DOI 10.25789/YMJ.2025.92.22
УДК 618.19 – 006 – 036.22 (571.62)

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SOCIAL DETERMINANTS OF BREAST CANCER RISK AND LATE DIAGNOSIS: A MEDICO-SOCIOLOGICAL STUDY OF KHABAROVSK KRAI

This study analyzes the social determinants of breast cancer (BC) among the female population of the Khabarovsk Krai. The relevance of the problem is determined by the complex influence of not only biomedical but also socioeconomic factors. An analysis of the studied cohort revealed a characteristic clinical and demographic profile, which includes a predominance of patients from older age groups and a burdened somatic history. The key conclusion of the work is that the effectiveness of measures to combat BC is significantly limited by structural, predominantly organizational, deficiencies within the healthcare system. Manifestations such as low accessibility and untimeliness of medical care, expressed in delays in diagnosis and treatment, as well as insufficient follow-up care, exacerbate the existing social inequality in healthcare provision in the region.

Keywords: breast cancer, epidemiological indicators, psychosocial factors, healthcare accessibility, Khabarovsk Krai (Russia).

For citation: Kiselev S.N., Kirik Yu.V., Nesterov A.A. Social determinants of breast cancer risk and late diagnosis: a medico-sociological study of Khabarovsk krai. Yakut Medical Journal, 2025; 92(4): 96-99. https://doi.org/10.25789/YMJ.2025.92.22

Introduction. Breast cancer remains a critical medico-social problem, leading in terms of oncological morbidity and persisting as the primary cause of cancer-related mortality among the female population worldwide [3]. The distribution of the breast cancer burden is characterized by significant heterogeneity, both between countries and within them. Contemporary research indicates that this disparity is determined predominantly not by the biological characteristics of the tumor, but rather by socioeconomic factors and structural barriers within the healthcare system [1]. Although the role of modifiable lifestyle factors [12] and genetic predisposition [6] in the pathogenesis of breast cancer is acknowledged, it is the social determinants of health—income level, education, and geographic accessibility of medical care—that serve as critical predictors of adverse disease outcomes.

Within the framework of Russian scientific discourse, the problem of breast cancer has traditionally been considered through the prism of an organizational-clinical approach. This is reflected in studies devoted to the reorganization of healthcare services [7, 9], the improvement of diagnostic algorithms [11, 10], and the assessment of patients' quality of life [2, 8]. However, a systemic analysis of the impact of structural barriers and social inequality factors on the regional specifics of breast cancer epidemiological indicators remains an understudied area.

In this regard, reducing the burden of breast cancer requires the implementation of a comprehensive approach that, along with health promotion and the assessment of genetic risks, must be fundamentally oriented towards minimizing socio-economic disparities in access to all components of the healthcare system—from prevention and early detection to high-tech treatment and palliative care. The necessity for a comprehensive study of the social determinants of health defines the relevance of this research.

Materials and Methods. The research methodology was structured according to a sequence of stages, implying the comprehensive use of data collection and analysis methods. The initial stage involved an analysis of secondary data, which included examining official statistics from the P.A. Hertsen Moscow Oncology Research Institute (for the Russian Federation, the Far Eastern Federal District, and Khabarovsk Krai) [4, 5], alongside federal statistical reporting forms No. 7 and No. 12. The obtained statistical trends formed the basis for conducting a targeted sociological survey aimed at their in-depth understanding through the acquisition of relevant empirical data.

The main group consisted of women with a verified diagnosis of breast cancer (n=100) who received treatment at the Khabarovsk Krai Regional Clinical Oncology Center of the Ministry of Health. The control group (n=100) comprised women without oncological pathology, who were employees of medical organizations in the same region. Respondents were selected using a simple random sampling method. Data collection was carried out from November 2024 to May 2025 using two specialized questionnaires, the validity of which was confirmed by high Cronbach's alpha coefficient values (0.76–0.81). Statistical processing was performed using the SPSS.10 statistical data analysis package, employing descriptive statistics methods and the non-parametric Mann-Whitney U test for comparing independent groups; the statistical significance of differences was determined at $p<0.05$. The study was approved by the ethics committee, and all participants provided informed consent.

Discussion of Results. The dynamics of key statistical indicators for breast cancer (BC) in Russia from 2013 to 2023 are characterized by contradictory yet overall positive trends. Despite a steady increase in primary incidence (by 21.6% over the decade), likely associated with improved diagnostics, a substantial decrease in mortality—by almost 25%—has been observed. The anomalous decline in incidence during 2020-2023 is presumably an artifact caused by disruptions in the system of prophylactic medical check-ups during the COVID-19 pandemic.

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The cumulative lifetime risk of developing BC increased from 5.34% to 6.45%, reflecting both a real growth in the threat and improved detection rates. Progress in early diagnosis is confirmed by a significant increase in the proportion of BC cases detected at stages I-II (from 66.7% to 75.2%) and a concomitant decrease in the proportion of advanced cases. However, the persistently high proportion of diagnoses established at late stages (24.9% in 2023) indicates unresolved systemic problems in the organization of healthcare and the timeliness of patients seeking medical attention.

