A Psychoeducational Intervention for Breast Cancer Screening Methods and Healthy Lifestyles for University Students and Their Families

Intervención psicoeducativa sobre métodos de detección del cáncer de mama y estilos de vida saludables para estudiantes universitarias y sus familias

Intervenção psicoeducacional sobre métodos de detecção do câncer de mama e estilos de vida saudáveis para universitárias e suas famílias

Yasmin García Rosas, MSc[1]

Dehisy Marisol Juárez-García, PhD[1*]

Teresa de Jesús Sánchez Jauregui, PhD[1]

Arnoldo Téllez, PhD[1]

Received: September 11, 2024 • **Approved:** January 24, 2025

Doi: https://doi.org/10.12804/revistas.urosario.edu.co/revsalud/a.14800

To cite this article: García Rosas Y, Juárez-García DM, Sánchez Jauregui TdeJ, Téllez A. A psychoeducational intervention for breast cancer screening methods and healthy lifestyles for university students and their families Rev Cienc Salud. 2025;23(1):1-13. https://doi.org/10.12804/revistas.urosario.edu.co/revsalud/a.14800

Abstract

Introduction: In Mexico, cancer is a public health issue and the second leading cause of death among individuals aged 20 years. Three out of ten women with cancer suffer from breast cancer, and most are of reproductive age at the time of diagnosis, affecting the socioeconomic well-being of families. *Objective*: This

1 Psychology School, Autonomous University of Nuevo Leon – Mexico.

Yasmin García Rosas, ORCID: https://orcid.org/0000-0003-1229-8652
Dehisy Marisol Juárez-García, ORCID: https://orcid.org/0000-0002-5166-4611
Teresa de Jesús Sánchez Jauregui, ORCID: https://orcid.org/0000-0002-4159-2562
Arnoldo Téllez, ORCID: https://orcid.org/0000-0002-2338-3062

* Corresponding Author: dehisy.juarezgrc@uanl.edu.mx

study evaluated the effects of a psychoeducational intervention on beliefs about breast cancer screening methods and healthy lifestyles among university women and their families. *Materials and methods*: A pretest-posttest design was used, with 42 university students participating in a three-session psychoeducational intervention on breast cancer detection methods and healthy lifestyle practices. These students, in turn, shared the information with their relatives (n = 28). *Results*: Significant differences were found in the university students' group in perceived seriousness (z = −1.95, p = .047, d = .48), perceived self-efficacy (z = −3.62, p = .001, d = 2.5), and physical activity (z = −3.18, p = .001, d = 1.8). Among their relatives, significant differences were also observed in the posttest in susceptibility (z = −2.31, p = .021, d = .82), perceived seriousness (z = −2.30, p = .021, d = .98), perceived self−efficacy (z = −2.37, p = .0118, d = 1.51), and health motivation (z = −2.30, p = .021, d = 1.10). *Conclusion*: Psychoeducational interventions can improve beliefs about cancer and its screening methods in college students and their families. Therefore, such interventions can serve as a strategy to promote breast cancer screening methods and a healthy lifestyle.

Keywords: psychoeducational intervention; health belief model; breast cancer screening; healthy lifestyle.

Resumen

Introducción: En México, el cáncer representa la segunda causa de muerte entre las personas de 20 años de edad. Tres de cada diez mujeres con cáncer padecen cáncer de mama y la mayoría de las mujeres están en edad reproductiva en el momento del diagnóstico, lo que afecta el bienestar socioeconómico de las familias. *Objetivo*: evaluar los efectos de una intervención psicoeducativa sobre las creencias del cáncer de mama y sus métodos de detección y estilo de vida saludable en mujeres universitarias y sus familias. *Materiales y métodos:* se utilizó un diseño pretest-postest, en el cual participaron 42 estudiantes universitarias, quienes recibieron una intervención psicoeducativa de 3 sesiones sobre métodos de detección de cáncer de mama y estilo saludable y quienes a su vez compartieron la información con sus familiares (n = 28). *Resultados*: Se encontraron diferencias significativas en el grupo de universitarias en seriedad percibida (z = −1.95, p = 0.047, d = 0.48), autoeficacia percibida (z = −3.62, p = 0.001, d = 2.5) y actividad física (z = −3.18, p = 0.001, d = 1.8). En las familiares también hubo diferencias significativas en el postest en susceptibilidad percibida (z = −2.31, p = 0.021, d = 0.82), seriedad percibida (z = −2.30, p = 0.021, d = 0.98), autoeficacia percibida (z = −2.37, p = 0.018, d = 1.51) y motivación por la salud (z = −2.30, p = 0.021, d = 1.10). *Conclusión*: la intervención psicoeducativa puede mejorar las creencias sobre el cáncer y sus métodos de detección en estudiantes universitarias y sus familiares, por lo que puede ser utilizada como estrategia para ampliar la promoción de métodos de detección de cáncer de mama y estilo de vida saludable.

