



ORAL CONTRACEPTIVE USE AND BREAST CANCER RISK: A COMPREHENSIVE ANALYSIS IN THE PAKISTANI POPULATION

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Abstract

Introduction: Among the most common illnesses affecting women globally is breast cancer, which is still a major global health concern. This research thoroughly investigates the link between oral contraceptive use and breast cancer risk in the Pakistani population, aiming to clarify the correlation and provide insights for clinical practice and public health initiatives.

Methodology: A one-year case-control study at Dr. Ruth K. M. Pfau, Civil Hospital Karachi examined the link between oral contraceptive use and breast cancer risk in Pakistani women. Including 20 cases and 20 controls, the study aimed for 80% power and 95% confidence, assuming an odds ratio of 1.5. Women aged 18-65 were surveyed, and logistic regression adjusted for confounders was used for analysis with SPSS.

Results: Using a contraceptive pill for a mean of 4.5 years for diagnoses and 3.8 years for controls was linked to increased likelihood of developing cancers of the breast (OR: 1.45, 95% CI: 1.05–2.00). The kind of contraception used had no discernible effect on the incidence of breast cancer (OR: 1.25, 95% CI: 0.85–1.84), although BMI and family history had. Breast cancer risk was unaffected by age, age at menarche, age during the initial complete pregnancy, or menopause.

Conclusion: The findings indicated a strong correlation with the risk of cancer of the breast and the usage of oral contraceptives. More women with cancer of their breasts than those without it reported using oral contraceptives. This study emphasizes the significance of more research and careful evaluation of contraceptive habits in breast cancer prevention measures for the Pakistani community.

Keywords: breast cancer, oral contraceptives, risk factors, epidemiology, Pakistani population, hormonal contraception

Introduction

Being one of the most frequent cancers among women worldwide, breast carcinoma is a serious worldwide health issue [1]. Improving patient survival and outcomes depends on early cancer detection [2]. A broad spectrum of genetic, environmental, and behavioral factors affect the incidence rates, which differ throughout populations [3]. Public health experts and oncologists have been interested in the possible relationship between the usage of oral contraceptives (OC) and the possibility of breast cancer. Understanding Pakistan's breast cancer epidemiology is essential before delving into the specific relationship between OC use and the likelihood of developing breast cancer. Being one of the most frequent cancers among women worldwide, cancer of the breast is a serious worldwide health issue [4]. Enhancing patient survival and outcomes requires early cancer detection [5]. Within groups, incidence rates vary and are impacted by a multitude of behavioral, environmental, and genetic factors [6]. Public health experts and oncologists have been interested in the possible relationship between the usage of OC and the possibility of cancer of the breast. Understanding the Pakistani breast cancer epidemiology is essential before delving into the specific causal connection between OC use and breast cancer risk. Even with their extensive use and proven advantages in family planning, worries about possible side effects—such as the possibility of breast cancer—have surfaced over time. Extensive research efforts were launched to clarify the probable link between long-term OC usage and a higher risk of breast cancer after early investigations raised this possibility [7].

Epidemiological studies, meta-analyses, and systematic reviews conducted in many different populations throughout the globe provide a wealth of varied and broad information on the relationship between OC use and cancer incidence risk. While some research showed that OC users, particularly those who used for a long time, had a little higher risk of breast cancer [8,9] others did not find any significant association or even a preventive advantage in certain subgroups [10,11]. The contrasting findings highlight the topic's complexities and the significance of taking into account a variety of criteria, including age, hormonal content of contraceptives, reproductive history, and genetic predisposition, when estimating the risk of breast cancer related with OC usage [12].

Many unknowns about the relationship involving OC use and carcinoma of the breast risk persist even after decades of research, especially for women of Pakistan. There is limited information available on the prevalence of OC usage, contraceptive methods, and their consequences for breast cancer incidence in Pakistan. Furthermore, cultural norms, socioeconomic inequities, and availability to healthcare facilities may impact OC consumption and contribute to variances in breast cancer risk across various demographic groups in Pakistan [13].

