

Article

Clinico-pathological Profiles and Risk Factors Analysis of Breast Cancer Patients

Rozhgar Star Jabbar¹, Farooq Ibrahim Mohammad²

1. University of Kirkuk - College of Science -Medical Genetics - Biology Department

2. University of Kirkuk - College of Science - Medical Biotechnology - Department of Forensic Evidences Science

* Correspondence: scbm24015@uokirkuk.edu.iq

Abstract: Background: Breast Cancer is the most common cause of a significant public health concern. Among women in Iraq, optimizing screening and treatment approaches requires an understanding of the localized clinicopathological characteristics and risk profiles. Objectives : To assess the clinicopathological characteristics and examine possible risk factors in a group of Northern Iraqi women patients with breast cancer. Methodology: The current retrospective cross-sectional study included 100 participants. Patients with histopathologically proven breast cancer were evaluated. The Clinicopathological markers (tumor stage, grade, and laterality), reproductive history, and demographic information were all cross-analyzed. Results: The age group of 40–49 years old had the highest incidence of breast cancer (38.0%). Early menarche (less than 12 years), breast cancer risk, and family history of cancer were found to be significantly correlated ($P < 0.05$). Invasive ductal carcinoma (IDC) was the most prevalent histological category in terms of histopathology. When they initially came, most patients were in advanced stages; Stage III (44.0%) and histology Grade III (50.0%) were highly prevalent. Compared to right-sided breast involvement (48.0%), left-sided breast involvement was marginally higher (52.0%). Conclusion: Compared to Western norms, patients with breast cancer in Kirkuk-Iraq often show up younger, with more advanced tumour stages and higher grades. Organisations and programs for genetic knowledge and early detection are very required.

Citation: Jabbar, R. S., & Mohammad, F. I. Clinico-pathological Profiles and Risk Factors Analysis of Breast Cancer Patients. Middle European Scientific Bulletin 2026, 46(3), 56-63.

Received: 5th May 2026Revised: 15th May 2026Accepted: 8th Jun 2026Published: 25th Jun 2026

Copyright: © 2026 by the authors. Submitted for possible open access publication under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>)

Keywords: Breast cancer, Risk factors, Clinicopathological characteristics, Tumor grade

1. Introduction

Worldwide, breast cancer is the most common type of cancer diagnosed and the leading cause of cancer-related deaths among women [1].

The epidemiological landscape of breast cancer is clearly changing in emerging nations, especially in the Middle East and Iraq, with an increasing incidence rate and a propensity to impact younger age groups [2]. A large rate of female cancers in Kirkuk of Iraq are breast cancers [3].

Local studies reveal that Middle Eastern women often present one to two decades earlier and often exhibit more aggressive biological behaviours, in contrast to Western communities where the disease is primarily identified in postmenopausal women [2,4]. Early age menarche, late menopause, nulliparity, not breastfeeding, and a positive family history of breast or ovarian cancer are strong risk factors that have historically been connected to the development of breast cancer in women [1,4]. Additionally, late-stage presentation remains a major problem in the area, which is typically caused by socioeconomic conditions, a lack of public awareness, and the lack

of comprehensive national program of screening.[5]. In addition to a comprehensive risk factor analysis, local clinicopathological patterns, such as tumour stage, histological grade, and physical distribution, must be documented in order to map the disease's behavioral pattern in Kirkuk. This study aims to provide a thorough clinical and pathological picture of a breast cancer cohort in order to guide local oncological therapy and early detection programs by comparing attempts to give a comprehensive clinical and pathological picture of a breast cancer cohort by comparing certain risk indicators.

2. Material and Method

2.1 Study Design

A total of 100 female participants were examined in Azadi Teaching Hospital in Kirkuk region. This retrospective, descriptive cross-sectional study aims to evaluate the clinicopathological features of 100 Iraqi female patients with histopathologically proven breast cancer.

