

Employment Condition Modifies the Using Patterns of Screening Mammography in Workers Insured by the Mexican Government: A Case–Control Study

Abstract

Background: Our main aim was to investigate whether the employment condition modifies the use patterns of the screening mammography in workers insured by the Mexican government (*Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado*, ISSSTE; medical facilities of the Mexican government). **Methods:** A case–control study age-matched was done in women insured by the Mexican government, aged 40–69 years, attending a general hospital (ISSSTE). All subjects were submitted to an interview and anthropometric data registry. In the interview were obtained: demographic data, of schooling, breast cancer family history, and reproductive history; besides, mammography history during the past 2 years and place of performance (in or outside of the ISSSTE). Finally, it was evaluated whether the mammography use in the ISSSTE was related to their employment condition: Active workers (cases) vs. dependents or retired workers (controls). **Results:** The sample was of 252 women: 126 cases and 126 controls. Cases obtained less mammograms in the ISSSTE ($P = 0.03$, odds ratio = 0.54, 95% confidence interval, CI 0.30–0.96), than their dependents or the retired workers. Furthermore, cases with high education (university or higher) also obtained fewer mammograms in the ISSSTE ($P = 0.03$, odds ratio = 0.26, 95% CI 0.05–0.93). **Conclusions:** Women active workers with higher education are obtaining less screening mammograms in the ISSSTE than their dependents or the retired workers.

Keywords: Breast neoplasms, epidemiology, mammography, México, neoplasms, radiology

Introduction

Cancer has increased worldwide;^[1] however, the highest morbidity and mortality occurs in low and middle-income countries.^[1] In México, breast cancer is the leading cause of cancer deaths in women since 2006; less than 10% of these cancer cases occur in early stages, where the disease is most treatable.^[2,3] The only diagnostic tool available to identify early breast cancer is mammography.^[4] The organized use of screening mammography has allowed to reduce breast cancer mortality.^[4–6] Besides, having some kind of health insurance coverage increases the likelihoods of using the screening mammography.^[5,7]

In 2015, the Institute of Social Security and Services for State Workers (ISSSTE; *Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado*) insured >7 million Mexican government workers, and their dependents.^[8] However, only there are two investigations

regarding few aspects of screening mammography using in women insured by the ISSSTE.^[9,10] A remarkable fact, from one of these studies has been that women active workers indicate common difficulties for access to mammography in medical facilities of the ISSSTE (Mexican government's medical facilities).^[10] Outstandingly, the National Health and Nutrition Survey of the Right Holder of the ISSSTE-2007 study (*ENSADER; Encuesta Nacional de Salud y Nutrición del Derechohabiente del ISSSTE-2007*) that analyzed more than 11000 beneficiaries, did not assess the use of the screening mammography.^[11] Therefore, there are many questions unresolved of screening mammography using in women insured by the ISSSTE.

Accordingly to previous information, a case–control study aged matched was designed to investigate screening mammography using by females insured by an ISSSTE general hospital at Mexico City

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How to cite this article: Ortiz-Mendoza CM, Sánchez-Hernández AG. The employment condition modifies the using-patterns of screening mammography in workers insured by the Mexican government: A case–control study. *Int J Prev Med* 2019;10:133.

Access this article online

Website:
www.ijpvmjournal.net/www.ijpvm.ir

DOI:
10.4103/ijpvm.IJPVM_455_18

Quick Response Code:



according to their employment condition: active workers vs. dependents or retired workers.

Methods

Ethics

It was a study done between October-2015 and June-2016 at the Hospital General Tacuba administered by the ISSSTE (Mexican government's medical facilities), previously approved by the Institutional Research Committee (protocol #045).

