Breast, prostate and cervix cancer mortality, years lost and cost of programs. Mexico, 2013-2016

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Abstract

Introduction: In Mexico, large expenditure is made on resources for cervical and breast cancer early detection, but the Ministry of Health and the Mexican Institute of Social Security do not have a program for the detection of prostate cancer. **Objective:** To compare breast, cervical and prostate cancer mortality, as well as years lost in Mexico from 2013 to 2016 versus the cost of programs. **Method:** Overall mortality figures were taken from the number of deaths for each type of cancer based on ICD-10. The number of years lost were obtained according to life expectancy in Mexico (72 years for men and 77 years for women). **Results:** Prostate cancer mortality is higher than that of breast cancer, but lost years in women due to breast cancer are higher. The cost of programs for breast and prostate cancer from 2013 to 2016 in both institutions was 3 036 322 156 Mexican Pesos. **Conclusion:** Institutional programs have not had an impact to the benefit of the population in spite of their cost and prostate cancer has not been correctly evaluated. It is necessary for strategies to be assessed and redesigned in order to optimize expenditure and benefit the population.

KEY WORDS: Mortality. Breast cancer. Prostate cancer. Cervical cancer. Years of Life Lost.

Introduction

The World Health Organization refers that among the main cancers that attack women in the world, breast and cervical cancer are found: in 2015, 570,896 women died in the world from the former and 279,311 from the latter; as for men, 1064 died from breast cancer and 343,898 from prostate cancer.¹

If the frequency of breast cancer in the region of the Americas is compared in women younger than 65 years, it is higher in Latin America and the Caribbean with 57 %, than in North America with 41 %.² As regards prostate cancer, 413,000 new cases are diagnosed every year and 85,000 men die;³ only in the region of North America, 35,155 men passed away from this cancer in 2015, and 1168 in Central America.⁴

About cervical cancer, in the region of the Americas, more than 83,000 women were diagnosed with cervical cancer in 2012 and nearly 36,000 died from this

disease. If current trends are maintained, the number of deaths in the Americas will increase by 45 % by 2030. Mortality rates are 3 times higher in Latin America and the Caribbean than in North America, which shows evidence of enormous health inequalities.⁵

The Mexican United States, based on the 2010 Population and Housing Census, carried out by the National Institute of Statistics and Geography, was constituted of 112,336,538 inhabitants,⁶ for the Inter-censal Survey carried out in 2015, total population was 119,530,753⁷ and the Population and Housing Council population projections mentions a national population of 122,273,473 for 2016, 59,644,308 males and 62,629,165 females,⁸ and the difference between males and females is therefore a little over two millions.

The Mexican United States Political Constitution, on its 4th article indicates that every person has the right to health protection,⁹ and the 2015 Inter-censal Survey carried out by the National Institute of Statistics and Geography in the field of health services reports

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that 17 % of the national population is not affiliated to health institutions and that the population that is, is affiliated to one of 3 institutions: 49.90 % to the Ministry of Health, with the *Seguro Popular* (People's Insurance), 39.18% to the Mexican Institute of Social Security and 7.71 % to the Institute of Security and Social Services for State Workers. Since the three institutions cover 96.79 % of the affiliated population, it is important for them to have programs for breast cancer early detection in women and men, as well as for cervical and prostate cancer, whose development requires a strong outlay of resources. Notwithstanding, the Ministry of Health and the Mexican Institute of Social Security do not have a program for prostate cancer detection and priority is given to breast and cervical cancer timely detection in women.¹⁰⁻¹²

As regards life expectancy in the region of the Americas, the World Health Organization reported in 2015 a life expectancy of 74 years for men and 79.9 years for women.¹³ As for Mexico, the National Institute of Statistics and Geography¹⁴ reported for 2016 a life expectancy of 72.6 years for men and 77.8 for women, which is below life expectancy of the region.

Taking the World Health Organization and the Pan American Health Organization breast, cervical and prostate cancer mortality data as a reference, as well as life expectancy average age in the region and considering that an efficacious early diagnosis can facilitate cancer detection at an earlier stage, which allows the implementation of treatments that are usually more efficacious, less complex and less expensive,¹⁵ it should be determined whether the programs of health institutions in Mexico are favorably impacting on the population and not only knowing the number of activities for early detection. In addition, there is much talk about the priority to women owing to breast cancer mortality, but, what happens with prostate cancer? Due to the above, the purpose of this work was to know the following for the 2013 to 2016 period:

1. Whether in Mexico deaths due to breast cancer have decreased in women and men, as well as deaths from cervical cancer and prostate cancer.
2. Whether cumulative breast cancer mortality of women in the country is higher than prostate cancer mortality in men.
3. Breast cancer mortality in women accumulated by state, as well as that of prostate cancer and cervical cancer.

