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The Effect of Pregnant Follow-up with Home Visits on Perinatal Outcomes

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Pregnancy is a natural process that results in physiological and psychological changes in expectant women. However, it can also result in complications that could be dangerous for both the pregnant woman and the fetus. Therefore, early identification of risks ensures the safety of women. During this period, expectant women need access to health services for a safe birth experience. However, studies in the literature have shown that during pregnancy, women resort to unsafe sources such as the internet instead consulting health care professionals to meet their pregnancy-specific information and counseling needs (Nawabi et al., 2022; Şahin et al., 2019). To ensure that pregnant women have a healthy birth and postnatal period, it is very important to increase their knowledge during the prenatal period.

On the other hand, not having enough information about these processes can lead to danger signs being noticed late, anxiety, and difficulty coping during birth, and education and counseling during this period can improve the birth experience (Dessu et al., 2018; Acharya et al., 2015; Dessu et al., 2018).

Women's lack of knowledge about pregnancy, childbirth, and the postpartum period is also associated with cesarean section rates (Yanıkkerem, 2018). A high cesarean section rate is a public health issue, and Turkey has a cesarean section rate of 58.4%, ranking second among Organization for Economic Co-Operation and Development (OECD) countries in terms of cesarean section rates (Turkish Ministry of Health, 2021). Numerous studies investigating the impact of women's birth preferences have shown that education received during pregnancy has a significant effect on birth preferences (Karkın et al., 2021; Onchonga et al., 2020; Özceylan et al., 2020; Yanıkkerem, 2018).

Antenatal care integrated with home visits by midwives and nurses increases the perinatal knowledge of pregnant women, helping them recognize danger signs and prepare for complications. Routine antenatal care is limited to four follow-up visits, focusing mainly on physical examination and health assessment; therefore, insufficient time is allocated for education and counseling. In integrated care, the number of visits is increased to eight, and women can receive more comprehensive and effective education and counseling in their own

living environment, which can improve the quality of care compared with standard practices (Mohaghegh et al., 2023; Mueller et al., 2020). Home visits to pregnant women are a promising model for reaching pregnant women and providing a healthy start to life (Downe et al., 2019; UNICEF & World Health Organization, 2015; Zinsser et al., 2020). Therefore, the development and implementation of programs integrated with home visits is highly important for increasing the health knowledge of pregnant women and ensuring that they are better prepared for possible risks during the prenatal period. In this study, the Antenatal Care Integrated with Home Visits (ANHOMVI) program was implemented to increase pregnant women's perinatal knowledge, improve birth outcomes, and evaluate important health indicators such as breastfeeding and depression during the postpartum period. The research hypotheses were as follows: the quality of care delivered in the intervention improves maternal and neonatal outcomes; a high proportion of those participating in the intervention will exclusively breastfeed; and perinatal knowledge scores will increase from before to after the intervention. In addition, by evaluating the effectiveness of this program, we aimed to understand the impact of home visits on antenatal care and education and thus how they improve pregnancy and birth outcomes.

Methods

Study Design: In this study, a randomized controlled trial design was used. The aim of this study was to assess whether the combination of home visits and traditional antenatal care leads to better perinatal outcomes than standard antenatal care alone does and to assess the level of perinatal knowledge. It also aimed to evaluate the quality of antenatal care for pregnant women with and without the ANHOMVI program.

Setting and Sample: This study was conducted between July 2020 and January 2022 in Family Health Centers (FHC) in Istanbul, Turkey. Family health centers are institutions where primary health care services are provided. In these centers, pregnancy and postnatal follow-ups are carried out by midwives. However, in Turkey, antenatal care is also provided by obstetricians/gynecologists in public and private hospitals. Pregnant women who were registered at the family health center on the basis of address composed the study population.

