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Mammography Stages Adoption and Health Beliefs in Mexican Women

Etapas de Cambio en el Uso de la Mamografía y Creencias de Salud en Mujeres Mexicanas

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Abstract

Objective. To identify associations between sociodemographic variables and stages of change and evaluate differences between health belief model variables and these stages. Methods. This cross-sectional descriptive study included 612 women aged 40 years and older admitted to a public hospital in the Northeast of Mexico. The participants answered the health belief model scale and selected the statement that best reflected their experience with mammography screening. The association between sociodemographic and clinical variables and the mammography stages of change was assessed using X2, and the groups of stages of change were compared using one-way ANOVA and Games-Howell post-hoc tests. Results. There was a significant association between age and the stages of action and maintenance. Breast cancer screening methods such as breast self-examination and clinical breast examination were more common among women in the stages of maintenance and relapse. There were differences between pre-contemplation and the more advanced stages in all dimensions except in the perceived seriousness p <.001. Self-efficacy and health motivation were different among women at the stage of contemplation, maintenance, and relapse. Conclusions. Perceived self-efficacy and health motivation may increase adherence to mammography screening.

Keywords: Breast cancer screening; Mammography; Stages of adoption; Transtheoretical model; Health belief model

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Resumen

El objetivo de la investigación fue identificar la asociación entre las variables sociodemográficas y las etapas de cambio para el uso de la mamografía y evaluar si existen diferencias entre las dimensiones del modelo de creencias en salud y las etapas de cambio. El diseño de este estudio es transversal descriptivo, se realizó de enero de 2017 a enero de 2018, incluyó a 612 mujeres de 40 años en adelante que asistían a un hospital de atención terciaria en el noreste de México. Las participantes firmaron el consentimiento informado y respondieron a la escala del modelo de creencias en salud y seleccionaron la declaración que mejor reflejaba su experiencia con la mamografía. La asociación entre las variables sociodemográficas y clínicas y las etapas de cambio de la mamografía se evaluó mediante X2, y los grupos de etapas de cambio se compararon mediante pruebas post hoc de ANOVA unidireccional y Games-Howell. Se encontró una asociación significativa entre la edad y las etapas de cambio de acción y mantenimiento. Los métodos de detección del cáncer de mama, como la autoexploración de mama y el examen clínico de mama, fueron más comunes entre las mujeres en las etapas de mantenimiento y recaída. Se obtuvieron diferencias significativas entre las etapas de pre-contemplación y las etapas más avanzadas en todas las dimensiones de creencias de salud, excepto en la seriedad percibida p <.001. La autoeficacia y la motivación para la salud fueron diferentes entre las mujeres en la etapa de contemplación, mantenimiento y recaída. La identificación de las etapas de cambio para la adopción de mamografías puede ayudar a desarrollar e implementar estrategias de intervención más efectivas. Además, la autoeficacia percibida y la motivación para la salud pueden aumentar la adherencia a la mamografía como método de detección del cáncer de mama.

Palabras Clave: Mamografía; Etapas de cambio; Modelo transteórico; Modelo de creencias de salud

Breast cancer (BC) represents 28% of all cancer cases in Latin America and the Caribbean countries and 8.1% of deaths (International Agency for Research on Cancer [IARC]., 2021). BC is the main cause of death by cancer in women aged 30 to 59 years in Mexico (Instituto Nacional de Estadística y Geografía [INEGI]., 2018). The incidence of breast cancer is comparatively higher in Mexican states with a higher per-capita income, and the number of cases of this disease are expected to increase (Aggarwal et al., 2015).

The use of screening methods for early detection of BC, such as mammography screening, can improve cancer survival (Mandelblatt et al., 2016; Myers et al., 2015). The mammography is a radiographic imaging examination capable of detecting breast lesions smaller than 0.5 cm and it is recommended to be performed annually by women aged ≥40 (American Cancer Society, 2017). Likewise, federal regulations in Mexico recommend performing biannual mammography in women aged 40 to 69 years (Secretaría de Salud, 2011).

