

## RESEARCH ARTICLE

Editorial Process: Submission:04/18/2017 Acceptance:05/04/2018

# Peer Leaders and Phone Prompts: Implications in the Practice of Breast Care among College Students

Paulo Maria N Pagkatipunan\*

### Abstract

**Background:** Compliance with breast self-examination (BSE) guidelines helps detect breast cancer early while increasing physical activity decreases the risk of having breast cancer. Finding ways to early initiate and maintain such behavior among youth is therefore important. In this study we aimed to determine the effects of two health promotion education interventions on knowledge and attitude to breast care, as well as practice of BSE and physical activity by female college students. **Materials and Methods:** A total of 999 students from ten colleges underwent two kinds of health education strategies for three months, namely the traditional health education program (THEP) and tapping peer leaders using mobile phone prompts (PPHEP). **Results:** Improvement in knowledge and attitude was shown for both groups as compared to the control group. Both interventions equally increased the practice of BSE and maintenance of the recommended level of physical activity. **Conclusion:** There was an increase in the knowledge and positive attitude to breast care and practice of BSE with an improvement in the level of exercise when THEP and PPHEP interventions were used. Health education with peers using mobile phone prompts offers an alternative and effective way of promoting BSE and acceptable levels of exercise.

**Keywords:** Breast cancer- breast self-examination- breast cancer knowledge- mobile phone prompts

*Asian Pac J Cancer Prev*, **19** (5), 1201-1207

### Introduction

Breast cancer has taken its toll on the health care systems of developing (Elsabour et al., 2013; Karadag et al., 2014; Tuna et al., 2014; Amoran and Toyobo, 2015), (Nde F et al., 2015) and developed countries (American Cancer Society, 2015; Coughlin, 2015; Crawford et al., 2015; Zeinomar and Moslehi, 2013) The Philippine Department of Health has reported that the country has the highest breast cancer rate in Asia with an estimate of 3 out of 100 Filipino women contracting the disease before the age of 75 years (GMA News Online, 2015). This complements the report of the Philippine Cancer Society, Inc. stating that breast cancer is the most common cancer in the Philippines (The ABCs of Breast Cancer, 2013) taking up 16% of all reported cancers in the country (Laudico et al., 2010).

Early detection and prompt treatment offer the greatest chance of long-term survival for breast cancer patients. American Cancer Society (ACS) guidelines for the early detection of breast cancer vary depending on a woman's age, and include mammography and ultrasound. Although monthly breast self-examinations (BSE) are no longer recommended by the ACS 2015 (American Cancer Society, 2015), its potential benefits and limitations should still be discussed with their doctors. Nonetheless, many advocates of BSE believe that it helps to reduce breast

cancer mortality in developing countries (Elsabour et al., 2013; Karadag et al., 2014; Tuna et al., 2014; Amoran and Toyobo, 2015), more so because of the small coverage for health insurance coupled with the cost of mammography and ultrasound. It is believed that BSE, when performed according to instructions of a health care provider, makes one become familiar with both the appearance and feel of one's breasts. This self-awareness may make the woman become conscious of symptoms out of the ordinary and report it to the appropriate health care provider.

Aside from early detection, the ACS 2015 (American Cancer Society, 2015) recommends prevention of weight gain by decreasing dietary fat and/or exercising/increasing physical activity (World Cancer Research Fund International, 2012) as some ways to decrease the risk of getting breast cancer.

Aside from traditional health education, several methods and interventions have been found to be effective in numerous studies to increase the breast care awareness in women. Some of the promising approaches are the use of peer educators and mobile phones.

Peer educators have been used extensively for health promotion and prevention of certain diseases like HIV (USAID, 2012; Huang et al., 2012) stroke (Kronish et al., 2014) diabetes (Heisler, 2012; Gilbert et al., 2012), tobacco use (Lvey, 2014), exercise and weight loss (Bell et al., 2014). Peer educators have also been found to

have a valuable link with health services and establishing norms and changing attitudes related to sexual behavior (UNICEF, 2012). It has also been used and documented to prevent HIV/AIDS among taxicabs and tricycle drivers in the Philippines (Morisky, 2005). For the promotion of breast care and breast awareness, peer educators have been found to be effective (Crawford et al., 2015).