Sampling and Randomization:

There are 38 family health centers in the Kadıköy district, and 433 pregnant women in the first trimester were registered at these institutions when this study was conducted. The inclusion

criteria were age ≥18 years, primipara in the first trimester, low-risk pregnancy, having a single fetus and receiving antenatal care in a hospital or FHC. The G*Power-3.1.9.2 program determined the sample size on the basis of four or more sessions of antenatal care (90%) of the Turkish Demographic and Health Survey (Hacettepe University Institute of Population Studies, 2019) and a 95% confidence interval (CI). In the calculations, the sample size was found to be 54. Considering the refusals to participate in the research, a 20% larger sample size was included, and 64 pregnant women (intervention group=32, control group=32) were randomly included in the study groups using the website randomizer.org. The 433 women listed in the FHC are listed by number in an Excel file. The numbers in this list were randomized by assigning unique numbers to two groups on the random.org website, and a sampling method was applied. With respect to the randomization of the study, a total of 64 pregnant women were included, the centers where these pregnant women were located differed, and the study was conducted with pregnant women registered in 15 family health centers in total. Blinding could not be performed in the study because of the intervention conditions.

A post hoc power analysis was conducted to determine whether the withdrawal of participants affected the statistical power of the study. This analysis was based on the primary outcome of the study, which was the difference in perinatal knowledge posttest scores between the intervention and control groups. Using G*Power software, an effect size (Cohen's d) of 1.71 was calculated on the basis of the observed difference in mean posttest scores and standard deviations. In the sample of 54 participants (26 interventions, 28 controls), the post hoc power was 0.99 at an alpha level of 0.05, indicating that the study retained sufficient power despite dropouts.

Data Collection Instruments: A total of five data collection forms were used in the study.

The Descriptive Data Form consists of a total of 46 questions, including sociodemographic information such as age, marital status, and education level; obstetric history, including the number of pregnancies, miscarriages, and mode of delivery; and current pregnancy history, including gestational week and presence of bleeding (Aksu, 2020; Altıparmak & Coşkun, 2016).

The Perinatal Knowledge Form contains questions about the participants' pregnancy, birth and postpartum information (Aluş Tokat et al., 2010; Meghea et al., 2013; Taş et al., 2019). The Perinatal Information Form was prepared to assess the level of knowledge of pregnant women

on nutrition, healthy lifestyle during pregnancy, physiological complaints, preterm birth and danger signs, physiology of birth, relaxation at birth and methods of coping with pain, postpartum puerperium, newborn care and breastfeeding. The form was developed on the basis of existing validated instruments and adapted to the local context through expert consultation. The Kuder–Richardson reliability formula is used to convert perinatal data into a score. A reliability coefficient of 0.80 or above is recommended. This form was used twice in the study for the pretest and posttest. The reliability coefficient of the perinatal data form was 0.83 for the pretest and 0.87 for the posttest.

The Perinatal Data Assessment Form consists of 39 questions and collects data on the participants' postpartum childbirth methods, gestational weeks at birth, interventions applied during childbirth, skin-to-skin contact, initial breastfeeding time, and postpartum breastfeeding status, as well as information about their social support situation (Şahin et al., 2019; Yılmaz Esencan et al., 2018).

The Breastfeeding Self-Efficacy Scale consists of 33 items developed by Dennis in 1999. The Cronbach's alpha for the scale was 0.96. This scale was later converted to the Breastfeeding Self-Efficacy Scale-Short Version, which contains 14 items. The validity and reliability of the short version of the Turkish version were assessed by Aluş et al. (2010). The Cronbach's alpha coefficient for the short version was 0.94. It is a 5-point Likert scale (1= "I am not sure" and 5= "I'm always sure"). The minimum and maximum scores are 14 and 70, respectively. Higher scores indicate higher levels of breastfeeding self-efficacy (Aluş Tokat et al., 2010). The Cronbach's alpha value of the tool in this study was 0.89.

The Edinburgh Postnatal Depression Scale (EPDS) is a 4-point Likert instrument with ten items scored between 0 and 3. Aydın et al. (2004) adapted the EPDS into the Turkish version. The lowest score is 0, while the highest score is 30. The cutoff value was 12.5. Four items (3, 5, 6, 7, 8, and 9) were evaluated in reverse order. The Cronbach's alpha for the scale was 0.79. The Cronbach's alpha value of the tool in this study was 0.86.

Antenatal Care Qualified Assessment Form: In Özvarış and Akın's study, six basic categories related to antenatal care were defined to assess the quality of AC. These categories were evaluated for several parameters (tetanus vaccination; weight, hemoglobin, blood pressure, and fetal heart rate (FHR) measurements at any of the follow-ups; and taking iron supplements during pregnancy), and each of them was given 1 point. The evaluation scores include the following: a good degree of completion: 5–6 points, moderately complete: 3–4 points, and poorly complete: 1–2 points (Özvarış & Akın, 2002).

