

The Impact of Health Information Provision on Breast Cancer-Related Knowledge and Protective Behaviors: An Experiment in Health Education

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Abstract

This study examines the impact of health information provision on health-related knowledge and corresponding behaviors. Our main assumption is that women's health can be improved by adopting health protective and health-enhancing behaviors. The study employs a before–after, no-control-group design, aimed at examining whether exposure to health knowledge concerning breast cancer can change participants' behavior in relation to breast self-examination. Our sample consists of 50 young females whose knowledge and behavior related to breast cancer was assessed in a pre-exposure phase, followed by an exposure session during which they were shown a video film, participated in a discussion, and were given health education literature about breast cancer to take home. Two weeks later, the participants were reassessed, using the same measures. Their health knowledge and behavior were found to have improved significantly. We recommend that formal education should incorporate health education as part of the curricula at all academic levels, especially for women. The mass media can also play an important role in improving public health protective behavior.

Keywords: Health, breast cancer, behavior, Pakistan.

JEL classification: I10.

1. Introduction

Individual awareness is key to promoting health, preventing disease, encouraging medical consultation, or taking prompt health-directed action. People can be expected to take health-enhancing actions only when they are aware of the difference between healthy and unhealthy lifestyles. In a culture that places a high value on fatty foods, where overweight people are considered “fortunate”, and domestic labor is abundant, promoting the concept of healthy habits would mean changing a generations-old system of cultural norms. Many modern diseases are,

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however, lifestyle-related, and so it becomes imperative to modify health habits. This is even more significant in the case of diseases such as various forms of cancer, including breast and testicular cancers, which can be detected conveniently at a very early stage.

Studies conducted over the last five to ten years indicate that breast cancer is the most common form of cancer among females in Pakistan. An estimated one third of all malignant cases are patients of breast cancer, and Pakistan has the highest incidence of breast cancer in Asia (Aziz, Sana, Akram, & Saeed, 2004). According to some estimates, there are 30,000 new cases of breast cancer in Pakistan every year (Bhurgri et al., 2003; World Health Organization & Pakistan, Ministry of Health, 2004). The likelihood that a Pakistani woman will develop breast cancer is 1 out of 9. The incidence of breast cancer in Pakistan is much higher than that in India— 50/100,000 versus 19/100,000—despite the two countries' similar socio-cultural conditions (Naeem, Nasir, Aman, Ahmad, & Samad, 2008; Sohail & Alam, 2007).

An important aspect to consider is the disease's early presentation. Whereas breast cancer presents itself at around 60 years in the West, it has been recorded at lower ages in Pakistan (Mahmood, Rana, & Ahmad, 2006; Naeem, Khan et al., 2008). Taj, Akbar, Hassan, and Yusuf (2009) report the mean age to be 33 years in their prospective descriptive study of 200 female breast cancer patients—the age range is an alarming 14 to 71 years. The average age of presentation in this study is much lower than that reported in other studies. Naeem et al. (2008) report the mean age to be 48.3, with an age range of 32 to 75 years.

Recent indigenous investigations have revealed another even more alarming fact—the high frequency of females reporting for a delayed diagnosis with mature malignancy. This becomes an issue that requires special attention because breast cancer can be detected at a very early stage, even without medical assistance, and an early detection would mean a very good prognosis. The problem becomes complex when patients are relatively young but report for medical diagnosis at a late stage when treatment may not produce the desired outcomes (Mamoon, Sharif, Mushtaq, Khadim, & Jamal, 2009).

A recent study shows that 72 percent of a total of 200 female breast cancer patients investigated at Rawalpindi General Hospital reported for diagnosis at Stage III or IV of the malignancy. The majority of the sample was completely ignorant about the disease. Few (12 percent) were fully aware and one fourth of patients were partially aware. Around 92 percent

were unaware of the significance of breast self-examination (BSE). On average, women had taken 10 months to self-discover the lump and report it to their doctor. Considering the delayed medical consultation and level of awareness about breast cancer, the study's authors emphasize the need to improve people's awareness level (see Taj et al., 2009).

