

## Breast Cancer Screening

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### **Abstract**

Has been detected, that usage of special questionnaire (algorithmically based epidemiological questionnaire for detection of risk factors) of female population and routine and cost-effective methods (physical + cytological examination), formation of high-risk groups, contribute to effective secondary prevention of breast cancer. The selection of high-risk groups and screening permits detection of precancer diseases and chronic inflammation processes resulting cancer prevention. The optimal scheme of screening makes possible the breast cancer early detection and treatment, resulting the early death prevention.

**Keywords:** *breast cancer, epidemiology, diagnostic methods  
sensitivity, specificity, screening*

### **Introduction**

**B**reast cancer ranks the first place in world and Europe females oncology disease structure. The pick incidence of this cancer in the world per 100 000 female according to ASR was registered in Uruguay (88,0) and USA (87,1), and in Europe - in Holland (87,3) and Denmark (77,7). The lowest figures of breast cancer incidence were noted in the world in Israel (72,2‰) and England (71,7‰), and in Europe - in Greece (46,5‰) and Spain (45,4‰) [7,8,10].

In Georgia, like many other countries of the world, the breast cancer ranks the first place in female's oncology disease structure. Breast cancer represents the most frequent disease among the oncology diseases, 700-800 cases are registered annually, composing the more than 1/3 of whole cancer incidence. According to ASR indicators, the first place in Georgia in 1996-1999 was taken by Adjara (36,9‰). The incidence also was high in Shida Kartli (27,4‰), Samtskhe Javakheti (31,2‰), Kakheti (27,4‰). The breast cancer low cumulative risk regions are: Zemo Svaneti (11,4‰), Mtskheta Mtianeti (17,0‰), Qvemo Kartli (17,6‰) [1].

Frequently, the breast cancer is diagnosed in advanced stages, when the radical treatment is not possible, determining the decreased chance for cure and life

prolongation, increasing the incidence of mortality. The tendency of increasing the ratio of advanced cases is determined by not conduction of population preventive examinations [3,5,6].

Preventive examination with traditional way (populate screening) is not possible in present economical situation that's why, the work out of new organization- and methodological forms were necessary considering the realities of present time. For instance, breast cancer screening in high-risk groups [2,4,9].

The problem is especially significant for Tbilisi, as for high cancer incidence cumulative risk region. Considering the fact, that the cancer incidence structure in Tbilisi is not specified, as well as the breast cancer ratio and its rank place in this structure is not determined; also the breast cancer cumulative risk according to Tbilisi regions is not estimated; it is necessary to determine the volume of risk group contingent, supposed for the screening. The screening scheme needs the optimization and economical soundness. All the above-mentioned determine the actuality of the presented study.

The aim of the study is the work out of breast cancer screening program and its economical motivation on the Tbilisi model.

The goals of the study - The evaluation of structure and trends of breast cancer incidence in 1988-1992 according to Tbilisi regions and prognoses of anticipated situation in 2010; formation of risk groups; study of each diagnostic methods and their combinations specificity and sensitivity and work out of cost-effective optimal schemes; organization of screening in high risk groups.

### **Materials and Methods**

The information on 7830 cases registered in 1988-1992 in Tbilisi was collected due to Form 281. For breast cancer screening organization in Tbilisi and study of the specificity and sensitivity of each diagnostic method and their combinations, 507 breast cancer patients, managed at outpatient clinic of National Cancer Center and Mammology Center in 2001-2002 were evaluated. The massive preventive examinations were conducted in Tbilisi in 2001 by international humanitarian organization "Amchor". Due to support of this organization, 676 risk group females were tested with worked out high sensitive and cost-effective screening scheme.

The Descriptive and Analytical Epidemiology study methods, recommended by International Agency on Research of Cancer (IARC, Lyon) and International Association of Cancer Registries (IACR, Lyon) were used for analyses of database [11,12].

### **Results**

According to received data, it was found that, the breast cancer ranked the first place in Tbilisi females oncology disease structure (ASR=35,8) and in general population for both genders among the 5 main localization cancers (ASR=21,0) according to Aged Standardized Figures per 100 000) in 1988-1992.

The breast cancer in males is 60 times rare than in females (SRR=59,6). The pick incidence was revealed in Saburtalo region (ASR=56,9), which is the 1,6 times more (SRR=1,6) compared to mean figures in Tbilisi (ASR=35,8) and 2,5 times more, compared to lowest figures in Tbilisi (ASR=23,0), registered in Gldani region. According cumulative risk indicators, the breast cancer cumulative risk among 0-74 aged females in Saburtalo region was 1,5 times more ( $CR_{(0-74)}=5,9$ ) compared to mean figures in Tbilisi ( $CR_{(0-74)}=3,9$ ) and 2,4 times more compared to lowest figures, registered in Gldani region ( $CR_{(0-74)}=2,5$ ). The breast cancer incidence ratio in entire oncology disease structure was more by 22% in Mtatsminda (PIR=122) and by 19% in Didube (PIR=119) regions compared to mean figures in Tbilisi. According to Aged Specific Incidence indicators, the incidence of disease rises with older age and reaches the pick in 50-69 age group.