The Mexican government offers free mammography services (Secretaría de Salud, 2015). However, less than 15% of new cases of BC are detected in stages 0 and I, while 40 to 60% are in late stages of the disease (Villarreal-Garza et al., 2017). In addition, in 2016 only 25% of the eligible population had a mammography examination (Secretaría de Salud, 2016). Some studies indicate that Mexican women are aware of the screening methods for BC but rarely practice them (Jacobo-Galindo et al., 2014; López-Carrillo et al., 2014; Tenahua-Quitl et al., 2015).

Therefore, research has studied several factors associated with an appropriate practice of mammography screening, mainly sociodemographic factors, knowledge of BC and its screening methods and beliefs related to BC and the mammography (Aggarwal, 2015; Agudelo Botero, 2013). Some studies on beliefs suggest that these factors can determine if a person will perform the screening behavior or not (Doumit et al., 2017).

For instance, different psychosocial models have been helpful in explaining the process in which a health behavior is adopted by a person. In particular, the Health Belief Model (HBM) and the Transtheorical Model (TTM) have been used in different health

behaviors, including mammography screening (Ogden, 2004).

The HBM explains that health behaviors are mediated by individual beliefs. These beliefs are categorized in different dimensions: perceived susceptibility, the perceived risk of contracting a disease; and perceived severity, beliefs on the clinical and social limitations caused by a disease; perceived benefits, beliefs about the effectiveness and availability of alternative options to reduce the threat of disease; perceived barriers, perceived obstacles to perform a behavior. Self-efficacy is the perception of self-trust in the ability to perform a behavior; and health motivation is the level of individual motivation and knowledge about health (Janz & Becker, 1984; Ogden, 2004).

The TTM postulates that behavior changes are gradual. The five stages of change are: precontemplation, characterized by the lack of intention or motivation to change; contemplation, which is characterized by an intention to make changes but it is outweighed by factors that prevent change; action, when an individual has made significant changes; maintenance, in which an individual attempts to maintain the performed changes; and relapse, when there have been previous attempts with negative results and there is no motivation to try again (Ortiz P. & Ortiz P., 2007; Prochaska & Velicer, 1997).

Studies in other countries such as the US found that perceived barriers are negatively associated to the mammography screening (Murphy et al., 2014). In Iran and Lebanon, it was found that women with higher self-efficacy and perceived benefits have higher possibilities to undergo a mammography (Doumit et al., 2017; Hajian-Tilaki & Auladi, 2014). Women in precontemplation and contemplation stages reported higher perceived barriers while women in maintenance and action stages reported higher perceived benefits and perceived susceptibility (Sharifirad et al., 2012; Shirzadi et al., 2017).

To the best of our knowledge, only one study conducted in Mexico evaluated cognitive factors related to the use of mammography and found that the decisional balance (costs and benefits) and self-efficacy were related to the stages of adoption of mammography (Salinas-Martínez et al., 2018). However, this study did not evaluate other HBM dimensions related to this health behavior. For this reason, it is necessary to examine the relation between all the HBM and TTM variables in the mammography screening practice.

The specific objectives of this study are a) to describe the distribution of women aged 40 years and older at different stages of change for mammography adoption, b) identify associations between sociodemographic, clinical variables and the stages of change, and c) determine differences between the scores of HBM dimensions and the stages of change.

Methods

We conducted a cross-sectional study with a non-probabilistic sample in a public health care facility in Northeast Mexico. The data collection took place from 2017 to 2018. The study was approved by the Hospital's Research Bioethics Committee [HMBSSSNL-2016/748].

Participants

We recruited women who were 40 ≥ years old, as the Mexican guidelines for mammography screening recommend the examination to women aged 40 to 69 (Secretaría de Salud, 2011). The exclusion criteria were current or previous diagnosis of breast cancer and current pregnancy or current breastfeeding and cognitive disability. All the participants gave their informed consent to the study.

Measurement

The questionnaire included a sociodemographic section that inquired about age, marital status, years of education, place of residence, income, and work. Also, the section had questions about the ability to perform breast self-examination, history of clinical breast examination and history of mammography screening.

Stages of change. We used an adaptation of statements for mammography adoption (Rakowski et al., 1996). The participants selected the statement that best reflected their experience with mammography screening. We chose the period of 2 years for mammography screening as the Mexican regulations indicate a biannually use of the method (Secretaría de Salud, 2011).

