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Breast Cancer Risk in Users of Hormonal Contraception

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Abstract:

Combined oral contraceptives (COCs) are a widely used method of birth control among women. They have a low Pearl Index, confirming high efficacy. Their mechanism of action relies on suppression of ovulation. This is achieved through the influence of estrogenic and progestogenic components on the release of follicle-stimulating hormone and luteinizing hormone from the pituitary gland. COCs also inhibit fertilization by altering cervical mucus composition and prevent blastocyst implantation.

The mechanism of action of COCs allows their use for non-contraceptive purposes. For example, they reduce the risk of ovarian and endometrial cancer. They also limit menstrual bleeding and alleviate acne, migraine headaches, and dysphoric symptoms. Conversely, adverse effects of COCs include an increased risk of cervical cancer. Their impact on breast cancer remains inconclusive.

Clinical studies have demonstrated that the overall incidence of breast cancer among women using COCs is comparable to that among women who have never used them. However, during COC use and shortly after discontinuation, the risk of developing breast cancer is elevated, whereas it decreases five years after cessation. Among women with BRCA1 or BRCA2 mutations, the impact of COCs remains uncertain, with some studies reporting increased risk and others suggesting a reduction.

Breast cancer is the most frequently diagnosed malignancy among women and the second leading cause of cancer-related death. Prognosis is often dependent on the stage at diagnosis. Mortality risk due to breast cancer is higher among women using COCs, whereas it does not significantly change with the use of progestin-only oral contraceptives.

Some patients discontinue oral contraception due to concerns about adverse effects and a potential increase in breast cancer risk. The aim of this study was to present the mechanisms of COC action within breast tissue and their influence on the risk of breast cancer.

AIM: The aim of this study was to review, analyze, and summarize current data on the impact of combined oral contraceptives on breast cancer risk and prognosis, with particular emphasis on biological mechanisms, timing and duration of hormonal contraception use, and treatment outcomes in women genetically predisposed to breast cancer.

Material and methods: For the purposes of this analysis, original studies, reviews, and meta-analyses determining the impact of hormonal contraception on the risk of breast cancer were reviewed. The literature was searched using PubMed and Google Scholar for articles published up to 2025. The search terms included “hormonal contraception,” “combined oral contraceptives,” “breast cancer,” “cancer risk,” “breast cancer mortality,” and “BRCA1/BRCA2 mutations.” Data from selected publications were subjected to qualitative analysis.

Conclusion: Combined oral contraceptives are highly effective and widely used, with both beneficial and adverse non-contraceptive effects. Current evidence does not conclusively demonstrate a meaningful increase in breast cancer incidence associated with COC use, although prolonged use (≥5 years) may be linked to a small increase in risk in some populations, including BRCA mutation carriers. If such a risk exists, it appears to be modest and inconsistent across studies. However, reports of higher breast cancer-related mortality among COC users highlight the need for further large, well-designed studies to clarify long-term safety.

Keywords: Hormonal contraception, Combined oral contraceptives (COCs), Breast cancer, Cancer risk, BRCA1/BRCA2 mutations, Breast cancer mortality

Introduction

Hormonal contraception is the most commonly used method among women for the prevention of pregnancy. Several forms of hormonal contraceptives are available worldwide, including oral contraceptive pills, transdermal patches, vaginal rings, subcutaneous implants, and intrauterine devices. All of these methods are characterized by a low Pearl Index, which is defined as the number of pregnancies occurring during the use of a given contraceptive method per 100 women engaging in regular sexual intercourse over the course of one year. A low Pearl Index reflects the high contraceptive efficacy of the method [1][2]. Owing to differences in composition, these preparations are also used in indications unrelated to contraception. The

most commonly chosen form is the combined oral contraceptive pill (COC), whose mechanism of action involves the inhibition of ovulation through the effect of estrogenic and progestogenic components on the suppression of pituitary secretion of gonadotropins: follicle-stimulating hormone (FSH) and luteinizing hormone (LH). Additionally, progestin alters the composition of cervical mucus, thereby reducing the likelihood of fertilization, and impairs blastocyst implantation [3].