The breast cancer standardized indicator in Tbilisi at the beginning of 70s was 35,6‰, it was stable during 10 years, but raised to 40,8‰ at the beginning of 80s. The decrease of disease incidence was detected (35,8‰) in 1988-1992 and near the end of 90s it has fallen to 29,4‰, which could be explained by unstable political and economical situation in the country.

According to Standardized Incidence Ratio (SIR) figures the breast cancer cases are increased by 8% in 1988-1992 compared to 1978-1982 (SIR=108).

According to analyses of anticipated prognoses the breast cancer standardized figures in 2010 would be 55,4 per 100 000.

In order to study the specificity and sensitivity of each diagnostic method and their combinations, the physical, cytological, ultrasound and mammography examinations were evaluated considering the final histological results of each case.

After the evaluation of diagnostic importance of each method, it was found, that most sensitive is mammography - 90,6%, and less - the physical examination - 83,0%, which was verified by Pv (*Tab.1*). The most specific is the cytological - 94,4% and mammography examinations - 93,4% and less - the physical examination - 75,5%.

According to analyses of results, the highest diagnostic importance has the combination of physical and cytological examinations - 7,4% (Pv=95%).

Screening requires the estimation of diagnoses using the most sensitive, easy, noninvasive and cost-effective methods. Consequently, according to our study results, the optimal scheme of breast cancer screening is: clinical + cytological examination. The sensitivity of this screening test is highest (97%) compared to other tests, specificity is - 88,9%, the right diagnoses is estimated in - 95%, hypodiagnosing - 18,4%, hyperdiagnosing - 1,4%. This screening test is most cost-effective. The cost of 1 patient screening test is - 12 Georgian Laris.

The breast cancer-screening scheme, worked out by us, was used in high-risk groups of Tbilisi female's population. The patients selected due to screening, were subjected to the deep examinations and surgeries followed by histological examination at National Cancer Center. It was found, that the physical examination had the false negative results in 0,7%, false positive - in 26,3%. Accordingly, the sensitivity of this method was - 82,4%, specificity - 98,9%. The hypodiagnoses in cytological examination was found in 2,2%, hyperdiagnoses - in 5,9%. Consequently, analyzing the sensitivity of this method it was revealed, that the true

positive diagnosis was reached in 94,1%. The specificity of cytological method was not exceeding- 97,8%. The sensitivity of physical examination + cytological examination test was 100%, so false negative results were not received with combination of these methods. The specificity was 97,7% - the false positive result was received only in one case.

Among the breast cancer cases detected due to screening, the I stage was diagnosed in 21,1%, II stage - in 52,6% and the III stage - in 26,3%.

DIAGNOSTIC METHODS AND THEIR COMBINATIONS	SENSITIVITY (%)	FALSE NEGATIVE (%)	SPECIFICITY (%)	FALSE POSITIVE (%)	PV (%)	ECONOMICAL EFFICIENCY (in Georgian Laris)
Physical	83,0	46,4	75,5	7,1	87	5
Cytological	89,3	32,5	94,4	1,4	94	7
Ultrasound	88,6	41,7	79,7	4,4	90	10
Mammography	90,6	32,4	93,4	1,5	92	20
Physical+ Cytological	97,4	18,4	88,9	1,4	95	12
Physical+Ultrasound	96,0	19,6	74,0	5,7	73	15
Physical+Mammography	89,8	22,4	92,7	3,0	90	25
Physical+Cytological+Ultrasound	96,8	13,9	92,5	1,6	98	22
Physical+Cytological+Mammography	90,5	19,1	97,4	1,1	89	32
Physical+Ultrasound+Mammography	88,7	16,7	97,2	0,4	88	35

**Tab.1** *Diagnostic and economical efficiency of different diagnostic methods and their combinations.*

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## **Скрининг рака молочной железы**

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### **Р Е З Ю М Е**

Проведение эффективных вторичных превентивных мероприятий по поводу рака молочной железы возможно с помощью анкетирования женского населения, формирования групп высокого риска, с использованием в них рутинных недорогих методов исследования. Проведением скрининга в группе высокого риска возможно выявление предраковых заболеваний молочной железы, хронических фоновых процессов и профилактика рака. С помощью оптимальной схемы скрининга своевременно диагностируется рак молочной железы, после чего возможно адекватное лечение, в результате чего снизится заболеваемость и смертность.

**Ключевые слова:** *ХОБЛ, гипоксия, свободные радикалы, лёгочная недостаточность, спирометрия*