Table 1: Demographic and Reproductive Risk Profile of The Patients (n=100)

Demographic and Risk factor	Patients Cohort (n=100)	Percentage (%)
Age Group (Years)		
< 40	22	22.0%
40 – 49	38	38.0%
50 – 59	27	27.0%
≥ 60	13	13.0%
Family history of Breast cancer		
Positive	35	35.0%
Negative	65	65.0%
Age at menarche		
Early (<12 years)	42	42.0%
Normal (≥ 12 Years)	58	58.0%

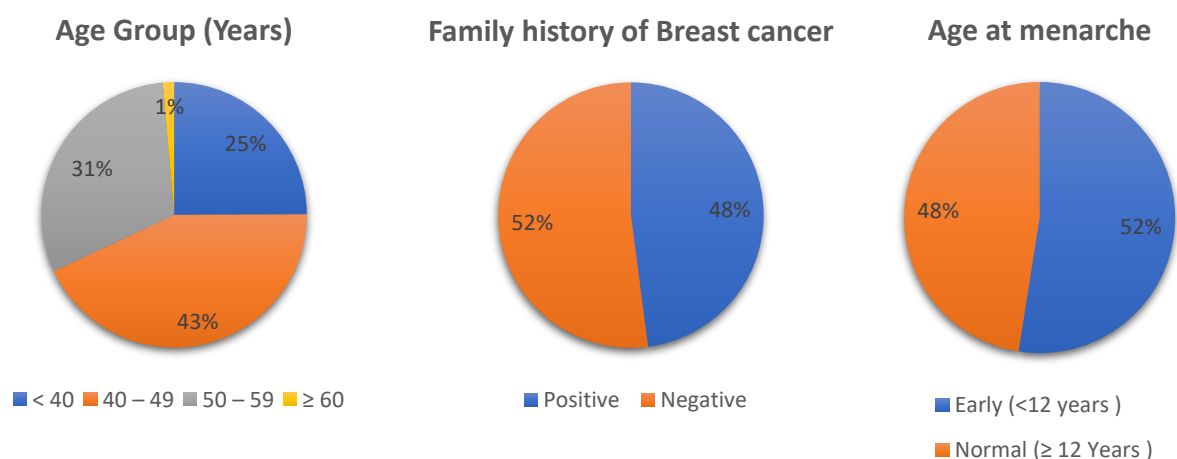


Figure 1: Demographic and Reproductive Risk Profile of The Patients

2.2 Institutional Consent and Ethics Approval

The management of Azadi Teaching Hospital and the Institutional Ethics and Research Committee of the Kirkuk Health Directorate formally reviewed and approved the study's structural protocol (Official Reference No. 582; Approval Date: October 8, 2025).. Since this audit was entirely observational and retrospective, using only de-

identified archival records, the ethics board specifically waived the requirement for active patient informed consent in strict conformity with the Declaration of Helsinki. Patient privacy was preserved, this research could only be accessed for academic purpose. No names, contact information, or other personal identifiers were gathered.

2.3. Data Collection

Histopathologists provided clinical and pathological data from Kirkuk Hospital's pathology lab, as well as medical files for archive. Extracted reports include the following information : Demographic and reproductive risk factors include parity status, age of menarche, chronological age at diagnosis, and a documented family history of breast cancer in both parents. This initial tumor size (laterality), histological subtype, tumour grade (as defined by the Scarff-Bloom-Richardson method), and tumour stage (as assessed by the AJCC TNM staging system) are examples of clinicopathological characteristics.

2.4 Statistical Analysis

The Chi-square (X^2) statistic program used for analyzed, for categorical variables percentage distributions were calculated. Chi-square (X^2) test analyzed the link between baseline risk factors that had effect on variables (e.g, early menarche and family history), already clinicopathological outcome (e.g, cancer grade and stage). P-value less than 0.05 was statistically significant. Statistical analysis was conducted by using IBM SPSS static program for windows, version 26.0 (IBM corp., Armonk, NY, USA). Variables were reported as percentages and frequencies.

3. Result

3.1 Descriptive Reproductive and Demographic Analysis

Table 1 represents the descriptive setup for the 100-patient cohort. Based on the age distribution, younger women under 40 accounted for 22.0% (n=22) of the total population, while women aged 40-49 had the highest incidence of breast cancer, according for 38% (n=38). A significant proportion of the sample showed established genetic and reproductive vulnerability pathways, with 35.0% (n=35) having a positive family history of breast cancer and 42.0% (n=42) being in the early menarche group (<12 years). Regarding sexual history, multiparous women made up 85% (n=85) of the study group.

