Assessment of trends of breast cancer and carcinoma in situ to monitor screening policies in developing settings

Carlos Anselmo Lima1,2,3; Marcela S. Lima2,3; Erika de A. C. Brito2,3; Hianga F. F. Siqueira3; Marceli de Oliveira Santos4; José Erinaldo Lôbo de Oliveira1; Sueli Pina Vieira1; Elma Santana de Oliveira1; Marcia Maria Macedo Lima3; Angela Maria da Silva2,3

Aracaju Cancer Registry; University Hospital/Federal University of Sergipe/EBSERH/ Aracaju, Brazil; Health Sciences Graduate Program/Federal University of Sergipe/ Aracaju, Brazil; Instituto Nacional de Câncer José Alencar Gomes da Silva. Coordenação de Prevenção e Vigilância.

BACKGOUND

Breast cancer standardized incidence rates in Brazil are estimated to vary in 2018/2019 from 24 to 59/100,000 in less to more developed regions respectively, with mean rate of 51/100,000 women. Rates are higher in the capital of the states. The role of screening is not well understood. Health policies advocate initiating screening at the age of 50. However, some controversies still exist about beginning screening at the age of 40, as some cancer societies state. We aim to calculate breast cancer incidence and mortality standardized rates (ASR) and ASR of carcinoma in situ in a mid-sized northeastern Brazilian city; and to calculate trends according to age groups 20-40, 40-49, 50-69, and 70+, to verify if screening policies should be modified.

METHODS

The databases from the Aracaju Cancer Registry and from the Brazilian Mortality Information System (SIM) from 1998-2014 have been used to calculate standardized rates, considering all invasive tumors, ICD-10: C50 and pure non-invasive lesions, D05. Trends have been assessed by calculating the annual percent change (APC) using the Joinpoint Regression Program.

RESULTS

For the period of study, 2,569 incident cancer cases, 154 in situ lesions, and 759 deaths were assessed. Cancer cases and deaths were distributed in percentage by age groups as following: 20-39: 11.1% e 9.0%, 40-49: 24.2% e 19.5%, 50-69: 44.0% e 41.8%, 70+: 20.5% e 29.8%, respectively. Carcinoma in situ occurred in 39.0% in women below 50 years and in 61% above 50 years of age (Table 1). Mean cancer incidence ASR, carcinoma in situ incidence ASR and mortality ASR were 58.4, 2.7 and 16.7/100,000 women respectively; mortality to incidence ratio was 0.29, which if used as a proxy of 5-year survival would be 71% (Table 2). Trends have showed stabilization both for incidence and mortality for all age groups (Figures 1, 2 and 3).

DISCUSSION AND CONCLUSIONS

The population of study has demonstrated a middle incidence rate, and low rate of pure in situ lesions. Such finding is characteristic of the Brazilian population. Considering stable mortality ASR and non-significant APC through the various age groups, we conclude that population screening policies beginning at 50, with two-year interval, should be appropriate and prioritized for the 50-69 age group.

Table 1. Number and percentage (%) of cases, age-standardized rates for all ages, age-specific rates distributed by age groups, of incidence of invasive breast carcinoma and carcinoma in situ, and deaths, 1998-2014.

Age Group	Invasive	%	Rate	In situ	%	Rate	Death	%	Rate
20-39	285	11.1	18.2	12	7.8	1.7	68	9.0	4.6
40-49	623	24.3	105.4	47	30.5	7.1	148	19.5	24.1
50-69	1133	44.1	186.6	68	44.2	9.1	317	41.8	52.4
70+	528	20.5	268.3	27	17.5	11.8	226	29.8	121.7
All	2569	100.0	56.8	154	100.0	2.9	759	100.0	16.2

Table 2. Data on number of cases (N), annual age-standardized rates of invasive breast carcinoma, carcinoma in situ, and mortality with confidence intervals; mortality to incidence ratios (M/I) with confidence intervals, 1998-2014.