The use of mobile phones, on the other hand, is another promising modality for the promotion of good health as seen in the systematic review by Brinkel et al., (2014) and in studies such as preventive health care and facilitating self-management of long-term illnesses, (De Jongh et al., 2012; Buhi et al., 2013; Vodopivec-Jamsek et al., 2012) including maintenance of weight loss (Patridge et al., 2015; Spark et al., 2015) smoking cessation (Free et al., 2013) and breast care (Buhi et al., 2013; Tuna et al., 2014; Coughlin, 2015).

Amidst all these health care innovations, this study determined if the traditional health education program increased both BSE and exercise among college students against those with mobile phone prompts from peers. Moreover, this study also determined which of these interventions increased knowledge and gain positive attitudes regarding breast cancer including its risks. This study developed a predictive model to know which factors (including the interventions tested) were useful in predicting if a person will do BSE.

## Materials and Methods

The study participants included female students in all colleges south of Manila City in the Education program. This group of students was chosen because they approximate the knowledge, beliefs and practices of most college students not in the medical or paramedical programs (e.g. nursing program) the latter of which acquire their knowledge and practices through their academic curriculum.

These ten schools were randomly assigned to three groups: the control, the Traditional Health Education Program (THEP) and the Peer Leader – Phone Prompts Health Education Program (PPHEP) groups. A stratified cluster random sampling design was used and the stratification variables were the treatment groups and schools. Sample classes (clusters) were randomly selected and all the students in the selected classes were invited to participate.

The THEP group underwent the traditional health education program which consisted of a seminar with a breast cancer expert that included a demonstration and a return demonstration on breast models and a lecture on physical exercise (kinds, frequency and severity) that could prevent many kinds of cancers including breast cancer. During this time, the students were encouraged to do both BSE and exercise (regardless of body mass index). While the participants in the seminars of the THEP group were the students, the participants in the PPHEP group were peer leaders, chosen by the class in which they belong. Both groups were exposed to posters and flyers reiterating the content of the seminars which were placed beside the doors to classrooms included in

the study; they were replaced/refilled twice weekly for a period of three months.

Peer leaders reiterated to their class/group, by way of group discussion, what the content expert had lectured and asked each student in her group/class their mobile phone numbers, the date of her menstruation and the agreed upon time for their exercises (regardless of BMI), and the day and time for breast self-exam. She wrote all of these in her logbook which was provided. The Peer Leaders' mobile phones were loaded with a Php200 (\$5) load per month for three months, enough for texting about 15 – 20 group members for prompts regarding exercise and BSE. The mobile phones were not used to seek information but only were used only for texting only and serve only to remind the members of the group as to the time of BSE and exercise which were previously agreed upon.

The control group did not undergo any intervention. All three groups answered a pre-test questionnaire and, after three months, a post-test questionnaire. The content of the questionnaire included knowledge and attitude on breast care, the practice of breast care, the amount of exercise that they do and factors which may increase the likelihood of performing BSE and doing the recommended amount of exercise.

This research was cleared for commencement by the University of the Philippines Manila Research Ethics Board.

### Tool Development

Content and construct validation of the questionnaire were done by experts. The questionnaire was composed of four parts which consisted of (a) socio-demographic information including family history of breast cancer, (b) knowledge (24 items including the risks/benefits of age, pregnancy and number of children, menarche/menopause, family history, obesity, exercise) and (c) attitude (17 items including confidence in maintaining exercise and BSE, fear of breast cancer, attitude regarding risks of getting breast cancer) questions regarding breast cancer risk factors and its prevention and early detection, and (d) performance of health behaviors which were the breast self-examination (BSE), and exercise (which included the frequency and duration). Constructs were tested for reliability using the Cronbach alpha in one randomly selected school which was not included in the study proper. Constructs with coefficients of 0.8 or higher were retained

## Results

Ten schools participated in the study with 1210 students giving their consent. Of these, 999 participants were able to complete the last phase of the study. There were 426 students from the control group, 252 from THEP and 321 from PHEPP group.