Palabras clave: intervención psicoeducativa; modelo de creencias sobre la salud; métodos de detección del cáncer de mama; estilo de vida saludable.

Resumo

Introdução: No México, o câncer é um problema de saúde pública que representa a segunda principal causa de morte entre pessoas com 20 anos de idade. Três em cada dez mulheres com câncer têm câncer de mama, e a maioria delas está em idade reprodutiva no momento do diagnóstico, o que afeta o bem-estar socioeconômico das famílias. *Objetivo*: avaliar os efeitos de uma intervenção psicoeducacional nas crenças sobre o câncer de mama, métodos de detecção e estilos de vida saudáveis em mulheres universitárias e suas famílias. *Materiais e métodos*: foi utilizado um projeto pré-teste-pós-teste, do qual participaram 42 universitárias, que receberam intervenção psicoeducacional de três sessões sobre métodos de detecção do câncer de mama e estilo de vida saudável e que, por sua vez, compartilharam as informações com suas famílias (n = 28). *Resultados*: foram encontradas diferenças significativas no grupo de universitárias na percepção de seriedade (z = −1,95; p = 0,047; d = 0,48), percepção de autoeficácia (z = −3,62; p = 0,001; d = 2,5) e atividade física (z = −3,18; p = 0,001; d = 1,8). Nos membros da família, também houve diferenças significativas no pós−teste em suscetibilidade percebida (z = −2,31; p = 0,021; d = 0,82), seriedade

percebida (z = −2,30; p = 0,021; d = 0,98), autoeficácia percebida (z = −2,37; p = 0,018; d = 1,51) e motivação para a saúde (z = −2,30; p = 0,021; d = 1,10). *Conclusão*: a intervenção psicoeducacional pode melhorar as crenças sobre o câncer e seus métodos de detecção em universitárias e suas famílias, de modo que pode ser usada como estratégia para expandir a promoção de métodos de detecção do câncer de mama e de um estilo de vida saudável.

Palavras-chave: intervenção psicoeducacional; modelo de crença na saúde; métodos de detecção do câncer de mama; estilo de vida saudável.

Introduction

Breast cancer is the leading cause of mortality in women. Most breast cancer cases and deaths occur in low-and middle-income countries (1).

In Mexico, cancer is a public health problem that represents the second leading cause of death. Furthermore, women are more likely to suffer and die from cancer than men. Among those aged 20 years, three out of ten women with cancer suffer from breast cancer, and most women are of reproductive age at the time of diagnosis, which affects the socioeconomic well-being of families (2,3).

Although developed countries only recommend mammography as a breast cancer detection method (4), in Mexico, breast self-examination (BSE), clinical examination (CBE), and mammography (MMG) are considered early diagnostic detection methods (5). This is consistent with the WHO recommendations on the use of education to raise awareness of the signs and symptoms of breast cancer for early care-seeking in countries with low mammography coverage (1).

The correct utilization of breast cancer screening methods such as breast self-examination, clinical breast examination, and mammography is low; only 11 and 5.4% of women have undertaken BSE and CBE correctly. Likewise, only 7.6% of women between the ages of 40 and 49 years and 31.6% of women over 50 had a mammogram (6). Another study of women between 20 and 35 years from a family medicine unit found that 27.0% had a good knowledge of BSE, 6.8% had a basic understanding of BSE, and 78.4% displayed a poor BSE technique (7).