Data Collection: Data collection was carried out prospectively during the antenatal period between the 10th and 36th weeks of pregnancy and during the first month after delivery. All the data were collected at the same number of gestational weeks in the intervention and control groups. During the first antenatal follow-up, the Introductory Information Form, Perinatal Information Form (pretest) and Antenatal Care Qualified Assessment Form were administered during face-to-face interviews at the FHC. During all subsequent follow-up weeks, the Antenatal Care Qualified Assessment Form was completed again at both the FHC visit and the home visit (only in the intervention group). The Perinatal Information Form (posttest) and Antenatal Care Qualified Assessment Form were administered at the last follow-up of the antenatal period at weeks 34–36. Postnatal assessments were conducted at the ASM between the 7th and 14th days after delivery, and at this stage, the Perinatal Assessment Form, Edinburgh Postnatal Depression Scale and Breastfeeding Self-Efficacy Scale were completed. Thus, the data collection process was carried out in both groups in a structured, systematic and predetermined manner.

Study Procedure: *ANHOMVI (Antenatal Care Integrated with Home Visits Intervention) is an intervention program that includes home visits integrated into antenatal care services for pregnant women. The content and visit timing of the program were developed on the basis of the World Health Organization antenatal care guidelines published in 2016 and the existing antenatal care follow-up protocol of the Turkish Ministry of Health* (Kurnaz et al., 2015; *WHO, 2016).*

Pregnant women in the intervention group underwent a total of eight follow-ups: four at the FHC and four in-home visits. The weeks of follow-up at the FHC were determined in line with the Ministry of Health national pregnancy follow-up protocol (i.e., 0–14th, 18–24th, 28–32nd, 30th, and 36–38th weeks of gestation), while the remaining four follow-ups were conducted at home in accordance with WHO recommendations (i.e., 28–30th, 32–34th, 34–36th, and 36–38th weeks).

Content of Home Visits:

During the home visits, standard antenatal care components were applied; medical history, general physical examination, abdominal and pelvic examination, edema and varicose veins were checked. These visits lasted an average of 30 minutes and were performed by trained health personnel.

Education Program:

Within the ANHOMVI program, a training module was offered in addition to home visits to increase the level of knowledge about the pregnancy process. The topics covered in the training included the physiology of pregnancy, common complaints during pregnancy and coping methods, danger signs during pregnancy, stages of labor, coping with fear and pain of childbirth, birth planning and hospital selection, the postnatal period and infant care, and the use of breast milk and breastfeeding.

The training consisted of face-to-face lectures, PowerPoint presentations, question-answer sessions and demonstrations of practical exercises and lasted approximately 90 minutes. Trainings were initiated during the first home visit and reinforced during subsequent visits (Figure 1).

Figure 1 here

Control Group: Pregnant women in the control group followed the routine steps of national antenatal care follow-up procedures (4 follow-ups at the hospital or FHC) and underwent physical examination and laboratory tests at the hospitals (public or private hospital or FHC) where they were admitted. The researchers accessed the records of these follow-ups using the National Public Health System. Finally, an interview was conducted at the FHC during the first postnatal month.

Ethical Approval: This study was conducted in accordance with the ethical standards of the 1964 Declaration of Helsinki and its later amendments. Approval for the research protocol was obtained from the Institutional Review Board of the xxxxx Observational Research Ethics Committee. Institutional permission was granted by the Istanbul Provincial Health Directorate. All the participants provided written informed consent before they participated in the study.

Clinical Study Registration: Since our research constituted a randomized controlled study, it was registered on the ClinicalTrials.gov website under ClinicalTrials ID No. NCTxxxxx.

Data Analysis: The data were analyzed using IBM SPSS Statistics for Windows, Version 25.0 (IBM Corp., Armonk, NY, USA).Independent t tests were used to compare quantitative data between groups in cases where the data were normally distributed. For nonnormally distributed data, the Mann–Whitney U test and Kruskal–Wallis test were used. Chi-square analysis was

used to examine the correlations between categorical variables. Statistical significance levels of $P<0.05$ and $P<0.01$ were accepted.