

Hospital Communication Campaigns and Breast Cancer Awareness in Lahore

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ABSTRACT

Aim of the Study: This research was conducted to assess the effect of breast cancer awareness campaigns in hospitals on increasing awareness among women in Lahore, Pakistan.

Methodology: A Mixed-method research design was adopted in this study. The study sample comprised (n=400) women patients attending five hospitals: Shaukat Khanum Memorial Cancer Hospital & Research Center, INMOL Hospital, Doctors Hospital & Medical Center, Evercare Hospital Lahore, and Cancer Care Hospital & Research Center. Using the HBM framework, the study measured campaign exposure, understanding, affective response, perceived value, and behavioral intention. The statistical tools used include chi-square test, One-Way ANOVA, Spearman correlation, and multiple regression.

Findings: The majority of respondents (64%) were exposed to campaign messages via social media and counseling. Nevertheless, emotional involvement remained low because only 39% felt supported, whereas one-third found the campaign language hard to comprehend. Only 5% feel strongly emotionally attached. While 42% indicated readiness for screening and 45.3% mentioned practicing prevention, there were no differences in campaign effectiveness at hospitals and different education levels using Chi-square and ANOVA tests.

Conclusion: Breast cancer awareness campaigns implemented in hospitals are highly effective in terms of dissemination, but their influence on people's actions is insignificant.

Keywords: Breast Cancer Awareness, Hospital Communication Campaigns, Healthcare Sustainability, Health Belief Model (HBM), Pakistan.

1. INTRODUCTION

Hospitals' health communication campaigns are instrumental in increasing public knowledge and awareness as well as improving the practice of prevention related to breast cancer, particularly in areas where the rate of incidence is quite high, such as in Lahore, Pakistan. Breast cancer (BC) ranks as the second most common cancer type with the highest number of diagnoses each year. In a year, about 2.3 million people develop breast cancer (Bray et al., 2024). Conversely, about 90% of survivors with breast

Article History

Received:
April 20, 2026

Revised:
June 24, 2026

Accepted:
June 27, 2026

Online:
June 30, 2026

cancer experience severe negative impacts associated with alterations in their physiological, psychological, emotional, and social aspects, which influence the quality of their lives (García-Chico et al., 2025). Across the world, breast cancer has emerged as one of the major causes of illness and fatality among females (Tupper et al., 2024). The Nuclear Oncology Radiotherapy Institute (NORI) conducts yearly breast cancer awareness campaigns with activities like fast-track facilitation counters and free screening clinics (Shafique, 2023). Breast Cancer is the prioritised public health issue faced in Pakistan, as almost 90,000 cases are reported each year, with 40,000 deaths occurring due to late diagnoses of the disease (Chaudhry & Zia, 2020). Mostly, the mothers in Pakistan are not aware that they should check their breasts themselves, and when they should go for treatment.

However, since the primary factors that lead to breast cancer cases being identified in the fourth stage are examined, physicians recommend that women who are below 40 years of age should perform self-examinations on their breasts, while those who are above 40 years of age should undergo mammograms annually. There is an increase in the incidence of this disease, and people usually delay seeking help for their condition. It would be very important to understand why such delays take place because this is one way to help in diagnosing the illness in the early stages of development. As suggested by the World Health Organization (n.d.), early diagnosis can contribute significantly to better recovery from the disease and lower fatalities associated with it. Women may be hesitant to seek medical attention owing to the issue of social embarrassment or stigma (Sharmeen, 2023). Therefore, interventions should be aimed at providing education to Pakistani women through health campaigns.