1. Precontemplation: "I have never had a mammogram, and I do not intend to have one."
2. Contemplation: "I have never had a mammogram, but I plan to have one next year."
3. Action: "I recently had my first mammogram, and I intend to have one at least every two years."
4. Maintenance: "I have mammograms routinely (at least every two years)."
5. Relapse: "I have had some mammograms, but I do not do it routinely (at least every two years)."

Health Belief Model Scale for Breast Cancer Screening. Mexican adaptation of the Champion's health belief model scale measures HBM variables related to adherence to mammography screening. This scale showed construct validity through the exploratory factor analysis that confirmed the 6-factor structure of the original scale. Criterion validity was also obtained in relation to the perceived benefits dimension and the performance of mammography. The current scale has 41 items divided into six subscales: susceptibility (six items, $\alpha = 0.79$), severity (ten items, $\alpha = 0.80$), benefits (nine items, $\alpha = 0.94$), barriers (five items, $\alpha = 0.68$) perceived self-efficacy (seven items, $\alpha = .81$), and health motivation (four items, $\alpha = 0.68$). The questionnaire had multiple choices (4 = "Yes," 3 = "Probably yes," 2 = "Probably no," and 1 = "No") (Juárez-García et al., 2021).

Data collection

The sample was obtained in a public tertiary health care facility in the Northeast of Mexico. Research volunteers approached patients' companions, inviting them to participate in the study. If the participant accepted, the volunteers asked several questions to check whether the person met the inclusion criteria. Subsequently, the participant received detailed information of the purpose of the study, their rights, the structure of the instrument, and was asked to sign the informed consent form. Then, each participant provided general sociodemographic data and completed the health belief questionnaire.

Data analysis

The data analysis was performed in the SPSS 22 software. Descriptive analysis was performed for sociodemographic and clinical variables and the scores of HBM dimensions. The association between sociodemographic and clinical variables and the mammography stages of change was assessed using chi-square test of independence, and the groups of stages of change were compared using one-way ANOVA and Games-Howell post-hoc tests. Partial eta squared was used as effect size. The values indicate the following: 0.01 is small effect, 0.06 indicates a medium effect, and greater than 0.14 is already a large effect.

Results

Descriptive analysis

Eight hundred five women who were contacted, 57 refused to participate, and 691 met the inclusion criteria; of these, 79 did not complete the questionnaire. A total of 103 participants were excluded for the following reasons: age<40 (n=52), history of breast cancer (n=3), cognitive disability (n=1), residence in another country (n=1). A total of 612 (76% response rate) women completed the questionnaire, and their data were included in the analysis. The sample characteristics, the stages of adoption and HBM dimensions are shown in Table 1.

Table 1
Sample characteristics and distributions of TTM and HBM

Characteristics	F (%)
Age	
40-49	335(54.7)
50-59	200(32.7)
≥60	77(12.6)
Marital Status	
Married	363(59.3)
Consensual union	74(12.1)
Divorcee	111(12.8)
Widow	31(5.1)
Employment status	
Working	218(35.6)
Not Working	394(64.4)
Stage adoption MMG	
Precontemplation	26(4.2)
Contemplation	139(22.7)
Action	74(12.1)
Maintenance	196(32.0)
Relapse	177(28.9)
	M (SD)
Age	49.96(7.24)
Scholarship	8.76(3.27)
Montly income	6083.06 (4443.56)
HBMD	
Susceptibility	10.55(4.19)
Seriouness	26.34(6.95)
Benefits	34.57(3.83)
Barriers	19.16(2.28)
Self-Efficacy	27.37(1.79)
Health Motivation	13.43(2.79)

Note: MMG: Mammography HBMD: Health Belief Model Dimensions

Association between sociodemographic factors and the stages of change

Of the evaluated sociodemographic factors, there was a significant association between the stages of change and age, especially among women aged 40 to 49 years in the action stage and women aged 50 to 59 years in the maintenance stage. There was a significant association between self-examination, clinical breast examination and the stages of change, and the women who underwent screening were in advanced stages of change (maintenance and relapse) (Table 2).

