Relationship of Dietary Acid Load Index with Pathobiological Markers and the Odds of Breast Cancer: A Case-Control Study

Zeinab Azizian[1], Saba Hesami[1], Seyed Ali Razavi Nasab[2], Adele Khodabakhshi[3], Vahideh Aghamohammadi[4], Arash Rafeei Nia[2], Hadi Bazyar[2*]

[1]Student Research Committee, Sirjan School of Medical Sciences, Sirjan, Iran
[2]Sirjan School of Medical Sciences, Sirjan, Iran
[3]Department of Nutrition, Faculty of Public Health, Kerman University of Medical Science, Kerman, Iran
[4]Department of Nutrition, Khalkhal University of Medical Science, Khalkhal, Iran

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***Corresponding Author:**
Sirjan School of Medical Sciences, Sirjan, Iran

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ABSTRACT

Introduction: Breast cancer (BC) is the most common cancer and the leading cause of death in women worldwide. Among the identified risk factors, the crucial role of diet as a potential environmental factor in the incidence of BC is significant. This study was conducted to determine the relationship between the dietary acid load (DAL) index with pathobiological markers (tumor size, Ki-67 marker, histological grade, and tumor stage) and the odds of BC in Iranian women.

Methods and Materials: In this case-control study, 155 women with BC and 155 cancer-free women (18-70 years old) were recruited from Kerman City, Iran, using a convenience sampling method. DAL score was calculated based on dietary data obtained from a 168-item food frequency questionnaire. DAL included two profiles: potential renal acid load (PRAL) and net endogenous acid production (NEAP). PRAL was measured based on the dietary intake of five nutrients, including protein, potassium, phosphorus, magnesium, and calcium. NEAP was estimated based on the ratio of dietary protein to potassium. Linear regression with adjustment for confounding factors was used to determine the relationship between DAL with tumor size and the Ki-67 marker. Logistic regression, adjusted for confounding factors, was employed to investigate the odds ratio (OR) of BC according to DAL quartiles compared to the reference (OR = 1), with 95% confidence intervals (CI). The Spearman test measured the correlation between the index quartile with histological grade and tumor stage.

Results: A significant positive relationship was observed between the NEAP and PRAL with tumor stage (coefficient = 0.27; p = 0.001 and coefficient = 0.17; p = 0.02, respectively). However, there was no significant relationship between the NEAP and PRAL indices with histological grade ($p \geq 0.05$). In the crude and adjusted models, no significant correlation was found between the NEAP and PRAL indices with the tumor size and Ki-67 marker ($p \geq 0.05$). Also, in the crude model and the adjusted models, no significant relationship was observed between the quartiles of the NEAP and PRAL indices with the odds of BC.

Conclusion and Discussion: In this study, there was no relationship between the DAL indices (NEAP and PRAL) and the OR of BC. Future studies with prospective designs are necessary for a more detailed examination of the proposed hypothesis.

Keywords: Breast neoplasms, Ki-67 antigen, Women's health

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