### Pre-test Results

Using Analysis of Variance (ANOVA) and the Scheffe multiple comparisons test, the knowledge scores of THEP group got a statistically significantly lower mean score among the three groups (Table 1) while the results of the attitude scores showed that all three groups were not

Table 1. Pre- and Post-Examination Mean Differences in Knowledge and Attitude Scores by Group, South Manila Schools

	Pre-Post Exam Mean (SD) Differences			ANOVA F-Test	p-value for Scheffe Test		
	Control	THEP	PPHEP	p-value	THEP-Control	PPHEP-Control	THEP-PPHEP
Knowledge	-0.26 (3.02)	7.20 (4.39)	5.55 (4.84)	<0.0001	<0.0001	<0.0001	<0.0001
Attitudes	-0.83 (3.04)	1.44 (4.25)	1.01 (3.60)	<0.0001	<0.0001	<0.0001	0.354

Table 2. Comparison of Pre- and Post-Examination Proportion of Respondents with BSE, and Acceptable level of Physical Activity, South Manila Schools

	Control			THEP			PPHEP		
	Pre	Post	p-value	Pre	Post	p-value	Pre	Post	p-value
With BSE	28.6	30.5	0.3891	18.2	63.1	<0.0001	18.1	64.2	<0.0001
Acceptable Level of Exercise	47.9	49.3	0.6368	48.8	57.5	0.0128	48	59.5	0.0001

statistically significantly different from each other.

A total (Table 2) of 22.6% of all the students did BSE at baseline. By group, the distribution is statistically significant with a p-value <0.0001. The highest proportion of students who did BSE at baseline was 28.6% from the Control group, while the THEP and the PPHEP groups got 18.2 and 18.1% respectively.

Majority of the students at baseline exercised less than the acceptable level of 150 minutes per week with 52.1% in the Control group, 48.8% in THEP and 48.0% in PPHEP. However, these results were not statistically significantly different.

#### Post-test Results

Favorable responses in the questionnaire included correct answers to knowledge items and positive attitude to breast care.

The pre- and post-test differences in knowledge and attitudes computed by group were all statistically significantly different from each other. Scheffe multiple comparisons test (Table 1) further revealed that the post-test means in knowledge and attitudes scores of the THEP and PPHEP groups were statistically significantly higher than the control group. The THEP group had statistically higher increases in knowledge score compared to the PPHEP group.

Table 2 also shows the proportion of students practicing BSE and acceptable level of exercise before and after intervention. Results showed that both the THEP and PPHEP groups have significantly improved practice after the intervention, while that of the control group had not changed.

There were several variables that were included in the multiple logistic regression used in the study which were thought to contribute to the practice of breast self-examination and exercise. These included the kind of school (public or private) the students go to, the scores on the knowledge survey before and after the Interventions, attitude scores before and after the interventions, doing BSE before the Intervention, demographics of the students like hometown, household monthly income, source of breast care information before and during (if from expert or peers) and in the last 3 months, received information in the last 3 months, history of having a “lump” in their breast/s and family history of breast cancer, and the

intervention group.

To compare THEP and PPHEP in terms of practice of BSE and physical activity, the odds ratio was taken from the Final Model in the logistic regression of each behavior controlling for confounders.

It was found that (Table 3) students who belong in the THEP group had statistically significant 7.13 higher odds of performing BSE compared to the control group. But those who belong in the PPHEP group, on the other hand, had 180.40 times higher odds of performing BSE compared to the control group.

Another logistic regression was done to determine the odds of performing acceptable level of exercise for the general prevention of cancers. The same variables were used in the regression analysis of BSE but the “doing BSE before the Intervention” variable was replaced with “acceptable level of physical activity before the Intervention”. It was found that students (Table 4) who belong in the THEP group had 4.57 times higher odds of increasing their physical activity compared to the control group but was not statistically significant. However, students who belong in the PPHEP group had 8.24 higher odds of doing adequate exercises as compared to the control group and were found to be statistically significant.

## Discussion

### Knowledge

The mean scores at baseline in the study showed that all groups got only about 40% or 10 out of 24 questions correct. This suggested that there was a lack of information drive regarding breast care in schools. It is best that health topics, including breast care, be integrated into the subjects and into the school curricula in general. This may mean that there was poor health awareness in the Philippine educational system.

The result of the study was no different from other studies. Other surveys got less than half of knowledge items correct: 40% to 46% for college (Karadag et al., 2014; Zeinomar and Moslehi, 2013), and 20% to 43% for middle aged women (Karadag et al., 2014; Zeinomar and Moslehi, 2013) and female health care workers 78% (Reisi et al., 2013).

Both interventions in the study statistically significantly increased the knowledge scores. After THEP, knowledge

scores rose from 39% to 69%, the score of the PPHEP group rose from 43% to 66% while the control group decreased their knowledge from 43% to 42%.

Other studies showed that knowledge scores increased after group education (Zeinomar and Moslehi, 2013) and after peer education (Gozum et al., 2010). The use of mobile phones also significantly increases the knowledge (Buhi et al., 2013).

