RESEARCH ARTICLE

Breast Cancer Diagnosis by Mammography in Kazakhstan - Staging Results of Breast Cancer with Double Reading

Eldar Beysebayev*, Kazbek Tulebayev, Tylek Meymanalyev

Abstract

While mammography has been used for diagnosis of breast cancer in Kazakhstan for a long period, published data are very limited. Recently stress has been placed on increasing the accuracy by double reading of mammograms. Here we provide an overview of breast cancer screening in the different regions of Kazakhstan with data on the stages of cancers detected. A total 459,816 women aged 50, 52, 54, 56, 58 and 60 years were screened in 2012 and 379,903 in the first 9 months of 2013. Clear differences in levels of detection were noted between urban and rural residents, the latter demonstrating lower rates for both screening and cancer detection. Women aged 50 were more likely to undergo screening than their counterparts aged 60. While there were no clear relationships evident between screening rates and stage or numbers of breast cancers observed, this might be due to a number of complicating factors like geographical variation in risk factors as well as ethnicity. Future analyses should focus on the efficacy of mammography in Kazakhstan to reduce mortality.

Keywords: Breast cancer - mammography - double reading - stage distribution - Kazakhstan

Asian Pac J Cancer Prev, **16 (1)**, 31-34

Introduction

Breast cancer is of great improtance throughout Asia (Ferlay et al., 2013) including Central Asia, the incidence rate for example being recently found to be increasing in Kazakhstan (Bilyalova et al., 2011; Igissinov et al., 2011; 2012). Reported risk factors include unfavorable living conditions, chronic stress, unilateral breastfeeding, breastfeeding less than 3 months and over 2 years, abortions, and hereditary predisposition (Toleutay et al., 2013). In addition, a direct strong correlation between the degree of contamination with high pollution emissions in the atmosphere from stationary sources and the incidence of breast cancer has been described (Bilyalova et al., 2012). The situation in Central Asia may be complicated by higher rates in Russians than Turkic inhabitants. (Igisinov et al., 2005).

It has been stressed that clinical and public health interventions should be aimed at both women and healthcare providers to use mammography as a tool for early detection of breast cancer in Kazakhstan (Chukmaitov et al., 2008). However, while mammography screening is cost-effective in most Western countries, this may not be the case in Asian countrie sfor reasons of incidence rate or racial characteristics, such as dense breast tissue (Yoo et al., 2013). On possible way to improve accuracy is by double reading of mammograms, even as an adjunct to real-time single reading plus immediate assessment (Caumo et al., 2011). In Iran, despite no significant improvement in the cancer detection rate by double reading, a lower recall rate was thought to be a more helpful consequence (Moradi et al., 2013).

Since very litimited information is available in the international literature regarding mammography screening in Kazakhstan, the present descritive study was performed to provide baseline data for more analytical analyses kin the future.

Materials and Methods

This study was conducted at the Kazakh Research Institute of Oncology and Radiology in close cooperation with the staff of oncology clinics and medical departments of universitiesinvolved in breast cancer screening acroos the country. Fundamentals and principles of mammographic screening for the Republic of Kazakhstan were developed on the bases of European guidelines: 1) Type of screening-populational; 2)screening method-mammography of both breasts in 2 projections; 3) the interval –once in every 2 years; 4) the target group -women aged50,52,54,56,58,60years.

Mammograms are made at primary health centers (PHC) in the various Oblasts, with women of the indicated age groups, together with the completed documentation and "primary readings" sent to the city or Regional Oncology Center, where doctors radiologists perform a 'second reading'. Interpretation of the results of mammography performed

*Kazakh Medical University, named after S.D Asfendiyarov *For correspondence: beysebayev@gmail.com*

Table 1. Indicators for "Second Readings" of Mammograms

Regions	Mammography	Second Reading	
		No.	%
2012			
Akmola	25622	15945	62.2
Aktobe	20655	8403	40.7
Almaty	18996	10799	57.5
Atyrau	12571	5349	42.6
Eastern K	40697	16417	95.8
Jambul	26501	26501	100.0
Western K	15844	15703	99.1
Karaganda	36034	36034	100.0
Kyzilorda	13608	10921	80.2
Kostanai	27936	7634	27.3
Mangystau	12758	2058	16.1
Pavlodar	18484	18388	99.4
Northern K	20355	19232	94.4
South K	44941	44846	99.7
Almaty city	41374	22910	55.4
Astana city	9910	9910	100.0
2013 (9 months)			
Akmola	37861	18522	48.9
Aktobe	31673	13802	43.5
Atyrau	37863	12631	33.3
Jambul	75433	25805	34.2
Western K	51172	25017	48.8
Karaganda	112936	56468	50.0
Kyzilorda	43528	21073	48.4
Kostanai	52322	26161	50.0
Mangystau	24986	12493	50.0
Pavlodar	45931	22894	49.8
Northern K	68375	31289	45.7
Southern K	103360	51680	50.0
Almaty city	103009	43846	42.5
Astana city	32586	16293	50.0

K, Kazakhstan

by classifying BI-RADS. The emphasis in organizational and methodological aspects is on obligatory performance of 'double readings' of mammograms by two independent radiologists.