1.1 Media's Role in Health Communication

Media messages have been called a "social vaccine" for behavior modification in the sense that awareness is generated through mass communication, and motivation is provided to individuals to consult physicians for generalizing the knowledge gained from targeted messages to prevent disease. Media is an effective medium to disseminate health information for altering the perception of the population regarding diseases because mass media focuses on improving the health conditions of women through proper utilization of contraceptives, family planning, preventing STDs, and performing screening tests for breast and cervical cancers (Tariq et al., 2021). Awareness programs on television, radio, and newspapers can be organized to educate women, thereby breaking cultural barriers and motivating women to visit nearby clinics for breast examination. The majority of these campaigns tend to include educational activities focusing on the importance of regular self-examinations and prompt consultations with a doctor. This research aims to explore the efficacy of health-related communication campaigns through hospital interventions amongst the breast cancer sufferers in Lahore in relation to their effect on awareness, attitudes, and health behaviors. The World Health Organization reports that about 2.3 million cases are diagnosed annually. Breast cancer is a huge issue for women in Pakistan, where one of the world's highest rates is found (Pink Ribbon Pakistan, n.d.). But on the other hand, the media becomes very significant in public health communications. Media may impact a vast population, shape public opinion, and encourage behavioral changes.

1.2 Problem Statement

Even with growing efforts made by different hospitals in Lahore to sensitize people regarding breast cancer, there is not much known concerning the effect that the campaign messages have on women in terms of awareness levels, psychological well-being, satisfaction with health care services provided, and preventive behavior. It is still questionable whether the hospital-led breast cancer awareness campaigns are reaching the target group, engaging them emotionally, and prompting them to undertake timely health care-related activities such as diagnosis and treatment. This study attempts to explore the influence of hospital-led breast cancer campaigns on awareness levels, psychological effects, trust towards health care facilities, and preventive health behaviors among women. This study is vital since breast cancer remains one of the prevalent health problems amongst women in Pakistan; it is life-saving if it is diagnosed on time. Different hospitals are trying to sensitize people in relation to breast cancer using different

campaigns; however, it is essential to find out how successful these campaigns are. It would help the hospitals understand how the women receive the campaigns, become more aware, and take action based on this research.

1.3 Hypotheses

H1: Higher exposure is positively associated with emotional engagement.

H2: Perceived usefulness of the campaign significantly predicts intention to perform breast self-exams.

H3: Perceived value of the campaign is the strongest predictor of campaign impact.

H4: Emotional and behavioral engagement negatively predicts campaign impact.

H5: Exposure to the campaign negatively predicts perceived impact.

2. LITERATURE REVIEW

2.1 Health communication for sustainable breast cancer awareness

Cancers are among the most deadly illnesses that affect people; however, they have not been proven curable yet, even with artificial intelligence (AI) technologies (Nassif et al., 2022). It is expected that by 2040, one million people will die of breast cancer annually, and more than three million new cases will arise. Numerous factors are causing the burden from the illness, among which are family history, delayed diagnosis, and insufficient funding. Studies have shown the effectiveness and efficiency of the media in raising health awareness among the public, but the internet plays a bigger role in motivating young women to carry out self-examinations. One study involved comparing knowledge, attitudes, and behavior between medical and non-medical female students, which indicated moderate levels of knowledge and attitudes (65%-84%), but lower BSE behaviors (13%-20%). Only 14.2% of nurses in Services Hospital (November-December 2024) displayed adequate knowledge regarding breast cancer risk factors, while the others exhibited average to poor levels of knowledge (Jamil et al., 2025). However, the effect of different BC campaigns in South Asia, mass media interventions were effective since they increased awareness; however, such interventions did not always evaluate the changes in people's actions. An experiment was performed by Hosseinifar et al. (2024), who established that a structured education program in which the patient recall-and-explanation method was adopted to facilitate awareness, particularly among females, regarding early signs and self-examination methods, significantly ($p < 0.001$). In the area of digital technology, Najafi et al. (2024) have created "Breamy," an augmented reality application that improves patient knowledge of surgical procedures. About patient-centered design, another study carried out in Iran, Mohammad et al. (2025), found that breast cancer patients preferred to use digital information technologies that included video-based emotional support rather than those that were static. Fertility preservation amongst women suffering from breast cancer in China aged above 40 has been studied further to identify the factors that affect such a practice (Chen et al., 2025).