The mechanism of COC action is also responsible for several non-contraceptive effects. The benefits associated with their use include a reduced risk of ovarian and endometrial cancer, decreased menstrual bleeding, and alleviation of menstruation-related symptoms such as acne, migraine headaches, and dysphoric complaints [4][5]. On the other hand, adverse effects of combined oral contraceptives include an increased risk of cervical and breast cancer [6]. Despite numerous studies assessing the risk of breast cancer among women using oral contraceptives, the impact of oral contraceptive use on breast cancer development remains inconclusive. The aim of this paper is to review the current literature on this subject.

Mechanism of COC Influence on Breast Cancer

The mammary glands consist of clusters of ducts and secretory lobules surrounded by connective tissue. The ducts are lined by a single layer of cuboidal glandular epithelium, whereas the lobules are composed of columnar glandular epithelium. Epithelial tumors of the breast, namely ductal and lobular carcinoma, originate from these structures. Epithelial breast cancers account for 98–99% of cases, while the remaining 1–2% are non-epithelial tumors arising from the stroma, such as sarcomas. In women of reproductive age, the mammary glands are composed mainly of glandular tissue, which is progressively replaced by adipose tissue with age. The breasts undergo hormonal changes during the menstrual cycle: in the first phase they are stimulated by estrogens, and in the second phase by progesterone [7],[8],[9].

Estrogens are responsible for the development of the ductal system within the breast lobes, whereas progesterone contributes to the development of the connective tissue forming the lobes [10]. The influence of female sex hormones on cell proliferation within the mammary gland has been analyzed both in vivo and in vitro. In both types of studies, estrogens were shown to increase the proliferation of epithelial cells lining the mammary ducts, suggesting their mitogenic effect. The effect of progesterone, however, is less clear: in vitro studies demonstrated that it inhibited epithelial cell proliferation in the mammary gland, whereas in vivo studies indicated that, under conditions of high progesterone concentration during the luteal phase of the cycle, epithelial cell proliferation in the mammary gland was increased [11].

During the metabolic cycle of estrogens, semiquinones and quinones are formed. These compounds may exert DNA-damaging effects in mammary epithelial cells, although such reactions occur infrequently [12][13]. Estrogens also influence matrix metalloproteinases (particularly MMP-2 and MMP-9), which may facilitate stromal invasion by tumor cells. Furthermore, they stimulate vascular endothelial growth factor (VEGF) and epidermal growth factor (EGF), which may accelerate cellular differentiation toward malignant transformation [12],[14].

The effect of COC use on breast cancer risk is not uniform. It depends on multiple factors, including individual sensitivity to exogenous sex hormones and the enzymatic activity of mammary gland cells [11].

Breast Cancer Risk Associated with COC Use

The *Royal College of General Practitioners' Oral Contraception Study* is the longest-running investigation to date, with a 44-year follow-up that provided extensive data on women using combined oral contraceptives (COCs) and their risk of developing breast cancer [15]. The study included patients from a wide age range (18 to >70 years). In addition to age, investigators considered other potential risk factors for breast cancer, such as smoking and socioeconomic status. Based on the results, the incidence rate ratio of breast cancer among COC users compared with women who had never used COCs was very similar [16]. This finding indicates that COC use does not substantially increase the overall risk of breast cancer. However, particular attention should be given to women currently using COCs. In this group, as well as in those who had recently discontinued use, the risk of breast cancer was elevated, although it declined after more than five years following cessation [16]. Importantly, no overall increase in breast cancer risk was demonstrated among women with a history of COC use.

Another study collected data from women aged 35–64 years. Researchers examined whether participants were current COC users, the duration of use, and the time since last use. They also considered different formulations of COCs, accounting for varying hormone doses. Data from 2,282 women with breast cancer and 2,424 controls, both users and non-users, were analyzed. No significant differences were observed between different COC formulations, and none of the preparations were associated with an increased risk of breast cancer [17].

