

Breast Cancer Burden in Tbilisi

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According to GLOBOCAN/IARC (2013), in 2008, 1 384 000 new cases of breast cancer incidence and 458 000 cancer related deaths were registered worldwide. Epidemiological research has been conducted at the University of Georgia to specify the number of breast cancer incidence in Tbilisi. There is data on 12 913 cases of breast cancer in Tbilisi in 1998-2010 provided by the National Center for Disease Control and Public Health (NCDC). Tbilisi Population Cancer Registry provided information about 16 705 cases of death in the Tbilisi's female population in 2002-2004. Based on a descriptive analysis, it has been determined that in the Tbilisi's female population, the number and frequency of breast cancer is an important medical and social problem. The frequency of incidence of breast cancer in Tbilisi (ASR=123% ; AAR=158%) and the frequency of cancer related deaths (ASR=33% ; AAR=43%) correspond to the index of the average level of the developed countries of the world. Besides, according to both indicators in dynamics, there was an increase in breast cancer incidence. Compared to 1988-1992, in 2008-2010, according to SRR, the frequency of breast cancer rose 3.5 times, and according to SIR – by 253%. In Tbilisi, in 2002-2004, the cases of deaths caused by cancer ranked second after those caused by the circulatory system and its share in the structure of death comprised 18%. In the structure of cancer mortality in women over 25, breast cancer ranks first. At the same time, at a later period, 35-59, breast cancer again ranks first in the structure of different causes of death. As a result of the research, recommendations have been worked out.

Problems Statement

In the modern world, for the past few decades the burden of disease has been mainly defined by chronic diseases. Among these diseases, alongside circulatory ones, cancer is the leader. It is generally accepted that the issue of breast cancer has long gone beyond the sphere of medical care and has acquired the meaning and importance of vital social problems.

According to GLOBOCAN (2013), in 2008 there were 1 384 000 new cases of breast cancer which caused 458 000 deaths.

According to Parkin D. M. and Fernandez L. M. G. (2006), approximately 16% of the world's population is covered by the Cancer Incidence Registry System while receiving information about cancer mortality can be found in approximately 29% of the world.

According to Parkin D. M. and Fernandez L. M. G. (2006), the index of breast cancer incidence and mortality differs considerably in different regions of the world. Mainly, the highest levels (80 and more per 100 000 women) are found in the developed regions, while the lowest levels (30 and less cases per 100 000 women) are found in the developing regions. At the same time, there is a tendency of increase in breast cancer incidence in almost all regions.

According to the data provided by World Health Organization (WHO, 2005), the highest indices of breast cancer mortality were registered in Denmark (23.5%), Belgium (22.6%), Ireland (22.2%) and the Netherlands (21.7%), while the lowest indices were registered in Tajikistan (4.8%), San Marino (6.0%), Albania (7.4%), Turkmenistan (7.9%), Uzbekistan (8.5%) and Kyrgyzstan (9.9%).

According to the data provided by the World Health Organization (WHO, 2008), breast cancer ranks first in the structure of cancer in developed regions, America, Europe and West Mediterranean regions, and it is the second in Africa and South-Eastern Asia.

P. Boyle and J. Ferlay (2010) analyzed breast cancer incidence and mortality in 25 European countries in 2004. Breast cancer is one of the

main forms of cancer found in European women. In 2004, 370 100 new cases of breast cancer incidence (27.4% out of all types of cancer in females) and 129 900 cases of mortality (17.4%) were registered in Europe.

According to the data provided by Fred Hutchinson's Cancer Research Center of Washington University (Porter P.L., 2009), there has recently been a tendency for an increase in the numbers of breast cancer incidence and mortality around the whole world, particularly in economically less developed countries. On the one hand, it is connected with the changes in the distribution of risk factors such as a different way of life, genetic and biological differences between ethnic groups and races. On the other hand, in economically less developed countries, there are no commonly established effective strategic programs to control cancer, like cancer screening, which is able to considerably reduce the number of deaths caused by breast cancer.

Breast cancer incidence is higher in economically developed countries among white populations. According to the database of Global Cancer (GLOBOCAN/IARC), by 2002, worldwide, 37.4 per 100 000 women, suffered from cancer and 13.2 died of it. Among them, 103.7 suffered and 18.1 died in economically developed countries, while in developing countries, 20.9 suffered from and 10.3 died of cancer. It is notable that the incidence/mortality ratio is on average 0.35. This ratio is the highest (0.69) in Africa and the lowest (0.19) in South America (Porter P.L., 2009).

According to Lythcott N. (2004), between 1995-1999 in California on average 48 new cases of invasive breast cancer and of Ca in situ were found in women under 50 per year, among them: 52.7/100,000 white, 48.4/100,000 black, 46.3/100,000 Asian and 35.2/100,000 Latina women. In women above 50, there was a sharp increase in invasive breast cancer and Ca in situ and, on average, reached 426.2/100,000, among them: 484.1/100,000 white, 372.2/100,000 black, 265.4/100,000 Asian and 256.9/100,000 Latina women.

Botha J.L. (2003) and his co-authors analyzed the tendency of breast cancer incidence and mortality in 16 European countries, in six of them there has been abreast-screening program since the 1980s. In England,

Wales, Scotland and Holland, there is a tendency for a reduction in breast cancer mortality, which is connected with diagnosing cancer at its early stage and adequate treatment by screening.

M. McCracken and his co-authors (2007) studied the data provided by the California Cancer Centre Registry concerning the main cancers (prostate, breast, lung, large intestine, stomach, liver, womb), the index of deaths related to the disease and the screening results in 5 main ethnic groups of Asian immigrants living in the State of California (Chinese, Filipino, Vietnamese, Korean and Japanese). The authors point to certain differences in the structure of incidence and mortality according to ethnic affiliations. The highest index of breast cancer mortality was registered in Filipina and Japanese women.

Lacey J.V. et al. (2001) studied the indices of breast cancer incidence and mortality in the USA in 2001. In the USA in 2001, breast cancer made up 1/3 of the diagnostic cases and 15% of cancer mortality. In 2001 in the USA there were 192 000 registered cases of breast cancer incidence and 40 000 cases of mortality.

According to Katalinic et al. (2009), breast cancer is the most common form of cancer among German women. According to Population-Based Cancer Registry in Germany, there was an increase in breast cancer incidence until 2002, after which, as a result of improved early diagnostics and therapy, there was a reduction of this form of cancer by 6.8% until 2005. The maximum reduction of the disease was found in the age group: 50-59 (12%). Compared to 1996-1997, in 2004-2005 the death rate decreased by 19%, especially (30%) among women under 55. The authors explained this tendency by the improvement of early detection and the reduction of hormonal therapy.

Based on the data provided by National Cancer Institute (NCI, Bethesda) and SEER program of Cancer Statistics, according to Altekruse S.F. et al. (2009), the average age of people having cancer in the USA is 61. In the USA, the number of cases of cancer by age are the following: in women under 20 – 0.0%, 20-34 – 1.9%, 35-44 – 10.5%, 45-54 – 22.6%, 55-64 – 24.1%, 65-74 – 19.5%, 75-85 – 15.8% and 85 and more – 5.6%. In the USA, in 2003-2007, the index of cancer cases per year by age was, on average, 122.9 per 100 000 women. At the same time, the highest level of

cancer (126.5 per 100 000 women) was registered among white women, and the lowest (76.4) – among American Indians and Alaska aboriginal women. Five-year surveillance during breast cancer corresponded to 98.0%, in case of regional distribution – 83.6%, and in case of distance metastases – 23.4%.

According to Pujol H. (2000), breast cancer has been the main concern for the health system, despite some data provided by other authors concerning the decrease in breast cancer mortality in the countries which practice screening programs. The author studied the preventive role of Tamoxifen in the case of breast cancer. In the author's opinion, chemotherapy reduces the risk of development of cancer in the other breast by 40%, at the same time it increases the risk of development of endometrial cancer among healthy women.

Having analyzed the cases of cancer incidence and mortality all over the world in 1973-1997, Althuis M.D. et al. (2005) came to the conclusion that breast cancer is the main site of cancer and the main cause of death among women. The difference between the highest and the lowest levels of breast cancer is distinguished according to geographical area and ethnic affiliation. In 1973-1997, the lowest level of breast cancer (27/100 000) was found among Asian women, and the highest in the USA among white women (97/100 000).

Gomez S.L. et al. (2010) studied the data gathered by the California Cancer Registry and SEER program about the breast cancer incidence revealed in Asian (Chinese, Japanese, Filipina, Korean, Vietnamese) women living and born in the USA in 1988-2005. The follow-up observations were conducted until 2007. The research results showed that among women born in the USA, despite their ethnic affiliation, there were the same death-rate indices. At the same time, the chance of surviving after treatment of breast cancer was higher among women born in the USA than among the first generation of Asian immigrants.