Health knowledge and awareness can play a significant role in the practice of health behaviors. People are more likely to seek medical consultation for symptoms, provided they know what their symptoms might represent. Carelli et al. (2008) highlight the importance of disseminating health-related knowledge and its relationship with the performance of specific health behaviors. They find that the mass media is the most significant—although not necessarily the most accurate—source of knowledge about BSE for the sample of women included in their study, followed by “medical sources”. In a study on Turkey, Avci (2008) finds that, out of a sample of 103 Muslim females, only 26.2 percent were aware of the practice of BSE and an even smaller minority of 4.3 percent actually performed it.

Using a sample of 489 elderly patients in the Midwest in the US, Cho, Lee, Arozullah, and Crittenden (2008) explore the links between health status, the utilization of health services, and health literacy. They argue that increasing health literacy may be an effective way of improving health status, particularly among older patients.

This study was conducted to examine the impact of health information provision on young females' health-related knowledge and practices. It was designed following a within-subjects, before-after, no-control-group design to test two hypotheses:

1. If women are provided health-related information, their scores for health knowledge measures will increase.
2. If women are provided health-related information, their scores for health behavior measures will increase.

2. Methodology

2.1. Sample

Our sample consisted of 50 final-year female graduates enrolled at the Lahore College for Women University, all studying gender and development studies. The respondents were sampled from the same

university and class to ensure they had a similar academic background and had been exposed to the same kind of stimulation over the last four years. Their age ranged from 18 to 21 years. All were day scholars who lived in Lahore, and whose families had a monthly income ranging from PKR 15,000 to 25,000.

2.2. *Materials*

The following measures were used in this study.

- **Health knowledge questionnaire.** The questionnaire, given in English, comprised 28 items and was developed specifically for this study. Twenty-one items pertained to breast cancer-related knowledge, while the remaining seven covered respondents' health behavior.
- **Multimedia CD about cancer.** We used a commercially available CD titled "Breast cancer: The essential breast cancer reference", prepared by John H. Fetting and six other colleagues. Participants were shown a series of 35-minute-long clips of the CD during the treatment/exposure phase of the study.
- **Health education leaflet about breast cancer.** A leaflet about breast cancer was developed for this study.
- **Health education talk and discussion on cancer.** Participants were also given a health education talk about cancer with special reference to breast cancer. The talk focused primarily on cancers more commonly found in females and the significance of early detection, especially in the case of breast cancer.

2.3. *Procedure*

Prior to the study, a discussion was held with the participants in order to assess whether they had been recently exposed to cancer-related information. As mentioned earlier, they all came from similar backgrounds, and none reported having had any previous exposure to breast cancer-related information, whether in print or electronic form.

The study was conducted in three phases. The first phase was the pre-treatment phase in which the health knowledge questionnaire was used to develop a baseline assessment of participants' breast cancer-related knowledge and behavior. The second phase followed at the same venue after a half-hour break. In this session, participants were shown the video CD on health education, followed by a talk and discussion about cancer. At the end of the session, health education leaflets were

distributed among the participants to take home. The third phase was held a fortnight after the first two. The same group of participants was invited to the same venue, and their health knowledge and health behaviors were measured once again.

3. Results

Table 1 presents a brief description of some of the personal characteristics of the respondents in our sample. Since the sample was selected keeping in view the study's basic goal, i.e., to bring about a change in respondents' health knowledge and health behavior, they were selected on the basis of similar educational and family backgrounds and their lack of prior exposure to cancer-related information. Respondents fall within a very narrow range of age and monthly income levels.

Table 1: Personal characteristics of respondents

Age of respondents (years)	f	%
18-19	20	40
20-21	30	60
Total	50	100
Household income of respondents (PKR)	f	%
15,000-17,000	9	18
18,000-20,000	17	34
21,000-23,000	5	10
24,000-26,000	19	38
Total	50	100
Mode of transport to/from university	f	%
Public transport	18	36
University bus	14	28
Motorcycle	10	20
Foot	5	10
Total	50	100
Prior knowledge of cancer through electronic media	f	%
Yes	0	0
No	50	100
Prior knowledge of cancer through print media or textbooks	f	%
Yes	0	0
No	50	100

Source: Author's calculations.

The results do not yield any significant differences across income levels. The results of a t-test analysis to determine the pre- and post-exposure readings of respondents belonging to two broad income brackets included in the sample are given in Table 2.