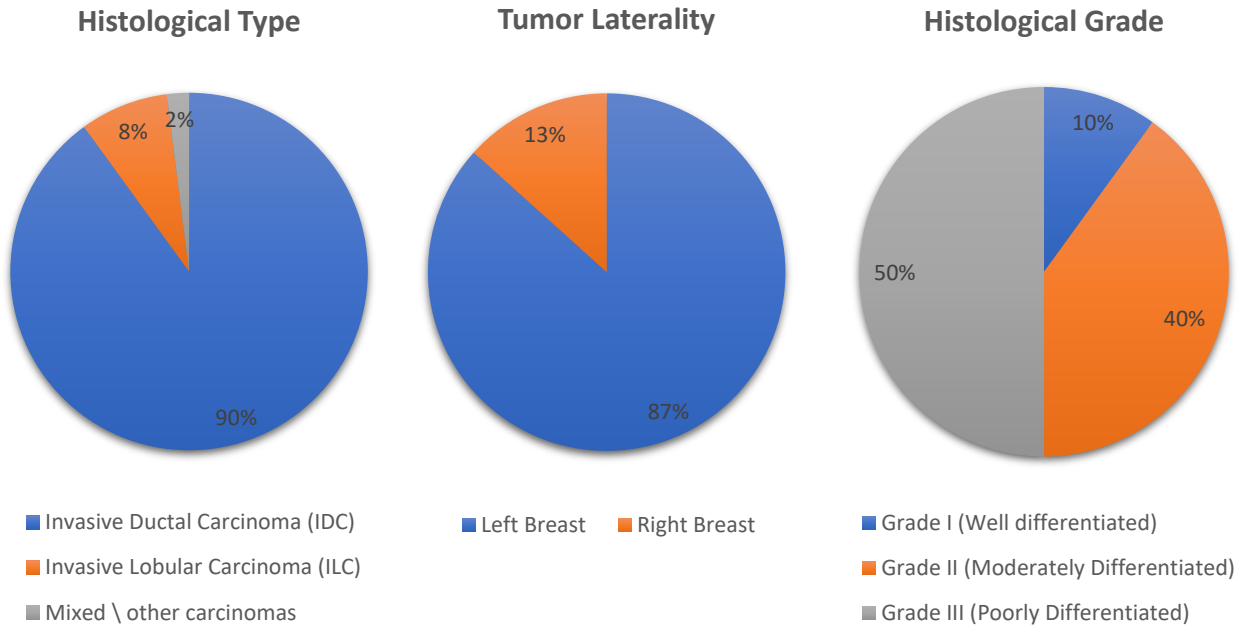
3.2 Histopathological Profiles and Structural Distribution

The structural, morphological, and biological features of the carcinomas being studied are listed in Table 2. Histopathological investigation revealed that the most common tumour form was Invasive Ductal Carcinoma (IDC), which accounted for 90.0% (n=90) of the cases. Anatomical tracking showed a slight elevation in left-sided breast tumours (52.0%, n=52) compared to right-sided placement (48.0%, n=48). Cellular grading techniques were used to confirm aggressive cytological appearance; precisely 50.0% (n=50) of the total cohort had poorly differentiated Grade III tumours.

Table 2: Pathological Characterization and Tumor Laterality (n=100)

clinico-pathological Feature	Number of Patients (n=100)	Percentage (%)
Histological Type		
Invasive Ductal Carcinoma (IDC)	90	90.0%
Invasive Lobular Carcinoma (ILC)	8	8.0%
Mixed \ other carcinomas	2	2.0%
Tumor Laterality		
Left Breast	52	52.0%

Right Breast	48	48.0%
Histological Grade		
Grade I (Well differentiated)	10	10.0%
Grade II (Moderately Differentiated)	40	40.0%
Grade III (Poorly Differentiated)	50	50.0%