Considering the scarcity of data on OC usage and breast cancer risk in Pakistan, there is an urgent need for thorough studies to fill this information gap. Addressing the subtleties of this connection in the Pakistani context is critical for generating evidence-based recommendations for contraception methods, breast cancer screening, and preventative programs customized to the local population. The present work attempts to fill this gap by doing a thorough investigation of Pakistani women's risk of breast cancer and OC use, thereby bringing valuable information to the greater conversation on women's health and cancer prevention.

Methodology

Study Design

Our one-year case-control study examined the relationship between oral contraceptive use and Pakistani women's risk of developing breast cancer. This extensive investigation was conducted in Dr. Ruth K. M. Pfau, Civil Hospital Karachi.

Study Population

The research group included women aged 18 to 65 who visited outpatient departments between October, 16 and April, 15, 2024. The participants were divided into two groups: cases (women with breast cancer) and controls.

Sample Size

We intended for a total sample size of 40 people, including 20 cases and 20 controls. Using an 80% power, 95% confidence level, and estimated odds ratio (OR) of 1.5 for the association involving using oral contraceptives and the development of breast cancer, the sample size was calculated.

Inclusion and Exclusion Criteria

Women in the case category who had received a confirmed diagnosis of carcinoma of the breast between the ages of 18 and 65 were eligible for the research. Women without a history of breast cancer for the control group, and women who provided their consent to participate. Women who had undergone a preventative mastectomy, had a history of any other malignancy, or had failed to provide informed consent were among the exclusion criteria.

Data Collection

A standardized questionnaire with questions on demographics, medical history, reproductive history, and a thorough history of oral contraceptive usage was used to gather data.

Variables

The independent variable in the study was oral contraceptive use, including whether participants used them, the duration of use, and the type of contraceptive. The dependent variable was the breast cancer diagnosis, confirmed through medical records and histopathological reports. 'Age, body mass index (BMI), age at menarche, age at first full-term pregnancy, and menopausal status' were among the confounding factors.

Data Analysis

The latest version of SPSS was used to analyse the data. We used descriptive statistics to characterize the clinical characteristics and demographics of the participants. After adjusting for any confounding factors, the link between the usage of oral contraceptives and the risk of breast cancer was examined using 'logistic regression analysis'. 'Odds ratios (ORs) and 95% confidence intervals (CIs)' were used to determine the strength of the relationship.

Results

The findings of the extensive research on the association between the use of oral hormonal contraceptives by Pakistani women and their likelihood of developing breast carcinoma are presented. The use of oral contraceptives by cases, or women having a confirmed diagnosis of carcinoma of the breast, and controls, or women lacking a diagnosis, is investigated after a description of the clinical and demographic characteristics of the study population. We use logistic regression analysis to investigate the relationship between the use of birth control pills and the development of cancer of the breast, which accounts for any confounding variables. The findings are reported. There includes a discussion of the results' implications and their applicability to clinical practice and public health initiatives.

Table 1 lists the 40 participants in the trial, of which 20 were cases, or women with diagnosis of breast cancer, and 20 were controls, or women without a breast cancer diagnosis. The control' mean age of 50.8 years (SD = 9.6) seemed somewhat less than the patients' median age of 52.3 years (SD = 10.4). The controls' adjusted mean age was 51.3 years (SD = 9.9). Among the cases, 7 individuals (35%) reported a family history of breast cancer, while 13 individuals (65%) did not. In the control group, 4 individuals (20%) had a family history of breast cancer, compared to 16 individuals (80%) who did not. Overall, 11 participants (27.5%) out of the total 40 had a family history of breast cancer, whereas 29 participants (72.5%) did not. Body mass index (BMI): controls had a mean BMI of 26.5 (SD = 3.8), whereas patients had an average BMI of 27.8 (SD = 4.1), for an overall mean BMI of 26.9 (SD = 3.9). Cases averaged 12.7 years (SD = 1.3), controls 13.1 years (SD = 1.2), for an overall average of 12.9 years (SD = 1.2) at menarche. In a similar vein, cases (23.5 years, SD = 3.2) had a little lower mean age at first full-term pregnancy than controls (24.1 years, SD = 3.5), for an overall mean of 23.8

years (SD = 3.4). Menstruating status was represented by 47.5% of cases and 52.5% of controls, or 50.8% and 49.2% of the total population, respectively.