According to American Cancer Society (ACS), in 2007, there were 178 480 new cases of invasive breast cancer among female population of the USA. In the same year, 62 030 cases of breast cancer at stage CIS (stage 0) were revealed. In 2007, 40 460 women died by breast cancer in the USA.

According to American Cancer Society (ACS), in 2009, 192 370 new cases of invasive breast cancer were registered in female population of the USA. In the same year, 62,280 cases of breast cancer at stage CIS (stage 0) were revealed. In 2007, 40 170 women died of breast cancer in the USA.

Tyczynski J.E. et al. (2002) provided data from the European Network of Cancer Registry (ENCR, Lyon): worldwide, the most frequent site of cancer among women is breast. The highest frequency of breast cancer is found in North America, and the lowest – in Asia and Africa. Breast cancer is also the most frequent form of cancer among European women. In 2000, there were 350 000 new cases of breast cancer in Europe and 130 000 cancer-related deaths. Breast cancer comprises 26.5% of cancer and 17.5% of cancer-related deaths.

According to the results of descriptive epidemiological research conducted by Baquet C.R. et al. (2008), in the USA, invasive breast cancer incidence is 1.16 times more frequent among black women under 40 than among white women. Breast cancer mortality was twice higher among black women under 40 than among white women. Statistically, compared to white women, among black women cancer is evidently found more frequently according to regional or distance distribution and, therefore, the index of the five-year survival rate was lower in the given case.

According to 2008 data from the National Cancer Institute (NCI, Bethesda), among US women, breast cancer is the most widely-spread site of cancer and the main reason of cancer-related deaths. From 1990, there has been an increase in this form of cancer. Compared to other ethnic groups, breast cancer incidence is higher in white women, while cancer mortality is higher in black women. In the USA, the treatment of breast cancer costs 8.1 billion dollars a year. From 2003 to 2007, National Cancer Institute (NCI, Bethesda) increased the investments in breast cancer research from 548.7 million to 572.4 million US dollars.

According to Hall R.G. (2007), in 2001 in the state of Victoria, Australia, the burden of breast cancer among women's diseases was 5%, based on the DALY index.

According to 2001 data of the health department of San Francisco, in San Francisco female population breast cancer ranked first in the structure of oncology diseases.

According to Woodcock J. et al. (2009), diseases in London's female population were mainly cardiovascular diseases (10-19%), cerebrovascular insult (10-18%) and breast cancer (12-13%).

According to Murray J.L. et al. (2001), in 2000, breast cancer mortality reached 1.6% in European regions, 1.5% - in America, 2.0% - in high-income countries.

According to Reddy K.S. (2003), death or disability caused by chronic diseases at an average reproductive age is economically heavy for individuals, their families and, generally, the society of New Delhi. Considering prevention of breast cancer, the author recommends a wide use of self-examination.

Ljung R. et al. (2005) analyzed the general burden of disease in Sweden using the DALY index. The authors came to the conclusion that 30% of all disease among Swedish women is connected with social and economic differences while receiving medical service.

Therefore, the breast cancer burden represents a vital problem for most countries in the world. Considering the social importance of the issue, it is important to specify the breast cancer burden for Tbilisi's female population.

Research Aims

Considering the actuality and social importance of the problem, it is necessary to specify breast cancer burden in Tbilisi. Based on the Georgian University of Medical Sciences and the School of Social Healthcare, descriptive research has been conducted within the scientific program of the university, on the topic: “Epidemiological evaluation of screening program of breast and cervical cancer in Tbilisi”.

The research set the following tasks:

- to study the incidence of breast cancer in Tbilisi;
- to establish the structure of the causes of death and specify the share of breast cancer in Tbilisi's female population.

Target Groups and Research Methodology

There National Center for Disease Control and Public Health (NCDC) collected data on 13 286 cases of breast cancer in Tbilisi between 1998-2012. It is notable that in 2008-2010, on average 1 028 new cases were registered annually, but in 2011-2012 – just 187 cases. This sharp fall in the number of registered cases of breast cancer in 2011-2012 (only 18% of expected cases were registered) was connected with the disappearance of the cancer registry system. Due to this fact, the data from 2011-2012 has been removed from the descriptive research. We have analyzed the data during a 13-year period (1998-2010) about 12 913 cases of breast cancer according to 5-year age groups. Tbilisi's population registry provided information about 16 705 cases of female mortality in Tbilisi between 2002-2004, 2 977 of whom died of cancer, 845 - of breast cancer.

Descriptive epidemiological research has been conducted. It employed methodology recommended by International Agency of Researching Cancer (IARC, Lyon), International Association of Cancer Register (IACR, Lyon), European Network of Cancer Register (ENCR, Lyon) and the Union for International Cancer Control (UICC, Geneva) and SEER Program. The database was processed statistically.

The following descriptive indicators have been calculated: Crude Rates, Age-Specific Rates, Age-Standardized Rates (ASR), 95% CI ASR, Truncated Age-Standardized Rates (TASR), 95% CI TASR, Age-Adjusted Rates (AAR), Standardized Rate Ratios (SRR), 95% CI SRR, Standardized Incidence Ratios (SIR), 95% CI SIR, Cumulative Risk (CR), 95% CI CR, Relative Frequency, Ratio Frequency of cancer incidence and mortality.

We have analyzed the outcomes of the research, or descriptive indices, and presented it in the form of tables and graphs.

Research Results

Breast Cancer Burden in Tbilisi

During a 13-year period(1998-2010), 12 913 cases of breast cancer were registered in Tbilisi.

According to crude rates, in Tbilisi, during a 13-year period (1998-2010), 167.4 per 100 000 women got breast cancer every year. Besides, according to crude rates in dynamics, compared to 1998-2010, 2003-2007 and 2008-2010, there was a rise in breast cancer incidence: from 149.9% to 181.5%and 173.3% respectively.

According to the Age-Standardized Rate (ASR), in Tbilisi, during a 13-year period (1998-2010) 122.9 per 100 000 women got breast cancer every year (95% CI ASR, 119,4-126,4) (see table 1).

Additionally, according to the Age-Standardized Rate(ASR) in dynamics, compared to 1998-2010, in 2003-2007 and 2008-2010, there was an increase in breast cancer incidence: from 109.6%(95% CI ASR,104,9-114,3) to 134.2% (95% CI ASR, 128,1-140,3) and 126.4% (95% CI ASR,118,8-134,0) respectively.

Table 1. The dynamics of breast cancer incidence in Tbilisi between 1998-2010, according to Age-Standardized Rates (ASR) per 100 000 women.

Years	ASR	SE	95% CIASR
1998-2002	109,6	2,4	104,9-114,3
2003-2007	134,2	3,1	128,1-140,3
2008-2010	126,4	3,9	118,8-134,0
1998-2010	122,9	1,8	119,4-126,4

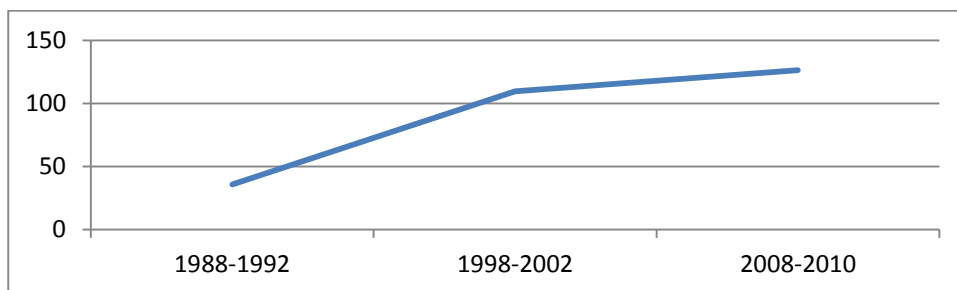
According to V. Tkeshelashvili's (2002) data, based on ASR, in Tbilisi in 1998-2010, 35.7 per 100 000 women (95% CI ASR, 33,9-37,5) got breast cancer.

The dynamics of breast cancer during three 5-year periods with 10-year intervals is presented in Table 2 and Chart 1.

Table 2. The dynamics of breast cancer with 10-year intervals (1988-1992, 1998-2002, 2008-2010) according to the Age-Standardized Rate (ASR)

Years	ASR	SE	95% CIASR
1988-1992	35,7	0,9	33,9-37,5
1998-2002	109,6	2,4	104,9-114,3
2008-2010	126,4	3,9	118,8-134,0

Chart 1. The dynamics of breast cancer with 10-year intervals according to the Age-Standardized Rate (ASR)



Following 1988-1992, there was a sharp rise in breast cancer incidence (1988-1992: ASR=35,7; 95% CI=21,0-33,9; 1998-2002: ASR=109,6; 95% CI=104,9-114,3). It is true that from 1998-1992, there was a decrease in the development of this form, but, at the same time, until 2008-2010, there was an increase in distribution of the disease (2008-2010: ASR=126,4; 95% CI=118,8-134,0).

