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Abstract

Maternal Factors and Breast Anatomy and Milk Production during Established Lactation †

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Abstract: Animal models show a more rapid mammary gland response and more milk with subsequent lactations, as well as impairment of lactation performance by obesity. Whilst maternal obesity is linked to reduced breastfeeding initiation, breastfeeding confidence, and duration as well as early introduction of formula, maternal adiposity, breast anatomy and milk production (MP) have not been assessed in this population. Thirty-four lactating mothers 1–6 months postpartum and with BMI range of 17–35 kg/m^2 participated in this study. We conducted ultrasound examination imaging to assess breast anatomy. The amount of glandular tissue (glandular tissue representation (GTR)) was classified as low, moderate, or high. Number and diameters of milk ducts as well as mammary blood flow (the resistive index) were measured. Maternal bra cup volume was calculated from current bra size. Maternal body composition was measured with bioimpedance spectroscopy. Mothers completed a questionnaire regarding their medical, obstetric and lactation history, and conducted a 24 h MP study to enable calculation of total volume, average and maximum feed volumes and breast storage capacity (24 h MP parameters). For statistical analysis, we used the correlation networks method (directions of multiple significant correlations are reported). Correlation networks show that pathways culminating in either high or low MP start as early as puberty. In this study, later menarche correlates with the absence of breast growth during both puberty and pregnancy, which further correlate with lower numbers of ducts and smaller diameters. Higher maternal adiposity correlates with larger bra cup volume (both correlate with absence of breast growth during pregnancy and low GTR) and lower 24 h MP parameters. Larger numbers of ducts and duct diameters correlate with higher parity and longer durations of previous lactations, and higher 24 h MP parameters. Mammary blood flow shows no correlations. Findings from this cross-sectional study corroborate animal studies showing that a number of modifiable and non-modifiable maternal factors may impact breast development and MP. Further research may inform interventions, such as maintaining healthy adiposity not only during pre-conception, pregnancy, and lactation, but as early as childhood and potentially infancy. Moreover, the results provide rationale for antenatal lactation assessment of women and intervention in high-risk mothers to ensure they reach their full lactation potential.

Keywords: breastfeeding; lactation; milk production; breast anatomy; body composition; glandular tissue; milk ducts; ultrasound

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