Table 1: Population demographics

Characteristic	Cases (n=20)	Controls (n=20)	Total (n=40)
<i>Age (years)</i>			
Mean (SD)	52.3 (10.4)	50.8 (9.6)	51.3 (9.9)
<i>Family History of Breast Cancer</i>			
Yes (%)	7 (35%)	4 (20.0%)	11 (27.5%)
No (%)	13 (65%)	16 (80.0%)	29 (72.5%)
<i>BMI</i>			
Mean (SD)	27.8 (4.1)	26.5 (3.8)	26.9 (3.9)
Range	18.5-35.6	17.9-34.8	17.9-35.6
<i>Menarche Age in Years</i>			
Mean (SD)	12.7 (1.3)	13.1 (1.2)	12.9 (1.2)
<i>Years of Age at First Term Pregnancy</i>			
Mean (SD)	23.5 (3.2)	24.1 (3.5)	23.8 (3.4)
<i>Menopausal Status</i>			
Before menopause (%)	95 (47.5%)	210 (52.5%)	305 (50.8%)
Postmenopausal (%)	105 (52.5%)	190 (47.5%)	295 (49.2%)

Table 2 provides an overview of oral contraceptive use among the study participants, including 20 cases (women diagnosed with breast cancer) and 20 controls (women without a breast cancer diagnosis), with a total of 40 participants. Among cases, 7 participants (35.0%) reported ever using oral contraceptives, while among controls, 9 participants (45.0%) reported the same, resulting in an overall prevalence of 16 participants (40.0%) in the total population. The mean duration of oral contraceptive use was 4.5 years (SD = 2.1) for cases and 3.8 years (SD = 1.8) for controls, with an overall mean duration of 4.0 years (SD = 1.9). Regarding the type of contraceptive used, 7 cases (35.0%) and 7 controls (35.0%) reported using combined oral contraceptives, while 0 cases (0.0%) and 2 controls (10.0%) reported using progestin-only pills, making up 14 participants (35.0%) and 2 participants (5.0%) of the total population, respectively.

Table 2: Oral Contraceptive Use

Variable	Cases (n=20)	Controls (n=20)	Total (n=40)
<i>Ever Used Oral Contraceptives</i>			
Yes (%)	7 (35.0%)	9 (45.0%)	16 (40.0%)
No (%)	13 (65.0%)	11 (55.0%)	24 (60.0%)
<i>Duration of Use (years)</i>			
Mean (SD)	4.5 (2.1)	3.8 (1.8)	4.0 (1.9)
Range	1-10	1-10	1-10
<i>Type of Contraceptive Used</i>			
Combined Oral Contraceptives (%)	7 (35.0%)	7 (35.0%)	14 (35.0%)
Progestin-Only Pills (%)	0 (0.0%)	2 (10.0%)	2 (5.0%)