Results

Data for mammograhy and second readings in different areas of Kazakhstan for 2012 and the first nine months of 2013 are shown in Table 1. A total 459,816 women aged 50, 52, 54, 56, 58 and 60 years were screened in 2012 and

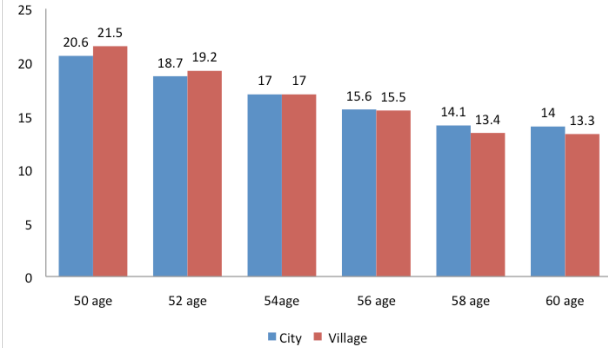

Figure 1. Percentage Compliance with Mammography in Different Age Groups for City and Village

Table 2. Identification of Breast Cancer by Stages and Regions

Regions	Stage I		Stage II		Stage III-IV		Total
	No.	%	No.	%	No.	%	No.
2012							
Akmola	0	0.0	12	80.0	3	20.0	15
Aktobe	7	26.0	18	66.7	2	7.4	27
Almaty	1	2.2	31	68.9	13	28.9	45
Atyrau	1	9.0	8	72.7	2	18.2	11
Eastern K	10	17.5	38	66.7	9	15.8	57
Jambul	2	6.3	27	84.4	3	9.4	32
Western K	17	41.5	24	58.3	0	0.0	41
Karaganda	38	52.1	25	34.2	10	13.7	73
Kyzilorda	7	14.9	30	63.8	10	21.2	47
Kostanai	5,9	0	16	94.1	-	0.0	17
Mangystau	0	0	1	100.0	-	0.0	1
Pavlodar	10	23.3	31	72.1	2	4.7	43
Northern K	8	18.2	33	75.0	3	6.8	44
Southern K	3	4.2	65	91.5	3	4.2	71
Almaty city	13	37.1	15	42.9	7	20.0	35
Astana city	22	29.7	48	64.9	4	5.4	74
2013 (9 months)							
Akmola	3	9.1	17	51.5	13	39.4	33
Aktobe	8	29.6	15	55.6	4	14.8	27
Almaty	2	6.5	22	71.0	7	22.6	31
Atyrau	1	5.3	17	89.5	1	5.3	19
Eastern K	12	18.5	46	70.8	7	10.8	65
Jambul	1	5.3	18	94.7	0	0.0	19
Western K	19	44.2	22	51.2	2	4.7	43
Karaganda	38	49.4	31	40.3	8	10.4	77
Kyzilorda	10	27.8	18	50.0	8	22.2	36
Kostanai	1	7.7	10	76.9	2	15.4	13
Mangystau	3	14.3	15	71.4	3	14.3	21
Pavlodar	5	15.2	27	81.8	1	3.0	33
Northern K	4	9.8	35	85.4	2	4.9	41
Southern K	2	3.4	45	76.3	12	20.3	59
Almaty city	6	16.7	20	55.6	10	27.8	36
Astana city	17	27.0	32	50.8	14	22.2	63

K, Kazakhstan

379,903 in the first 9 months of 2013. Clear variation was noted across the country, with higher rates achieved so far for 2012. Similarly, data for stages of breast cancers are shown in Table 2. No clear relationships between percentage second reading and total or early stage cancers could be discerned.