4. Accumulated lost years in absolute numbers for deaths due to breast cancer in women and men, as well as cervical cancer and prostate cancer, in relation to life expectancy for Mexican women and men.
5. Whether lost years due to breast cancer deaths have decreased in Mexico in women and men, as well as deaths from cervical cancer and prostate cancer.
6. The cost of breast, cervical and prostate cancer prevention programs, at the Ministry of Health, the Mexican Institute of Social Security and the Institute of Social Security and Services for State Workers.

Method

The study universe was the population of the Mexican United States and the sample the 100 % of deaths from breast cancer in women and men, as well as from prostate and cervical cancer, from 2013 to 2016. Deaths were taken from overall deaths by place of residence reported by the National Institute of Statistics and Geography recorded on that period.

To know the number of breast cancer deaths in women and men by age, the following codes were taken from International Classification of Diseases Tenth Revision:¹⁶

- C50.0 malignant neoplasm of breast, nipple and areola.
- C50.1 malignant neoplasm of breast, central portion of breast.
- C50.2 malignant neoplasm of breast, upper-inner quadrant of breast.
- C50.3 malignant neoplasm of breast, lower-inner quadrant of breast.
- C50.4 malignant neoplasm of breast, upper-outer quadrant of breast.
- C50.5 malignant neoplasm of breast, lower-outer quadrant of breast.
- C50.6 malignant neoplasm of breast, axillary tail of breast.
- C50.8 overlapping lesion of breast.
- C50.9 malignant neoplasm of breast, unspecified

For the number of deaths from prostate cancer by age:

- C61 malignant neoplasm of prostate.

Regarding the number of deaths from cervical cancer by age:

- C53 malignant neoplasm of cervix uteri.

- C53.0 malignant neoplasm of cervix uteri, endocervix.
- C53.1 malignant neoplasm of cervix uteri, exocervix.
- C53.8 overlapping lesion of cervix uteri.
- C53.9 malignant neoplasm of cervix uteri, unspecified.
- C54 malignant neoplasm of corpus uteri.
- C54.0 malignant neoplasm of isthmus uteri.
- C54.1 malignant neoplasm of endometrium.
- C54.2 malignant neoplasm of myometrium.
- C54.3 malignant neoplasm of fundus uteri.
- C54.8 overlapping lesion of corpus uteri.
- C54.9 malignant neoplasm of corpus uteri, unspecified.
- C55 malignant neoplasm of uterus, part unspecified

To determine lost years, a life expectancy of 77 years was taken as a basis for women and 72 years for men, whereby each age of death was subtracted 72 years for men and 77 years for women, with the result being the years lost due to death, which were multiplied by the number of deaths for each age in order to have the absolute number of years lost by age.

Regarding the cost of the programs per institution from 2013 to 2016, each institution was asked for information through the Federal Government National Platform of Transparency. The data were processed in Excel in order to tabulate the results. Each age value per year was associated with the number of recorded deaths; for the study, absolute frequency and absolute accumulated frequency were used, since the latter was the sum of variables from 2013 to 2016, to later represent them in tables.

Results

Table 1 shows deaths by type of cancer and each year from 2013 to 2016; in the latter, all deaths are increased in comparison with 2015; in addition, cumulative deaths from 2013 to 2016 for prostate cancer are observed to represent the largest amount with 25,685, in comparison with the other types of cancer.

Figure 1 shows the mortality distribution by state: the State of Mexico, Mexico City, Veracruz and Jalisco occupied the leading places of mortality by the studied types of cancer.

Table 2 shows the years lost to mortality due to these types of cancer from 2013 to 2016: mortality

Table 1. Deaths in the United States of Mexico by cancer type and gender. 2013-2016

Deaths	2013 (n)	2014 (n)	2015 (n)	2016 (n)	2013-2016 accumulated
Of women due to breast cancer	5 548	5 997	6 273	6 650	24 468
Of men due to breast cancer	49	54	31	43	177
Total due to breast cancer	5 597	6 051	6 304	6 693	24 645
Due to cervical cancer	4 748	5 059	5 046	5 144	19 997
Due to prostate cancer	6 023	6 296	6 447	6 919	25 685

Table 2. Total years lost due to deaths prior to the age corresponding to life expectancy

Years lost	2013	2014	2015	2016	2013-2016 accumulated
Of women due to breast cancer	103 475	112 916	115 426	122 023	453 840
Of men due to breast cancer	356	511	318	468	1 653
Due to cervical cancer	86 421	92 341	92 057	94 858	365 677
Due to prostate cancer	11 864	13 415	13 168	13 646	52 093

was higher in 2016 in comparison with 2015. As regards accumulated years lost, women showed the highest number of years lost due to breast cancer with 453,840, followed by men with 52,093 years lost due to prostate cancer

About the cost of the programs, Table 3 shows that the Ministry of Health reduced its expenditure in 2014 and 2015 in relation to 2013, unlike the Mexican Institute of Social Security, which has gradually increased it. Between both institutions, they spent \$ 2,752,321,069 pesos between 2013 and 2016; the Institute of Social Security and Services for State Workers did not provide its information because it did not keep a quantification of the programs' cost.