Study design

Selection and description of participants

Women beneficiaries of the ISSSTE, active workers or pensioned or their dependents, who attended any service at the Hospital General Tacuba were evaluated. The sample was chosen through a nonprobabilistic selection, in emergency waiting rooms, outpatient areas, appointment scheduling or clinical file areas and from those that visited hospitalized relatives, in the morning and evening shifts, from Monday to Friday, from 8 am to 5 pm. The inclusion criteria were: any Mexican women by birth, beneficiaries of the ISSSTE, aged between 40 and 69 years who accepted the interview, the evaluation, and who signed an informed consent. Regular users of the gynecology, breast clinic, or oncology services were excluded.

All subjects were submitted to an interview and anthropometric data registry. The weight was measured on a mechanical scale, with the patient barefoot; the height was evaluated with a stadiometer integrated to the scale. With the weight and height, we calculate the body mass index with the formula: weight in kilograms between the square-height measured in meters (kg/m^2).

As well, in the interview were obtained demographic data, of schooling (basic: from primary to upper secondary education; and higher: bachelor, master or doctoral), breast cancer family history in first-degree relatives (mother, sister [s] or daughter [s]), and reproductive history, such as menarche age, age of first full-term pregnancy, and number of pregnancies. Regarding mammography (analog or digital), we inquired if they had ever been practiced it, frequency of use, date from the last, if it occurred during the 2 years prior to the interview, and place of performance (in or outside of the ISSSTE).

The cases were defined as women insured by the ISSSTE, who were active federal workers. The controls were defined as women insured by ISSSTE, paired by age with the cases, which were retired or family dependents.

Statistical data analysis

With the obtained information, we evaluated whether the mammography use in the ISSSTE was linked to their employment condition: Active workers (cases) vs.

dependents or retired workers (controls). We use the statistical program OpenEpi version 3 (www.openepi.com). The sample size was calculated from a confidence value of 95%, a power of 80%, a proportion of controls-cases of one, as well as an approximate frequency of mammography use of 15% for controls and 40% for cases.^[10,12] All values were expressed in numbers and percentages. The analysis of the categorical variables was through the “ χ^2 ” or Fisher’s exact test; the latter, if any of the values from the 2×2 table were ≤ 5 . The values of $P < 0.05$ were considered significant.

Results

The calculated sample size was at least of 57 cases and 57 controls. However, due to the copious beneficiaries’ participation (327 women interviewed), the sample was increased to 126 cases and 126 controls.

We identified several risk factors for breast cancer such as: overweight/obesity affecting two thirds and obesity alone in almost 30%. In addition, one in five women had high-risk reproductive factors such as nulliparous or first full-pregnancy at age ≥ 30 years. It was discovered that $>70\%$ had a history of having a mammogram at some time during their lives and that more than 40% did so regularly over a period not exceeding 2 years; see Table 1.

It was detected that cases with higher education (university or higher) used the mammograms significantly less frequently than controls in the ISSSTE; see Table 2.

Discussion

The results of this case–control study showed that active worker women with higher education obtained less screening mammograms in the ISSSTE than their dependents or the retired workers. These data are opposite to that indicated by several authors, even in Latin America, where to have a higher education or having some kind of medical insurance coverage increases the use of mammography.^[5,7] It is worrying that active female workers with the higher education use less

Table 1: Sample's analyzed features

<i>(n=252)</i>	
Features	n (%)
Overweight and obesity	167 (66.2%)
Obesity	74 (29.3%)
Age 40-50 years	132 (52.4%)
Age 51-60 years	120 (47.6%)
Basic education	164 (65.1%)
Higher education	88 (34.9%)
Family history of breast cancer	15 (5.9%)
No full-term pregnancies	26 (10.3%)
1 st pregnancy ≥ 30 years	29 (11.5%)
Mammography any time	190 (75.3%)
Mammogram during the past 2 years	103 (40.8%)