The epidemiological situation regarding breast cancer in the Far Eastern Federal District (FEFD) is characterized by systemic under-detection. This is masked by a formally low incidence rate (475.7 per 100,000 population) but manifested by a high mortality rate (12.19 per 100,000 population), suggesting frequent diagnosis at late stages. The situation is particularly critical in the Khabarovsk Krai, where high primary incidence (65.61 per 100,000 population) and high mortality (14.11 per 100,000 population) point to systemic challenges in the organization of healthcare. Despite a five-year survival rate close to the national average (66.2%), a low accumulation index for registered patients (10.2) and high case fatality rate (2.6%) confirm problems in follow-up care and patient routing. This dictates the necessity of prioritizing improvements in active case finding and the accessibility of BC diagnostics in the region.

Despite demonstrating higher treatment outcomes than the national and Far Eastern Federal District averages (five-year survival rate - 66.5%, cancer prevalence index - 11.4), the 20.2% increase in primary morbidity recorded between 2018 and 2023 in the Khabarovsk Territory represents an ambiguous epidemiological indicator that masks significant inter-territorial disparities. Sharp fluctuations in indicators across municipalities, including the multi-year absence of registered cases in some districts and a sporadic surge in others, point to systemic issues: unreliable statistics, chronic instability of cancer registration, patient migration, and an acute shortage of medical personnel in peripheral areas.

A conducted sociological study and subsequent analysis revealed key characteristics of the sample of female cancer patients compared to the control group. Patients diagnosed with breast cancer (Group I) were significantly older than women without oncopathology (Group II), as evidenced by the median age values: 51.5 years (interquartile range 25th–75th percentile 46.3–67.0 years) versus 45.0 years (37.0–50.7 years), respectively ($p < 0.05$). Analysis of the geographical distribution of participants showed a similar pattern in both the main and control groups: the majority (59.0±4.9% and 60.0±4.8%, respectively) resided in major regional cities (Khabarovsk, Komsomolsk-on-Amur), while the remainder (41.0±4.9% and 40.0±4.8%) represented urban settlements of municipal districts, such as Vanino, Chegdomyn, and Nikolaevsk-on-Amur, among others.

Despite a comparable proportion of individuals with higher education in the groups (66.0±4.7% and 63.0±4.8%, respectively), their employment status differed radically. In the control group, it was one hundred percent, whereas among patients with breast cancer, only 36.8±4.8% were employed; the rest were distributed among the statuses of temporary unemployment (24.2±4.2%), disability (24.0±4.2%), and being students (15.0±3.5%). However, the questionnaire data indicate a potential inaccuracy in self-reported employment status in the latter group.

Medical indicators also demonstrated a substantial difference: the prevalence of chronic diseases in Group I reached 50.0±5.0%, significantly exceeding the rate in the control group (11.0±3.1%). Furthermore, in 60.0±4.8% of patients in the main group, the duration of chronic pathology exceeded five years. The distribution by stages of breast cancer at the time of diagnosis in Group I was as follows: Stage I — 21.0±4.0%, Stage II — 31.0±4.6%, Stage III — 38.0±4.8%, Stage IV — 10.0±3.0%.

At the same time, parameters such as a history of at least one pregnancy (100% in both groups) and childbirth (70.0±4.0% vs. 75.0±4.3%) showed no significant difference ($p > 0.05$). The observed trend towards a lower prevalence of breastfeeding in the breast cancer group (60.0±4.8% vs. 66.0±4.7%), in the absence of statistical significance, indicates the need for further analysis of this protective factor. The unexpectedly low frequency of hormonal contraceptive use in the breast cancer group (61.0±4.8% vs. 100%) requires additional verification regarding its reliability. Thus, the obtained results underscore the multicomponent nature of breast cancer risk, with the dominant role of endocrine and genetic components.

The study results revealed statistically significant differences in a number of behavioral factors between women diagnosed with breast cancer and the control group of healthy women.

Systemic discrepancies were observed in the perception of working conditions, where breast cancer patients demonstrated a more critical assessment ($U=850$, $p<0.001$): only 25.0±4.3% characterized them as favorable compared to 48.0±4.9% in the control group. Furthermore, the vast majority of patients (87.5±3.3%) considered work a factor that worsened their health, whereas only 11.3±3.1% of healthy women shared this view ($p < 0.001$).

A significant difference was recorded in the subjective assessment of income level ($U = 500$, $p < 0.001$). While 81.0±3.9% of respondents in the control group reported a high income, only 31.0±4.6% in the breast cancer group gave a similar assessment, and 40.0±4.8% reported a low income. Paradoxically, despite the serious diagnosis, breast cancer patients subjectively assessed their stress levels as lower ($U = 3352$, $p < 0.001$): 41.0±4.9% reported a low level versus 41.0±4.9% of healthy women reporting a high level. However, the structure of stressors differed radically: for women with breast cancer, the main source was work (51.0±4.9%), while for healthy women it was financial issues (76.0±4.2%). This was accompanied by a significantly higher level of constant health anxiety among breast cancer patients (59.0±4.9% vs. 34.0±4.7%; $U = 3352$, $p < 0.001$).