According to SRR, compared to 1988-1992, in 1998-2002, the frequency of breast cancer incidence increased three times (SRR=3,1; 95% CISRR=2,8-3,5), while, compared to 1988-1992, in 2008-2010 – it increased 3.5 times (SRR=3,5; 95% CISRR=3,1-4,0). This tendency continued in 2008-2010, compared to 1998-2002, though there was a decrease in this form of cancer (SRR=1,2; 95% CISRR=1,1-1,3) (see Table 3).

Table 3. The dynamics of breast cancer in Tbilisi according to Standardized Registration Ratio (SRR)

Comparison of periods	SRR	χ^2	95% CISRR
1998-2002/1988-1992	3,1	807,9	2,8-3,5
2008-2010/1998-2002	1.2	13,9	1,1-1,3
2008-2010/1988-1992	3,5	514,2	3,1-4,0

Table 4. The dynamics of breast cancer in Tbilisi according to Standardized Incidence Ratios (SIR)

Comparison of Periods	SIR	SE	95% CI SIR
from 1998-2002 up to 2003-2007	305	4,6	296,4-314,3
from 2003-2007 up to 2008-2010-	116	2,1	111,5-119,7
from 1998-2002 up to 2008-2010	353	6,4	340,5-365,4

According to SIR, compared to 1988-1992, in 1998-2002, breast cancer increased by 205% (SIR =305;95% CISIR=296,4-314,3), while compared to 1988-1992, in 2008-2010 – by 253% (SIR =353;95% CISIR=340,5-365,4). This tendency remained in 2008-2010, compared to 1998-1992,

though this form of cancer decreased (SIR =116;95% CISIR=111,5-119,7) (see Table 4).

Table 5. The dynamics of breast cancer in Tbilisi according to Age-Adjusted Rates (AAR) (Tbilisi Standard, 2002) per 100 000 women

N	Years	AAR	SE	95% CI AAR
1	1998-2002	140,1	2,1	136,0-144,3
2	2003-2007	169,6	2,3	165,0-174,1
3	2008-2010	160,7	2,9	155,0-166,4
Total	1998-2010	156,2	1,4	153,5-158,9

According to Age-Adjusted Rates (AAR) (Tbilisi Standard, 2002), during a 13-year period (1998-2010), 156.2 per 100 000 women got breast cancer in Tbilisi per year (see Table 5).

Additionally, according to Age-Adjusted Rates (AAR) in dynamics, compared to 1998-2002, in 2003-2007 and 2008-2010, there was an increase in breast cancer incidence: from 140.1% to 160.7%.

Table 6. In 1998-2010, the dynamics of breast cancer in Tbilisi according to Truncated Age-Standardized Rates (TASR₃₀₋₆₉) per 100 000 women

Years	TASR ₃₀₋₆₉	SE	95% CITASR ₃₀₋₆₉
1998-2002	239,1	9,0	221,5-256,8
2003-2007	293,6	10,0	274,0-313,2
2008-2010	264,9	9,8	245,7-284,1
<i>1998-2010</i>	<i>269,5</i>	<i>9,6</i>	<i>250,6-288,3</i>

According to Truncated Age-Standardized Rates (TASR₃₀₋₆₉), in Tbilisi, during a 13-year period (1998-2010), in the age group: 30-69, 269.5 (95% CI=250,6-288.3) per 100 000 women had breast cancer each year (see Table 6).

Additionally, according to Truncated Age-Standardized Rates (TASR) in dynamics, compared to 1998-2002, in 2008-2010, there was an increase in breast cancer incidence in the age group: 30-69: from 239.1% (95% CITASR=221,5-256,8) to 264.9% (95% CITASR=245,7-284,1).

Table 7. Cumulative Risk (CR₀₋₇₄) of breast cancer in Tbilisi in 1998-2010

Years	CR ₀₋₇₄	SE _{Cum.Rate}	95% CICR ₀₋₇₄
1998-2002	11,8	0,21	11,1-12,1
2003-2007	14,3	0,23	13,3-14,7
2008-2010	13,4	0,29	12,5-13,9
<i>1998-2010</i>	<i>13,1</i>	<i>0,14</i>	<i>12,3-13,3</i>

The Cumulative Risk index (CR₀₋₇₄) of breast cancer among the women living in Tbilisi was 13.1% during a 13-year period (1998-2010). Besides, in dynamics, compared to 1998-2002, in 2003-2007, there was an increase in Cumulative Risk index (CR₀₋₇₄): from 11.8% (95% CICR₀₋₇₄= 11,1-12,1) to 14.3% (95% CICR₀₋₇₄= 13,3-14,7) (see Table 7).

The Structure of Death in Tbilisi's Female Population

In 2002-2004, there were 16 705 registered cases of mortality in Tbilisi's female population. The average life span in Tbilisi's female population was 70.

The deaths caused by malignant neoplasm of breast ranked second after circulatory system and its share in death structure was 18% (see Table 8 and Chart 2).

Table 8. Causes of Death in Tbilisi's female Population, 2002-2004

#	System	All Ages	Crude Rate	%	ASR World	ICD-10
1	Diseases of the circulatory system	11191	628.9	67.0	504.5	I00-I99
2	Neoplasms	2977	167.3	17.8	142.8	C00-D48
3	Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	602	33,8	3,6	31,8	R00-R99
4	Endocrine, nutritional and metabolic diseases	457	25,7	2,7	18,6	E00-E90
5	Certain conditions originating in the perinatal period	417	23,4	2,5	0,2	P00-P96
6	Diseases of the digestive system	281	15,8	1,7	11,8	K00-K93
7	External causes of morbidity and mortality	212	11,9	1,3	11,1	V01-Y98
8	Diseases of the respiratory system	205	11,5	1,2	7,3	J00-J99
9	Certain infectious and parasitic diseases	116	6,5	0,7	3,6	A00-B99
10	Diseases of the genitourinary system	77	4,3	0,5	3,6	N00-N99
11	Injury, poisoning and certain other consequences of external causes	54	3,0	0,3	2,1	S00-T98
12	Diseases of the nervous system	51	2,9	0,3	2,6	G00-G99
13	Congenital	26	1,5	0,2	0,0	Q00-Q99

	malformations, deformations and chromosomal abnormalities					
14	Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	8	0,5	0,0	0,6	D50-D89
15	Mental and behavioural disorders	6	0,3	0,0	0,5	F00-F99
16	Pregnancy, childbirth and the puerperium	5	0,3	0,0	0,1	O00-O99
17	Diseases of the skin and subcutaneous tissue	4	0,2	0,0	0,2	L00-L99
18	Diseases of the musculoskeletal system and connective tissue	3	0,2	0,0	0,1	M00-M99
19	Diseases of the ear and mastoid process	1	0,1	0,0	0,1	H60-H95
	ICD unknown	12	0,7	0,1	0,3	unknown
All Causes		16705	938,8	100,0	625,0	All

In Tbilisi's female population, 9 out of 10 causes of mortality are connected with circulatory system diseases. A main cause of death is breast cancer (ICD-10: C50) as well, which ranks fourth in 10 main causes of death in Tbilisi's female population of all ages and its share is 5% of all deaths.