While significant age-related differences in the detection of breast cancer were not observed, women aged 50 were more likely to undergo screening than their older

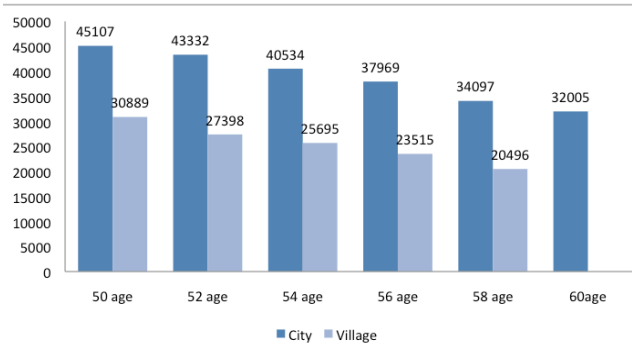

Figure 2. Numbers Undergoing Mammography in Different Age Groups for City and Village

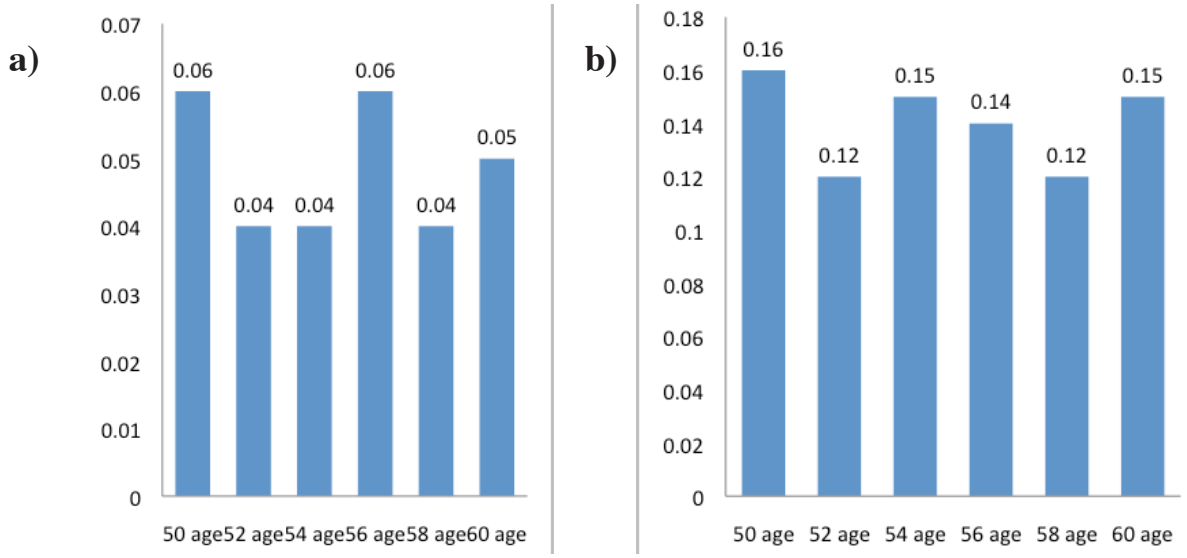

Figure 2. Percentages of Individuals Undergoing Mammography in Different Age Groups for a) Rural and b) Urban Populations who were Positive for Breast Cancer

counterparts in both rural and urban settings (see Figure 1). In addition, numbers of individuals screened were higher for cities than villages (see Figure 2) while percentages of screenees who were positive for cancer was far greater in the urban group. These data also confirmed a lack of variation in prevalence across age groups.

Discussion

The priority of this researchwas to report 'double readings' of screening mammograms in the Kakazhstan context. While the relative proportions of stage I and II as compared to stage III-IV were relatively high it is difficult to compare the data with other series in other countries given the lack of any control groups of non-screened individuals, although one study in Khanty-Mansiysky Autonomous Region-Yugra demonstrated similar results (Zakharova, 2013). The accuracy of staging may be affect by the primary method of obtaining material because fine needle aspiration biopsy, in some cases provides poor information (Cherenkov et al., 2013). Also the actual benefits of double reading (cf Caumo et al., 2011; Moradi et al., 2013) could not be ascertained with the comparison groups included here. Clearly in the future, there should be attention paid to differences between screened and non-screened regarding staging of lesions and mortality or survival. Given the preponderance of numbers undergoing mammography in urban and compared to rural groups, despite similar perecntage compliance, and the much higher actual rates for cancer positives, any future work should take these parameters into account and also if possible the ethnic groups of people involved. Incidence rates are known to be generally higher in cities than villages, for example in China (Wu et al., 2014). The focus here was on those aged 50-60 as reported also for China (Shi et al., 2013), a little later than the 40-459 group of screened women in Turkey found to be positive (Kayhan et al., 2014)..

It is well known that ethnicity can affect breast cancer knowledge and compliance with screening recommendations in Kazakhstan (Chukmaitov et al., 2008) and rates of breast cnacer for example in Kyrgystan between Russian and Turkic peoples (Igisinov et al., 2005). Whether there might be any correlate between rates of cancer positives and screenees by geographical location in Kazakhstan should also be assessed, taking into consideration the findings of Bilyalova et al. (2012).