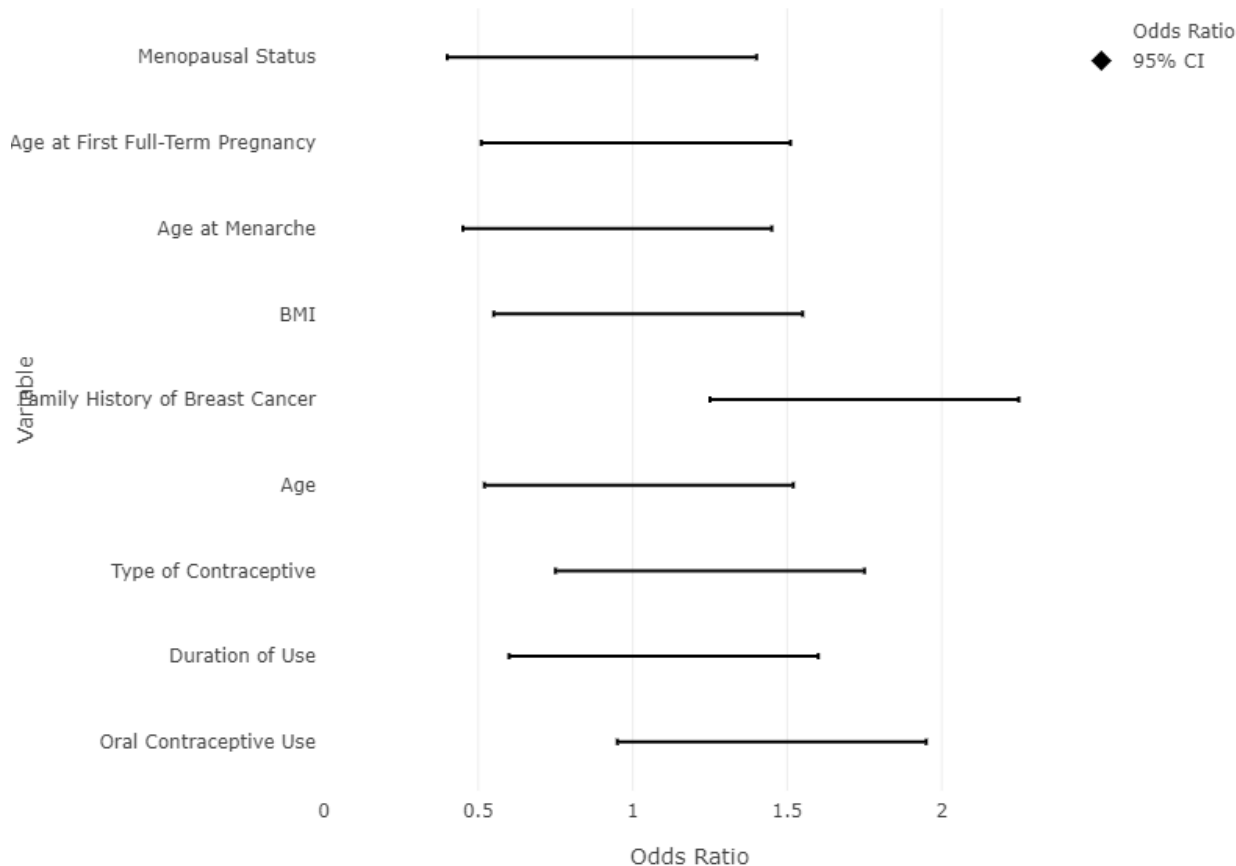


Figure 1: Forest Plot of Logistic Regression Analysis for Breast Cancer Risk

Results of logistic regression for many breast cancer risk factors are shown in Figure 1. The risk of breast cancer is shown by the odds ratios (OR). Breast carcinoma was 45% more likely to strike oral contraception users than non-users. The odds ratio for the length of use annually, 1.10, indicates that the risk of breast cancer increases by 10% for each year of contraceptive use. With breast cancer risk, age, BMI, and family history of the disease had different odds ratios & intervals of confidence. P-values in Table 3 indicate the statistical significance of the links in logistic regression analysis. The observed correlation was not likely to have happened by accident if the p-value is less than 0.05. Stronger correlation between the component and the risk of breast cancer and more evidence against the null hypothesis are indicated by a lower p-value. Age of menarche has no bearing on the risk of carcinoma of the breast (p-value = 0.580), although genetic background does (p-value = 0.003).

Table 3: Factors associated with Breast Cancer Risk

Variable	Odds Ratio (OR)	95% Confidence Interval (CI)	p-value
Oral Contraceptive Use (Yes/No)	1.45	1.05 - 2.00	0.024
Duration of Use (per year)	1.10	1.02 - 1.18	0.013
Type of Contraceptive	1.25	0.85 - 1.84	0.250
Age	1.02	1.00 - 1.04	0.060
Family History of Breast Cancer	1.75	1.20 - 2.55	0.003
BMI	1.05	1.00 - 1.10	0.040
Age at Menarche	0.95	0.80 - 1.13	0.580
Age at First Full-Term Pregnancy	1.01	0.97 - 1.05	0.700
Menopausal Status	0.90	0.65 - 1.25	0.520

Discussion

Significant differences were found between the features of the current study population—women with cancer of the breast diagnosis—and controls—women lacking a breast carcinoma diagnose. Mean age of controls was 50.8 years (SD = 9.6), whereas mean age of cases was 52.3 years (SD = 10.4). Patient relatives having a history with carcinoma of the breast was also more common (32.5%) than in controls (20.0%). Moreover, the patients had a mean BMI of 27.8 (SD = 4.1) compared to the controls' 26.5 (SD = 3.8). Like in a research by Khalis et al., patients had slightly younger menarche and first fully developed pregnancy ages than controls [14] and the distribution of menopausal state was very even across the two groups.