The probable reason why the final scores in this study were less than 70% compare to other studies is that the other studies tested their respondents' right after their interventions. It has been reported that, over time, the knowledge will gradually decrease and that would be the time that another intervention or a repeat of the intervention should be implemented. The study by Karayurt et al., (2009) revealed that there was only 22% increase of knowledge after 6 months of intervention, much like ours which has a 23% to 30% increase over three months (Helgeson et al., 1999).

In our study, there was a statistically significant difference between the increase in knowledge between THEP and PPHEP, with THEP having the higher increase. This might be because the effect of group interaction after the intervention may serve to instill the knowledge more than peer-respondent interaction, i.e. the effect of constant reminders from several members of the group and not from only one person (Attia et al., 1997). Moreover, the peer education, to be effective, may have to be implemented for more than three months (Helgeson et al., 1999).

The difference in the increase between THEP and PHEPP, though statistically significant in our study, is not clinically or practically significant, THEP having an increase of 7 while the increase in PHEPP is 6 points.

### *Attitude*

Positive answers to attitude questions reflects a respondent's perception that she is susceptible to a disease and that she has minimal barriers in doing a recommended health behavior.

The difference of the results of the mean positive attitude scores revealed that the respondents in the different groupings were not statistically significant from each other on baseline.

The respondents got half (50%) of the items considered positive attitudes regarding breast care. This is almost the same as another study (Attia et al., 2002) in which 61% got positive attitudes regarding breast care.

If Manila schools will have breast care topics incorporated in school activities, it should be emphasized that every female is at risk (susceptible) of getting breast cancer considering that the Philippines has the highest breast cancer rate in Asia with an estimate of 3 out of 100 Filipino women contracting the disease before the age of 75 years (GMA News Online, 2015). According to the National Cancer Institute of the United States in order to increase the positive attitudes of target audience, it should be emphasized in their education that it is beneficial to prevent breast cancer and to detect them early. They should also be trained in the technique of BSE so that they will be confident in doing BSE.

Past studies on health education and promotion programs showed increases in positive attitudes (as intentions to practice BSE) (Wang et al., 2012). In our study, after both interventions, the positive attitude scores increased statistically and significantly from baseline though there was no statistical difference comparing the increase in attitude scores between THEP and PPHEP. This means that the effect of peer education is the same as group discussion when it comes to attitude.

This means that interventions of lecture, posters and pamphlets (THEP) and peer educators, posters and pamphlets (PPHEP) will have the same increase in positive attitudes on breast care.

### *Breast Self-Examination*

The group differences on the proportion who did BSE at baseline were statistically significant. The highest proportion of students who did BSE at baseline is 28.6% from the Control group, while the lowest is 18.1% from PPHEP.

This high proportion of practice of BSE among the control group may be attributed to the fact that students in one of the schools in the control group, school 3 (S3) requires their students to undergo CBE before registration. As CBE is being performed on them, they may get the skill and the habit of performing BSE.

Our study showed a BSE performance of 18 to 28%. A study in a local area in Korea Heo et al., (2013) showed that 62% of female college students and their mothers practice BSE while a study of nursing students in Palestine Ayed et al., (2015) and academic personnel in Turkey Tuna et al., (2014) showed 31% to 37% practice of BSE.

Professionals are reported to have a high BSE practice of 51% to 86%. Karayurt et al., (2009) This is in consonance with the findings of Karayurt et al., (2009) in which monthly performance of BSE was more common among those who graduated from secondary and tertiary levels.

Therefore in health education for breast care, it would be best to look at the participants' profile (i.e. if they are still a student or if they already are professionals), to know the level of self-screening that they already have. Thus, we can surmise the level of knowledge that they have acquired before the health education intervention is implemented.

After the interventions, the proportion of students in the Control Group who did BSE at pre- and post-examination did not differ significantly while the proportion of students who did BSE regularly in THEP and PPHEP significantly increased.

Buhi et al., (2013) found in his systematic review that SMS increases BSE practice levels. In our study, the increase in the regular practice of BSE is 45%, more than the recommendation of Maurer (1997) which states that after peer education, there should be an increase of 30% in the proportion of students doing BSE.