This shows the need to address this problem, for which there are proposals such as the National Cancer Control Plan, which proposes the development of feasible primary and secondary prevention programs (8).

Health promotion is a process that allows individuals to control the factors that determine their health with a view to increasing it. Activities related to health promotion include creating environments, reinforcing community action, and developing personal skills (9).

Studies conducted in the general population show that cognitive factors such as health beliefs affect the practice of detection methods such as BSE and MMG. The health belief model includes different constructs that predict why individuals act to prevent, detect, or control

diseases. Such constructs include perceived susceptibility, perceived seriousness, perceived benefits, barriers to performing the behavior, cues to action, and self-efficacy (10). Precisely, variables from the health belief model, such as barriers to performing healthy behavior and perceived self-efficacy, predict the practice of BSE in university students (11). For women over 40 years of age, it was found that the perceived benefits of MMG predict its usage (12). Therefore, it is essential to implement interventions that consider these psychological factors in the promotion of breast cancer detection methods.

Although cancer is a multifactorial disease that includes biological, genetic, and behavioral factors, a sedentary lifestyle and unhealthy eating are risk factors that can be modified through educational interventions (13). A healthy lifestyle, such as eating healthy foods, being physically active, and maintaining a healthy weight, can reduce the risk of some types of cancer. Therefore, it is essential to consider this when promoting breast cancer screening methods (14).

Psychoeducational interventions have shown effectiveness in increasing women's knowledge, beliefs, and practices related to breast cancer. Studies have found that educational interventions produced significant differences in ratings of susceptibility, severity, benefits, barriers, and perceived self-efficacy in MMG compared to a control group, and changes in skill mastery and lump detection (15-17).

In addition to the health belief model, interventions that consider population models seek to change behavior at a mass level in different settings with health promotion programs in schools, work, health care organizations, and communities; from an ecological perspective, this approach addresses individual, group, and environmental problems, which can help in developing more effective interventions to change behavior (18,19).

The objective of this study was to evaluate the effects of a psychoeducational intervention on breast cancer screening methods, beliefs, and healthy lifestyles in female university students in Mexico and their families.

Material and methods

Participants

A pretest–posttest design was used, in which university students who met the following criteria participated: they were aged 20 years or older, agreed to participate in the research, and signed the informed consent form to share the information with their mothers or female relatives over 20 years of age. The exclusion criteria were a history or current diagnosis of breast cancer.

Measures

A schedule of sociodemographic and clinical data integrates information such as age, gender, schooling, occupation, and history of practicing detection methods.

Health Belief Model Scale for BSE. For relatives aged 20 years or older, the Spanish adaptation of Juárez et al. (20) was used. It has 43 items that evaluate the six dimensions of the health belief model about breast cancer and BSE: susceptibility, seriousness, benefits, perceived barriers, motivation for health, and self-efficacy. The answer options are presented on a 4-point Likert scale (1 = yes, 2 = it seems that yes, 3 = it seems that no, 4 = no). Cronbach's alpha obtained in this version was .65 to .84.

The transtheoretical model of behavior change. For women over 40 years, the stage of change for MMG adoption was identified through a series of statements that represent the stages of change from the transtheoretical model of behavior change concerning the use of MMG (21). Women select the statement that most reflects their experience with MMG:

1. Precontemplation: I have never had a mammogram and do not intend to have one.
2. Contemplation: I've never had a mammogram, but I plan to have one next year.
3. Action: I recently had my first mammogram and intend to have one at least every 2 years.
4. Maintenance: I have had mammograms for several years routinely, at least every two years.
5. Relapse: I've had some mammograms, but I don't do it routinely, that is, at least every 2 years.

Health Belief Model Scale for Breast Cancer Screening. The Mexican adaptation was used for women 40 years and older (12). It has 41 items divided into six subscales that evaluate the six dimensions of the health belief model about breast cancer and MMG: susceptibility (6 items, $\alpha = .79$), seriousness (10 items $\alpha = .80$), benefits (9 items $\alpha = .94$), barriers (5 items $\alpha = .68$), perceived self-efficacy (7 items $\alpha = .81$), and motivation for health (4 items $\alpha = .68$). The answers are presented on a multiple-choice scale ranging from 1 = disagree, 2 = somewhat disagree, 3 = somewhat agree, 4 = agree.