The most common method of screening for breast cancer includes mammography (MMG); however, there are cheaper methods to examine symptoms clinically and personally (Marandu et al., 2024). Hospital-based health promotion campaigns, often run in collaboration with provincial and national groups such as Pink Ribbon, aim to raise breast cancer awareness and encourage preventive behaviors; however, they are not very effective. Hospital-based campaigns have the advantage of reaching patients directly through culturally appropriate messaging; however, they focus more on fundraising than behavior change (Aslam et al., 2024). To fill this void, the current study provides an in-depth analysis of hospital-based breast cancer awareness campaigns in Lahore. Even though considerable success has been achieved in curing this type of cancer, the death rate remains very high because of late diagnoses, lack of medical facilities, and treatment (Anas et al., 2024). Among Pakistan's provinces, the highest burden of the disease is found in Punjab (45.13%), followed by Sindh, Khyber Pakhtunkhwa, and Baluchistan (Ikram et al., 2023). The Health Belief Model (HBM) explains health behaviors, especially those related to cancer screening programs (Rosenstock, 1974). In this research, the HBM is applied to analyze the effects of

hospital-based breast cancer awareness campaigns on risk perception, screening behavior, and preventive measures.

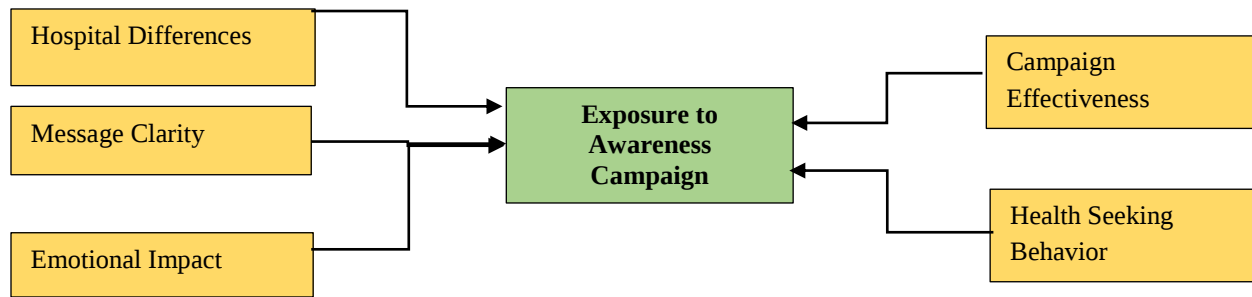
2.2 Theoretical Framework

Rosenstock (1975) tried to explore health behaviors, specifically those concerning disease screening and early detection behaviors. In his research, the Health Belief Model offers a theoretical perspective to analyze media-based interventions on breast cancer screening and early detection behaviors of Pakistani women. Some of the important theoretical constructs included: beliefs regarding vulnerability, seriousness of the condition, and preventive actions to face the upcoming issues by several factors.

2.3 Conceptual Framework

In this study, the researchers used a conceptual framework to show different way that we collect and analyze information (see figure 1).

Figure 1: *Conceptual Framework*



3. RESEARCH METHODOLOGY

3.1 Study Design

The population for this study includes all registered breast cancer patients who have received treatment or consultation at any of the following five major hospitals in Lahore. This hospital included Doctor Hospital & Medical Center, Inmol Hospital, Evercare Hospital Lahore, Cancer Care Hospital & Research Center, and Shaukat Khanum Memorial Cancer Hospital & Research Center. Since there is no publicly available record of admitted breast cancer patients under each of the five hospitals, the population size is not known, but it is estimated to get a representative and heterogeneous sample of 400 (with an exclusion of forty patients' being unresponsive) by using Cochran's formula: $n_0 = (Z^2 \times p \times (1 - p)) / e^2$ (Ahmed, 2024); Where: n_0 = required sample size for an infinite population.

3.2 Sampling and Data Collection

The selection of five tertiary care hospitals in Lahore is made by purposive sampling, considering their known participation in breast cancer awareness campaigns. Patients were selected in time blocks randomly in each of the hospitals to reduce respondent bias. Sampling criteria comprised female patients capable of consenting, as the sample would be reflecting the audience of communication breast cancer campaigns in hospitals. The data-gathering tool was modified for use in Pakistan using the pre-validated survey on breast cancer awareness and communication campaigns by Goyal et al. (2025) and also included questions adopted from internationally accepted measures for Breast Cancer Awareness (CAM, 2008). Exploratory Factor Analysis has been used for assessing the contextual reliability as well as for ensuring the validity of the survey questionnaire before any complete analysis. According to many researchers, Cronbach's Alpha value should be at least 0.70 or higher (Tavakol & Dennick, 2011). Such a factor analysis helps in making the survey design logical and accurate.