Table 2: Analysis

Features	n	Mammography		P	OR CI 95%
		Yes	No		
Basic Education					
Cases	67	54	13	0.21	1.5
Controls	97	70	27		0.7-3.4
High education					
Cases	59	41	18	0.03	0.26
Controls	29	26	03		0.05-0.93
Mammography in ISSSTE					
Cases	95	45	49	0.03	0.54
Controls	96	61	35		0.30-0.96
Mammography out of ISSSTE					
Cases	95	49	45	0.03	1.85
Controls	96	35	61		1.03-3.32
Age 40-50 years					
Cases	66	38	28	0.85	0.94
Controls	66	39	27		0.46-1.88
Age 51-60 years					
Cases	60	56	04	0.99	0.73
Controls	60	57	03		0.10-4.58

ISSSTE=Institute of Social Security and Services for State Workers, OR=Odds ratio, CI: Confidence interval

the mammography in the Mexican government's medical facilities (ISSSTE); this give support to our notion about the existence of barriers to mammography access in the ISSSTE. This is a huge challenge for the ISSSTE, and other similar health systems through the world, struggling with growing financial pressures, given that it assures more than 7 million workers of the Mexican government;^[8] besides it is important to consider, that 50.7% of its beneficiaries are women: 62.3% between 30 and 49 years and 21.1% among 50–59 years.^[11] Furthermore, it was found that many of our female workers have several risk factors for breast cancer.

Thus, our data are consistent with what was detected by the ENSADER study, in which less of active workers (40.9%) attend preventive studies in the ISSSTE than the retired workers (57%).^[11] As revealed by the ENSADER study, one of the main reasons for not attending the ISSSTE preventive services is the dissatisfaction with the extended times to receive the medical attention.^[11] In other study, the authors have detected that the leading disappointment is with the administrative processes to arrange appointments in the ISSSTE because it take very long times for their achievement.^[13] All the former circumstances, may inhibits the possibility of obtaining the necessary permissions at work, for attending to screening mammograms in medical facilities of the ISSSTE.

Our findings point to create new practices, institutional, and in the workplace, to overcome the obstacles in the access to mammography in medical facilities of the ISSSTE. We should highlight that preventive health services benefit people health by reducing morbidity and mortality. Thus, it is

necessary to improve the efficiency of administrative procedures at the ISSSTE to schedule any medical appointments. It is essential to explore new techniques to offer mammography, like through mobile units at the workplaces, or to open screening mammography service on weekends. Finally, within its legal attributions the ISSSTE can issue official endorsements to all government agencies (workplaces) to grant the authorizations for women active workers can to attend screening mammograms, according to the Official Mexican Standard for the Prevention, Diagnosis and Treatment, Control and Epidemiological Surveillance of Breast Cancer (NOM-041-SSA2- 2011; *Norma Oficial Mexicana para la Prevención, Diagnóstico y Tratamiento, Control y Vigilancia Epidemiológica del Cáncer de Mama*).^[14]

Alike all studies, this one presents limitations. This work is the result of a single urban hospital population. In the analyzed sample, obesity was not evaluated with the abdominal perimeter. Additionally, case-control studies have intrinsic limitations due to their design. Notwithstanding the former data, our findings are supported and consistent with other studies.^[11,13]

Conclusions

The results of this case-control study support that active workers women with higher education obtained less screening mammograms in the ISSSTE than their dependents or the retired workers. The results indicate the need to create new practices, institutional, and in the workplace, to overcome the obstacles for access screening mammograms in medical facilities of the ISSSTE.

Ethics standards for human research

The management of research subjects was in accordance with the Helsinki Declaration in its latest version, the Guidelines for Clinical and Epidemiological Research of the Council for International Organizations of Medical Sciences (CIOMS), the Code of Ethics of the World Medical Association, the Belmont Report, the Guidelines for Good Clinical Practices, the Mexican Federal Law for the Protection of Personal Data Held by Individuals and the Mexico's General Health Law.

Informed consent

All patients were required to sign an informed consent.

Financial support and sponsorship

The present work has been self-financed by the authors.

Conflicts of interest

There are no conflicts of interest.

Received: 06 Oct 18 **Accepted:** 29 May 19

Published: 12 Aug 19

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