Healthy Lifestyle Profile Scale (all participants). Two of the subscales of this questionnaire were used: (i) Nutrition, which has nine items concerning the selection and consumption of foods essential for sustenance, health, and well-being. (ii) Physical Activity, which has eight items concerning regular participation in light, moderate, and/or vigorous activities, either within a planned and monitored program for the sake of health or incidentally as part of daily life or leisure activities. For both subscales, each item presents four possible response options organized with a Likert scale that assesses the frequency (never, occasionally, frequently, routinely) with which behaviors related to a healthy lifestyle are performed. The

instrument has been validated in the Hispanic population and has a Cronbach's alpha range for its dimensions from .69 to .82 (22).

Procedure

University students were recruited via advertising posters on campus. A computer session was held where they were provided with information about the nature of the study. Once the inclusion criteria were met, signed informed consent was obtained, the health beliefs questionnaire for BSE was administered, and the questionnaire was provided for their relatives to whom they would share the information. Depending on their age, they were provided with the scale of the health belief model for BSE or for MMG.

The intervention was based on the model of health beliefs. It consisted of three psychoeducational sessions about breast cancer detection methods, risk factors, BSE modeling and practice, and information on places to perform breast cancer screening and mammograms. Session 2 addressed healthy lifestyle information such as healthy eating, types of food, label reading, and alcohol consumption. Session 3 provided information on physical activity and the types and benefits of exercise. The sessions were held every 15 days so that the students had enough time to share the information with their families and had an approximate duration of 90 minutes. The students shared the same material seen in the presentation, for which they were provided with a manual that presented the key elements to share.

Data analysis

The data were analyzed using SPSS 22. The comparative analysis between the groups was conducted, first between the students before and after the intervention, and a comparative analysis of their relatives before and after the intervention provided by the students, for which Wilcoxon's test was used in both cases. The effect size was obtained to determine the impact of the intervention; the *d* de Cohen values indicated the following: $d = .30$ is considered a low effect, $d = .50$ a medium-sized effect, and $d = .80$ a large effect.

Results

Descriptive data

Forty-two university students participated, of whom 18 completed the intervention. The participants had a mean age of 21.5 (SD = 1.1). Most were single, students only, studying in the areas of nutrition and dentistry from the seventh to ninth semesters. Most had no history of breast

cancer in their family or in any other social circle. Most did not know how to perform BSE, nor had they done this in the previous month (Table 1).

Table 1. Characteristics of participant

Variable	Students (n = 18)	Relatives 20 years (n = 11)	Relatives 40 years (n = 15)
Age M (SD)	21.5 (1.1)	25.1 (5.9)	53.2 (7.9)
Years of education	14.5 (1.4)	15.5 (2.2)	11 (2.3)
Marital Status F (%)			
Single	18 (100)	7 (77.8)	1 (6.7)
Married/Consensual		1 (11.1)	11 (73.4)
union		1 (11.1)	2 (13.3)
Divorced/Separated		0	1 (6.7)
Widow			
Employed			
Yes	4 (22.2)	5 (41.7)	8 (61.5)
History of breast cancer in the family			
Yes	5 (27.8)	3 (33.3)	4 (26.7)
History of breast cancer in another social circle			
Yes	6 (33.6)	1 (11.1)	7 (46.7)
Know about breast self-examination			
Yes	8 (44.4)	2 (22.2)	7 (46.7)
Practice breast self-examination			
Yes	6 (33.3)	2 (22.2)	7 (46.7)
Practice breast self-examination last month			
Yes	0	2 (22.2)	3 (20)
Stage of change MMG			
Pre-contemplation			1 (6.7)
Contemplation			1 (6.7)
Maintenance			11 (73.3)
Relapse			2 (13.3)

M: mean; SD: standard deviation; MMG: mammography.

The relatives over 20 years of age to whom the information was shared consisted of 11 participants who completed the intervention, with a mean age of 24.7 (SD = 5.7); the majority were single, 41.7% working outside the home, with a mean of 15.5 (SD = 2.2) years of schooling. Most had no history of breast cancer in the family or social group, did not know how to perform BSE, and had not done so in the previous month.