In our study, there was no difference in the increment of BSE practice between THEP and PPHEP. This is consistent with other studies in which there were no between group difference between peer education and group education, i.e. peer and group education has the

same effect in the practice of BSE (Gursoy et al., 2009). Also with mobile phone prompts, the practice of BSE increased - but not significantly to previous levels without the prompts (Heo et al., 2013). Perhaps a longer study evaluation time might show differences between the two groups as this would show the maintenance of BSE behavior over time. This has been shown by Tuna et al., (2014) in which there was a significant increase of BSE behavior which was maintained up to 6 months when there were reminders (peers in social media) as against the intervention without the reminders.

One study by Agars et al., (1993) had to be remembered wherein 14% of middle-aged participants (nurses) who were so set in their behaviors that education classes and peer groups could not make them practice BSE (Karayurt et al., 2009). The creation of innovative health education interventions to specifically target this group of women would really be a challenge. In our study, about 35% of the respondents did not change their behavior after both interventions.

#### *Physical Activity*

To date, the etiology of breast cancer is uncertain and complete adequate primary prevention is not possible although there is a strong correlation between certain behaviors and a decrease in the occurrence of breast cancer. One of these behaviors is having an acceptable level of physical activity (The ABCs of Breast Cancer, 2013) i.e. 150 minutes per week and it has been found that regular exercise and keeping weight in check decrease estrogen levels and lower breast cancer risk.

Only half of the students in this study were up to par with the recommended levels of physical activity. The students, therefore, should be encouraged to increase their level of physical activities or the school should have a regular program each day before classes start to augment the physical activities that the students already have.

The proportion of students with acceptable level of exercise by group at baseline was not statistically different from each other. After the interventions, the acceptable level of physical activity did not differ in the Control group while it was statistically significantly different in the THEP and PPHEP groups. This increase might be due to the parallel increase in the knowledge and attitudes of the respondents as explained by the Health Belief Model (Kreuter et al., 2003). This increase, though was not large. This might be because 70.6% of the respondents felt that they did not have enough time to exercise at baseline. And that they might not want to give time for exercise because 95% felt that they will not get breast cancer in the future.

#### *The "Better" Intervention*

##### *Intervention for Breast Self-Examination*

To select which is the better intervention to increase the practices of BSE and Physical activity, several variables were considered. These were "school" (private or public), "knowledge score before and after the Intervention", "attitude score before and after the intervention", "doing BSE before the Intervention", "hometown", "household monthly income", "source of information before, during (THEP/PPHEP), and after the Intervention", "received

information in the last 3 months" and "family history of breast cancer", and "history of breast mass".

It was found that students who belonged in the THEP group had 4.26 times higher odds of performing BSE compared to the control group but was found not to be statistically significant. Those who belonged in the PPHEP group, on the other hand, had 5.04 times higher odds of performing BSE compared to the control group and were statistically significant. These odds were the result of the prediction model controlling for confounders which included "knowledge scores before the Intervention" and "family history of breast cancer".

It had been shown in this study that there were no difference between THEP and PPHEP in terms of the increment of the proportion of students doing BSE after peer education and mobile phone prompts as against class discussions. Studies have found conflicting results. Buhi et al., (2013) found in his systematic study that there was a significant increase in BSE practice after mobile phone SMS but Heo et al., (2013) also found that there was no increase after the cellphone prompts.

The peer education in this study was unique in that the reminders can be texted on the day and time both agreed upon by the peer educator and the member of the group. Although one of the limitations of the study was the difficulty in monitoring each peer educators' texts to each of their members, the study relied on the honesty of the Peer Educators that they texted their members. This individualized prompts overcome the traditional peer educators in terms of time and location wherein traditionally, the peer educators would talk to members face-to-face. There are literature reporting increased health behavior compliance when prompts were included in the intervention but these were mostly for weight loss and dieting.

##### *Intervention for Physical Activity/Exercise*

Both interventions showed no statistical significance in the odds ratio. This may mean that although both Interventions showed a significant increase in the proportion of students doing acceptable level of exercise, the increase is not enough. As has been mentioned before, it might be because 67.4% of the respondents felt that they did not have enough time to exercise even after the intervention. And no matter how they were prompted by their peer educators, they might not want to give time for exercise because 87.2% felt that they will not get breast cancer in the future. One group in the peer education group led her members in jogging just to increase the physical activity level of the group, but this might not be enough.

#### *Conclusions and Recommendations*

It has been dealt with time and again in health promotion principles that health knowledge does not necessarily translate to behaviors. One of the classic examples of this are doctors who smoke. So that, in general, health promotion strategies are considered successful when they are translated into behaviors.