The results of the statistical analysis demonstrated a significant deterioration in sleep quality in the group of patients with breast cancer (BC) compared to the control group ($U = 2940$, $p < 0.001$). Specifically, 20.0 ± 4.0% of respondents in the study group rated their sleep as low-quality, with none of the participants selecting the highest rating on the five-point scale. However, it should be noted that, as additional analysis showed, the identified differences may be partially attributable to age disparities between the compared groups.

Regarding eating behavior, the opposite pattern was observed: the diet in the BC patient group was more balanced, and the attitude towards it was more positive ($Me = 3.5$, $Mo = 4$), whereas in the control group, the ratings were statistically significantly lower and unanimously negative ($Me = 1$, $Mo = 1$; $U = 1850$, $p<0.001$).

Concerning behavioral factors, no significant differences were found in the frequency of alcohol consumption or smoking intensity among smokers

(p>0.05). However, a significantly lower reported prevalence of coffee consumption was recorded among BC patients (39.0 ± 4.8% vs. 83.5 ± 3.7%; U = 20506, p < 0.001), with no differences in the amount consumed among consumers, which may indicate a socially desirable response bias. At the same time, BC patients demonstrated significantly higher adherence to regular physical activity (80.0 ± 4.0% vs. 28.0 ± 4.4%; U = 2400, p < 0.001).

The most alarming differences were identified in the realm of healthcare accessibility. Women with BC were significantly less engaged in the system of dispensary observation prior to diagnosis (U = 4656, p < 0.001). They also faced more substantial systemic barriers: 90.0±3.0% reported various obstacles in obtaining care, and the hospitalization process lasted more than a month for 61.0 ± 4.8%, with 20.0 ± 4.0% waiting from four to five months. No statistically significant differences were found between the groups regarding the difficulty of scheduling an initial appointment with a general practitioner (U = 4643, p = 0.3). However, scheduling specialized diagnostic procedures for BC patients was associated with greater difficulties (U = 4260, p<0.05).

Thus, the experience of an oncological disease shapes a distinct system of evaluations, shifting the focus of perceived distress from financial difficulties and general stress onto systemic problems: the perceived threat from working conditions and, most critically, the catastrophic inaccessibility of timely and high-quality medical care, which exacerbates the course of the disease and creates an atmosphere of constant struggle.

Conclusion

1. Despite a nationwide positive trend of decreasing breast cancer mortality and improved early-stage diagnosis, the situation in the Far Eastern Federal District, and in particular, the Khabarovsk Territory, remains challenging. The identified discrepancies between the relatively low officially registered incidence, high mortality, and problems with follow-up care indicate systemic under-detection and late diagnosis in the region. This negates nationwide achievements and necessitates the development of differentiated approaches to organizing medical care, taking into account geographical and logistical specificities. The validity of this conclusion is based on the consistency of official statistics and epidemiological patterns.

2. The conducted study revealed a complex interplay of similarities and differences in the medico-social characteristics between women with breast cancer and the control group in the Khabarovsk Territory. While statistically significant differences (p < 0.05) were found for age (mean age in the breast cancer group was 6.5 years higher), level of comorbidity (50.0±5.0% vs. 11.0±3.1%), and socioeconomic status (a significantly higher percentage of unemployed individuals was recorded in the breast cancer group), the groups were comparable in terms of education level and geographical distribution. In both groups, the proportion of residents living in large regional cities was approximately 60.0±4.8%, indicating homogeneity of the samples for this parameter.

3. The analysis revealed the complex nature of behavioral and reproductive risk factors for breast cancer. Statistically significant differences (p < 0.05) confirm the key role of endocrine background, manifested in a significantly more frequent history of hormonal disorders, irregular menstruation, and use of hormone replacement therapy (HRT), as well as a family history of the disease. At the same time, factors such as smoking and alcohol consumption did not demonstrate a significant difference between the groups; however, the high proportion of evasive answers among breast cancer patients may indicate an underestimation of their actual contribution. The subjective perception of lifestyle appears to be important: women with breast cancer were significantly more likely to rate their working conditions as negative and their income level as low. This, along with identified dietary peculiarities and increased adherence to physical activity *after* diagnosis, paints a multifaceted picture of behavioral patterns associated with the disease.

The obtained data, which are statistically significant (p < 0.05), indicate low accessibility and timeliness of medical care for female oncology patients. The current situation is characterized by significant obstacles in organizing follow-up care (only 7.0±2.5% of patients visited a doctor annually), widespread difficulties in scheduling diagnostic procedures (encountered by 90.0±3.0% of respondents), and critically long waiting times for hospitalization. For the majority of patients (61.0±4.8%), inpatient treatment began a month or more after it was prescribed. These facts point to a profound gap between the needs of patients and the actual capabilities of the healthcare system.

The authors declare no conflict of interest.

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