Table 2: Difference in pre- and post-exposure health knowledge and behaviors of respondents from two income brackets

	Income bracket	Mean	SD	df	t	p
Pre-exposure knowledge	15,000-19,500	10.82	2.675	48	0.007	0.994
	19,501-25,000	10.82	2.378			
Post-exposure knowledge	15,000-19,500	12.24	2.513	48	-0.485	0.630
	19,501-25,000	12.61	2.585			
Pre-exposure behavior	15,000-20,000	3.94	1.478	48	0.416	0.679
	20,000-25,000	3.76	1.480			
Post-exposure behavior	15,000-20,000	5.12	1.933	48	-0.057	0.955
	20,000-25,000	5.09	1.355			

Source: Author's calculations.

A comparative description of participants' pre- and post-exposure responses to the health knowledge questions pertaining to breast cancer is given in Table 3.

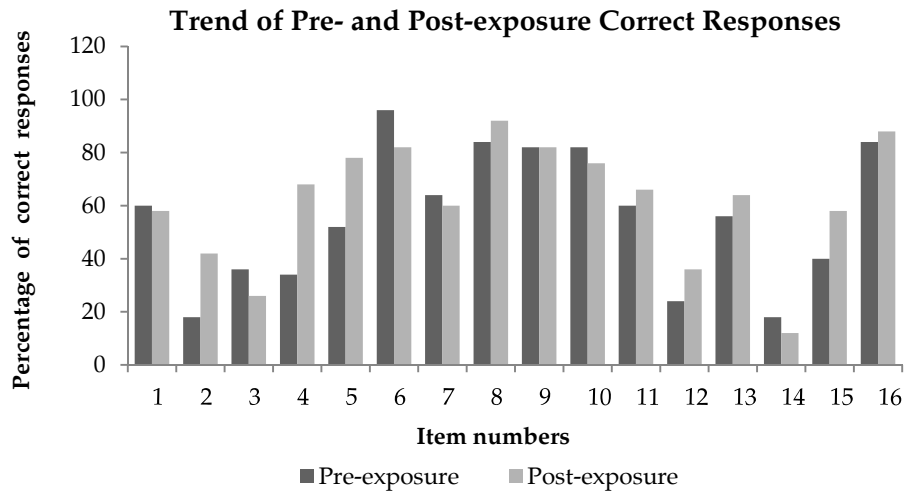
Table 3: Pre- and post-exposure health knowledge of participants

No.	Questions	Yes		No		Total	
		f	%	f	%	f	%
1.	Is breast cancer always a fatal disease?	30	60	20	40	50	100
		29	58	21	42		
2.	Can an ordinary looking change in your breasts be an indication of cancer?	9	18	41	82	50	100
		21	42	29	58		
3.	Is breast cancer directly related to any type of food intake?	18	36	32	64	50	100
		13	26	37	74		
4.	Do you think it has any relationship with the cessation of menstruation?	17	34	33	66	50	100
		34	68	16	32		
5.	Is heredity related to the development of the breast cancer?	26	52	24	48	50	100
		39	78	11	22		
6.	Are women who smoke at higher risk of developing breast cancer?	48	96	2	4	50	100
		41	82	9	18		
7.	Is there any relationship between the development of breast cancer and breastfeeding?	32	64	18	36	50	100
		30	60	20	40		

No.	Questions	Yes		No		Total	
		f	%	f	%	f	%
8.	Does breast cancer necessarily affect a woman's marital life negatively?	8	16	42	84	50	100
		4	8	46	92		
9.	Does breast surgery for the treatment of cancer, always put an end to a woman's beauty?	41	82	9	18	50	100
		41	82	9	18		
10.	Does breast cancer always restrict a woman's social role?	41	82	9	18	50	100
		38	76	12	24		
11.	Can a female's breast be reconstructed?	30	60	20	40	50	100
		33	66	17	34		
12.	If yes, can it make a woman as normal as before?	12	24	38	76	50	100
		18	36	32	64		
13.	Are woman who suffer from breast cancer able to conceive?	28	56	22	44	50	100
		32	64	8	16		
14.	Do you think breast cancer is infectious and can spread from one woman to another?	9	18	41	82	50	100
		6	12	44	88		
15.	Can prolonged stress cause breast cancer?	20	40	30	60	50	100
		29	58	21	42		
16.	Do you think breast cancer is curable?	42	84	8	16	50	100
		44	88	6	12		

Note: Post-exposure readings are given in bold and prominent improvements highlighted. *Source:* Author's calculations.