Chart 2

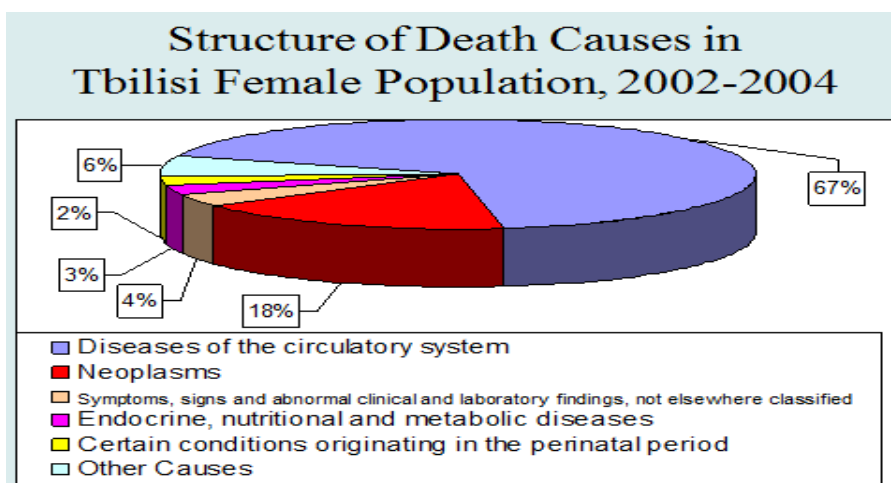


Table 9. 10 Main Causes of Death in Tbilisi's female Population, 2002-2004

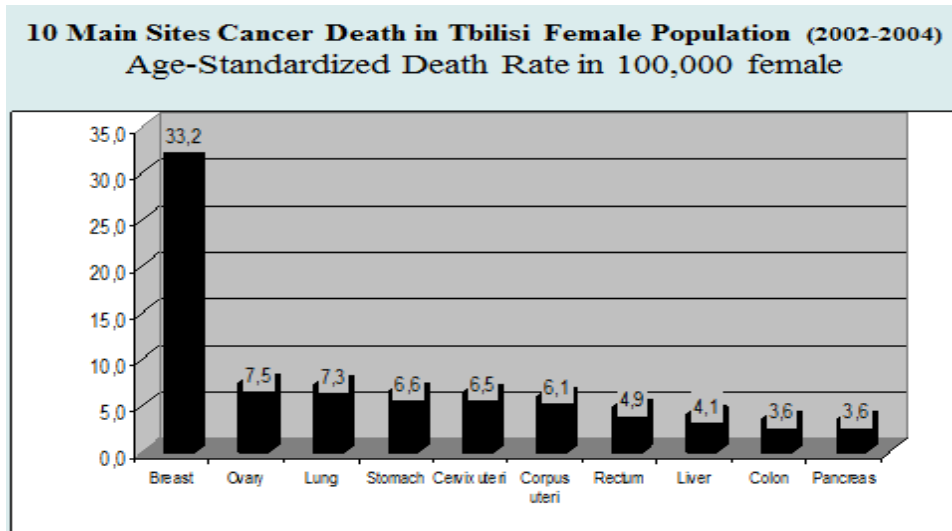
<i>N</i>	<i>SITE/Cause</i>	<i>All Ages</i>	<i>CrudeRate</i>	<i>%</i>	<i>ASR World</i>	<i>AAR (2002 Tbilisi Standard)</i>	<i>ICD 10th</i>
1	Chronic ischaemic heart disease	3735	209,9	22,4	115,0	170,3	I25
2	Stroke, not specified as haemorrhage or infarction	1866	104,9	11,2	59,2	87,0	I64
3	Heart failure	1414	79,5	8,5	47,3	66,6	I50
4	Malignant neoplasm of breast	845	47,5	5,1	33,2	43,2	C50
5	Other acute ischaemic heart diseases	894	50,2	5,4	27,6	40,8	I24

6	Intracerebral haemorrhage	830	46,6	5,0	26,8	38,7	161
7	Essential (primary) hypertension	537	30,2	3,2	16,5	24,6	110
8	Acute myocardial infarction	432	24,3	2,6	15,4	21,0	121
9	Hypertensive heart disease	465	26,1	2,8	14,0	21,3	111
10	Atherosclerosis	423	23,8	2,5	13,4	19,0	170

In 2002-2004, there were 845 registered cases of death caused by breast cancer; in other words, each year, according to crude rates, 48 per 100 000 Tbilisi's female citizens die of breast cancer, according to Age-Standardized Rates – 33, and according to Truncated Age-Standardized Rates (Tbilisi Standard) - 43.

Chart 3 presents the order of 10 main sites of cancer-related deaths per 100 000 women in Tbilisi's female population in 2002-2004, according to Age-Standardized Death Rates (World standard):

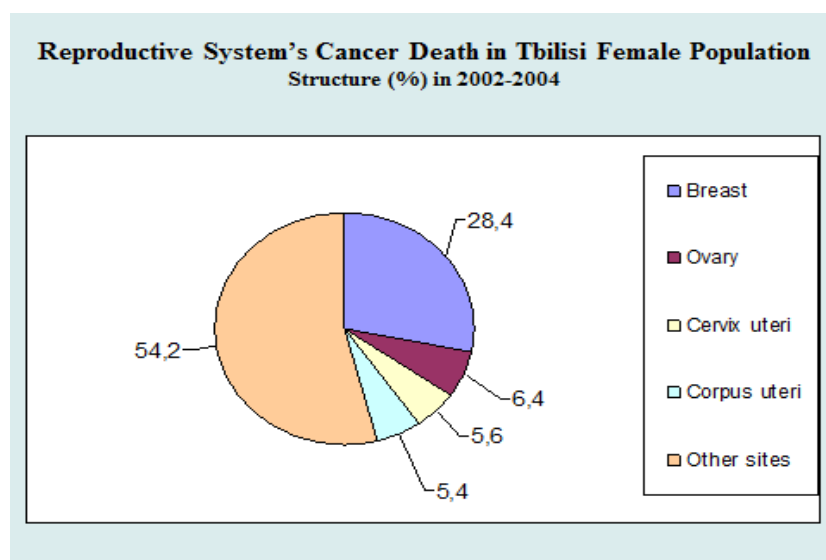
Chart 3



In 2002-2004, the structure of cancer-related deaths in Tbilisi's female population (10 main forms, according to Age-Standardized Rates per 100 000 women): 1. Breast - 33.2%; 2. Ovary - 7.5%; 3. Lung – 7.3%; 4. Stomach – 6.6%; 5. Cervix uteri - 6.5%; 6. Corpus uteri - 6.1%; 7. Rectum - 4.9%; 8. Liver – 4.1%; 9. Colon - 3.6%; 10. Pancreas - 3.6%.

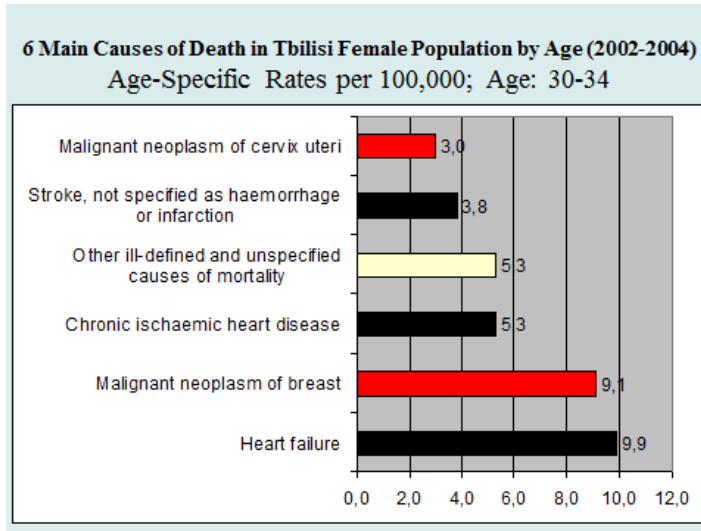
Almost half of the cases (45.8%) in the structure of cancer-related mortality in Tbilisi's female population are organs of the reproductive system, including: breast - 28.4%, ovary- 6.4%, cervix uteri- 5.6%, corpus uteri- 5.4% (Chart 4).

Chart 4



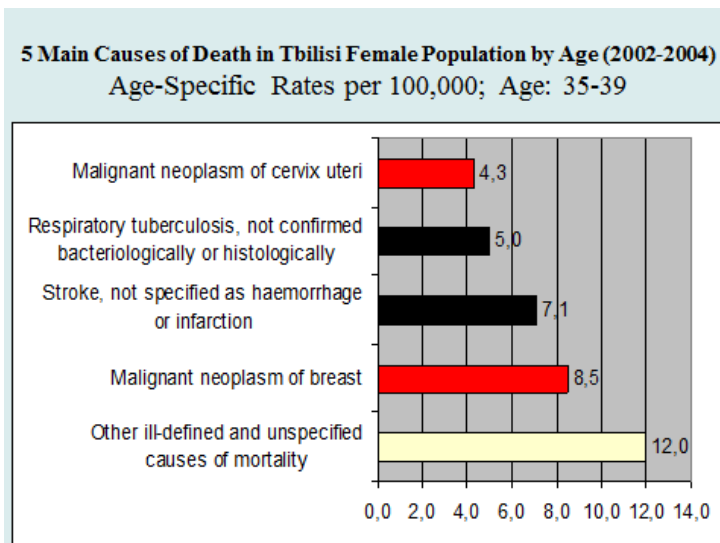
For effective preventive approach to the management of social healthcare, one of the most interesting issues for representatives of any field of medicine is the analysis of structure of death causes by age. In other words, while studying death structure, it is very important to establish the index of age-specific death rate in every 5-year age group per 100 000 citizens. This is possible by presenting it in a graphic form by comparing the levels of their importance.