In 2017, results from the *Danish Sex Hormone Register Study* were published. This cohort study included 1.8 million women aged 15–49 years who were followed for nearly 11 years. None had a prior history of cancer, venous thromboembolism, or infertility treatment. During the

study, 11,517 cases of breast cancer were diagnosed. The relative risk (RR) of breast cancer was higher among current or recent users of hormonal contraception (RR 1.20) compared with non-users. The risk increased with longer duration of use (from RR 1.09 for less than one year to RR 1.38 for more than 10 years). Women using hormonal contraception for five years or more remained at elevated risk compared with never-users. Nevertheless, the absolute increase in breast cancer incidence was modest, corresponding to one additional case per 7,960 women using hormonal contraception for one year [18].

Further insights were provided by the *Nurses' Health Study II*. The authors noted that the previously reported association between hormonal contraception and increased breast cancer risk was largely based on studies of women who used formulations available in the 1960s–1980s, which contained higher hormone doses than those used today [18]. This investigation included women exposed to newer-generation contraceptives. Multiple potential confounders were considered, including body mass index, age, smoking, family history, alcohol consumption, menstrual cycle regularity, and breastfeeding history. Differences in breast cancer risk were also assessed by duration of use. Among 116,413 participants, 1,344 cases of breast cancer were identified [16]. For former users, the multivariate RR (adjusted for other risk factors) was 1.12, while among current users the RR was slightly higher at 1.33. Risk increased with longer duration, reaching 1.42 in women who had used hormonal contraception for more than eight years. Of note, the only formulation associated with a statistically significant increase in risk was the triphasic preparation containing ethinyl estradiol combined with levonorgestrel (RR 3.05) [16].

It is also important to assess breast cancer risk in women already predisposed to the disease. In 2022, the results of a meta-analysis evaluating breast cancer risk associated with COC use among women with BRCA1 or BRCA2 mutations were published [19]. The pooled RR was 1.24 [19]. The increase was observed only among patients who had used COCs for more than five years. In a subsequent review study, it was found that the risk of breast cancer was elevated among users of oral contraceptive therapy (OCT) compared to women who had never used these contraceptives, with the increased risk persisting for more than 10 years after discontinuation [20]. Different findings were reported in a 2005 clinical study conducted in a large cohort of Caucasian women carrying BRCA1 or BRCA2 mutations. That study demonstrated that COC use did not increase breast cancer risk and might even reduce it in BRCA1 mutation carriers who had used COCs for more than 12 months [21]. However, researchers emphasized that among women who used COCs before and during 1975, the risk

was increased. This effect was observed both in carriers of BRCA1/BRCA2 mutations and in women without these mutations [21].

Additionally, a systematic review of studies conducted among women in Indonesia indicated that the use of hormonal contraception is associated with an increased risk of developing breast cancer. The most significant factors influencing this risk were duration of use (particularly more than 5 years), type of preparation (e.g., combined contraceptives), and personal history of use. The odds ratios (ORs) for the association between hormonal contraception and breast cancer in the studies included in the review ranged from 2 to 6. The authors recommend the continuation of research, particularly in larger and more diverse populations [22].

Breast Cancer Prognosis

Breast cancer is the most frequently diagnosed malignancy in women. It ranks second in terms of cancer-related mortality among the female population. Despite a relatively stable incidence rate—approximately five cases per 1,000 women screened in Poland each year—mortality continues to rise. While the mortality rate in Poland was 30.2 per 100,000 women in 2000 and increased to 31.1 in 2015, by 2020 it had reached 41.8 per 100,000 women, according to data from the Organisation for Economic Co-operation and Development (OECD) [23][24][25].

Publications indicate that reproductive decisions, such as the use of oral contraceptives, late pregnancies, and nulliparity, as well as genetic predisposition, family history, and age, influence the risk of developing breast cancer. However, the question remains whether risk factors that predispose to breast cancer also affect its prognosis.

Globally, there are more than sixty million women of reproductive age (15–44 years). When considering only sexually active women, it is estimated that up to 99% use at least one contraceptive method, with oral contraceptives—particularly COCs—being the most commonly chosen [26],[27].

Recent studies conducted in a U.S. population of European descent demonstrated that women using COCs had a 1.91–3.02-fold higher risk of death from breast cancer and a 2.35–3.38-fold higher risk of all-cause mortality compared with women who had never used these agents [28],[29].