Seventeen relatives over 40 years of age participated, and fifteen completed the intervention. They had a mean age of 53.2 (SD = 7.9), and 11 years of schooling. Most of them were married and working outside the home. Most had no history of breast cancer in their family

or in another social circle. Most did not know how BSE was performed and had not practiced it in the previous month. In the stages of change from the transtheoretical model, most were in maintenance.

Comparative analysis

In the group of students who received the psychoeducational intervention, significant differences were found in perceived seriousness ($z = -1.95$, $p = .047$, $d = .48$), perceived self-efficacy ($z = -3.62$, $p = .001$, $d = 2.5$), and physical activity ($z = -3.18$, $p = .001$, $d = 1.8$).

In the group of participants over 20 years of age who received the information from the students, significant and large effect size differences were found in susceptibility ($z = -2.31$, $p = .021$, $d = .82$), perceived self-efficacy ($z = -2.37$, $p = .018$, $d = 1.51$), and motivation for health ($z = -2.30$, $p = .021$, $d = 1.10$). The seriousness and benefits subscales were not significantly different but showed a medium effect size (Table 2).

Table 2. Pretest-posttest comparison analysis

M(SD)	Students (n = 18)		Relatives 20 years (n = 18)		Relatives 40 years (n = 15)	
	Pre	Post	Pre	Post	Pre	Post
Susceptibility	9.4 (2.7)	9.3 (2.4)	8.2 (3.0)	10.8 (3.3) **[a]	10.0 (4.5)	11.5 (2.8) [c]
Seriouness	17.1 (4.1)	15.3 (3.2) **[c]	19.5 (4.0)	15.9 (5.3)[b]	25.5 (4.0)	22.0 (3.0)**[a]
Benefits	29.8 (2.0)	30.5 (2.4)[c]	29.0 (3.8)	30.8 (1.3)[b]	35.2 (1.4)	34.1 (3.7)[c]
Barriers	11.7 (2.6)	10.5 (2.1)[b]	14.0 (5.1)	11.2 (3.4)[c]	7.6 (2.9)	6.3 (1.4)[b]
Self eficacy	24.7 (6.6)	38.1 (3.3) ***[a]	25.1 (9.7)	36.5 (4.3) *[a]	26.6 (1.6)	26.1 (1.9)[c]
Health motivation	12.5 (2.4)	12.9 (2.4)[c]	10.9 (2.1)	13.4 (2.4) **[a]	11.4 (4.0)	9.9 (3.6)[c]
Nutrition	22.3 (3.3)	24.3 (4.0)[b]	23.1 (3.9)	25.0 (4.2)[c]	22.7 (5.0)	24.7 (5.1)[c]
Physical activity	16.1 (5.0)	24.3 (4.0) ***[a]	14.6 (5.0)	16.5 (5.3)[c]	13.3 (5.4)	11.2 (2.4)[b]

* $p \leq .01$; ** $p \leq .05$; *** $p \leq .001$.
[a] $d \geq .80$; [b] $d \geq .50$; [c] $d \geq .30$.

In the group of participants over 40 years of age, significant differences were found only in the dimension of perceived seriousness ($z = -2.30$, $p = .021$, $d = .98$), with a medium effect size for perceived barriers.

Discussion

The objective of this study was to evaluate the effects of a psychoeducational intervention on female university students and their families in Mexico.

As for the effects on the students, the results are relevant because they increased perceived self-efficacy, which is a person's confidence that they can perform a behavior. Additionally, an increase in physical activity was observed, which has been associated with a lower risk of breast cancer. These results coincide with studies in other populations where perceived self-efficacy improves (23,24). Studies on variables other than self-efficacy find improvements in other dimensions of the health beliefs model, such as susceptibility, benefits, and perceived seriousness (25,26).

Regarding the effects of the intervention on students' healthy lifestyles, for the nutrition variable, the difference was not significant; however, a medium effect size was obtained. Some studies have found an improvement in knowledge, nutrition beliefs, and behaviors in different populations (27,28). In this study, an improvement was observed in the students' physical activity level, which is a similar finding to that of other psychoeducational interventions specifically aimed at increasing physical activity (29,30). This is important, as the American Cancer Society recommends that adolescents engage in at least 1 hour of moderate exercise or vigorous activity daily to prevent cancer (31).