Chart 5



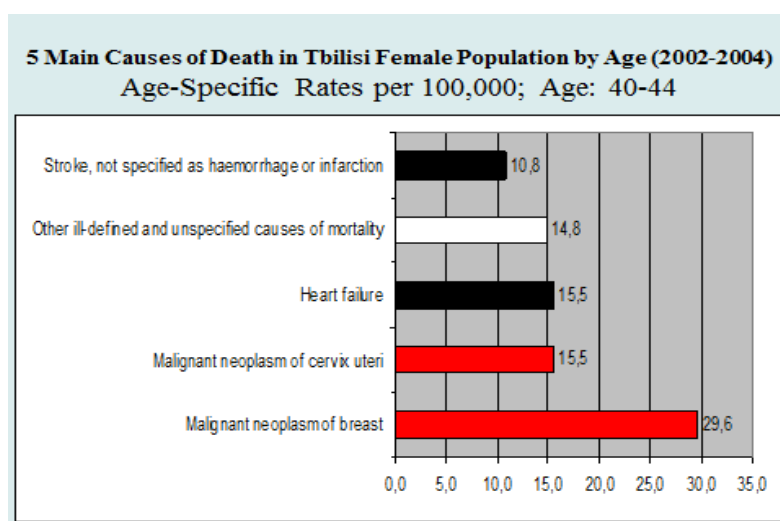
In the structure of the 5 main causes of death in women in the age group: 30-34, alongside diseases of circulatory system, there are breast (9.1%) and cervix uteri (3.0%) cancers which rank second and fifth respectively. 29.4% of deaths in women of this age were connected with cancer (ranked first), while 28.3% - to the diseases of circulatory system (ranked second). 10.4% of deaths in women of this age was connected with external reasons, 6.6% were caused by digestive system, and 25.3% - by other forms of disease (Chart 5).

Chart 6



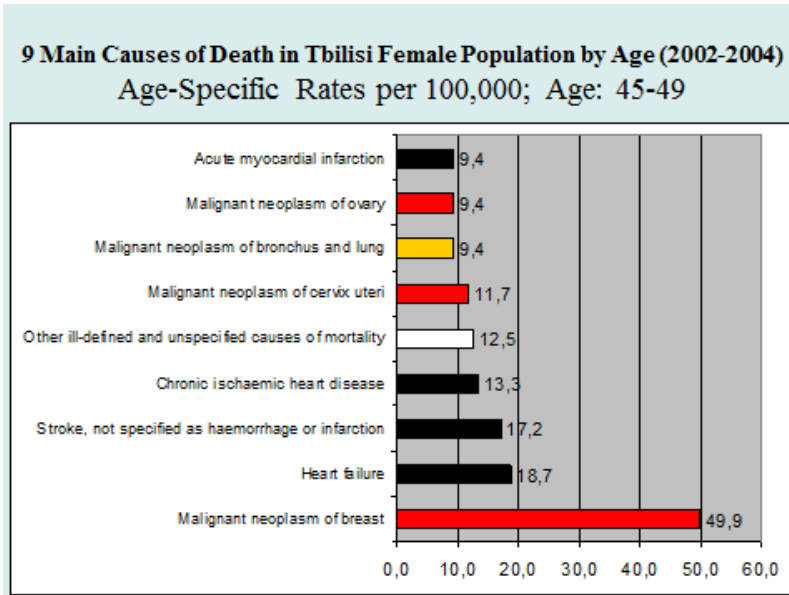
In the structure of death in Tbilisi's female population in the age group: 35-39, after studying non-verified causes of mortality, in 5 main causes breast (8.5%) and cervix uteri (4.3%) cancers ranked first and fourth respectively. Every 3rd death (37.6%) in women of this age was caused by cancer. In the structure of causes of death, cancer ranked first. The frequency of cancer-related deaths is 1.9 times more than the diseases of circulatory system which ranked second (19.6%) and 5.2 times more than infectious diseases which ranked third (7.2%). In women of this age, 6.5% of deaths were connected with external reasons. In the age group: 35-39, 17.4% of fatal cases were caused by other diseases, and 11.7% - were not identified at all (Chart 6).

Chart 7



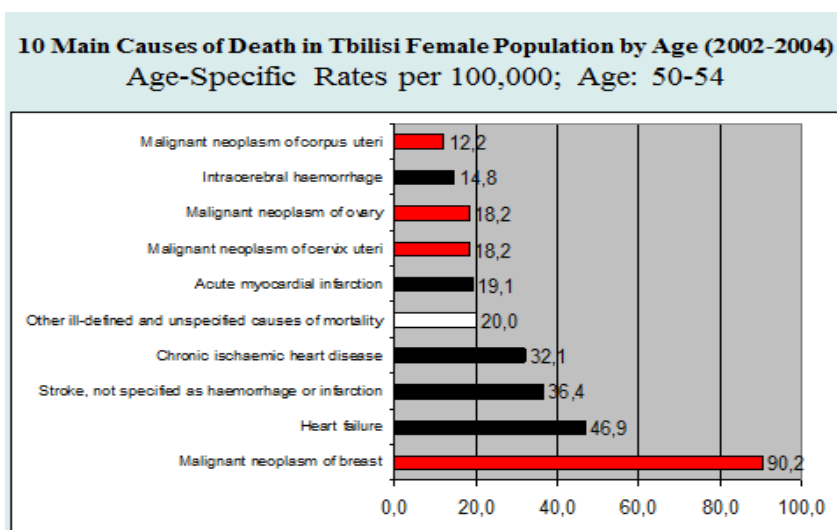
In the structure of death in Tbilisi's female population in the age group: 40-44, in 5 main causes, breast (29.6%) and cervix uteri (15.5%) cancers ranked first and second respectively. In women of this age, 43.6% of deaths were connected with cancer which ranked first in the structure of death. The frequency of cancer-related deaths is 1.7 times more than the diseases of circulatory system (25.6%) which was second. In women of this age, 6.5% of fatal cases were caused by external causes. In women aged 40-44, 15.8% of death were caused by other diseases and 8.4% - were not identified at all (Chart 7).

Chart 8



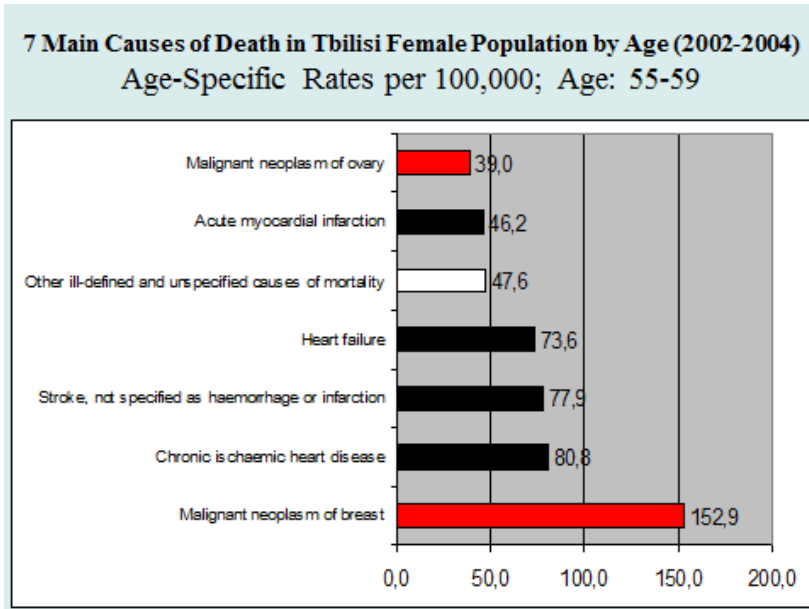
In the structure of death in Tbilisi's female population in the age group: 45-49, among 5 main causes breast (29.6%) and cervix uteri (15.5%) cancers ranked first and fifth respectively. 43.6% of deaths in women of this age were connected with cancer, which was first in the structure of causes of death. The frequency of cancer-related deaths is 1.7 times more than the diseases of circulatory system which rank second (25.6%). In women of this age, 6.5% of deaths were connected with external reasons. In the age group: 45-49, 15.8% of fatal cases were caused by other diseases, and 8.4% - were not identified at all (Chart 8).