This raises the question of whether breast cancer mortality studies among COC users may be biased, given that these patients statistically attend medical consultations more frequently, potentially leading to earlier cancer detection. Nevertheless, studies comparing POC (progestin-only contraceptives), COC, and combined POC+COC in relation to breast cancer outcomes

demonstrated that participants underwent similar levels of medical screening. Importantly, POC use was not associated with an increased breast cancer risk, thus providing a valuable control group [29].

Another favorable finding from comparing POC with COC or COC+POC use is the indication that estrogen appears to be the component negatively affecting breast cancer prognosis. However, further research is required to confirm this observation, as the population of POC users included in existing studies was relatively small [29].

Conclusion

Oral hormonal contraception is a very common method of preventing pregnancy among women of reproductive age. It is characterized by high efficacy; however, it must be emphasized that, beyond its intended contraceptive effect, it also exerts a range of non-contraceptive effects on the female body, both beneficial and adverse [1],[4]. The greatest concern regarding the use of COCs is the reported increased probability of breast cancer, which is the most frequently diagnosed malignancy in women and often a cause of mortality. The estrogenic component of COCs is suspected to be the factor contributing to breast cancer progression.

Studies have not demonstrated a clear association between the use of combined oral contraceptives for less than five years and an increased incidence of breast cancer. In contrast, it has been suggested that women who use COCs for more than five years may be at greater risk. Nevertheless, in many analyses, the incidence ratio remained close to identical, which does not allow for a definitive conclusion regarding a harmful effect of these agents. Thus, if an elevated risk of breast cancer exists due to COC use, it is likely to be very small and cannot be conclusively confirmed based on current evidence. [18],[30]

The most recent systematic review conducted among women in Indonesia confirms the association between hormonal contraceptive use—particularly for a duration of at least five years—and an increased risk of developing breast cancer, while simultaneously emphasizing the need for further research in larger and more diverse populations [22].

Investigations have also been conducted among women with BRCA1 and BRCA2 mutations who used COCs. The most recent publications reported an increased incidence of breast cancer only among women with prolonged use (exceeding five years). However, earlier analyses, such as those from 2005, did not reveal such an association; indeed, some even suggested a potential risk-reducing effect of COCs [21]. Despite considerable concerns regarding the biological plausibility of hormonal contraceptives promoting tumorigenesis, current evidence does not

conclusively support an increased incidence among users, including in genetically predisposed populations.

It has been observed, however, that women using COCs may face up to several-fold higher mortality from breast cancer. As with incidence, estrogen has been suggested as the component responsible for this unfavorable outcome. Nonetheless, given the limited number of individuals included in studies, a potential negative role of progestin cannot be excluded [29],[31].

Breast cancer remains a highly prevalent and serious condition among women, underscoring the importance of identifying predisposing factors. Since COCs are widely used, it is critical to rule out their detrimental effect on cancer development. Although current studies do not provide unequivocal evidence for an increased incidence of breast cancer across many study populations, the potential risk of breast cancer–related mortality among prior COC users warrants further investigation.

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References:

1. Sitruk-Ware, R., Nath, A., & Mishell, D. R. Jr. (2013). Contraception technology: Past, present and future. Contraception, 87(3), 319–330. https://doi.org/10.1016/j.contraception.2012.08.002
2. Creinin, M. D., Westhoff, C. L., Bouchard, C., Chen, M. J., Jensen, J. T., Kaunitz, A. M., Achilles, S. L., Foidart, J. M., & Archer, D. F. (2021). Estetrol-drospirenone combination oral contraceptive: North American phase 3 efficacy and safety results. Contraception, 104(3), 222–228. https://doi.org/10.1016/j.contraception.2021.05.002
3. Medard, M. L., & Ostrowska, L. (2007). Combined oral contraception and the risk of reproductive organs cancer in women. Ginekologia Polska, 78(8), 637–641, PMID: 18050614.
4. Brown, E. J., Deshmukh, P., & Antell, K. (2017). Contraception Update: Oral Contraception. FP essentials, 462, 11–19. PMID: 29172411
5. Fraser, I. S. (2010). Non-contraceptive health benefits of intrauterine hormonal systems. Contraception, 82(5), 396–403. https://doi.org/10.1016/j.contraception.2010.05.005
6. Iversen, L., Sivasubramaniam, S., Lee, A. J., Fielding, S., & Hannaford, P. C. (2017). Lifetime cancer risk and combined oral contraceptives: The Royal College of General Practitioners' Oral Contraception Study. American Journal of Obstetrics and Gynecology, 216(6), 580.e1–580.e9. https://doi.org/10.1016/j.ajog.2017.02.002

