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Interventions based on multimedia technologies to promote breast self-examination.

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Abstract: *Objective: To systematize theresults that incorporate multimedia technologies, hence promoting the practice of breast self-examination among women.Methodology: A systematic review of published articles was performed, in which new technologies and communication tactics were added to support interventions, aimed to improving the practice of breast self-examination; as a strategy used for early detection of breast cancer. Articles published in several languages between 2005and 2015 were included covering up to 15 databases.Keywords, such as "Breast Self-Exam", "Multimedia", "Intervention Studies" and "Experimental Epidemiology", were used by the Medical Subject Headings (MESH). These terms were searched for in 3 languages (English, Spanish and Portuguese). We included researcheswith pre- experimental, experimental and quasi-experimental designs. Results: Four out of sixty one articles, which were submitted to the review, met the criteria for the final analysis.The most commonly used tools were videos and podcasts.Conclusion: Information, technology and communication have a positive impact on behavioral changes. They are more cost-effective, promote access of a bigger number of the population to educational services in health and are more useful as supplement educational activities, aimed at the early detection of breast cancer.*

Keywords: *Breast Self-Examination, Multimedia, Clinical Trial, Intervention Studies, Experimental Epidemiology.*
Source: (MESH)

I. Introduction

Health promotion is known as the process that allows people to have more control over health factors, to maintain or improve them[1],considering public policies, social and global actions, and individuals' commitments, that may be fostered whenspecial strategies are performed [2, 3].

Health promotion interventions are organized in several ways, and can be applied to different environments on a national, regional and even local level. Among the most commonpromotion strategies are: education by peers, communicative mass campaigns, social marketing, promoting healthy environments and health policies [4, 5,6].Furthermore, some of the most effective health intervention plans in therecent years are those based on multimedia technologies as a strategy for promoting public policies and educational programs, that seek the reduction of risk behaviors and adopting better health care practices [7, 8, 9].

The communication strategies are fundamental tools for education and health promotion, theyare formed and structured through behavioral interactions, which are mediated by perception of risks, benefits and barriers that every individual may have or encounter along the healthcare process [10]. The success of these interventions may also be largely increased when strengthening the health systems' core, especially the primary care services. Thus offering the citizens various programs and strategies, which are designed within the public policy's framework, therefore enhancing the health care cultureat all social levels [11, 12].

Currently, the major challenges of health promotion programs, originate in the media andmultimedia technologies, for example when promoting for breast cancer preventions and screenings. Breast cancer is the most common cancer in females, and because of its high frequency and mortality rate in the world, it is considered a major disease of public health interest. However, despite all the early detection strategy promotions, such as breast self-examination, medical examinations and mammography, millions of women die each year, mainly because of late diagnosis and treatment [13, 14, 15].

Leading countries, as well as few of the emerging ones, have developed and documented several new intervention strategies, which use information and communication technologies to familiarizepatients and encourage self-care. Among these we can mention some tactics that use technological means, aimed to improve self-care in kidney patients [16],diabetics [17, 18],patients with chronic cardiovascular diseases [19, 20, 21, 22] and mental healthproblems [23]. Nonetheless, there have been very few reported interventions, which promote and encourage the practice of breast self-examination, despite its simplicity, usefulness and low cost.These prevention plans are mainly focused on patients that already havecancer [26, 27],toprimarily reduce their anxiety [28, 29, 30, 31, 32]and not on healthy women, where health promotion plans should act in the first place.Other interventions reported by the articles mentioned before, follow traditional teaching methods and orientations, which although being very useful, should be modernized and brought to the 21st century media, to

have a more significant impact [33-42]. Given the dynamics of globalization and the new marketing trends, which are aimed for young people and adults, it is important to highlight the role of technology in generating greater impact on programs that seek public healthcarepromotion [43, 44]. For example, when we increase the awareness on early breast cancer detection, the breast self-exam techniques automatically increase and improve among female communities [45].