Chart 9



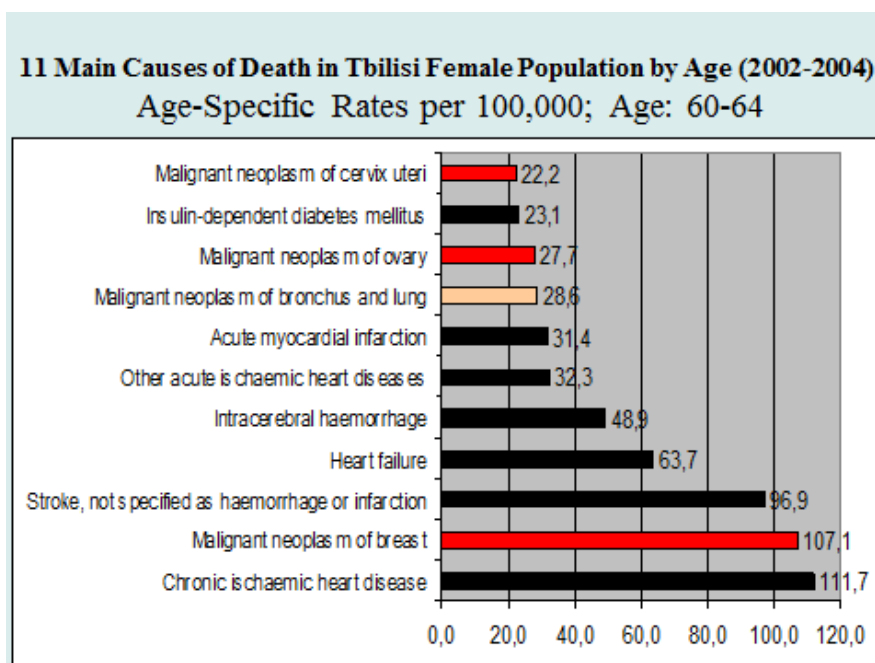
In the structure of death in Tbilisi's female population in the age group: 50-54, 4 out of 10 main causes were cancers of four forms of reproductive system, and five were presented by circulatory system. According to the structure of death in women of this age, cancer was presented in the following sites: I – breast (90.2%), VII-VIII – Cervix Uteri (18.2%) and Ovary (18.2%), X – Corpus Uteri (12.2%). It should be mentioned that the frequency of breast cancer is 1.9 times more than heart failure (46.9%), which ranked second in the cases of death in women of this age. The frequency of cancer mortality (46.0%) was first, which was 1.2 times more than the diseases of circulatory system (37.9%) which ranked second and 15.3 times more than the diseases of digestive system (3.0%). In 8.7% of fatal cases in women aged 50-54, death was caused by other forms of disease (Chart 9).

Chart 10



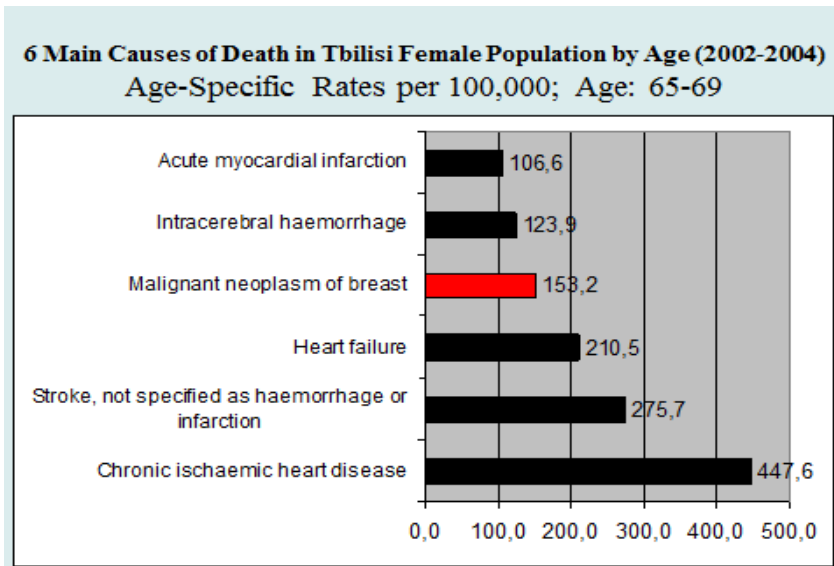
In the structure of death in Tbilisi's female population in the age group: 55-59, breast (152.9%) and ovary (39.0%) cancers ranked first and seventh respectively in 7 main causes. It should be noted that the frequency of breast cancer-related death in women of this age was 1.9 times more than chronic ischemic heart disease (80.8%) which ranked second in this structure. In women of this age, 47.2% of mortality were connected with cancer which was first in the structure of death causes. The frequency of cancer-related deaths was 1.2 times more than the diseases of circulatory system (38.7%) which ranked second. In women of this age, 2.4% of mortality was connected with the diseases of digestion system, 2.0% - with external causes. 5.1% of fatal cases in women of age group: 55-59, the death was caused by other diseases (Chart 10).

Chart 11



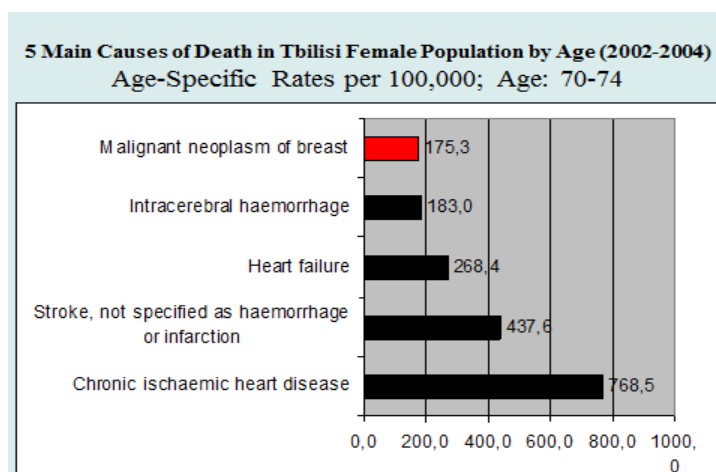
In the structure of death in Tbilisi's female population in the age group: 60-64, 4 out of 11 causes of death were different forms of cancer, three of which were three forms of reproductive system. In the structure of death in women of this age, malignant neoplasm was presented in the following forms: the second was breast (107.1%), the eighth –lung (28.6%), the ninth –ovary (27.7%) and the eleventh - cervix uteri (22.2%). It should be noted that the frequency of breast cancer-related mortality in women of this age group was just insignificantly less than the chronic ischemic heart disease (111.7%), which ranked first in the structure. The share of cancer caused deaths (36.6%) was just 1.3 times less than the diseases of circulatory system (48.7%) which was first in the death structure, while it was 7.3 times more than endocrinology and metabolic diseases (5.0%), which ranked third. 7.0% of mortality in women of age group: 60-64 were caused by other diseases and the causes of 2.7% of deaths were not identified at all (Chart 11).

Chart 12



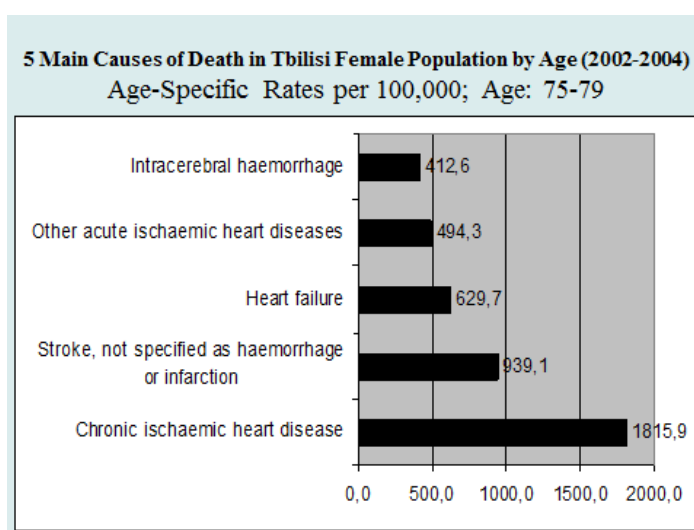
In the structure of death in Tbilisi's female population in the age group: 65-69, breast cancer (153.2%) ranks only fourth in the main causes of death. The share of deaths caused by cancer (24.9%) was 2.5 times less than the diseases of circulatory system (61.6%) which was first in the death structure, while it was 5.2 times more than endocrinology and metabolic diseases (4.8%), which ranked third. In women of this age, 2.1% of deaths were connected with the diseases of digestion system, 4.3% - with other diseases and 2.5% of the causes were not identified at all (Chart 12).

Chart 13



In the structure of death in Tbilisi’s female population in the age group: 70-74, breast cancer (175.3%) ranked only fifth in the main causes of death. The share of cancer-caused mortality (18.6%) was 3.8 times less than the diseases of circulatory system (70.6%) which ranked first in the death structure, while it was 4.5 times more than endocrinology and metabolic diseases (4.1%), which ranked third. In women of this age, 2.2% of deaths were connected with the diseases of digestion system, 2.7% - with other diseases and 1.7% of the causes were not identified at all (Chart 13).

