subgroups: 60 women were assigned to the right lateral position (Intervention 1), and 60 women to the semi-Fowler position (Intervention 2). The positions were explained to the participants, and vital signs were monitored at regular intervals before, during, and after the CTG procedure.

The control group, also consisting of 120 women, adhered to the clinic's routine practice of the left lateral position. All women in this group were placed in the left lateral position, with the remainder of the procedure conducted in the same manner as for the intervention groups. Researchers supervised all monitoring and follow-up assessments (Figure 1).

**Fig. 1.** CONSORT flow diagram.