Knowing the importance of multimedia technologiesusage, and how it can improve informational processes in vulnerable and minority groups, as well as the saving advantages and high benefits that impact the use of technology to access poor populations; this study aims to systematize the results of researches that integrated multimedia technologies, which promote breast self-examination among women.

II. Materials and Methods

A systematic review of published articles was performed, in which new technologies and communication tactics were added to support interventions, aimed to improving the practice for early detection of breast cancer. Articles published in several languages between 2005and 2015, were included covering up to 15 databases in 3 languages (English, Spanish and Portuguese); *Dialnet, Ebsco, Masterfile, Science Direct, Scopus Academic Search Complete, Fuente Academica*, *Springer link, Science AAAS, Clinical Key, Embase and Enfermeria al Día.* Severalpublic data bases were consulted, such as Pubmed, Scielo and the Virtual Library of Health Sciences Department. Keywords were chosen according to the Medical Subject Headings (MeSH), such as "Breastself-examination", "Multimedia", "interventionstudies" and "experimental epidemiology". These words were used in the 3 languages with pre-experimental, experimental and quasi-experimental designs.

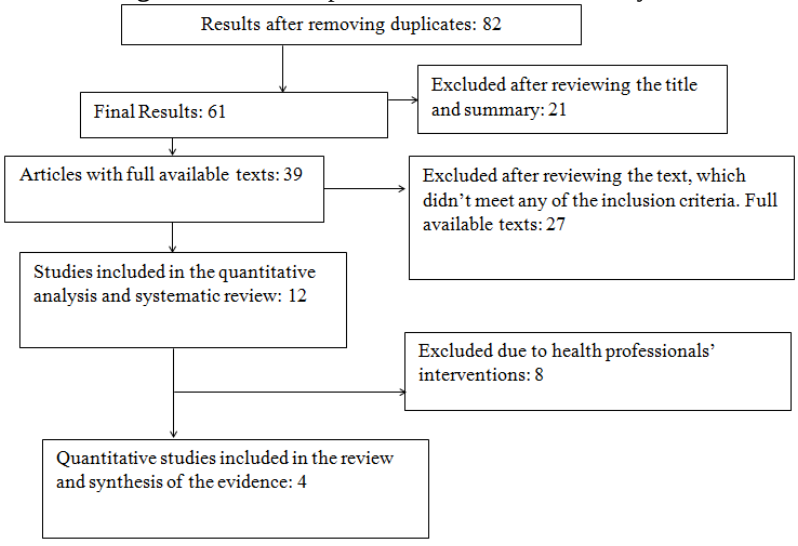
The standard criteria for articles were: 1) the study must provide information on an educational intervention, supported by multimedia technologies performed on women. 2) The participants must have been adult women without a previous diagnosis of breast anomalies. The exclusion criteria were:1) studies that evaluated only the breast screening practice by clinical examination or mammograms, 2) studies that focused on women with some professional training in the health area, or who were leading relevant researches.

III. Summary of Results and Quality Assessment

The results of this systematic review are presented as recommended by the prism method. The three authors led three groups, accompanied by two reviewers. Abstracts were divided equally and distributed to each group, where they were examined independently and inclusion and exclusion criteria were applied as described above. When reviewing the summaries, in case of doubt and confusion, items were included for the full text review for clarification. Afterwards, two researchers independently reviewed all full-text articles to confirm whether they met the inclusion criteria. Disagreements were resolved by consensus, and if necessary a third evaluator was requested for impartiality.

Data found in the studies were brought together in two ways; first, types of multimedia technologies implemented in the reported interventions. The description of applied multimedia interventions was considered important; hence itcould be useful for future improvements in the breast self-examination practice strategies. Second, the quality of results and the efficacy of the tests used in the intervention, based on the proposed design, group sample sizes and the presence or absence of a control group(Figure 1).