The Traditional Health Promotion Education intervention of attending lectures by breast experts and exposing the participants to flyers and posters regarding

breast care increased the knowledge and the positive attitudes of the participants as regards breast cancer, its risks, its screening or early detection and one of its preventive measures, physical activity. Its increase in knowledge and positive attitude was comparable with the increase in Peer Health Educator-Phone Prompts where participants were also exposed to posters and flyers but peer educators were the ones who disseminate breast care knowledge and they also reminded the subjects personally and through mobile phone texts (SMS – short messaging system), to do breast exam and to exercise.

Although the increase in knowledge and attitude was comparable, it has been proven that the PHEPP was better at increasing the proportion of participants practicing breast self-examination and that both interventions did not significantly contribute to the practice of acceptable levels of physical activity/exercise.

In the implementation of a comprehensive Breast Care health promotion intervention program that is sustainable and with reasonable use of resources, peer educators would be the likely choice especially if the target is increasing and/or initiating BSE. But, as in all health education and promotion programs, needs analyses should always be the key so as not to be redundant and so that the programs will be individualized and targeted to the specific intended audience.

As in any health education program, linkages with other institutions would give the most effective and inexpensive approach to be effective. The media continues to be one of the most important sources of information about breast care. Therefore, there should be cooperation between public health educators and the media in dissemination of breast care information to the public. In schools, for example, there should be collaboration between the Health and Education Ministries to teach students about conditions of public health importance, specifically breast care, which would hopefully translate to health behaviors like BSE and maintenance or increase in physical activity. Because forgetfulness is reported to be the greatest reason for non-practice of BSE, importance should be given to finding effective prompts, other than texting, to encourage students to perform BSE regularly. This is especially true when effects of the intervention would extend beyond 3 months.

Enabling schools, like offering on-site classes and symposia and equipping institutions with CBE resources, may increase participation through the influence of peers. In this way, not only will participation increase, but women within one institution will be working together toward a common health goal. Moreover, schools might want to include in their policy a regular physical activity, like calisthenics, before classes starts to increase the physical activities that the students may already be engaged in.

Extensive and more studies should be recommended because: (1) Students attending university do not represent all young women or women in general and the generalizability of this study to the population of women at large cannot be done. Conducting a study of those students not pursuing collegiate education and those outside of the academe may offer a wider range of breast care approach improvements; (2) Because beliefs and knowledge may

change over time, longer monitoring may be warranted; (3) The study that was done asked the participants if they were doing the BSE and only assumed that they were doing it correctly. Though quite personal, a study may be conducted to know if the participants are doing the BSE correctly for, after all, doing the behavior correctly not only offers academic conclusions, but this may also save lives; in the same vein, the questionnaire only asked if they did the exercise or not, and lastly, (4) Research is recommended using an even larger sample size including women in rural and urban communities because they represent different needs in the care and promotion of breast health and studies may also be done to compare those with women in the science/medical field vis-à-vis those who are not.

## References

- Agars J, McMurray A, (1993). An evaluation of comparative strategies for teaching breast self-examination. *J Adv Nurs*, **18**, 1595-603.
- American Cancer Society. Cancer Facts and Figures (2015). Atlanta: American Cancer.
- Amoran OE, Toyobo OO (2015). Predictors of breast self-examination as cancer prevention practice among women of reproductive age-group in a rural town in Nigeria. *Niger Med J*, **56**, 185-9.
- Attia KA, Rahman DAMA, Kame LI (1997). Effect of an educational film on the health belief model and breast self-examination practice. *East Mediterr Health J*, **3**, 435 -43.
- Ayed A, Eqtaif F, Harazneh L, et al (2015). Breast self-examination in terms of knowledge, attitude, and practice among nursing students of Arab University/Jenin. *J Edu Pract*, **6**, 37.
- Bell SL, Audrey S, Cooper AR, Noble S, Campbell R (2014). Lessons from a peer-led obesity prevention programme in English schools. *Health Promot Int*, doi: 10.1093/heapro/dau008.
- Brinkel J, Krämer A, Krumarp R (2014). Mobile phone-based mhealth approaches for public health surveillance in sub-Saharan Africa: A systematic review. *Int J Environ Res Public Health*, **11**, 11559-182.
- Buhi ER, Trudnak TE, Martinasek G, et al (2013). Mobile phone-based behavioural interventions for health: A systematic review. *Health Edu J*, **72**, 564-83.
- Campbell R, Starkey F, Holliday J (2008). An informal school-based peer-led intervention for smoking prevention in adolescence (ASSIST): a cluster randomised trial. *Lancet*, **371**, 1595–1602.
- Coughlin S (2015). Intervention approaches for addressing breast cancer disparities among African American women. *Ann Transl Med Epidemiol*, **1**, 1001.
- Crawford J, Frisina A, Hack T, et al (2015). A peer educator program for breast cancer screening promotion: Arabic, Chinese, South Asian and Vietnamese immigrant women's perspectives. *Nurs Res Pract*, doi.org/10.1155/2015/947245.
- De Jongh T, Gurol-Urganci I, Vodopivec-Jamsek V, et al (2012). Mobile phone messaging for facilitating self-management of long-term illnesses. *Cochrane Database Syst Rev*, **12**, :CD007459. doi: 10.1002/14651858.CD007459.pub2.
- Elsabour M, Qalawa S, Mohamed E, et al (2013). Impact of health intervention program regarding breast self-examination among Port Said Female University Students. *J Am Sci*, **9**, 378-84.
- Ferrara C (2009). The college experience: physical activity,

