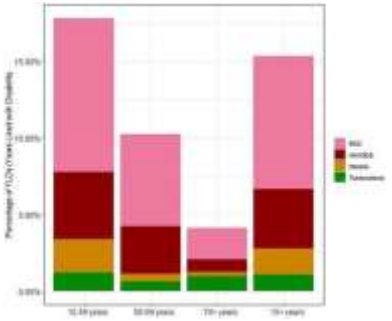
Eating Disorders' Influence on Development of Gynecological Disorders: An Epigenetic Perspective

Sabeeca Sajid

Eating disorders disproportionately affect females and are associated with significant endocrine and reproductive disruptions; however, the relationship between eating disorders and the development of gynecological disorders remains insufficiently explored. Epigenetics provides an integrative framework for understanding how environmental, psychological, and biological factors interact to influence disease vulnerability across the lifespan. While epigenetic mechanisms have been independently implicated in both eating disorders and gynecological disorders, research examining epigenetics as a shared mediating pathway between these conditions remains limited. Understanding this link is particularly important given that women report higher rates of mood disturbances than men, and the differences in reporting can not account for more than a fraction of these differences observed (OECD, 2025). Psychological stress has been shown to influence epigenetic regulation of gene expression, including DNA methylation processes.

This paper presents a narrative literature review, drawing on secondary data from peer-reviewed studies, to examine and synthesize potential epigenetic mechanisms linking eating disorders specifically Anorexia Nervosa, Bulimia Nervosa, and Binge Eating Disorder with gynecological disorders, including Polycystic Ovarian Syndrome, endometriosis, and ovarian and cervical cancers. By synthesizing existing evidence, this review highlights shared biological pathways, identifies gaps in the literature, and proposes directions for future interdisciplinary research. Such an approach underscores the importance of multidisciplinary treatment frameworks for eating disorders, enhances understanding of biological vulnerability in females, and informs potential preventative strategies aimed at promoting adaptive epigenetic regulation.



This graph by Global Burden of Disease database (2019) represents that the percentage of years lived with benign gynecological concerns (pink bar) are the most, when compared to tuberculosis, AIDS, and malaria. Thus indicating that it is imperative to maintain a holistic perspective in understanding these concerns, such as their link to mental health.

Some examples of epigenetic effects on both eating disorders and gynecological disorders

Linked epigenetic pathways	Effect on Eating Disorder symptoms	Effect on gynecological disorders
Dysregulation of Insulin signaling genes	Dysregulated insulin in cases of BN and BED. Altered metabolic gene expression in AN patients.	Insulin resistance – PCOS Risk of insulin-driven tumor growth – gynecological cancers
Methylation in glucocorticoid receptors	Cortisol dysregulation; compulsive behavior; appetite changes.	Increased stress increases hormonal imbalance, and supports survival of tumor cells.
Estrogen signaling pathway dysfunction	Amenorrhea; suppression of reproductive hormones.	Estrogen imbalance; hyperandrogenism; estrogen-driven tissue proliferation.