Purpose: The aim of this study was to evaluate and compare the rate of sister chromatid exchange (SCE), the occurrence of micronuclei, and the lymphocyte proliferation rate index (PRI) in patients with breast cancer, their first-degree relatives, and healthy volunteers. Methods: We analyzed the frequency of SCE and micronuclei, and the PRI in the peripheral blood lymphocytes of 30 women with breast cancer, 22 of their female family members, and 20 age-matched healthy female volunteers. Results: SCE occurred significantly more often in the lymphocytes of breast cancer patients (10.84±0.4 per metaphase), compared with their first-degree relatives (7.45±0.54) and controls (5.94±0.2) (p<0.001 for both). The mean SCE frequency was not statistically different between first-degree relatives and controls (p=0.071). Similarly, micronuclei occurred at a significantly higher rate in breast cancer patients (9.6±0.72), and in their first-degree relatives (7±0.64), compared to controls (3.85±0.4) (p<0.001 and p=0.001, respectively). There was also a significant difference between the occurrence of micronuclei in patients compared to their family members (p=0.021). The PRI was significantly lower in patients (1.61±0.1), compared with both their first-degree relatives (1.75±0.1), and controls (1.74±0.1) (p=0.001 and p=0.002, respectively). Conclusion: Increased SCE and the occurrence of micronuclei, as well as a reduced PRI are associated with breast cancer. Furthermore, increased SCE and the frequency of micronuclei in a first-degree relative suggest that they exhibit greater genetic instability than women of the same age.