Few studies have been conducted in which students share information with their relatives, while others specifically evaluate information sharing between mothers and daughters. These have obtained similar results in perceived self-efficacy for BSE and other variables such as knowledge and practice of BSE (32,33).

The family is the first social support network, and the support it can offer can be the main resource for promoting health and preventing disease (34,35). In this sense, some of the support functions within the family that can contribute to health promotion are the informative and appreciative functions. In the former, the family collects and shares lived experiences, and in the latter, the family acts as a guide, providing feedback for problem solving (36).

We observed that family members who are similar in age to the university students showed an improvement in all dimensions of the health belief model, most with a medium to large effect, and in the variables of healthy lifestyle with a small effect size. This could be related to the intensity of the relationship or the characteristics of the social networks that influence the reception of information. Some studies show that social networks with wide intensity and close proximity maintain a better affective exchange; nonetheless, less intense social networks can also promote better adaptation to new situations, facilitating greater social reach and the exchange of new information (37). Therefore, these characteristics of social networks should be considered in future studies.

Another aspect that could have influenced the effect of the intervention on family members over 40 years was the fact that the majority were in the maintenance stage of change, which means that they performed the MMG. This could indicate that they knew about cancer and MMG, and the importance of continuing to take care of themselves was only considered since the susceptibility, the barriers, and the perceived benefits obtained changes with a small effect size. It is also important to consider that the same instrument was not used; that is, for women over 40, a specific measure of beliefs about MMG was used, and although the intervention had information on the three detection methods, more time was dedicated to BSE. Therefore, measuring beliefs about BSE could have given different results.

Despite this, in this study, it was possible to confirm the effects of a psychoeducational intervention on beliefs about cancer and BSE, and it was observed that training the participants could extend these effects to their relatives. However, some limitations of this study should be considered. It is important to compare these effects with a control group, as well as to investigate the type of family relationship that the participants have and to monitor or verify the points covered by the participants with their relatives. It would also be advisable to evaluate and monitor the practice of detection methods.

Conclusion

This psychoeducational intervention can improve beliefs about cancer and its screening methods as well as promote healthy lifestyles in college students and their families.

Author's contribution

Yasmin García Rosas and Dehisy Marisol Juárez- García: Conception and design, acquisition of data and information and analysis and interpretation of the data; planning of the article or revision of important intellectual content and final approval of the version to be published.

Teresa de Jesús Sánchez Jauregui and Arnoldo Téllez: Planning of the article and final approval of the version to be published.

Conflict of interest

None.