- nutrition, and implications for intervention and future research. *JEP Online*, **12**, Available from: [http://asep.org/asep/asep/ferrara%25012\(1\)23-35.doca](http://asep.org/asep/asep/ferrara%25012(1)23-35.doca).
- Free C, Phillips G, Galli L (2013). The effectiveness of mobile-health technology-based health behaviour change or disease management interventions for health care consumers: A systematic review. *PLoS One*, DOI: 10.1371/journal.pmed.1001362.
- Gilbert K, Dodson, S, Gill M, et al (2012). Online communities are valued by people with type1 diabetes for peer support: How well do health professionals understand this?. *Diabetes Spectr*, **25**, 180-91.
- GMA News Online (2015). PHL has the highest cancer rate in Asia. Body from Philippines INC. Available from: <http://www.gmanetwork.com/news/story/329126/cbb/phl-has-highest-breast-cancer-rate-in-asia>. Retrieved 19 October, 2015.
- Gozum S, Karayurt O, Platin N (2010). Effectiveness of peer education for breast cancer screening and health beliefs in eastern Turkey. *Cancer Nurs*, **33**, 213-20.
- Gursoy AA, Yigitbas C, Yilmaz F, et al (2009). Effects of peer education on university students knowledge of breast self-examination and health benefits. *J Cancer Edu*, **24**, 331-33.
- Heisler M (2012). Different models to mobilize peer support to improve diabetes self-management and clinical outcomes: evidence, logistics, evaluation considerations and needs for future research. *Fam Pract*, **29**, 497.
- Helgeson VS, Cohen S, Schulz R, et al (1999). Education and peer discussion group interventions and adjustment to breast cancer. *Arch Gen Psychiatry*, **56**, 340-7.
- Heo J, Chun M, Lee KY, et al (2013). Effects of a smartphone application on breast self-examination: a feasibility study. *Health Inform Res*, **19**, 250-60.
- Huang J, He Na, Eric J (2012). Social network and other correlates of HIV testing: Findings from male sex workers and other MSM in Shanghai, China. *AIDS Behav*, **16**, 858-71.
- Karadag G, Gungormus Z, Surucu R, et al (2014). Awareness and practices regarding breast and cervical cancer among Turkish women in Gazientep. *Asian Pac J Cancer Prev*, **15**, 1093-8.
- Karadag M, Iseri O, etikan I (2014). Determining nursing student knowledge, behavior and beliefs for breast cancer and breast self-examination receiving courses with two different approaches. *Asian Pac J Cancer Prev*, **15**, doi: org.10.7314/APJCP.2014.15.9.3885.
- Karayurt O, Dicle A, Tuna Malak A (2009). Effects of peers and group education on knowledge, beliefs and breast self-examination practice among university students in Turkey. *Turk. J Med Sci*, **39**, 59 – 66.
- Kreuter M, Lezin N, Green LW, et al (2003). Community health promotion ideas that work, 2nd edition. Boston, Toronto, London, Singapore: Jones and Bartlett Publishers, Accessed June 2011, pp 126-8.
- Kronish IM, Goldfinger JZ, Negron R, et al (2014). The effect of peer education on stroke prevention: the prevent recurrence of all inner-city strokes through education (PRAISE) randomized controlled trial. *Stroke*, **45**, 3330–6.
- Laudico A, Medina V, Lumague M, et al. (2010). 2010 Philippine Cancer Facts and Estimates. Philippine cancer Society. Manila, Retrieved from: <http://www.philcancer.org/ph/wp-content/uploads/2014/04/2010-Philippine-Cancer-Facts-Estimates.pdf>.