Conclusion

Prostate cancer-related deaths in men were determined to be higher than those in women due to breast cancer, unlike years lost, which were higher in women, which means that men die closer to the age established as life expectancy and that women die at ages earlier than life expectancy.

Figure 1. Mortality by state accumulated per type of cancer, 2013-2016.

Table 3. Cost of the programs of the main health institutions of Mexico

Institution	Program	2013	2014	2015	2016	2013-2016 accumulated
Ministry of Health	Breast and cervical cancer	\$507 797 297	\$327 024 435	\$467 583 885	\$579 714 318	\$1 882 119 934
Mexican Institute of Social Security	Breast and cervical cancer	\$178 927 042	\$191 159 455	\$223 692 645	\$276 422 003	\$870 201 135

There are other methods to calculate years lost when the number of deaths is available by age groups, assuming an even distribution of deaths at each group. They can also be expressed as a rate, both if individualized or grouped data are available; however,

just as gross mortality rates, the rates of years lost can be influenced by confounding variables, as it generally occurs with the population age structure. Similarly, it can be calculated with the difference between the dying age of each deceased subject of a

population and a specific number of years to be fixed, then, the years lost by each individual who dies before the threshold established for a particular cause in a population are added; the sum will yield total years lost due to said cause in that population.¹⁷ This form of calculation was chosen in order to avoid confounding variables and because years lost serve to determine premature mortality.

The highest mortality by state was for Mexico City, followed by the states of Mexico, Jalisco and Veracruz. It might be thought that it would be proportional to the volume of population they comprise; however, when observing the Institute of Geography and Statistics 2015 Inter-censal Survey total population, the first place was for the State of Mexico with 16,187,608 inhabitants, followed by Mexico City with 8,918,653, Veracruz with 8,112,505 and Jalisco with 7,844,830; thus, it can be inferred that it is not proportional. Hence the importance of carrying out a study to have mortality rates per 100,000 population by state, to better define the differences between states.

Timely detection programs are not efficacious, even when in Mexico priority has been given to breast and cervical cancer early detection, since there is a legislation for both.

In Mexico, due importance has not been given to prostate cancer despite the high mortality it causes. It was until December 15, 2017 when the Official Mexican Standard NOM-048-SSA2-2017 was published, which addresses the prevention, detection, diagnosis, treatment, epidemiological surveillance and health promotion of benign prostatic growth (hyperplasia of the prostate) and prostate cancer (malignant neoplasm of the prostate). Owing to this, in the study period, the Ministry of Health and the Mexican Institute of Social Security reported not having a program for prostate cancer, unlike breast cancer, the program of which was started in 2001 and 2002, respectively; the cervical cancer program was started in 1973 and 2001, respectively. The cost of both programs for both institutions, accumulated from 2013 to 2016, was close to 3 billion pesos. The Institute of Security and Social Services for State Workers refers having a program for each one of the three types of cancer; however, it does not keep a quantification of the cost thereof and, therefore, it did not provide the information.

Therefore, the institutions must rethink their programs in order to change the trend and to consider the new guidelines suggested by the World Health

Organization, as essential practices for cervical cancer comprehensive control, since one of public health goals is to reduce the incidence, prevalence and the number of deaths caused by cancer.¹⁸

Having a comprehensive vision in the development of programs is necessary; for example, in cervical cancer, considering the three interdependent components mentioned by the World Health Organization; primary, secondary and tertiary prevention with appropriate interventions planned for each component, especially to reduce years lost due to death before the age established as the life expectancy, particularly in women with breast cancer, which occupies the first place in years lost.

One variable that health institutions of Mexico have not considered is breast cancer in men, although it is highly infrequent. Programs to disseminate information to the male gender should be implemented, in particular about self-exploration for early detection.

While it is true that 17 % of the Mexican population has no access to health services, it is also true that between the Ministry of Health, the Mexican Institute of Social Security and the Institute of Security and Social Services for State Workers provide care to approximately 96 % of affiliated population, and thus their programs and budget would have to impact on the decrease of years lost due to mortality associated with breast, cervical and prostate cancer.