Differences in the scores of HBM variables between the stages of change

There were significant differences in scores for susceptibility $F(4, 607)=3.20$, $p<.01$, benefits $F(4, 607)=38.48$, $p<.001$, barriers $F(4, 607)=34.04$, $p<.001$, self-efficacy $F(4, 607)=31.60$, $p<.001$, and health motivation $F(4, 607)= 2.46$, $p<.05$ between the stages of change. The post-hoc analysis points out that statistically significant differences are found between women in the precontemplation stage who had lower scores for susceptibility, benefits, and barriers compared to the other stages. There were significant differences in scores for perceived self-efficacy between the women in the precontemplation stage and women in the maintenance and relapse stages. Moreover, there were significant differences in scores for health motivation between the contemplation and maintenance stages (Table 3).

Discussion

In this research, the objectives were to describe the distribution of women in different stages of change of mammography screening, identify associations between sociodemographic variables and the stages of change, and determine the relationship between sociodemographic variables and HBM variables. Therefore, identifying cognitive factors, such as beliefs, associated with the mammography screening may enhance its practice.

Most women aged 40 years and older were in the maintenance stage (32%) and relapse stage (28%). These results are similar to another study conducted in Mexico in which most of the participants were in the same stages (Salinas-Martínez et al., 2018). Moreover, it has been shown that the percentage of Asian women living in the United States who were in the maintenance stage (48%) was higher than that of women in the other stages (Wu et al., 2009).

Table 2
Association between sociodemographic variables and the stages of adoption

Characteristic	P F (%) n=26	C F (%) n=139	A F (%) n=74	M F (%) n= 196	R F (%) n=177	Chi-square, p value
Age						
40-49 50-59 ≥60	13 (50.0) 8 (30.8) 5 (19.2)	110(79.1) 24(17.3) 5(3.6)	60(81.1) 10(13.5) 4(5.4)	74(37.8) 87(44.4) 35(17.8)	78(44.1) 71(40.1) 28(15.8)	X^2 = 86.95, df = 8, p =.000
Employment						
Yes No	10 (38.5) 16 (61.5)	52(37.4) 87(62.6)	25(33.8) 49(66.2)	70(35.7) 126(64.3)	61(34.5) 116(65.5)	X^2 = 499, df = 4, p =.974
Marital status						
With partner Without partner	18 (69.2) 8 (30.8)	100(71.9) 39(28.1)	54(73.0) 20(27.0)	145(74.0) 51(26.0)	120(67.8) 57(32.2)	X^2 = 1.93, df = 4, p =.748
Education (years)						
0-6 7-9 10-13 >14	-- 9 (36.0) 12 (48.0) 3 (12.0) 1 (4.0)	37(26.6) 66(47.5) 21(15.1) 15(10.8)	22(29.7) 36(48.6) 13(17.6) 3(4.1)	73(37.6) 72(37.1) 28(14.4) 21(17.0)	60(34.5) 72(41.4) 29(16.7) 13(7.5)	X^2 = 11.5, df = 12, p =.482
BSE						
Yes No	17 (65.4) 9 (34.6)	88(63.3) 51(36.7)	52(70.3) 22(29.7)	166(84.7) 30(15.3)	125(70.6) 52(29.4)	X^2 = 21.8, df =4, p =.000**
CBE						
Yes No	8 (30.8) 18 (69.2)	55(39.6) 84(36.9)	66(89.2) 8(10.8)	176(90.3) 19(9.7)	144(81.4) 33(18.6)	X^2 = 149.5, df =4, p =.000
HBC family						
Yes No	1(3.8) 25(96.2)	19(13.7) 120(86.3)	12(16.2) 62(83.8)	38(19.4) 158(80.6)	32(18.1) 145(81.9)	X^2 = 5.2, df =4, p =.259

Note: P – Precontemplation; C – Contemplation; A – Action; M – Maintenance; R- Relapse. BSE: Breast Self-Examination CBE: Clinical Breast Examination HBC: History of breast cancer.