Chart 14



In the structure of death in Tbilisi's female population at the age of 75-79, breast cancer is not included in the five main causes of death. The share of breast cancer-related death is reduced to 12.2% and was 6.5 times less than the diseases of circulatory system (79.4%), which ranked first and 4.2 times more than endocrinology and metabolic diseases (2.9%), which ranked third. In women of 75-79, 1.4% of mortality were caused by diseases of digestive system, 2.0% - by other diseases, and 2.1% of causes were not identified at all (Chart 14).

In the structure of death in Tbilisi's female population aged 80-84, breast cancer (215.6%) ranks tenth in 10 main causes of mortality. The share of death caused by cancer is reduced to 5.0% and is 17.2 times less than the diseases of circulatory system, which ranked first and whose share reaches its peak and constitutes 86.0%. The share of endocrine and metabolic diseases, which ranked third, is 1.6%. Death caused by respiratory and digestive systems was registered with the same index – 0.7%.

In the death structure in Tbilisi's female population of age group: 85 and more, breast cancer (185.4%) ranks twelfth. The share of cancer-related death is reduced to 2.6% and is 34 times less than the diseases of circulatory system which ranks first, whose share reaches its peak and makes up 88.3%.

The mortality of Tbilisi population caused by cancer of reproductive system: in the structure of death caused by cancer in Tbilisi's female population, nearly half of the death cases (45.8%) come on organs of reproductive system, including: breast – 28.4%, ovary – 6.4%, cervix uteri – 5.6%, corpus uteri – 5.4%. In 2002-2004, there were 845 registered cases of mortality caused by breast cancer, in other words, each year, 48 per 100 000 women in the capital died of this cause according to crude rates, 33 women died according to Age-Standardized Rate (world standard) and 43 - according to Age-Adjusted Rate (Tbilisi Standard).

In the structure of deaths caused by cancer in women over 25, breast cancer ranks first. At the same time, at a later period, 35-59, breast cancer is again the first in the structure of different causes of death. At 60

and more, breast cancer moves to the 2nd, 4th, 5th, 9th and, at 80, to the 10th place.

In the 25-year-period (35-59), breast is the main form of cancer and it represents the main cause of death in Tbilisi's female population! Except breast, the following organs of reproductive system belong to 10 mainly affected organs: ovary, cervix uteri and corpus uteri.

Summary

Breast cancer burden in Tbilisi

In the structure of cancer diseases among women, the leading part belongs to breast cancer. The issue of breast cancer has long gone beyond the frames of healthcare and acquired a vital social importance that is why the struggle against breast cancer is the first and foremost concern for healthcare and social sphere.

According to GLOBOCAN (2013), in 2008, 1 384 000 new cases of breast cancer incidence and 458 000 cases of mortality were registered worldwide.

At the same time, people usually get cancer at the optimal age of their professional and creative development (45-64), when their activity has the greatest effect. Therefore, cancer does huge financial harm to the country's economy and prevents the speed of its development.

Due to social orientation and economic effectiveness, prevention of disease and early diagnostics are regarded to be the priority concerns of the XXI century by World Health Organization (WHO, Geneva). According to World Health Organization, the present level of medical development makes it possible to reduce cancer incidence by one-third, one-third of the people suffering from cancer are potentially curable, and in one-third of the cases, adequate palliative care makes it possible to prolong the patients' lives and improve their life quality.

In order to specify the number of cancer incidence and the frequency of cancer mortality, there has been a descriptive epidemiological research in Tbilisi.

During a 13-year period (1998-2010), 12 913 cases of breast cancer were registered in Tbilisi.

According to crude rates, in Tbilisi, during a 13-year period (1998-2010), 167.4 per 100 000 women got cancer each year. Besides, according to crude rates in dynamics, compared to 1998-2002, in 2003-2007 and 2008-2010, there was an increase in breast cancer incidence: from 149.9% to 181.5% and 173% respectively.

According to Age-Standardized Rates (ASR), in Tbilisi, each year during a 13-year period (1998-2010), 122.9 per 100 000 women got breast cancer (95% CI ASR, 119,4-126,4). At the same time, according to Age-Standardized Rates (ASR) in dynamics, compared to 1998-2002, in 2003-2007 and 2008-2010, there was an increase in the number of breast cancer: from 109.6% (95% CI ASR, 104,9-114,3) to 134.2% (95% CI ASR, 128,1-140,3) and 126.4% (95% CI ASR, 118,8-134,0) respectively.

After 1988-1992, while comparing periods with 10-year intervals, there was a notable increase in breast cancer (1988-1992: ASR=35,7; 95% CI=33,9-37,5; 1998-2002: ASR=109,6;95% CI=104,9-114,3). It is true that from 1998-2002, the speed decreased a little, but it continued to steadily increase until 2008-2010 (2008-2010: ASR=126,4; 95% CI=118,8-134,0).

According to SRR, compared to 1988-1992, in 1998-2002, cases of breast cancer increased 3 times (SRR=3,1; 95% CISRR =2,8-3,5), and, compared to 1988-1992, in 2008-2010 it increased 3.5 times (SRR=3,5; 95% CISRR=3,1-4,0). This tendency was preserved in 2008-2010, compared to 1998-2002, though there was a decrease in cancer of this form (SRR=1,2; 95% CISRR=1,1-1,3).

According to SIR, compared to 1988-1992, in 1998-2002, breast cancer incidence increased by 205% (SIR =305;95% CISIR=296,4-314,3), and, compared to 1988-1992, in 2008-2010 – by 253% (SIR =353;95% CISIR=340,5-365,4). This tendency remained in 2008-2010 compared to 1998-202, though there was a fall in the number of cancer of this form (SIR =116;95% CISIR=111,5-119,7).

According to Age-Adjusted Rates (AAR) (Tbilisi Standard, 2002), every year during a 13-year period (1998-2010), 158.2 per 100 000 women

got breast cancer in Tbilisi. Besides, according to Age-Adjusted Rates (AAR) in dynamics, compared to 1998-2002, in 2003-2007 and 2008-2010, there was an increase in breast cancer incidence from 140.1% to 160.7%.

According to Truncated Age-Standardized Rates (TASR₃₀₋₆₉), every year during a 13-year period (1998-2010), 269.5 (95% CI=250,6-288,3) women of age group:30-69 per 100 000 got breast cancer in Tbilisi. Besides, according to Truncated Age-Standardized Rates (TASR) in dynamics, compared to 1998-2002, in 2008-2010, in the age group: 30-69, there was an increase in the number of breast cancer: from 239.1% (95% CITASR =221,5-256,8) to 264.9%(95% CITASR =245,7-284,1).

The Cumulative Risk (CR₀₋₇₄) of breast cancer in Tbilisi's female population during a 13-year period (1998-2010), made up 13.1%. Besides, in dynamics, compared to 1998-2002, in 2003-2007, there was an increase in Cumulative Risk (CR₀₋₇₄) of breast cancer: from 11.8% (95% CICR₀₋₇₄= 11,1-12,1) to 14.3% (95% CICR₀₋₇₄= 13,3-14,7).

In 2002-2004, there were 16 705 cases of deaths registered in Tbilisi's female population. The average life span in Tbilisi's female population made up 70 years.

Deaths caused by malignant neoplasm ranked second in the structure of death after circulatory system and its share made up 18%.

Nine out of ten main death causes in Tbilisi's female population are connected with the diseases of circulatory system. The main cause of death is also breast cancer (ICD-10: C50), which ranks fourth in 10 main causes of death in Tbilisi's female population and its share makes up 5% of cancer-related deaths.

In 2002-2004, there were 845 registered deaths caused by breast cancer in Tbilisi's female population, or, annually 48 per 100 000 women die according to crude rates, 33 women die according to Age Standardized Rates, and 43 women - according to Age-Adjusted Rates (Tbilisi Standard).

The structure of death caused by cancer in Tbilisi's female population in 2002-2004 was the following (10 main forms according to Age-Standardized Rates per 100 000 women): 1. breast – 33.2% ; 2. ovary –

7.5% ; 3. lung – 7.3% ; 4. stomach – 6.6% ; 5. cervix uteri – 6.5% ; 6. corpus uteri – 6.1% ; 7. rectum – 4.9% ; 8. liver – 4.1% ; 9. colon - 3.6% ; 10. pancreas – 3.6% .

Nearly half (45.8%) of cancer-related deaths in Tbilisi's female population are of organs of reproductive system, including: breast – 28.4%, ovary – 6.4%, cervix uteri – 5.6%, corpus uteri – 5.4%.

In the structure of 5 main causes of death in women aged 30-34, alongside diseases of circulatory system, breast (9.1%) and cervix uteri (3.0%) cancers rank second and fifth respectively. 29.4% of mortality in women of this age were connected with cancer (ranking first), and 28.3% - with the diseases of circulatory system (ranking second).