	Incidence, Invasive			Incidence, in situ			Mortality			M/I Ratio	
Year	N(2569)	ASR	95% CI	N(154)	ASR	95% CI	N(759)	ASR	95% CI	M/I	95% CI
1998	91	51.4	40.8; 62.0	2	1.1	-0.4; 2.6	24	13.6	8.1; 19.0	0.3	0.2; 0.5
1999	104	55.7	45.0; 66.4	2	0.8	-0.3; 2.0	31	15.7	10.1; 21.2	0.3	0.2; 0.5
2000	115	53.5	43.7; 63.3	1	0.5	-0.5; 1.5	33	14.9	9.8; 20.0	0.3	0.2; 0.5
2001	117	56.5	46.2; 66.7	1	0.5	-0.4; 1.4	49	22.6	16.3; 28.9	0.4	0.3; 0.6
2002	141	63.5	53.0; 74.0	1	0.5	-0.4; 1.3	25	10.9	6.6; 15.1	0.2	0.1; 0.3
2003	110	51.0	41.4; 60.5	3	1.7	-0.2; 3.5	43	21.1	14.8; 27.4	0.4	0.3; 0.7
2004	135	61.1	50.8; 71.4	6	2.7	0.5; 4.9	25	11.5	7.0; 16.0	0.2	0,1; 0.3
2005	147	65.2	54.6; 75.7	4	1.8	0.0; 3.6	47	20.4	14.5; 26.2	0.3	0.2; 0.5
2006	144	63.2	52.8; 73.5	6	2.2	0.4; 4.0	36	15.6	10.5; 20.8	0.2	0.1; 0.4
2007	154	57.3	48.2; 66.4	9	2.9	1.0; 4.8	35	12.6	8.4; 16.7	0.2	0.1; 0.4
2008	159	54.6	46.1; 63.1	11	4.1	1.7; 6.5	51	17.9	13.0; 22.8	0.3	0.2; 0.5
2009	176	60.4	51.4; 69.3	16	5.3	2.7; 7.9	54	17.9	13.1; 22.7	0.3	0.2; 0.5
2010	188	58.2	49.9; 66.5	12	3.8	1.7; 6.0	57	17.5	12.9; 22.0	0.3	0.2; 0.5
2011	203	62.8	54.2; 71.5	9	2.5	0.9; 4.1	51	15.1	10.9; 19.2	0.2	0.1; 0.4
2012	195	59.2	50.9; 67.5	17	5.1	2.6; 7.5	68	19.5	14.9; 24.2	0.3	0.2; 0.5
2013	179	54.3	46.4; 62.3	27	7.7	4.8; 10.6	65	19.5	14.8; 24.3	0.4	0.2; 0.6
2014	211	59.0	51.0; 66.9	27	7.7	4.8; 10.6	65	18.3	13.9; 22.8	0.3	0.2; 0.5

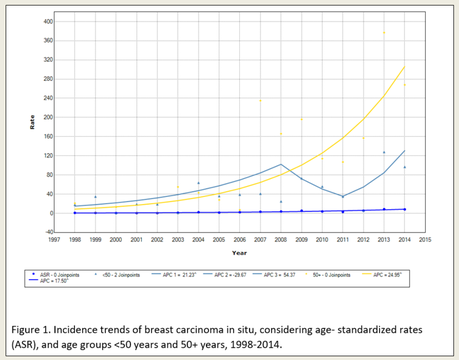

Figure 1. Incidence trends of breast carcinoma in situ, considering age- standardized rates (ASR), and age groups <50 years and 50+ years, 1998-2014.

Figure 2. Incidence trends of invasive breast carcinoma, considering age- standardized rates (ASR), and age groups 20-39, 40-49, 50-59 and 70+, 1998-2014.

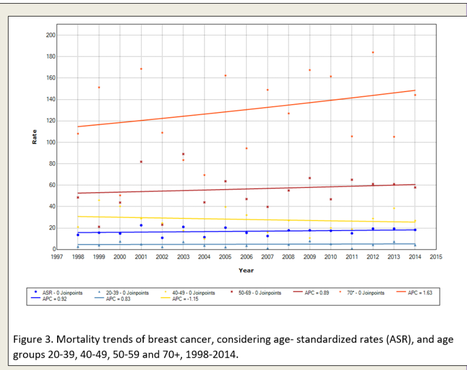

Figure 3. Mortality trends of breast cancer, considering age- standardized rates (ASR), and age groups 20-39, 40-49, 50-59 and 70+, 1998-2014.

ACKNOWLEDGEMENTS

The authors wish to thank the personnel of the Cancer Registry for their great work of collecting data and preparing the database for this research work, José Erinaldo Lobo de Oliveira, Elma Santana de Oliveira, Maria das Graças Prata França, Sueli Pina Vieira; Suzana Maria de Carvalho, Marina Kobilsek, Analeide Rezende and Cecília Ferreira.

REFERENCES

1. Haukka J, Byrnes G, Boniol M, Autier P. Trends in breast cancer mortality in Sweden before and after implementation of mammography screening. *PLoS One*. 2011;6. doi:10.1371/journal.pone.0022422
2. Lauby-Secretan B, Scoccianti C, Loomis D, et al. Breast-Cancer Screening ? Viewpoint of the IARC Working Group. *N Engl J Med*. 2015;372(24):2353-2358. doi:10.1056/NEJMsr1504363