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Journal of Cancer Science and Research

Commentary

Risk of Epithelial Ovarian Cancer in Women Carrying *BRCA1* and *BRCA2* Mutations

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ABOUT THE STUDY

Epithelial ovarian cancer is a complex disease, affecting thousands of women worldwide. Among the various risk factors associated with this type of cancer, mutations in the *BRCA1* and *BRCA2* genes have been identified as major contributors to elevated susceptibility. *BRCA1* and *BRCA2* are tumor suppressor genes involved in repairing damaged DNA, therefore maintaining the character of a cell's genetic material. Mutations in these genes can considerably increase the risk of developing certain cancers, including breast and ovarian cancer. Women carrying mutations in either *BRCA1* or *BRCA2* have a higher lifetime risk of developing epithelial ovarian cancer compared to the general population. The presence of a *BRCA1* or *BRCA2* mutation greatly raises the risk of developing epithelial ovarian cancer. Studies have shown that women with these mutations have a lifetime risk of 40-60% for developing ovarian cancer, compared to the average population risk of approximately 1-2%. This increased risk concentration, the key role these genetic mutations play in the start of this specific type of cancer.

Specificity of *BRCA1* and *BRCA2* mutations in ovarian cancer

Both *BRCA1* and *BRCA2* mutations are associated with an increased risk of ovarian cancer, but they may differ in certain aspects. *BRCA1* mutations, for instance, are more strongly linked to a higher risk of developing serous ovarian cancer, one of the most common subtypes. Also, *BRCA2* mutations might be associated with a slightly lower risk of ovarian cancer compared to *BRCA1* mutations, but they are still significantly linked to increased susceptibility.

***BRCA1* gene:** This gene is located on chromosome 17 and is involved in repairing damaged DNA. Mutations in *BRCA1* are linked to an increased risk of breast and ovarian cancer.

***BRCA2* gene:** This gene, located on chromosome 13, is also involved in DNA repair. Mutations in *BRCA2* are associated with an elevated risk of breast, ovarian, and other cancers.

Ovarian cancer risk

***BRCA1*:** Women with *BRCA1* mutations have a higher risk of developing ovarian cancer compared to the general population. The risk factor differ, but studies suggest that *BRCA1* mutations are more strongly associated with serious ovarian cancer.

***BRCA2*:** Similarly, *BRCA2* mutations are associated with an increased risk of ovarian cancer, although the risk may be potentially lower than that associated with *BRCA1* mutations.

Histological subtypes

Ovarian cancer is a heterogeneous disease with different histological subtypes, including serous, endometrioid, clear cell, and mucinous. Mutations in *BRCA1* are more commonly associated with high-grade serous ovarian cancer. But mutations in *BRCA2* are also linked to an increased risk of serous ovarian cancer, which can be associated with other histological subtypes as well.

Screening and prevention

Women with *BRCA1* or *BRCA2* mutations may consider more intensive screening for ovarian cancer, and certain people might choose risk-reducing strategies, such as prophylactic surgery (removal of the ovaries and fallopian tubes) to reduce their cancer risk. While *BRCA1* and *BRCA2* mutations are associated with an increased risk of ovarian cancer, not all individuals with these mutations will develop the disease. Also, other genetic and environmental factors also contribute to ovarian cancer risk. Genetic counseling and testing can help individuals understand their specific risk and make informed decisions about screening and prevention.

Clinical consequences and risk management

Women with *BRCA1* or *BRCA2* mutations often face an earlier appearance of ovarian cancer compared to those without these mutations. The age factor can differ, with some individuals developing ovarian cancer in their 30s or 40s. Also, the effect of these mutations i.e., likelihood of developing cancer if one carries

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Received: 24-Oct-2023, Manuscript No. JCSR-23-28017; **Editor assigned:** 26-Oct-2023; Pre Qc No. JCSR-23-28017 (PQ); **Reviewed:** 09-Nov-2023, Qc No. JCSR-23-28017; **Revised:** 16-Nov-2023, Manuscript No. JCSR-23-28017 (R); **Published:** 23-Nov-2023, DOI: 10.35248/2576-1447.23.8.558.

Citation: Mizan E (2023) Risk of Epithelial Ovarian Cancer in Women Carrying *BRCA1* and *BRCA2* Mutations. J Can Sci Res. 8:558.

the mutation is high, highlighting the important need for proactive screening and risk-reducing strategies among mutation carriers. Understanding the increased risk of epithelial ovarian cancer allows for targeted and proactive measures to manage this risk. This includes improved observation, such as regular screenings involving transvaginal ultrasound and CA-125 blood tests, as well as discussions about risk-reducing surgery, including prophylactic removal of the ovaries and fallopian tubes. For women with *BRCA1* or *BRCA2* mutations, risk-reducing approaches play a vital role in managing the elevated risk of ovarian cancer. Prophylactic surgeries, such as bilateral salpingo-oophorectomy, significantly reduce the risk of ovarian cancer. Also, ongoing research into targeted therapies and medications for mutation carriers is a promising area, offering potential alternatives for early intervention and risk management. The knowledge of carrying a *BRCA1* or *BRCA2* mutation and associated with increased risk of ovarian cancer can have very important psychological effects on individuals and their families. Genetic counseling, support groups, and access to mental health services are important in helping individuals direct the emotional and psychological aspects of understanding and managing their increased risk of cancer.

CONCLUSION

In conclusion, women carrying mutations in the *BRCA1* or *BRCA2* genes have a risk of developing epithelial ovarian cancer. The association is particularly marked for high-grade serous ovarian cancer, with *BRCA1* mutations showing a stronger correlation. These genetic mutations not only increase the likelihood of ovarian cancer but also impact the age of arrival, often showing at an earlier age than irregular cases. As a result, individuals with *BRCA1* or *BRCA2* mutations may benefit from increased ovarian cancer screening and may consider risk-reducing strategies, such as prophylactic surgery. However, it is vital to identify that while these mutations greatly increase ovarian cancer risk, not all carriers will develop the disease, focusing on the complex interaction of genetic and environmental factors in cancer development. Genetic counseling and testing play a vital role in allowing individuals to make informed decisions about risk management and prevention strategies modified to their specific genetic profile.