The greatest improvement in knowledge is observed for question 5 (“Is heredity related to the development of the breast cancer?”)—from 52 to 78 percent. This is followed by question 2 (“Can an ordinary looking change in your breasts be an indication of cancer?”), where the percentage of respondents giving the correct answer rose from 18 to 42 percent. Questions 15 and 12 also show an improvement, from 40 to 58 percent, and from 24 to 36 percent, respectively. Figure 1 illustrates the trends in correct responses in the pre- and post-exposure phases. Clear-cut improvements occur in all cases except four.

Figure 1: Correct responses in the pre- and post-exposure phase

Participants' pre- and post-exposure descriptions of various aspects of the diagnosis and treatment of breast cancer are given in Table 4.

Table 4: Description of breast cancer-related concepts

Responses	Pre-exposure (plain) and Post-exposure (bold)	
	F	%
Accurate description of BSE	43	86
	42	84
Accurate description of mammogram	21	42
	29	58
Accurate understanding of the population at risk	39	78
	37	74
Accurate description of mastectomy	28	56
	36	72
Accurate description of biopsy	26	52
	25	50

Note: Post-exposure readings are given in bold and prominent improvements highlighted.
 Source: Author's calculations.

Breast cancer-related health knowledge means obtained on both occasions were compared employing the t-test (Table 5).

Table 5: Difference between pre- and post-exposure health knowledge of participants

Pre-exposure health knowledge		Post-exposure health knowledge		df	T	p
M	SD	M	SD			
10.82	2.455	12.48	2.541	49	-3.877	0.000

Source: Author's calculations.

The two means, pre- and post-exposure, are found to be significantly different: $t(49) = 3.877$, $p = 0.000$. This lends strong support to the hypothesis that, if women are provided health-related information, their scores for the health knowledge measure will increase.

The pre- and post-exposure reports on participants' health behavior reveal a number of significant findings (Table 6). Their pre-exposure health behavior indicates a number of areas that need attention. Pre-exposure, most participants had neither read any health-related information on breast cancer in the form of newspapers, books, or health education material, nor had they watched any television programs on the subject. Moreover, 82 percent said that they did not practice any type of BSE. Of the remaining 8 percent, only 3 percent reported having done so occasionally.

The post-exposure reports on breast cancer-related health behavior also yielded significant improvements: all the respondents (100 percent) said that health education activities should be carried out in educational institutions to disseminate information on breast cancer (question 6); 86 percent showed an interest in conducting research on breast cancer (question 8). Twenty-eight percent of the respondents reported that they occasionally performed BSE. There was an increase in respondents' interest in all aspects of breast cancer-related health behavior. The most significant change occurred in their response to question 3. In the pre-exposure phase, only 18 percent of the participants reported having practiced BSE; this percentage rose to 52 in the post-exposure phase (Table 6).

Table 6: Pre- and post-exposure health behavior of participants

No.	Health behavior indicators	Yes		No		Total	
		f	%	f	%	f	%
1.	Do you read any health-related segments or articles about breast cancer in the newspaper?	21	42	29	58	50	100
		28	56	22	44		
2.	Have you ever read any books or pamphlets, or watched any TV programs related to breast cancer?	24	48	26	52	50	100
		36	72	14	28		
3.	Do you practice any type of examination of your breasts?	9	18	41	82	50	100
		26	52	24	48		
4.	** (See end of table)						
5.	If you were to go to your family doctor, would you like to talk to him or her about any change/growth in your breasts?*	23	46	27	54	50	100
		29	58	21	42		
6.	Do you think there should be some kind of lectures, campaigns, and seminars in colleges or universities to impart information about breast cancer?	45	90	5	10	50	100
		50	100	0	0		
7.	Would like to join a breast cancer-related diagnosis/treatment campaign?	30	60	20	40	50	100
		39	78	11	22		
8.	Would you like to do research on breast cancer?	41	82	9	18	50	100
		43	86	7	14		

** Question 4 (If yes, when?)									
Yearly		Occasionally		Never		No response		Total	
f	%	f	%	f	%	f	%	f	%
0	0	3	6	3	6	44	88	50	100
4	8	14	28	3	6	29	58	50	100

Note: Post-exposure readings are given in bold and prominent improvements highlighted.
 Source: Author's calculations.