In the structure death in Tbilisi's female population aged 35-39, after studying non-verified cases of mortality, among the 5 main causes of death, breast (8.5%) and cervix uteri (4.3%) cancers ranked first and fourth, respectively. About 37.6% of deaths in women of this age were caused by cancer. In the structure of death causes, cancer was the first. The frequency of cancer related deaths was 1.9 times more than the diseases of circulatory system which ranked second (19.6%) and 5.2 times more than infectious diseases which ranked third (7.2%).

In the structure of death in Tbilisi's female population aged 40-44, among 5 main causes of death, breast (29.6%) and cervix uteri (15.5%) cancers rank first and second, respectively. About 43.6% of deaths in women of this age were connected with cancer, which ranked first in the structure of death causes. The frequency of cancer-related deaths was 1.7 times more than the diseases of circulatory system which ranked second (25.6%).

In the structure death in Tbilisi's female population aged 45-49, among 5 main causes of death, breast (29.6%) and cervix utery (15.5%) cancers ranked first and fifth, respectively. About 43.6% of deaths in women of this age were connected with cancer, which ranked first in the structure of death causes. The frequency of deaths caused by cancer was 1.7 times more than the diseases of circulatory system which ranked second (25.6%).

In the structure of death in Tbilisi's female population aged 50-54, among the 10 main causes of death, four of them were four different forms of cancer of the organs of reproductive system, five – the diseases of circulatory system. According to ranks in the structure of death causes in women of this age, cancer of reproductive system was presented in the following forms: I – breast (90.2%), VII-VIII – cervix uteri (18.2%) and ovary (18.2%), X – corpus uteri (12.2%). It should be noted that in women of this age, the frequency of cancer-related deaths was 1.9 times more than those caused by heart failure which ranked second (46.9%). The frequency of cancer-related mortality (46.0%) ranked first, it was 1.2 times more than the diseases of circulatory system which ranked second (37.9%) and 15.3 times more than the diseases of digestive system which ranked third (3.0%).

In the structure of death in Tbilisi's female population aged 55-59, among 7 main causes of death, breast (152.9%) and ovary (39.0%) cancers ranked first and seventh, respectively. It should be noted that the frequency of cancer-related deaths was 1.9 times more than chronic ischemia heart disease (80.8%) which ranked second among causes of death in women of this age. About 47.2% of deaths in women of this age were connected with cancer that ranked first in the structure of death causes. The frequency of cancer mortality was 1.2 times more than the diseases of circulatory system which ranked second (38.7%).

In the structure of death in Tbilisi's female population aged 60-64, four out of 11 main causes of death were cancer and three of them were 3 forms of cancer of reproductive system. In the structure of death in women of this age, according to ranks, malignant neoplasm was presented with the following forms: II– breast (107.1%), VIII – lung (28.6%), IX – ovary (27.7%) and XI – cervix uteri (22.2%). It should be noted that the frequency of cancer mortality was just insignificantly less than chronic ischemia heart disease, which ranked first (111.7%) in women of this age. The share of cancer mortality (36.6%) was not much behind (1.3 times) the diseases of circulatory system which ranked first (48.7%), while it was 7.3 times more than endocrine and metabolic diseases (5.0%) which were the third.

In the structure of death in Tbilisi's female population in the age group: 65-69, breast cancer (153.2%) is only the 4th in the main causes of death.

The share of deaths caused by cancer (24.9%) was 2.5 times less than the diseases of circulatory system (61.6%) which ranked first in the death structure, while it was 5.2 times more than endocrinology and metabolic diseases (4.8%), which ranked third.

In the structure of death in Tbilisi's female population in the age group: 70-74, breast cancer (175.3%) only ranks fifth in the main causes of death. The share of cancer mortality (18.6%) was 3.8 times less than the diseases of circulatory system (70.6%), which ranked first in the death structure, while it was 4.5 times more than endocrinology and metabolic diseases (4.1%), which were the third.

In the structure of death in Tbilisi's female population at the age of 75-79, breast cancer is not included in the five main causes of death. The share of breast cancer mortality was reduced to 12.2% and was 6.5 times less than the diseases of circulatory system (79.4%), which ranked first and 4.2 times more than endocrinology and metabolic diseases (2.9%). In the structure of death in Tbilisi's female population aged 80-84, breast cancer (215.6%) ranked tenth in 10 main causes of death. The share of death caused by cancer is reduced to 5.0% and is 17.2 times less than the diseases of circulatory system, which rank first and whose share reaches its peak and makes up 86.0%. The share of endocrine and metabolic diseases, which rank third, is 1.6%.

In the structure of death in Tbilisi's female population of age group: 85 and more, breast cancer (185.4%) is only the 12th. The share of cancer-related death is reduced to 2.6% and is 34 times less than the diseases of circulatory system, which ranked first, whose share reaches its peak and makes up 88.3%.

The mortality of Tbilisi population caused by cancer of reproductive system: in the structure of death caused by cancer in Tbilisi's female population, nearly half of the death cases (45.8%) come on organs of reproductive system, including: breast – 28.4%, ovary – 6.4%, cervix uteri – 5.6%, corpus uteri – 5.4%. In 2002-2004, there were 845 registered cases of breast cancer mortality, in other words, every year, 48 per 100 000 women died of this cause according to crude rates, 33 women died according to Age-Standardized Rate (world standard) and 43 - according to Age-Adjusted Rates (Tbilisi Standard).

In the structure of cancer-related deaths in women over 25, breast cancer ranks first. At the same time, at a later period, 35-59, breast cancer again ranks first in the structure of different causes of death. At 60 and more, breast cancer moves to the 2nd, 4th, 5th, 9th and, at 80, to the 10th place.

In the 25-year-period (35-59), breast is the main form of cancer and it represents the main cause of mortality in Tbilisi's female population!

Conclusions

The issue of breast cancer in Tbilisi's female population is an important medical and social problem.

The frequency of breast cancer incidence (ASR=123% ; AAR=158%) and mortality (ASR=33% ; AAR=43%) corresponds to the average index of developed countries of the world. The ratio of disease and death (SRR) made up 0.27, less than world average index (SRR=0.35), which is also characteristic for developed countries. Besides, according to both indicators in dynamics, there was an increase in cancer incidence.

In Tbilisi, during a 13-year period (1998-2010) there were 12 913 registered cases of breast cancer.

According to SRR, compared to 1988-1992, in 1998-2002, the number of breast cancer rose by 3 times (SRR=3,1; 95% CISRR =2,8-3,5) and in 2008-2010, compared to 1988-1992 – by 3.5 times (SRR=3,5; 95% CISRR=3,1-4,0).

According to SIR, compared to 1988-1992, in 1998-2002, the number of breast cancer increased by 205% (SIR =305;95% CISIR=296,4-314,3) and in 2008-2010, compared to 1988-1992 – by 253% (SIR =353;95% CISIR=340,5-365,4).

According to Truncated Age-Standardized Rates (TASR₃₀₋₆₉), during a 13-year period (1998-2010), in the age group: 30-69, 269.5 (95% CI=250,6-288.3) per 100 000 women got breast cancer each year. Cumulative Risk (CR₀₋₇₄) of breast cancer in Tbilisi's female population made up 13.1%. Besides, according to these indicators in dynamics, there was an increase in the frequency of breast cancer incidence.

In 2002-2004, the deaths caused by malignant neoplasm of breast in Tbilisi's female population ranked second after the diseases of circulatory system and its share in death structure was 18%.

According to systems, in the structure of death causes in Tbilisi's female population, cancer of genitourinary system ranked first (56.9%) and its share made up 50%.

In 2002-2004, there were 845 registered cases of breast cancer-related deaths, in other words, every year, according to crude rates, 48 per 100 000 Tbilisi's female citizens died of this cause, according to Age-Standardized Rates (World Standard) – 33, and according to Age-Adjusted Rates (Tbilisi Standard) - 43.

In the structure of deaths caused by cancer in women over 25, breast cancer ranks first. At the same time, at a later period, 35-59, breast cancer ranks first in the structure of different causes of death. At 60 and more, breast cancer moves to the 2nd, 4th, 5th, 9th and, at 80, to the 10th place.

Recommendations

To control breast cancer, the first urgent task is to create population registry of cancer according to international requirements (IACR, Lyon; ENCR, Lyon) and to collect data about patients in follow-up regime, to renew electronic data bases, to hold descriptive analysis and epidemiological examination;

To increase the efficiency of screening programs and to reduce the number of breast cancer incidence in Tbilisi, it is recommended to carry out additional research, namely, to estimate the role and efficiency of ultrasonography of breast during the screening process.

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