Figure 1. Selection process and information analysis



Source: PRISMA. 2014

IV. Results

Two hundred seventy six articles were found in the initial search, where sixty one (22.1%) were related to improving the practice of self-examinationinterventions; still, only four articles were included in the final review, three of which were interventions in Asia. One particular article addressedinterventions based on multimedia technologies, whichaimed for training women with cognitive disabilities. Likewise, one of the interventions associated the family context;making the couple a part of the instructional activities. Three out of four interventionsusedvideos and multimedia content for better understanding. (Table1).

Tabla 1. Results of the reviewed interventions. 2005 to2015

Author	Year	Country	Population	Sample size
Swaine J. (46)	2014	USA	Females with cognitive disabilities	65 (controls); 98 (WBH); 35 (WBH 2)
Liu C (47)	2010	China	Females over 40 years old	1510 women
Park E (48)	2009	Korea	married couples	48 couples (24 controls) (24 treatments)
Chan S (49)	2007	China	Women	777 women

Source: Research Data 2016.

All the studied interventions had a significant improvement, reported inthe practice of breast self-examination.(Table 2).

Table 2. Comparative Analysis of Results and Effectiveness of Interventions.2005-2015

Author	Intervention	Comparison	Results
Swaine J. (46)	*Women by Health*is an eight weeks educational curriculum to improve health awareness, anxiety reduction techniques and to promote cervical and breast screenings.	Women were divided into 3 groups, where a comparison was made with respect to whether they felt lumps in their breasts or not, before and after the surgical procedure.	Significant increase in the appropriate answer (71% vs 89%)
Liu C (47)	Mammacare video presentation and a PowerPoint presentation about breast cancer and the importance of its early detection, a brochure and a souvenir necklace were handed.	They compared the breast self-examination awareness and how often females performed it.	Significant differences were found between breast self-examination awareness among the intervention group and thecontrol one (99% vs 59%). Significant increase in the monthly practice of breast self-examination in the intervention group going from 9% to 34%
Park E (48)	Topics such as the anatomy and function of the breasts, the practice of self-examination and the benefits of a regularself-examination, were covered through videos, multimedia presentations and group discussions.	Female's awareness, spouse's support, perceived contract, trust, benefits andfaced barriers was analyzed	There were significant differences between the two groups throughout all the variables.
Chan S (49)	A self-instructional video program, about the risks of breast cancer as well as general knowledge and ways to prevent it, was presented along with the benefits of a regular self-examination.	No comparisons were reported.	77% to 93% of women correctly described how to perform breast self- examination, after the intervention, and 93% regularly practiced self-examination.

Source: Research Data 2016

V. Discussion

An important aspect highlighted in the reviewed papers is the willingness to improve the regular practice of breast self-examinations. It is noteworthy that studies reported an improvement in the practice of breast self-examination, when females were taught correctly how to perform it. The multimedia technologies aim to strengthen the understanding of the information related to the practice and to provide greater dynamism to the educational process, promoting the awareness to a greater commitment to self-care[50, 51].

These new technological approaches, in addition to prove that they are more cost effective, resulted in being more motivational and persuasive on females for performing breast self-examination. Their willingness in turn, is determined by three factors: first, thefemales' attitude towards performing breast self-examination, where they demonstrated their negative and positive insights towards the practice. Second, the perception of those who are meaningful for them.Third, their own subconscious and hidden fears that may act as barriers and lead to acertain behavior [10].

Interventions based on technologies, can mediate and reinforce people's motivation. Depending on the type ofdevice, the instructions may vary and become more interactive and personalized, regarding their needs and guidance; for example, a computer can be used to help disseminate images or interact through programs. When promoting the practice of self-examination, these tools improve the ability to select, control, access and use information based on the user's response, they also provide feedback and guide actions [40, 48].

The term "Multimedia" means that information is presented in a variety of ways (e.g., videos, animation, graphics, sound, text,etc.) and is considered useful for patients' self-instruction when a minimal assistance is requested. These strategies can incorporate other media that can evenbe used by adults, with limited literacy skills and without further handling of this equipment. The results of this review, reportedsuccess in women with cognitive disabilities, supported by technology, which favored intervention monitoring, documentation, review of content and duration of the teaching-learning process [40, 48, 52].