References

1. World Health Organization. Breast cancer [Internet]. Switzerland; 2021 [update 2021 Feb 04, cited 2022 Jan 10]. Available from: https://www.who.int/news-room/fact-sheets/detail/breast-cancer
2. Herrera A, García F, Gil R, Jiménez X, Hernández A, Aboharp Z. Frecuencia de cáncer en un hospital de tercer nivel de la Ciudad de México: implicaciones para el desarrollo de métodos de detección oportuna. Cir Cir. 2014;82:28–37.
3. Instituto Nacional de Estadística e Informática. Estadística a propósito del día mundial contra el cáncer [Internet]. México; 2021 [update 2021 Feb 04, cited 2021 Sep 07]. Available from: https://www.inegi.org.mx/contenidos/saladeprensa/aproposito/2021/cancer2021_Nal.pdf
4. American Cancer Society. Recommendations for the early detection of breast cancer [Internet]. 2021 [update 2021 Feb 04, cited 2022 Jan 10]. Available from: https://www.cancer.org/es/cancer/cancer-de-seno/pruebas-de-deteccion-y-deteccion-temprana-del-cancer-de-seno/guias-de-la-sociedad-americana-contra-el-cancer-para-la-deteccion-temprana-del-cancer-de-seno.html
5. Secretaría de Salud. Norma Oficial Mexicana NOM-041-SSA2-2011 para la prevención, diagnóstico, tratamiento, control y vigilancia epidemiológica del cáncer de mama [Internet]. México; 2011 [update 2021 Feb 04, cited 2021 Sep 07]. Available from: http://dof.gob.mx/nota_detalle.php?codigo=5194157&fecha=09/06/2011
6. López L, Torres L, Blanco J, Hernández RU, Knaul FM. Utilización correcta de las técnicas de detección de cáncer de mama en mujeres mexicanas. Salud Púb Méx. 2014;56(5):538–46.
7. Delgado GE, López V, Urióstegui L, Barajas TJ. Conocimiento y perspectiva sobre la autoexploración de mamas y su realización periódica en mujeres. Rev Cuba Med Gen. Integral. 2016;32(3):1–10.
8. Reynoso N, Mohar A. El cáncer en México: propuestas para su control. Salud Púb Méx. 2014;56(5):S27–S32.
9. Organización Mundial de la Salud. Carta Ottawa. Promoción de la salud. Primera Conferencia Internacional sobre la Promoción de la Salud [Internet]. Ottawa; 1986 [update 1986 Nov 17, cited 2021 Sep 07]. Available from: https://www.paho.org/hq/dmdocuments/2013/Carta-de-ottawa-para-la-apromocion-de-la-salud-1986-SP.pdf
10. Skinner S, Tiro J, Champion V. Background on the health belief model. In: Health behavior: theory, research, and practice. 5th ed. San Francisco, CA: Jossey-Bass; 2015.

11. Juárez DM, Téllez A. The health belief model and prediction of breast self-examination practices in female Mexican college students. Psychol Russ. 2019;12(3):73–85. https://doi.org/10.11621/pir.2019.0306

12. Juárez D, Valenciano I, García M, Téllez A. Development and validation of a Mexican version of the Champion's Health Belief Model Scale for Breast Cancer Screening. J Cancer Educ. 2019;36:100–5. https://doi.org/10.1007/s13187-019-01603-5

13. Fernández Pérez MD, Regueira Betancourt SM, Torres Fernández M. Factores de riesgo modificables en algunos tipos de cáncer. Rev Electrón Zoilo. 2016;41(11).

14. Instituto Nacional del Cáncer. Obesidad [Internet]. [Update 2015 Apr 29, cited 2021 Oct 20]. Available from: https://www.cancer.gov/espanol/cancer/causas-prevencion/riesgo/obesidad

15. Gozum S, Karayurt O, Kav S, Platin N. Effectiveness of peer education for breast cancer screening and health beliefs in Eastern Turkey. Cancer Nurs. 2010;33(3):213–20.

16. Rezaeian M, Sharifirad G, Mostafavi F, Moodi M, Hadi Abbasi M. The effects of breast cancer educational intervention on knowledge and health beliefs of women 40 years and older, Isfahan, Iran. J Educ Health Promot. 2014;3(43):1–12. https://doi.org/10.4103/2277-9531.131929

17. Ahmed FA, Osman HA, Elmatti MA. The effectiveness of breast health promotion counseling on breast cancer screening behaviors among female patients. Life Sci J. 2014;11(8):835–45.

18. Fertman C, Allensworth D, Auld E. What are health promotion programs? In: Health promotion programs: from theory to practice. San Francisco, CA: Jossey-Bass; 2010. p. 4–24.

19. Sallis J, Owen K, Fisher E. Ecological models of health behavior. In: Health behavior and health education. 4th ed. San Francisco, CA: Jossey-Bass; 2008. p. 465–85.

20. Juárez-García DM, García-Solís M, Téllez A. Adaptation and validation of the health belief model scale for breast self-examination in Mexican women. Value Health Reg. Issues. 2020;23:30–36. https://doi.org/10.1016/j.vhri.2019.11.006

21. Rakowski W, Dube CA. Goldstein MG. Considerations for extending the transtheoretical model of behavior change to screening mammography. Health Educ Res. 1996;11(1):77–96.