The question of effects of screening on incidence rates, as recently reported for Australia (Beckmann et al., 2014) should also be a focus for future attention. The major problem of psossible over-diagnosis could not be addressed in the present study but certainly needs attention in the future. The role that additional modalities like ultrasonography could play, especially in detecting breast cancer in young women with high-density and relatively small breasts (Wang et al., 2014).

In conclusion, our data fprovide an initial survey of mammography screening and breast cancer identification in Kazakhstan, a Central Asian country with great geographical and ethnic variation. Hopefully future work will provide a clearer picture of the efficacy of screening, with possible attention to high risk groups and different target ages.

References

Beckmann KR, Roder DM, Hiller JE, Farshid G, Lynch JW (2014). Influence of mammographic screening on breast cancer incidence trends in South Australia. *Asian Pac J Cancer Prev*, **15**, 3105-12.

Bilyalova Z, Igissinov N, Moore M, et al (2012). Epidemiological evaluation of breast cancer in ecological areas of Kazakhstan--association with pollution emissions. *Asian Pac J Cancer Prev*, **13**, 2341-4.

Caumo F, Brunelli S, Zorzi M, et al (2011). Benefits of double reading of screening mammograms: retrospective study on a consecutive series. *Radiol Med*, **116**, 575-83.

Cherenkov VG, Petrov AB, Ivanchenko VV, Tverezovskiĭ SA, Frumkin BB (2013). Diagnosis and morphologic verification

of tumors detected by mammography screening. *Vopr Onkol*, **59**, 118-22. (in Russian).

Chukmaitov A, Wan TT, Menachemi N, Cashin C (2008). Breast cancer knowledge and attitudes toward mammography as predictors of breast cancer preventive behavior in Kazakh, Korean, and Russian women in Kazakhstan. *Int J Public Health*, **53**, 123-30.

Ferlay J, Soerjomataram I, Ervik M, et al (2012). Cancer incidence and mortality worldwide: IARC cancerbase No. 11 [Internet]. Lyon, France.

Igisinov N, Kokteubaeva N, Kudaibergenova I (2005). Epidemiology of breast cancer in females of reproductive age in Kyrgyzstan. *Asian Pac J Cancer Prev*, **6**, 37-40.

Igissinov S, Igissinov N, Moore MA, et al (2011). Trends of prevalent cancer incidences in the Aral-Syr Darya ecological area of Kazakhstan.

Igissinov S, Igissinov N, Moore MA, et al (2012). Component analysis of the incidence of malignant tumors of the population of Kazakhstan from 1999 to 2010. *Oncol Radiol Kazakhstan*, **1**, 3-8.

Moradi M, Ganji K, Teyfouri N, Kolahdoozan F (2013). Performance of double reading mammography in an Iranian population and its effect on patient outcome. *Iran J Radiol*, **10**, 51-5.

Poddubnaya I, Axel E, Kipriyanova N, et al (2007). Component analysis of cancer incidence population (Yakutsk, 1990-2003). *Siberian J Oncol*, **2**, 55-63.

Shi XJ, Au WW, Wu KS, Chen LX, Lin K (2014). Mortality characteristics and prediction of female breast cancer in China from 1991 to 2011. *Asian Pac J Cancer Prev*, **15**, 2785-91.

Starinsky V, Poddubnaya I, Axel E, et al (2005). Component analysis of malignant tumors of the population of the republic of Sakha (Yakutia) in 1989-2001. *Russian J Oncol*, **1**, 38-41.

Toleutay U, Reznik V, Kalmatayeva Z, Smigelskas K (2013). Risk factors of breast cancer in Kyzylorda oblast of Kazakhstan: a case-control study. *Asian Pac J Cancer Prev*, **14**, 5961-4.

Wang FL, Chen F, Yin H, et al (2013). Effects of age, breast density and volume on breast cancer diagnosis: a retrospective comparison of sensitivity of mammography and ultrasonography in China's rural areas. *Asian Pac J Cancer Prev*, **14**, 2277-82.

Wang JT, Chang LM, Song X, et al (2014). Comparison of primary breast cancer size by mammography and sonography. *Asian Pac J Cancer Prev*, **15**, 9759-61.

Wu LZ, Han RQ, Zhou JY, et al (2014). Incidence and mortality of female breast cancer in Jiangsu, China. *Asian Pac J Cancer Prev*, **15**, 2727-32.

Yoo KB, Kwon JA, Cho E, et al (2013). Is mammography for breast cancer screening cost-effective in both Western and Asian countries?: results of a systematic review. *Asian Pac J Cancer Prev*, **14**, 4141-9.

Zakharova NA (2013). Experience in the implementation of screening program for early detection of breast cancer in the Khanty-Mansi Autonomous Region-Yugra. *Vopr Onkol*, **59**, 382-5 (in Russian).