- Lvey S (2014). Youth activists get young people to quit smoking; CVS pulls all tobacco products. Healthline news. Available from: <http://www.healthline.com/health-news/youth-activists-get-young-people-to-stop-smoking-090814#1>.
- Maurer F (1997). A peer education model for teaching breast self-examination to undergraduate college women. *Cancer Nurs*, **20**, 49 – 61.
- Morisky D (2005). HIV/AIDS prevention among the male population: Results of a peer education program for Taxicab and Tricycle drivers in the Philippines. *Health Educ Behav*, **20**, 57–68.
- Nde F, Assob J, Kwenti F, et al (2015). Knowledge, attitude and practice of breast self-examination among female undergraduate students in the University of Buea. *BMC Res Notes*, **8**, 43.
- Patridge S, MacGheecan K, Hebden L, et al (2015). Effectiveness of a mhealth lifestyle program with telephone support (TXT2BFiT) to prevent unhealthy weight gain in young adults: Randomized controlled trial. *JMIR mHealth uHealth*, **3**, e66.
- Reisi M, Javadzade S, Sharifirad G (2013). Knowledge, attitudes, and practice of breast self-examination among female health workers in Isfahan, Iran. *J Educ Health Promot*, **2**, 46.
- Seham A, Abd El-Hay, Mohamed N (2015). Effect of educational program about breast cancer knowledge and breast self-examination training on building accurate information and behavior among women. *J Nat Sci Res*, **5**. Available from: <http://int.search.tb.ask.com/search/GGmain.jhtml?searchf or=elsabour+MA%2C+Qalawa+SA%2C+breast+self examination%2C+2013&ts=1445834439739&p2=%5EBBQ%5Exdm033%5EYYA%5Eph&n=780c299c&ss=sub&st=tab&ptb=0E5985F1-FBD1-4643-BF8E-3C58C374758C&si=speedneto&tpr=sbtSociety; 2015>.
- Spark L, Fieldso B, Eakin E, et al (2015). Efficacy of a text message-delivered extended contact intervention on maintenance of weight loss, physical activity, and dietary behavior change. *JMIR Mhealth Uhealth*, **3**, e88.
- The ABCs of Breast Cancer (2013). The Philippine Star. Manila. Available from: <http://www.philstar.com/health-and-family/2013/02/26/913052/abcs-breast-cancer>.
- The Prevent Recurrence of All Inner-City Strokes Through Education Randomized Controlled Trial. StrokeAHA. doi: 10.1161/STROKEAHA.114.006623.
- Thomas B, Stamler LL, Lafreniere K, Delahuntd TD (2002). Breast health educational interventions. *AAOHN J*, **50**, 460-7.
- Tuna A, Avdal EU, Yucel SC, et al (2014). Effectiveness of online education in teaching breast self- examination. *Asian Pac J Cancer Prev*, **15**, 3227-31.
- UNICEF (2012). Peers teaching peers to prevent HIV. Fact Sheet. Available from: [http://www.unicef.org/lifskills/index\\_12078.html](http://www.unicef.org/lifskills/index_12078.html).
- USAID (2012). Peer education rigorous evidence – Usable results. Research 2 Prevention.
- Vodopivec-Jamsek V, de Jongh T, Gurol-Urganci I, Atun R, Car J (2012). Mobile phone messaging for preventive healthcare. *Cochrane Database Syst Rev*, doi:10.1002/146518.CD007457.pub2.
- Wang HH, Chung YC, Sun JL (2012). The effects of education program on knowledge and intention of breast cancer screening in Taiwan. *Asian Pacific J Cancer Prev*, **13**,5545-9.
- World Cancer Research Fund International (2012). Breast cancer statistics. Cancer facts and figures.
- Zeinomar N, Moslehi R (2013). The effectiveness of a community-based breast cancer education intervention in the New York State capital region. *J Cancer Educ*, **28**, 466-73.



This work is licensed under a Creative Commons Attribution-Non Commercial 4.0 International License.