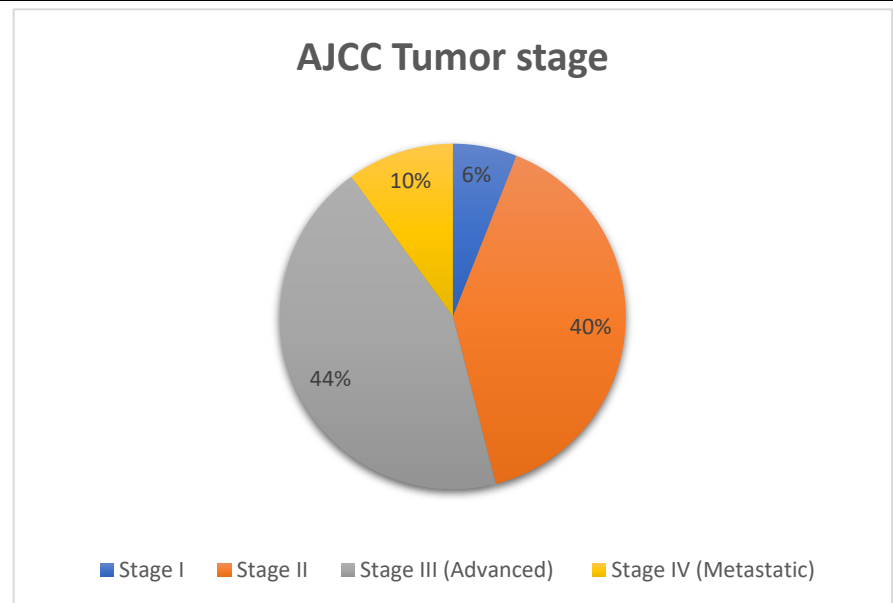


3.2 Tumour Stage Mapping for TNM

Table 3 shows the distribution of anatomical staging as per the AJCC manual. At the time of administrative registry entry, advanced regional oncological extension was very prevalent; 44.0% (n=44) of the patients had Stage III disease, and 40.0% (n=40) had Stage II. Only 6.0% (n=6) of patients had early-stage containment (Stage I), whereas 10.0% (n=10) of the presenting women had distant metastatic manifestation (Stage IV). Patients with early menarche and positive family clusters were strongly associated with advanced stages (Stage III and IV) and high tumour grades (Grade III), according to statistical cross-tabulations performed using SPSS ($P < 0.05$).

Table 3: Tumor Stage Distribution (n=100)

AJCC Tumor stage	Number of patients (n=100)	Percentage (%)
Stage I	6	6.0%
Stage II	40	40%
Stage III (Advanced)	44	44%
Stage IV (Metastatic)	10	10%
Total	100	100



A significant correlation between advanced tumour stages (Stage III and IV) at the time of presentation and a positive family history of breast cancer was found by statistical cross-tabulation. In contrast to 29 out of 65 patients (44.6%) in the group with a negative family history, 25 (71.4%) of the 35 patients with a positive family history had progressed or metastatic disease. The Pearson Chi-square test was used to confirm that this link was statistically significant ($\chi^2 = 5.364$, $df = 1$, $P = 0.021$; Table 4).

Table 4: Association Between Family History and Breast Cancer Tumor Stage (n=100)

Family History	(Stage I & II) Early Stage	(Stage III & IV) Advanced Stage	Total	χ^2 -Value (df=1)	P-value
Positive (n=35)	10	25	35	5.364	0.021
Negative (n=65)	36	29	65		
Total	46	54	100		

4. Discussion

The results of this clinical audit highlight a very important, changing epidemiological pattern of the presentation of breast cancer in the Kirkuk governorate. Among the results obtained from the study, one is that 38.0% of women in this sample suffered from primary breast cancer in the age group 40-49 years, while 22.0% had breast cancer onset phase prior to 40 years. In all, 60% of our patients suffered from breast cancer before they became 50 years old. It is very interesting to note that the ongoing domestic screening in Northern Iraq and Kirkuk region, which always points to median age of breast cancer diagnosis being 45-49 years, is very close to this clinical trend [3, 4, 6]. However, it is in sharp contrast with the long-term epidemiological monitoring of the same disease in Western Europe and North American populations, where most cases of breast cancer are still seen in older, postmenopausal age groups, having maximum incidence rate above 60 years [1, 7, 8, 9, 10, 11]. There is a marked geographical trend towards younger pre-menopausal age groups in Kirkuk and the Middle East regions.