22. Hulme PA, Walker SN, Effle KJ, Jorgensen L, McGowan MG, Nelson JD, Pratt EN. Health-promoting lifestyle behaviors of Spanish-speaking Hispanic adults. J Transcult Nurs. July 2003;14:244–254. https://doi.org/10.1177/1043659603014003011

23. Nural N, Hindistan S, Kobya H, Karadeniz, Yeşilçiçek K, Yigitbaş Ç, Kahriman İ. A different approach to breast self-examination education. Cancer Nurs. 2009;32(2):127–34.

24. Tuzcu A, Bahar Z, Gözüm S. Effects of interventions based on health behavior models on breast cancer screening behaviors of migrant women in Turkey. Cancer Nurs. 2016;39(2):E40–50. https://doi.org/10.1097/NCC.0000000000000268

25. Moodi M, Mood MB, Sharifirad GR, Shahnazi H, Sharifzadeh G. Evaluation of breast self-examination program using Health Belief Model in female students. J Res Med Sci. 2011;16(3):316.

26. Mahmoud MH, Sayed SH, Ibrahim HAF, Abd-Elhakam EM. Effect of health belief model-based educational intervention about breast cancer on nursing students' knowl-

edge, health beliefs and breast self-examination practice. Int J Nurs Stud. 2018;3(3):77. https://doi.org/10.20849/ijsn.v3i3.503

27. Masoudiyekta L, Rezaei-Bayatiyani H, Dashtbozorgi B, Gheibizadeh M, Malehi, AS, Moradi M. Effect of education based on health belief model on the behavior of breast cancer screening in women. Asia-Pac J Oncol Nurs. 2018;5(1):114–20. https://doi.org/10.4103/apjon.apjon_36_17

28. Khoramabadi M, Dolatian M, Hajian S, Zamanian M, Taheripanah R, Sheikhan Z, Mahmoodi Z, Seyedi-Moghadam A. Effects of education based on health belief model on dietary behaviors of Iranian pregnant women. Glob J Health Sci. 2015;8(2):230–9. https://doi.org/10.5539/gjhs.v8n2p230

29. Shojaei S, Farhadloo R, Aein A, Vahedian M. Effects of the Health Belief Model (HBM)-Based Educational Program on the Nutritional Knowledge and Behaviors of CABG Patients. J Tehran Univ Heart Cent. 2016;11(4):181–6.

30. Shao C, Wang J, Liu J, Tian F, Li H. Effect of a Health Belief Model-based education program on patients' belief, physical activity, and serum uric acid: a randomized controlled trial. Patient Prefer Adherence. 2018;12:1239–45. https://doi.org/10.2147/PPA.S166523

31. Virrareal Peña TE, Garza Elizondo T, Gutiérrez Herrera RF, Méndez Espinosa E, Ramírez Aranda JM. Intervención psicoeducativa en el tratamiento de la obesidad en un centro de salud de Nuevo León, México. Aten Fam. 2012;19(4):90–3. https://doi.org/10.22201/facmed.14058871p.2012.4.33713

32. Rock CL, Thomson C, Gansler T, Gapstur SM, McCullough ML, Patel AV et al. American Cancer Society guideline for diet and physical activity for cancer prevention. CA Cancer J Clin. 2020;70(4):245–71. https://doi.org/10.3322/caac.21591

33. Gürsoy A, Ylmaz F, Nural N, Kahriman İ, Yigitbaş Ç, Erdöl H et al. Different approach to breast self-examination education. Cancer Nurs. 2009;32(2):127–34.

34. Abasi E, Tahmasebi H, Zafari M, Tofigi M, Hasani S. The impact of female students' breast self-examination training on their mothers' awareness. J Midwifery Women's Health. 2018;6(4):1454–61. https://doi.org/10.22038/jmrh.2018.18718.1195

35. Louro-Bernal I. La familia en la determinación de la salud. Rev Cub Salud Publica. 2003;29(1):48–51.

36. Muñoz de Rodríguez L. El apoyo social y el cuidado de la salud humana. In: Pinto Afanador N, coordinadora. Cuidado y práctica en enfermería. Bogotá: Universidad Nacional de Colombia de Rodríguez; 2000. p. 99–105.

37. Heaney CA, Israel BA. Social networks and social support. In: Health behavior: theory, research, and practice. 5th ed. San Francisco, CA: Jossey-Bass; 2015. p. 335–60.