7. Cieśla, S., Wichtowski, M., Poźniak-Balicka, R., & Murawa, D. (2020). Anatomia chirurgiczna gruczołu piersiowego. Budowa ogólna, embriogeneza, histologia, kompleks brodawkowo-otoczkowy, powięzie tkanki gruczołowej i ściany klatki piersiowej. Część pierwsza. Nowotwory, 70(5), 211–219. https://doi.org/10.5603/NJO.2020.0042
8. Rivera, R., Yacobson, I., & Grimes, D. (1999). The mechanism of action of hormonal contraceptives and intrauterine contraceptive devices. American Journal of Obstetrics and Gynecology, 181(5 Pt 1), 1263–1269. https://doi.org/10.1016/S0002-9378(99)70120-1
9. Deptała, A., Smoter, M., & Stec, R. (2019). Onkologia: Podręcznik dla studentów medycyny. Pomoc dydaktyczna dla lekarzy specjalizujących się w onkologii (T. 1, s. 466). AsteriaMed.
10. Makowski, M., Połać, I., & Pertyński, T. (2007). Oestrogens and breast cancer. Przegląd Menopauzalny, 3, 150–154.
11. Wolski, H. (2014). Selected aspects of oral contraception side effects. Ginekologia Polska, 85, 944–949. https://doi.org/10.17772/gp/1887
12. Bidziński, M., & Dańska-Bidzińska, A. (2005). Hormonal therapy after endometrial and breast cancer treatment. Przegląd Menopauzalny, 4, 73–76.
13. Pietrzak, B., Wlaźlak, E., & Zwierzyńska, E. (2015). Long-term use of estrogens: Benefit or risk. Postępy Higieny i Medycyny Doświadczalnej, 69, 285–293. https://doi.org/10.5604/17322693.1142582
14. Huang, J.-C., Duan, C.-C., Jin, S., Sheng, C.-B., Wang, Y.-S., Yue, Z.-P., … et al. (2022). HB-EGF induces mitochondrial dysfunction via estrogen hypersecretion in granulosa cells dependent on cAMP-PKA-JNK/ERK-Ca^{2+}-FOXO1 pathway. International Journal of Biological Sciences, 18(5), 2047–2059. https://doi.org/10.7150/ijbs.69343
15. Kamani, M., Akgör, U., & Gültekin, M. (2022). Review of the literature on combined oral contraceptives and cancer. ecancermedicalscience, 16, 1416. https://doi.org/10.3332/ecancer.2022.1416
16. Hunter, D. J., Colditz, G. A., Hankinson, S. E., Malspeis, S., Spiegelman, D., Chen, W., et al. (2010). Oral contraceptive use and breast cancer: A prospective study of young women. Cancer Epidemiology, Biomarkers & Prevention, 19(10), 2496–2502. https://doi.org/10.1158/1055-9965.EPI-10-0747