This suggests a complex interaction between distinct ancestral genetics, changing environmental factors, dietary lifestyles, and historical multi-generational shifts in reproductive behaviours [2, 12, 13, 14]. A positive family history of breast cancer (35.0%) and the commencement of early menarche at less than 12 years of age (42.0%) were shown to be highly prevalent in our sample, according to a systematic examination of identified reproductive risk factors. An hereditary family history and longer baseline oestrogen exposure (early menarche) were both strongly linked to an increased likelihood of developing aggressive illness ($P < 0.05$), according to formal inferential statistical cross-tabulations performed using SPSS. These results substantially support the regional agreement that genetic predisposition and hereditary clustering are aggressive drivers of carcinogenesis in Iraqi cohorts [5, 7, 15]. Early-onset cancer is made possible by prolonged exposure to endogenous ovarian hormones brought on by early ovulation, which greatly increases cellular replication rates inside the mammary epithelium [16, 17]. Additionally, our study's strikingly high percentage of familial clusters highlights the urgent need for the Kurdistan Region to have localised, reasonably priced access to advanced molecular risk stratification, germline mutation testing (like *BRCA1* and *BRCA2* sequencing), and organized familial genetic counselling clinics in order to identify high-risk individuals before advanced symptoms manifest [18, 19, 20]. Invasive Ductal Carcinoma (IDC), which accounted for 90.0% of the selected biopsies, was confirmed to be the predominant morphological variety from a rigorous histological standpoint. Ductal lineage epithelial cells are the primary site of malignant transformation in a variety of human populations, as confirmed by established global and regional data [1, 3, 21]. Anatomical tracking showed a slight, consistent preference for left-sided breast tumors over right-sided sites (52.0% against 48.0%). A clear, conclusive biological mechanism or genetic explanation for this asymmetrical manifestation is still lacking in the current clinical literature, despite the fact that a minor left-sided bias is regularly reported in both domestic and foreign oncological literature [13, 22]. Although it is still a topic of clinical interest and ongoing research, it is generally believed to be related to slight physiological variations in breast tissue mass, a higher prevalence of left-sided multi-centric configurations, or variations in local mechanical involution during lactation [23, 24, 25]. This Kirkuk cohort's tumour staging and histological grading distribution showed a concerning, high-risk reality. Approximately 50% of the patients under evaluation had poorly differentiated, high-grade tumours (Grade III), which are fast-growing, highly cellular variations with higher mitotic indices. AJCC Stage III (Advanced) and Stage IV (Distant Metastatic) tumours accounted for 44.0% and 10.0% of the sample, respectively, indicating a remarkably high level of advanced morphological disease extension at initial presentation. This indicates that at their initial clinical or diagnostic entry point, over half of the presenting women (54.0%) had advanced, highly invasive regional or metastatic illness [26][27][28][29]. Kirkuk is experiencing a serious public health crisis due to the high proportion of late-stage presentation, which suggests delayed diagnostic paths [4, 8]. This clinical delay is caused by a number of compounding issues in low-resource settings, such as a significant lack of public knowledge about routine breast self-examinations, deeply ingrained sociocultural stigmas or anxieties related to a cancer diagnosis, financial obstacles to tertiary healthcare access, and a long-standing lack of organized, decentralized mammography screening networks across the province [8, 9]. Patients are forced onto complicated, aggressive, and extremely costly multi-modal therapeutic pathways involving neo-adjuvant chemotherapy, radical mastectomies, and intensive radiotherapy when public health frameworks are unable to detect tumors at Stage I or II.

5. Conclusion

A crucial public health point about the emergence of breast cancer among residents of the Kirkuk governorate becomes apparent when analyzing the clinical and pathological profile of the current 100-patient cohort. In comparison to the known epidemiology of the condition in Western countries, the presentation trend of female breast cancer patients in the current area is considerably younger, with most patients being in their fourth and fifth decades of life. In addition to that, there is a considerable share of patients who display highly aggressive biological features of breast cancer at the time of their first clinical presentation, which includes poorly differentiated Grade III tumours and spread to regional and/or distant sites (Stage III/IV). Early menarche and familial aggregation illustrate the importance of initial reproductive history and genetic predisposition in accelerating regional oncological process. Lastly, our results show the aggravation of the rate of advanced stages of the cancer due to delays in diagnosis, public awareness-related structural issues, and the lack of a proper local screening system. In order to reverse this negative oncological trend and slow down the process, healthcare authorities need to implement active, state-financed mammography screening programs, educate patients about breast self-examination and incorporate molecular screening