Table 3
Differences of health believes by stage of mammography adoption

Beliefs M(SD)	P[1] n=26	C[2] n=139	A[3] n=74	M[4] n= 196	R[5] n=177	Multiple comparisons	Partial eta squared
Susceptibility	8.2(2.9)	10.0(3.8)	10.4(4.3)	11.4(4.3)	10.5(4.1)**	1 vs 2,3,4,5*	.021
Seriousness	21.3(9.1)	26.5(6.8)	26.2(6.7)	26.4(6.6)	26.7(6.8)	1 vs 2,4,5	.023
Benefits	26.5(8.9)	34.5(2.7)	35.0(3.0)	35.3(2.5)	34.7(3.4)**	1 vs2,3,4,5*	.203
Barriers	14.6(5.3)	19.1(1.7)	19.3(1.8)	19.6(1.5)	19.2(2.1)**	1 vs 2,3,4,5*	.183
Self efficacy	24.1(3.6)	27.3(1.5)	27.7(1.1)	27.8(.75)	27.1(2.0)**	1 vs 2,3,4,5* 2vs 4*; 4 vs5*	.174
Health Motivation	13.0(3.3)	13.0(3.0)	13.3(2.7)	13.9(2.3)	13.2(2.9)*	2vs 4*	.017

Note: P – Precontemplation; C – Contemplation; A – Action; M – Maintenance; R- Relapse. **p≤.001; *p≤.05

On the other hand, these results differ from those obtained in other countries like Iran, where most women (75%) were in the stages of precontemplation and contemplation (Taymoori & Berry, 2009). Similarly, most African American women were in the contemplation stage (Russell et al., 2007). Iranian women still present barriers regarding mammography as it causes pain, takes a long time and is embarrassing. Similar to what was observed in African American women who, in addition to having lower incomes, which makes access to mammography difficult, also perceived more barriers.

However, these results suggest an increase in the use of the screening method in the population, in contrast of the reported in previous studies in Mexico (Jacobo-Galindo et al., 2014; López-Carrillo et al., 2014; Tenahua-Quitl et al., 2015).

In the study, most women aged 40 to 49 years were in the contemplation stage and most women aged 50 to 59 and >60 years were in the maintenance stage. This result is similar to a study from Iran, where middle-aged women were more likely to be in the maintenance stage (Taymoori & Berry, 2009). In Mexico, mammography is recommended starting at age 40, so women in this age range begin with the intention of having it done.

In the 50-year-old population groups, the percentages in maintenance and relapse are very similar, so it would be important to inquire about possible factors related to not performing a mammography regularly. Such as considering themselves without risk factors or having had several mammograms without findings.

In our sample, we found significant differences between the HBM variables scores and the stages of change. The scores for susceptibility were lower in the precontemplation stage than in more advanced stages. This result differs with another study, whereby there were no significant differences in this domain between the stages of change (Salinas-Martínez et al., 2018). A study suggests that women who have low perceived susceptibility did not perceive the need to perform the health behavior (Taymoori & Berry, 2009). In this case, it is expected that women in precontemplation do not perceive themselves in risk and would not practice the mammography screening.

As reported in other studies, perceived severity did not vary significantly between the stages of change (Moodi et al., 2012; Salinas-Martínez et al., 2018; Shirzadi et al., 2017). A study found that this variable had little variability because cancer was perceived as a serious disease by most women, even if they practice or not the behavior (Medina-Shepherd & Kleier, 2010).

Our results corroborate the finding. Women in the precontemplation stage perceive fewer benefits in the use of mammography than women in more advanced stages. However, there were no significant differences in this variable between other stages (Taymoori et al., 2014; Wu et al., 2009). It is expected that women in precontemplation stage perceive less benefits and would not have a mammography.

The barriers mean score was lower in precontemplation than in the rest of the stages. This finding is similar to some studies, whereby women in the precontemplation stage perceived fewer barriers than women in more advanced stages (Russell et al., 2007; Salinas-Martínez et al., 2018; Shirzadi et al., 2017). This result suggests that women in the contemplation stage are aware of certain limitations in performing a mammography. We consider it is important to continue exploring the relation between contemplation stage and specific perceived barriers as it may predispose women into not carrying out the mammography and avoid going to the action stage. A study in Mexico shows that perceived benefits predict the practice of mammography (Juárez-García et al. 2021). Both data should be considered in the design of intervention for breast screening promotion.