It is necessary to conduct studies for each state of the country, with the purpose to particularize the ages at which screening should be performed and to establish earlier detections in order for more timely treatments to be carried out, which will reduce years lost.

References

1. Organización Mundial de la Salud. [Sitio web]. Estimaciones de salud global 2015 muertes estimadas por edad, sexo y causa. Disponible en: http://www.who.int/healthinfo/global_burden_disease/estimates/en/index1.html
2. Organización Panamericana de la Salud/Organización Mundial de la Salud. [Sitio web]. Cáncer de mama. Disponible en: http://www.paho.org/hq/index.php?option=com_content&view=article&id=5041&Itemid=3639&lang=es&Itemid=3639
3. Organización Panamericana de la Salud/Organización Mundial de la Salud. [Sitio web]. Expertos regionales discuten enfoques para el tamizaje y detección temprana del cáncer de próstata en las Américas. Disponible en: http://www.paho.org/hq/index.php?option=com_content&view=article&id=13818&Itemid=42459&lang=es
4. Organización Panamericana de la Salud/Organización Mundial de la Salud. [Sitio web]. Datos de mortalidad. Disponible en: <https://hiss.paho.org/pahosys/idc.php>
5. Organización Panamericana de la Salud/Organización Mundial de la Salud. [Sitio web]. Cómo se desarrolla el cáncer cervicouterino. Disponible en: http://www.paho.org/hq/index.php?option=com_content&view=article&id=5521&Itemid=3962&lang=es
6. Instituto Nacional de Estadística y Geografía. [Sitio web]. Censo de Población y Vivienda 2010. Cuestionario básico. Disponible en: <http://www3.inegi.org.mx/sistemas/tabuladosbasicos/default.aspx?c=27302&s=est>

7. Instituto Nacional de Estadística y Geografía. [Sitio web]. Encuesta intercensal INEGI 2015. México: INEGI; 2015. Disponible en: <http://www.beta.inegi.org.mx/proyectos/enchogares/especiales/intercensal/>
8. Consejo Nacional de Población. [Sitio web]. Proyecciones de la población de México 2010-2050 Indicadores demográficos. Disponible en: <http://www.conapo.gob.mx/es/CONAPO/Proyecciones>
9. Constitución Política de los Estados Unidos Mexicanos. Disponible en: <http://www.diputados.gob.mx/LeyesBiblio/pdf/1.pdf>
10. Instituto Nacional de Transparencia, Acceso a la Información y Protección de Datos Personales. [Sitio web]. Información pública folio 0001200015818. Disponible en: <https://www.infomex.org.mx/gobierno-federal/moduloPublico/moduloPublico.action>
11. Instituto Nacional de Transparencia, Acceso a la Información y Protección de Datos Personales. [Sitio web]. Información pública folio 0064100167018. Disponible en: <https://www.infomex.org.mx/gobierno-federal/moduloPublico/moduloPublico.action>
12. Instituto Nacional de Transparencia, Acceso a la Información y Protección de Datos Personales. [Sitio web]. Información pública folio 0063700026718. Disponible en: <https://www.infomex.org.mx/gobierno-federal/moduloPublico/moduloPublico.action>
13. World Health Organization. [Sitio web]. Life expectancy data by WHO region. Disponible en: <http://apps.who.int/gho/data/view.main.SDG2016LEX-REGv?lang=en>
14. Instituto Nacional de Estadística y Geografía. [Sitio web]. Esperanza de vida. Disponible en: <http://cuentame.inegi.org.mx/poblacion/esperanza.aspx?tema=P>
15. Organización Mundial de la Salud. [Sitio web]. El diagnóstico temprano del cáncer salva vidas y reduce los costos de tratamiento. Disponible en: <http://www.who.int/mediacentre/news/releases/2017/early-cancer-costs/es/>
16. Organización Panamericana de la Salud/Organización Mundial de la salud. [Sitio web]. ICD 10 en línea, Volumen 1, Español. Disponible en: <http://ais.paho.org/classifications/Chapters/>
17. Organización Panamericana de la Salud/Organización Mundial de la salud. [Sitio web]. Demografía. Disponible en: https://www.paho.org/nic/index.php?option=com_docman&view=download&alias=45-bases-conceptuales-demograficas&category_slug=publicaciones-anteriores&Itemid=235
18. Organización Panamericana de la Salud/Organización Mundial de la salud. Control Integral del cáncer cervicouterino, guía de prácticas esenciales 2016. Segunda edición. Washington, DC: OPS; 2016.