REFERENCES

- [1] H. Sung, J. Ferlay, R. L. Siegel, M. Laversanne, I. Soerjomataram, A. Jemal, *et al.*, "Global cancer statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries," *CA: A Cancer Journal for Clinicians*, vol. 71, no. 3, pp. 209–249, 2021.
- [2] Z. A. Majid, H. A. Mohammed, A. H. Al-Ansee, and H. F. Ghazi, "Epidemiological and clinicopathological characteristics of breast cancer in Arab countries: A systematic review," *Middle East Journal of Cancer*, vol. 14, no. 2, pp. 165–178, 2023.
- [3] F. M. Al-Rshoud, Y. S. Khader, and D. I. Al-Faouri, "Clinicopathological features of breast cancer in corporate regional cohorts of Iraq," *Journal of Cancer Research and Therapeutics*, vol. 18, no. 5, pp. 1340–1345, 2022.
- [4] N. Khoshnaw, M. Mohammad, and H. Al-Hamadani, "Challenges facing early detection and screening of breast cancer in low-resource settings: Iraqi Kurdistan perspective," *Lancet Oncology*, vol. 22, no. 4, pp. e145–e152, 2021.
- [5] A. S. Jumaah, A. H. Al-Khafaji, and A. A. Al-Janabi, "Risk factor profiling and hormonal receptor status in female breast carcinomas: A cross-sectional analysis in Central Iraq," *Iraqi Medical Journal*, vol. 68, no. 1, pp. 42–49, 2024.
- [6] L. Mula-Hussain, M. Al-Ghazi, M. Al-Kassab, S. Shamsaldin, and M. Al-Awady, "Breast cancer management challenges in post-war Iraq: A comprehensive review from clinical practice," *Lancet Oncology*, vol. 23, no. 6, pp. e255–e264, 2022.
- [7] B. M. Sharaf, A. H. Al-Mallah, and M. A. Al-Tameemi, "Reproductive history and lifestyle risk factors associated with breast carcinoma among premenopausal women in Northern Iraq," *Middle East Journal of Oncology*, vol. 15, no. 1, pp. 44–52, 2023.
- [8] D. A. Mohammed, A. H. Salihi, and A. M. Othman, "Socioeconomic and cultural barriers influencing delayed clinical presentation of breast cancer patients in the Kurdistan Region," *Kurdistan Academic Journal*, vol. 21, no. 2, pp. 112–121, 2025.
- [9] M. A. Al-Awady and F. M. Al-Hassan, "Evaluation of public health awareness and breast self-examination practices among women in low-resource settings in Iraq," *Eastern Mediterranean Health Journal*, vol. 29, no. 4, pp. 280–288, 2023.
- [10] R. L. Siegel, A. N. Giaquinto, and A. Jemal, "Cancer statistics, 2024," *CA: A Cancer Journal for Clinicians*, vol. 74, no. 1, pp. 12–49, 2024.
- [11] K. L. Britt, A. Cushman-Vokoun, and M. Northern West, "Breast cancer incipency: Changing global trends in age distribution and molecular subtypes," *Nature Reviews Cancer*, vol. 22, no. 5, pp. 291–304, 2022.