The scores for perceived self-efficacy were different between the precontemplation stage and the other stages of change, specifically between the stages of contemplation and maintenance, and between the stages of maintenance and relapse. This finding corroborates other studies findings (Moodi et al., 2012; Salinas-Martínez et al., 2018) and evidences how self-efficacy varies among women who adhere to mammography screening and those who do not. This suggests that women in maintenance stage consider themselves capable of undergoing the mammography continuously. It could also be suggested that

self-efficacy is an important factor to change from the contemplation stage to action and maintenance stages. The questions related to self-efficacy to get a mammogram show whether the person feels confident to go through the steps to get a mammogram. Therefore, it is important to consider, when promoting mammography, to inform about the procedure to perform it, i.e., where to go, who to contact, so that women feel confident that they will be able to get the mammogram.

We found significant differences in health motivation scores between the stages of contemplation and maintenance. Resembling another study that found that women in the maintenance stage had a higher health motivation than women in other stages (Moodi et al., 2012). This shows that people who are interested in their general health care may be more interested in performing a specific health care behavior such as mammography and continue to practice it. This also suggests that interventions to promote breast cancer screening methods may also include general health care information that can also contribute to the promotion of protective factors against breast cancer.

Also, we found that breast cancer screening behaviors such as breast self-examination (BSE) and clinical breast examination (CBE) were more common in women in the maintenance stage. This is relevant as in Mexico these screening methods are still recommended; the AEM from the age of 20 and the ECM from the age of 25. These findings suggest that women perform the 3 recommended screening methods to stay in good health. In addition, as mammography is recommended biannually, these other methods can help women to be attentive to changes in their breasts in case a symptom occurs and requires some examination before the established time.

This study has limitations. First, the collected data was self-reported by the participants and the performance of mammograms in their health card was not investigated. Second, the participants were from a regional hospital in Northeast Mexico, hence the results could not be generalized to other populations.

The relevance of the study is the finding of the different stages of mammography adoption and the beliefs related to them. The results can be useful for the development of educative interventions for breast cancer screening. Our results indicate that the number of women who undergo mammography has increased. Nonetheless, a considerable percentage (26.9%) of women remained in the stages of precontemplation and contemplation, i.e., did not undergo mammography. As well, women in maintenance stage report higher self-efficacy and health motivation. According to the health promotion perspective, an educational program that informs about breast cancer, its risk factors and screening methods can be useful for the population (Martínez-Montañez et al., 2009).Therefore, implementing an educational intervention must consider the information needs of women on those stages, empower them to feel confident in performing a mammography, and interested in staying in good health.

Some interventions using both models (HBM and TTM) have shown that participants move to more advanced stages of change and undergo the mammography examination regularly. A study found that women that were in contemplation stage moved to action, and maintenance stage after TTM intervention (Lee-Lin et al., 2016). Other study applied HBM intervention for cancer screening behaviors and reported an increase of perceived benefits and self-efficacy after the intervention (Ghaffari et al., 2019).

References

Aggarwal, A. (2015). The challenge of cancer in middle-income countries with an ageing population: Mexico as a case study. *Ecancermedicalscience*, *9*. 536. https://doi.org/10.3332/ecancer.2015.536

Agudelo Botero, M. (2013). Determinantes sociodemográficos del acceso a la detección del cáncer de mama en México: una revisión de las encuestas nacionales. *Salud Colectiva*, *9*(1), 79–90. https://doi.org/10.1590/S1851-82652013000100007

American Cancer Society. (2017). *Recommendations for the Early Detection of Breast Cancer.* USA.

Doumit, M., Fares, S., & Arevian, M. (2017). Knowledge, Practices, and Attitudes of Women Towards Breast Cancer in Lebanon. *The American Journal of Hematology/Oncology*, *13*(07), 21–27.

Ghaffari, M., Esfahani, S. N., Rakhshanderou, S., & Koukamari, P. H. (2019). Evaluation of Health Belief Model-Based Intervention on Breast Cancer Screening Behaviors among Health Volunteers. *Journal of Cancer Education*, *34*(5), 904–912. https://doi.org/10.1007/s13187-018-1394-9

Hajian-Tilaki, K., & Auladi, S. (2014). Health belief model and practice of breast self-examination and breast cancer screening in Iranian women. *Breast Cancer*, *21*(4), 429–434. https://doi.org/10.1007/s12282-012-0409-3

Instituto Nacional de Estadística y Geografía [INEGI]. (2018). *Estadísticas a propósito del día mundial contra el cáncer*. http://Www.Beta.Inegi.Org.Mx/Contenidos/Saladeprensa/Aproposito/2018/Cancer2018_Nal.Pdf.