The mean scores for health behavior were also compared to determine whether the provision of health information and knowledge had made a difference (Table 7). The t-test analysis yields $t(49) = 4.595$, $p = 0.000$, indicating a significant difference. Participants' post-exposure responses generate a mean value higher than that obtained in the pre-exposure phase. This finding supports our second hypothesis, i.e., that if women are provided health-related information, their scores for the health behavior measure will increase.

Participants also gave a separate report on the health behavior changes that took place after their exposure to health education. As Table 8 shows, 100 percent of the respondents found the exercise to be informative, and 90 percent felt they would like to receive more such information on other diseases. Another 90 percent thought that early detection could help prevent the serious nature of most diseases, while 92 percent also believed that the risk factors associated with breast cancer could be minimized by acquiring the relevant information. A significant improvement in health protective behavior was reported by 60 percent of the participants, who said that they had carried out BSE after receiving information about it.

Table 7: Difference between pre- and post-exposure health behaviors

Pre-exposure health behavior		Post-exposure health behavior		df	t	p
M	SD	M	SD			
3.82	1.466	5.10	1.555	49	-4.595	0.000

Source: Author’s calculations.

Table 8: Post-exposure report on behavioral change

Health behavior indicators	Yes		No	
	f	%	f	%
1. Would you like to read informative literature, or watch informative video CDs related to other diseases?	45	90	5	10
2. Have you found it informative to read a pamphlet and watch a CD about breast cancer?	50	100	0	0
3. Have you examined your breasts after obtaining information about it?	30	60	20	40
4. Have you talked about breast cancer with other individuals?	38	76	12	24
5. Would you like to obtain further information related to breast cancer?	43	86	7	14
6. Can information about breast cancer help you prevent risk factors related to its development?	46	92	4	8
7. Has this information produced any change in your health-related beliefs?	38	76	12	24
8. Do you think that most diseases can be prevented if their onset is detected in time?	45	90	5	10

Source: Author’s calculations.

As the table shows, 76 percent of the participants had transferred the information acquired during the study to others. Of these, 42 percent had talked to friends and 12 percent to family members. Another 12 percent had kept the information to themselves.

A statistical analysis of this data involves identifying the correlation between the variables being investigated. Table 9 presents the correlation coefficient for health knowledge and health behavior at two levels, i.e., between pre-exposure health knowledge and behavior, and between post-exposure health knowledge and behavior. The correlation between pre-exposure health knowledge and behavior is not significant, but does indicate a positive relationship. The correlation between post-exposure health knowledge and behavior is found to be significant: $r(50) = 0.339, p < 0.05$.

Table 9: Correlations between health knowledge and health behavior

Pre-exposure knowledge and pre-exposure behavior	Pearson correlation	0.246
	Sig. (2-tailed)	0.085
	N	50
Post-exposure knowledge and post-exposure behavior	Pearson correlation	0.339
	Sig. (2-tailed)	0.016
	N	50
	Sig. (2-tailed)	

Source: Author's calculations.

4. Discussion

This study was designed to examine the impact of health information/knowledge provision on health-related beliefs and behaviors. Our main assumption was that women's health status can be improved if they adopt health protective and health enhancing behaviors, and that people can be expected to do so only when they are aware of (i) the existence of such behaviors, and (ii) the possibility that they are in control of their own lives and capable of practicing these behaviors.

People cannot be expected to adopt healthy lifestyles unless they are aware that such practices exist and understand their importance. Even people who are highly educated in the conventional sense might adopt unhealthy practices if they have learnt that such behaviors are beneficial for their health—hence the significance of appropriate health-related

knowledge. We hypothesized that women's health-related knowledge and behaviors could be enhanced by providing the relevant information.