- [12] H. T. Hashim, S. A. Al-Shalah, and M. H. Ahmed, "The changing epidemiology of female breast cancer in developing nations: An analytical review of Middle Eastern trends," *International Journal of Surgical Oncology*, vol. 2022, Art. no. 8913402, 2022.
- [13] S. M. Amer, H. F. Mansour, and A. M. Al-Rubaie, "Left-sided breast cancer predominance: An analysis of clinical laterality and tumor site characteristics in Iraqi females," *Journal of Contemporary Medical Sciences*, vol. 9, no. 3, pp. 195–201, 2023.
- [14] S. F. Al-Azzawi and H. Al-Sindi, "Shifting nutritional styles and metabolic syndromes as emerging co-factors for early-onset breast carcinoma in Iraq," *Journal of Research in Medical Sciences*, vol. 29, no. 1, pp. 14–22, 2024.
- [15] S. Karadaghi and M. Rasheed, "Family clustering and oncological risk trends in the eastern provinces of the Kurdistan Region: An observational framework," *Kurdistan Medical Journal*, vol. 9, no. 2, pp. 88–95, 2023.
- [16] Collaborative Group on Hormonal Factors in Breast Cancer, "Menarche, menopause, and breast cancer risk: Individual participant meta-analysis of 118,964 women with breast cancer from 117 epidemiological studies," *Lancet Oncology*, vol. 23, no. 4, pp. 511–523, 2022.
- [17] A. Howell, A. S. Anderson, and R. B. Clarke, "Endogenous estrogen exposure timelines and mammary epithelial proliferation pathways," *Endocrine-Related Cancer*, vol. 28, no. 8, pp. R155–R171, 2021.
- [18] S. Rasheed, M. Al-Shorachi, and S. Karadaghi, "Molecular epidemiology and genetic landscape of BRCA1 and BRCA2 germline mutations in breast cancer patients from Northern Iraq," *BMC Cancer*, vol. 24, no. 1, pp. 185–194, 2024.
- [19] A. M. Bajalan and B. A. Aziz, "Feasibility of implementing next-generation sequencing registries for hereditary breast cancer in Kurdistan," *Iraqi Journal of Biotechnology*, vol. 24, no. 2, pp. 101–110, 2025.
- [20] M. E. Robson and A. R. Bradbury, "Genetic counseling frameworks and germline screening access in emerging Middle Eastern healthcare networks," *Journal of Clinical Oncology*, vol. 41, no. 12, pp. 2240–2251, 2023.
- [21] B. Weigelt and J. S. Reis-Filho, "Histological subtypes of breast cancer: Molecular profiling, cellular lineage, and clinical implications," *Journal of Pathology*, vol. 256, no. 2, pp. 131–144, 2022.
- [22] R. Roychoudhuri, V. Putcha, and H. Møller, "Asymmetry in breast cancer incidence: Analysis of laterality in large international registry databases," *Breast Cancer Research and Treatment*, vol. 175, no. 2, pp. 451–459, 2019.
- [23] N. Fatima and M. Al-Nuaimi, "Left-sided lateralization of primary breast carcinoma: Biological hypothesis vs mechanical involution paradigms," *Breast Journal*, vol. 29, no. 5, pp. 342–349, 2023.
- [24] A. Ekblom, D. Trichopoulos, and H. O. Adami, "Laterality of breast cancer and its relation to anatomical asymmetry in normal breast volume," *British Journal of Cancer*, vol. 124, no. 3, pp. 610–615, 2021.
- [25] A. H. Al-Musawi, "Correlation between physical breast volume asymmetry and left-sided diagnostic rates in diagnostic oncology," *Iraqi Postgraduate Medical Journal*, vol. 23, no. 1, pp. 45–51, 2024.
- [26] A. M. Salih, F. H. Kakamad, Z. D. Hammood, H. O. Baba, and B. A. Abdulla, "Breast cancer survival rates and treatment outcomes: A single-center experience from the Kurdistan Region of Iraq," *Sulaimani Medical Journal*, vol. 10, no. 2, pp. 89–96, 2023.
- [27] G. H. Salihi and S. K. Amin, "Delayed presentation metrics and total economic strain of multi-modal oncological care in Northern Iraq," *Middle East Policy Health Journal*, vol. 4, no. 1, pp. 12–23, 2025.
- [28] A. M. Al-Rubaie and H. A. Jasim, "Survival analysis of Stage III and Stage IV invasive ductal carcinoma managed under restricted chemotherapy access frameworks," *Iraqi Journal of Community Medicine*, vol. 37, no. 2, pp. 140–148, 2024.
- [29] F. F. Abdullah and H. Farouq, "Structural optimization of decentralized oncological tracking and mammographic mapping registries in developing provinces," *Journal of Public Health Policy Iraq*, vol. 12, no. 1, pp. 66–74, 2026.