Furthermore, technology allows programs to bring health education and health promotion to ruraland indigenous communities in countries like ours, improving health awareness through self-learning. Digital insertion provides greater democratic access to technology; increases the publics' participation and their creative expression; and improves social inclusion[52, 53].

5.1 Communication in familiesand the supporting networks to promote the practice of Breast Self-Examination

Well-equipped health tools and servicesmust be available and accessible to people, in order to achieve an early detection of anomalies. Currently, multiple barriers limit breast self – examination practice, as well as the access to screening tests,for instance, the socio-economic conditions that can impact thefemales' educational levels, income and dwelling in rural areas. "Family support" is a persuading tool to encourage women to perform breast self-examination. Social support, may also help, when using multimedia technologies, where experiences, expectations and emotions can help others to perceive the importance of caringand develop solid motivational relationships to prevent, maintain and even improve health in general [49, 54, 55].

5.2 Interpersonal and professional health communication through social networks

This is a basic element in the process of guidance, support, improvement of the healthcare system and health-promoting behaviors, such asbreast self-examination. Repeated educational interventions performed by nurses,show the relevance of these activities in the health-educationprograms andhave a positiveimpact in communities. Several issues highlight the importance of cultural adaptation,regarding the means and tools used by health professionalsin these interventions [56, 57].

5.3 Multimedia learning environments as encouraging and motivational factors of behavioral change.

As noted in the previous studies, the use of interactive multimedia, usingdemonstrationsand digital workshops, resulted in improving awareness, attitudes and breast self-examination performance. This suggests that this is more effective and potentially more profitableway, than the traditional physician- patient consult[46, 47, 58, 59].The use of interactive material was proven to be more pleasant and less stressful for bothsides, where those who received instructionsbecame more involved in the learning process. Users can improve their interpersonal skills and knowledge, while feeling less anxious and or embarrassed; emotions that are often associated to the traditional process of self-examination[11, 47, 60]

5.4 Internet use for health education processes

Most of the time, instructions on breast self-examination are given through one-to-one relationship, between the woman and the health care professional. This type of education requires long sessions and time,whereas public health systems pressures for less and less physician - patient contact and time.These aspects are especially important for women who cannot regularly access to primary care services; therefore they should be more self-sufficient to monitor their own health. Offering health education using Internet expands the range of training opportunities, as well as providing women with a video model for a better and more accurate Breast self- examination. Although studies included in this review didn't use Internet as the main tool, other researchersreported the successful use of this resource as an educational tool in vulnerable communities, where they demonstrated itssuccessful implementation and efficiency in a variety of preventive healthcare services [61].

5.5 Videos as a supporting tool in the processes of community health education

Modifying health behaviors can lead to the prevention of many diseases. Educational interventions aimed at promoting healthy behaviors, have the potential to improve the general welfare. The use of videos as educational tools, offers several potential advantages. First, video interventions may involve a less spending of economic resources. Second, they can help eliminate irregularities that may result from human errors, during the educational sessions, thus providing more standardized information. Third, individuals with low health literacy are especially receptive to video basededucation. Finally, instructions can be given in many forms, such as videotapes, MP3 videos, downloads, etc. In Addition, educational videos delivered through sharing websites, can quickly reach a wide audience. These tools were commonly found in the revised interventions[62, 63].

VI. Conclusions

Information, technology and communication, have a positive impact on behavioral change and lead to agreater commitment to health. They are more cost- effective, increase access to educational services in health and may be more useful as supplement educational activities, aimed at the early detection of breast cancer. A "Patients' network", or the use of social groups in virtual media, can have a positive impact among women, helping them become more consistent with their health, especially when families, friends and support groups are active in these threads.The use of internet and multimedia tools may result as saferand more cost effectiveinterventions, favoring theaccess of individualsto educational services on the promoting, preventingand heeling level.

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