These hypotheses were formed on the basis of the available literature on the subject. Many studies conducted using a range of samples across cultures have found that health knowledge provision improves related health practices. In cultures such as ours, where the poor health status of women is a matter of concern for health authorities, the provision of helpful information could enable women to look after their health better, and lower the burden of high medical expenditure on the national exchequer.

We chose to examine breast cancer and its corresponding health knowledge and behavior because it is a disease that poses a serious threat to women's health, but one that can have a very good prognosis if detected at an early stage. Research evidence shows that most women report for medical consultation at a late stage of the disease. If women were better aware of the nature, risk factors, symptoms, and treatment options involved, they could be expected to adopt health protective behaviors.

A number of significant improvements were recorded in the sample participants' breast cancer-related knowledge and behaviors. Between the two phases, we found that a larger number had read health-related segments in newspapers, books, or health education materials, and watched television programs on the subject. The number who had performed BSE had almost tripled. Most post-exposure changes were found to be statistically significant. However, the most significant findings were those yielded by the t-tests carried out to examine the significance of the difference between the pre- and post-exposure means of breast cancer-related knowledge and behaviors. The improvement in both knowledge and behavior was noted and found to be statistically highly significant.

All the changes or improvements in participants' responses indicated a positive shift in their health knowledge and behavior. This underscores the realization that, if a small-scale session on health information provision could have such a significant impact, then it should be possible to bring about a change at a larger level by involving other agents of social change. The mass media and textbook developers could play an important role in this regard.

The large majority of participants said that they would like to gain more knowledge about breast cancer and similar information about other

health issues. All of them found the exercise to be informative, and most felt that information about breast cancer could help prevent risk factors, while early detection could help prevent most diseases. Most participants said they had practiced BSE after having learnt about the procedure.

These reports of behavioral change indicate that women are basically willing to acquire knowledge about issues pertaining to their health. We saw that the knowledge they had about health issues, including reproductive health, was not based on expert opinions because most of them had never read anything on the subject, discussed such issues with anyone, or watched health-related programs on television. Therefore, when this study provided them with an opportunity to acquire the relevant information, they expressed an interest in gaining more information on such subjects.

The value of this exercise acquires even more significance when we consider that our sample comprised educated females studying at a well-reputed women's university in the provincial capital. If this segment of the female population has insufficient, incomplete, or inaccurate knowledge of health issues, then we can expect women from less privileged regions to be even less knowledgeable.

Our findings have serious implications. In cases of breast cancer, it is usually the patient who first detects a lump and then seeks medical advice. The earlier the detection, the better her prognosis might be. Still, many women tend to ignore such changes in their bodies for some time and only seek medical help once they have reached the second or third stage of the disease's development. This is often because they were not aware that an ordinary looking change or growth could have serious, life threatening consequences. There are also women who are aware that changes in their body should not be ignored, but who delay seeking medical attention because they do not know how to detect the change at an early stage. These women do not perform BSE through lack of awareness of the procedure, carelessness, or procrastination.

In these and similar situations, accurate knowledge and awareness are two highly significant variables. Women need to possess health knowledge before they can adopt healthy lifestyles and health protective behaviors. In contemporary Pakistani society, little attention is paid to health education. Neither school textbooks nor curricula teach personal health, especially reproductive health. The mass media does not play an active role in the provision of public health education. The participants in

this study were educated females who had been exposed to a variety of academic stimulants in the last 13 or 14 years of formal education, but most of them lacked the essential knowledge that could be vital to a woman's health. It is, therefore, imperative that policymakers and other stakeholders join hands to find ways of promoting health and enhancing wellbeing through health education.

5. Conclusion

This study has shown that health information provision or health education can bring about significant positive changes in health related-behaviors. We have seen that formal education does not contribute as much to health knowledge, behaviors, or beliefs such as self-efficacy. Exposure to health-related information and subsequently enhanced awareness not only improves health knowledge but also encourages healthy practices.

Health education campaigns pertaining to breast cancer and other aspects of reproductive health should be designed and run through radio and television programs. Formal education should incorporate health education as part of the curricula at all academic levels. Simple messages pertaining to issues such as personal hygiene could be introduced at the school level, while awareness of health-promoting behavior, disease prevention, and the identification of symptoms of common diseases could be raised at college or university level. The print media should also be involved in delivering health protective messages.

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