International Agency for Research on Cancer [IARC]. (2021). *Latin America and the Caribbean*. https://Gco.Iarc.Fr/Today/Data/Factsheets/Populations/904-Latin-America-and-the-Caribbean-Fact-Sheets.Pdf.

Jacobo-Galindo, T., Villalobos-Arámbula, L., Gallegos-Torres, R., Xeque-Morales, A. S., Reyes-Rocha, B., & Palomé-Vega, G. (2014). Patrones de comportamiento para la detección de CA mamario en trabajadoras de una institución hospitalaria. *Enfermería Universitaria*, *11*(3), 101–109. https://doi.org/10.1016/S1665-7063(14)72673-9

Janz, N. K., & Becker, M. H. (1984). The Health Belief Model: A Decade Later. *Health Education Quarterly*, *11*(1), 1–47. https://doi.org/10.1177/109019818401100101

Juárez-García, D. M., Valenciano-Salas, I. A., de Jesús García-Solís, M., & Téllez, A. (2021). Development and Validation of a Mexican Version of the Champion's Health Belief Model Scale for Breast Cancer Screening. *Journal of Cancer Education*, *36*(1), 100–105. https://doi.org/10.1007/s13187-019-01603-5

Lee-Lin, F., Nguyen, T., Pedhiwala, N., Dieckmann, N. F., & Menon, U. (2016). A Longitudinal Examination of Stages of Change Model Applied to Mammography Screening. *Western Journal of Nursing Research*, *38*(4), 441–458. https://doi.org/10.1177/0193945915618398

López-Carrillo, L., Torres-Sánchez, L., Blanco-Muñoz, J., Hernández-Ramírez, R. U., & Knaul, F. M. (2014). Utilización correcta de las técnicas de detección de cáncer de mama en mujeres mexicanas. *Salud Pública de México*, *56*(5), 538. https://doi.org/10.21149/spm.v56i5.7711

Mandelblatt, J. S., Stout, N. K., Schechter, C. B., van den Broek, J. J., Miglioretti, D. L., Krapcho, M., Trentham-Dietz, A., Munoz, D., Lee, S. J., Berry, D. A., van Ravesteyn, N. T., Alagoz, O., Kerlikowske, K., Tosteson, A. N. A., Near, A. M., Hoeffken, A., Chang, Y., Heijnsdijk, E. A., Chisholm, G., … Cronin, K. A. (2016). Collaborative Modeling of the Benefits and Harms Associated with Different U.S. Breast Cancer Screening Strategies. *Annals of Internal Medicine*, *164*(4), 215. https://doi.org/10.7326/M15-1536

Martínez-Montañez, O., Uribe-Zúñiga, P., & Hernández-Ávila, M. (2009). Políticas públicas para la detección del cáncer de mama en México. *Salud Pública de México*, *51*(12), 350–360.

Medina-Shepherd, R., & Kleier, J. A. (2010). Spanish Translation and Adaptation of Victoria Champion's Health Belief Model Scales for Breast Cancer Screening-Mammography. *Cancer Nursing*, *33*(2), 93–101. https://doi.org/10.1097/NCC.0b013e3181c75d7b

Murphy, C. C., Vernon, S. W., Diamond, P. M., & Tiro, J. A. (2014). Competitive Testing of Health Behavior Theories: How Do Benefits, Barriers, Subjective Norm, and Intention Influence Mammography Behavior? *Annals of Behavioral Medicine*, *47*(1), 120–129. https://doi.org/10.1007/s12160-013-9528-0

Myers, E. R., Moorman, P., Gierisch, J. M., Havrilesky, L. J., Grimm, L. J., Ghate, S., Davidson, B., Mongtomery, R. C., Crowley, M. J., McCrory, D. C., Kendrick, A., & Sanders, G. D. (2015). Benefits and Harms of Breast Cancer Screening. *JAMA*, *314*(15), 1615. https://doi.org/10.1001/jama.2015.13183

Ogden, J. (2004). Health Beliefs. In *Health psychology: A textbook* (Third edition, pp. 13–45). McGraw Hill Education.