17. Marchbanks, P. A., Curtis, K. M., Mandel, M. G., Wilson, H. G., Jeng, G., Folger, S. G., et al. (2012). Oral contraceptive formulation and risk of breast cancer. Contraception, 85(4), 342–350. https://doi.org/10.1016/j.contraception.2011.08.007
18. Mørch, L. S., Skovlund, C. W., Hannaford, P. C., Iversen, L., Fielding, S., & Lidegaard, Ø. (2017). Contemporary hormonal contraception and the risk of breast cancer. New England Journal of Medicine, 377(23), 2228–2239. https://doi.org/10.1056/NEJMoa1700732
19. Park, J., Huang, D., Chang, Y. J., Lim, M. C., & Myung, S.-K. (2022). Oral contraceptives and risk of breast cancer and ovarian cancer in women with a BRCA1 or BRCA2 mutation: A meta-analysis of observational studies. Carcinogenesis, 43(3), 231–242. https://doi.org/10.1093/carcin/bgab107
20. van Bommel, M. H. D., IntHout, J., Veldmate, G., Kets, C. M., de Hullu, J. A., van Altena, A. M., … et al. (2023). Contraceptives and cancer risks in BRCA1/2 pathogenic variant carriers: A systematic review and meta-analysis. Human Reproduction Update, 29(2), 197–217. https://doi.org/10.1093/humupd/dmac038
21. Milne, R. L., Knight, J. A., John, E. M., Dite, G. S., Balbuena, R., Ziogas, A., … et al. (2005). Oral contraceptive use and risk of early-onset breast cancer in carriers and noncarriers of BRCA1 and BRCA2 mutations. Cancer Epidemiology, Biomarkers & Prevention, 14(2), 350–356. https://doi.org/10.1158/1055-9965.EPI-04-0376
22. Sulfiana, S., Prihantono, P., Usman, A. N., Ahmad, M., Aryadi Arsyad, M., & Mumang, A. A. (2024). Contraceptive use with breast cancer incidence in Indonesia. Breast Diseases, 43(1), 127–134. https://doi.org/10.3233/BD-249007
23. Brynhildsen, J. (2014). Combined hormonal contraceptives: Prescribing patterns, compliance, and benefits versus risks. Therapeutic Advances in Drug Safety, 5(5), 201–213. https://doi.org/10.1177/2042098614548857
24. Łukasiewicz, S., Czeczelewski, M., Forma, A., Baj, J., Sitarz, R., & Stanisławek, A. (2021). Breast cancer—Epidemiology, risk factors, classification, prognostic markers, and current treatment strategies—An updated review. Cancers (Basel), 13(17), 4287. https://doi.org/10.3390/cancers13174287
25. Jakowczyk, C. M. (2025, August 29). Rak piersi wykrywany coraz częściej u kobiet przed 50. rokiem życia. Czas na zmiany w badaniach przesiewowych. Onkonet.pl. https://www.onkonet.pl/n_n_rakpiersi_konieczne_zmiany_w_badaniach_przesiewoych.php

26. Christin-Maitre, S. (2022). La contraception à travers le monde. Medecine/Sciences (Paris), 38(5), 457–463. https://doi.org/10.1051/medsci/2022058
27. Cooper, D. B., & Patel, P. (2025). Oral contraceptive pills. In StatPearls. StatPearls Publishing. https://www.ncbi.nlm.nih.gov/books/NBK430882/
28. Trivers, K. F., Gammon, M. D., Abrahamson, P. E., Lund, M. J., Flagg, E. W., Moorman, P. G., et al. (2007). Oral contraceptives and survival in breast cancer patients aged 20 to 54 years. Cancer Epidemiology, Biomarkers & Prevention, 16(9), 1822–1827. https://doi.org/10.1158/1055-9965.EPI-07-0053
29. Samson, M. E., Adams, S. A., Mulatya, C. M., Zhang, J., Bennett, C. L., Hebert, J., et al. (2017). Types of oral contraceptives and breast cancer survival among women enrolled in Medicaid: A competing-risk model. Maturitas, 95, 42–49. https://doi.org/10.1016/j.maturitas.2016.10.014
30. Barriga, P., Vanhauwaert, P., & Porcile, A. (2019). Hormonal contraception and risk of breast cancer: A critical look. Gynecological Endocrinology, 35(6), 460–462. https://doi.org/10.1080/09513590.2019.1576610
31. Wingo, P. A., Austin, H., Marchbanks, P. A., Whiteman, M. K., Hsia, J., Mandel, M. G., et al. (2007). Oral contraceptives and the risk of death from breast cancer. Obstetrics & Gynecology, 110(4), 793–800. https://doi.org/10.1097/01.AOG.0000284446.22251.6E