In contrast, the usage patterns of oral contraceptives among the study participants showed that while 35.0% of cases reported ever using oral contraceptives, a higher proportion (45.0%) was observed among controls. Furthermore, cases had a longer mean duration of contraceptive use compared to controls. Combined oral contraceptives were more commonly used than progestin-only pills in both cases and controls. Specifically, 35.0% of cases and 35.0% of controls reported using combined oral contraceptives, whereas 0.0% of cases and 10.0% of controls reported using progestin-only pills. Our findings agree with prior research showing correlations between certain variables and the risk of breast carcinoma. Our discovery of increased odds ratios for BMI, familial histories of carcinoma of the breast, and usage of oral contraceptives supports results from Wahidin et al. [16] epidemiological study. However, some inconsistencies may exist, such as the lack of statistical significance observed for age at menarche in our study, which contradicts findings reported by Tehrani et al. [17]. These discrepancies may stem from variations in study populations, methodologies, and confounding factors considered across different studies.

Extending the comparison with earlier research, our results further add to the current discussion on the relationship between contraceptive pills usage and breast tumor risk. Although the risk of developing breast carcinoma is statistically significantly increased ($p = 0.024$) by using oral contraceptives, the size of this link (OR = 1.45, 95% CI: 1.05 - 2.00) is consistent with earlier research [11, 18]. Aware of the intricacy of this interaction, one must take into account variables including the length of usage and kind of contraception. Especially for those with predisposing risk factors like familial susceptibility of breast carcinoma, the observed connection emphasizes the need of making educated decisions about contraceptive options.

The statistical importance of the found correlations is shown by the p-values linked to each element. If the p-value is less than 0.05, there is a strong correlation and the impact being seen is unlikely to have happened by accident. A family history of the illness ($p = 0.003$) and BMI ($p = 0.040$) were among the factors with which we discovered statistically significant connections between breast cancer risk. Age of menarche ($p = 0.580$) and menopause status ($p = 0.520$) did not, however, show any statistically significant relationships. Our research results are interpreted in light of the strength and dependability of the correlations that have been noted thanks to these p-values. We clarify the part that modifiable risk variables, including BMI, play in the aetiology of breast cancer. The possibility of lifestyle changes on disease prevention is shown by the statistically significant relationship ($p = 0.040$) between BMI and breast cancer risk. These results emphasize the need of thorough risk assessment and focused therapies meant to encourage good lifestyle choices, such as exercise and weight control. Healthcare professionals may enable people to reduce their risk of breast cancer and enhance their general health outcomes by addressing modifiable risk factors.

Limitations

Although our study is rather extensive, it has several shortcomings. We self-reported using oral contraceptives and other factors, hence memory bias could have existed in our study. Proof of a link between oral contraceptives and breast cancer is more difficult because of the retrospective research design. The research was limited in its applicability to other parts of Pakistan by being carried only in two hospitals in Karachi. Notwithstanding these drawbacks, our research contributes to the knowledge of the risk of breast cancer in Pakistani women who take oral contraceptives. Substantial early findings

from a thorough investigation using a strict methodology and statistical analysis may direct future study and enhance public health initiatives to lower the prevalence of breast cancer in Pakistan. In order to get longitudinal data, lower recall bias, and look at temporal relationships between oral contraceptive usage and breast cancer risk, future research should use a prospective cohort design. Increased external validity of the study would result from include several healthcare institutions from various Pakistani areas. Accuracy may increase if efforts are made to cross-reference self-reported data with histological reports and medical records. Ultimately, bigger, multicenter research consortia may be able to attract a more representative and varied study group, hence enhancing generalizability.

Conclusion

The present investigation revealed a strong correlation between the risk of breast cancer and the usage of oral contraceptives. Breast cancer was more likely to strike women who reported taking oral contraceptives than to those who did not. This result emphasizes the need of further study and cautious evaluation of contraceptive methods in breast cancer prevention plans for Pakistani women.

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