Ortiz P, M., & Ortiz P, E. (2007). Psicología de la salud: Una clave para comprender el fenómeno de la adherencia terapéutica. *Revista Médica de Chile*, *135*(5). https://doi.org/10.4067/S0034-98872007000500014

Prochaska, J. O., & Velicer, W. F. (1997). The Transtheoretical Model of Health Behavior Change. *American Journal of Health Promotion*, *12*(1), 38–48. https://doi.org/10.4278/0890-1171-12.1.38

Rakowski, W., Dube, C. A., & Goldstein, M. G. (1996). Considerations for extending the transtheoretical model of behavior change to screening mammography. *Health Education Research*, *11*(1), 77–96. https://doi.org/10.1093/her/11.1.77

Russell, K. M., Monahan, P., Wagle, A., & Champion, V. (2007). Differences in health and cultural beliefs by stage of mammography screening adoption in African American women. *Cancer*, *109*(S2), 386–395. https://doi.org/10.1002/cncr.22359

Salinas-Martínez, A. M., Castañeda-Vásquez, D. E., García-Morales, N. G., Oliva-Sosa, N. E., de-la-Garza-Salinas, L. H., Núñez-Rocha, G. M., & Ramírez-Aranda, J. M. (2018). Stages of Change for Mammography Among Mexican Women and a Decisional Balance Comparison Across Countries. *Journal of Cancer Education*, *33*(6), 1230–1238. https://doi.org/10.1007/s13187-017-1236-1

Secretaría de Salud. (2011). *Norma Oficial Mexicana NOM-041-SSA2-2011, Para la prevención, diagnóstico, tratamiento, control y vigilancia epidemiológica del cáncer de mama*. http://Www.Cenetec.Salud.Gob.Mx/Descargas/EquipoMedico/Normas/NOM_041_SSA2_2011.Pdf .

Secretaría de Salud. (2015). *Cáncer de mama. Mastografía*. https://Www.Gob.Mx/Salud/Acciones-y-Programas/Cancer-de-Mama-Mastografia.

Secretaría de Salud. (2016). *Cáncer de la Mujer*. https://Www.Gob.Mx/Cms/Uploads/Attachment/File/248801/CancerdelaMujer.Pdf.

Sharifirad, G., Rezaeian, M., Moodi, M., & Mostafavi, F. (2012). Mammography stage of adoption among Iranian women. *Journal of Education and Health Promotion*, *1*(1), 37. https://doi.org/10.4103/2277-9531.102050

Shirzadi, S., Nadrian, H., Asghari Jafarabadi, M., Allahverdipour, H., & Hassankhani, H. (2017). Determinants of mammography adoption among iranian women: What are the differences in the cognitive factors by the stages of test adoption? *Health Care for Women International*, *38*(9), 956–970. https://doi.org/10.1080/07399332.2017.1338705

Taymoori, P., & Berry, T. (2009). The Validity and Reliability of Champion's Health Belief Model Scale for Breast Cancer Screening Behaviors Among Iranian Women. *Cancer Nursing*, *32*(6), 465–472. https://doi.org/10.1097/NCC.0b013e3181aaf124

Tenahua-Quitl, I., Arrioja-Morales, G., Salazar-Peña, M. T., Sifuentes-Pasillas, P., Antonio-López, M., & de León-Gómez, A. (2015). Conocimiento, razones y mitos en estudiantes de enfermería sobre la autoexploración de mama. *Revista de Enfermería Del Instituto Mexicano Del Seguro Social*, *25*(2), 95–99.

Villarreal-Garza, C., Mohar, A., Bargallo-Rocha, J. E., Lasa-Gonsebatt, F., Reynoso-Noverón, N., Matus-Santos, J., Cabrera, P., Arce-Salinas, C., Lara-Medina, F., Alvarado-Miranda, A., Ramírez-Ugalde, M. T., & Soto-Perez-de-Celis, E. (2017). Molecular Subtypes and Prognosis in Young Mexican Women with Breast Cancer. *Clinical Breast Cancer*, *17*(3), e95–e102. https://doi.org/10.1016/j.clbc.2016.11.007

Wu, T.-Y., Hsieh, H. F., & West, B. T. (2009). Stages of mammography adoption in Asian American women. *Health Education Research*, *24*(5), 748–759. https://doi.org/10.1093/her/cyp009