3.3 Data Collection Procedure

The collection of data lasted for one year, during which help was received from the hospital employees and health communication officers. Ethical approval was received from the respective hospitals, while informed consent was received from all participants. Survey questionnaires were conducted in the Urdu language for the purpose of clarity.

3.4 Inclusion Criteria

Female patients aged ≥ 18 years attending any of the five participating Lahore hospitals' breast clinics/oncology units during the study period, confirmed diagnosis of breast cancer (any stage) or under clinical evaluation for suspected breast disease at the time of recruitment, who were able to provide informed consent and complete the questionnaire in Urdu or English (assisted administration allowed). Moreover, residents of Lahore Division who are receiving ongoing care in Lahore and are willing to answer items about exposure (or non-exposure) to hospital-led/Pink Ribbon-linked breast cancer communication activities in the past 12 months were included.

3.5 Exclusion criteria

Male patients or individuals < 18 years; visitors/caregivers (i.e., not patients), medically unstable/critical condition, severe cognitive impairment, or acute distress that precludes consent or reliable survey completion (as judged by the treating team). Moreover, duplicate enrolment (patients approached at more than one visit; only the first completed questionnaire was retained), and primary malignancy other than breast without concurrent breast disease were not included. Furthermore, we did not set an upper age limit. The realized sample skewed from 18–54 years to 18–24 years (17%), 25–34 years (28.5%), 35–44 years (27.5%), and 45–54 years (27%). The older age categories met the eligibility criteria but were underrepresented because of clinic attendance tendencies. In the same manner, the exposure to campaign materials was not a requirement but rather something that was used in comparison between those who had been exposed and those who had not.

3.6 Data Analysis

The data were gathered through a cross-sectional survey among hospital populations from May 2024 to May 2025 at five significant breast cancer hospitals in Lahore. The survey sample included 400 women who answered a structured questionnaire to assess their demographic profile, knowledge level, and exposure to breast cancer-related communication campaigns. Statistical analyses are conducted with IBM SPSS Statistics 23.0 software. Chi-square analysis is used for testing any association among categorical variables. Correlation analysis is utilized to analyze the linkages between awareness and demographics. One-Way ANOVA was run to determine differences among education levels and age groups, while the relationship between awareness/perception scores and predictor variables was investigated using linear regression. For correlation (Pearson/Spearman), the objective is to measure the strength and nature of associations among pairs of variables measured in continuous scales (e.g., age and awareness score; number of sources and self-examination). The application of the pre-validated tool together with statistical validation methods enhances the research's validity and reliability. Statistical significance is achieved by setting the p-value at $p < 0.05$. Such statistical techniques are utilized to explore not only associations but also predictors of the effectiveness of breast cancer awareness campaign programs led by hospitals in Lahore.

3.7 Ethical Considerations

All participants were made clearly aware of the reason behind the research. Their names and personal data were kept confidential and not revealed to anyone. No gifts or rewards were provided for participation. The data gathered was used only for research.

4. RESULTS

As for the theoretical framework used, it is HBM, which was chosen to provide an interpretation of research results and campaigns' content. Demographic information indicates that the campaign managed to engage participants using several channels (digital and interpersonal ones), confirming the validity of the multi-channel strategy application.

Table 1: *Demographic Variables*

Variable	Categories	Frequency (n=400)	Percentage (%)
Hospital Name	Cancer Care Hospital & Research Center (CCHRC)	57	14.3
	Doctors Hospital & Medical Center (DHMC)	61	15.3
	Evercare Hospital Lahore (EHL)	64	16
	INMOL Hospital (INMOLH)	104	26
	Shaukat Khanum Memorial Cancer Hospital & Research Center (SKMCH&RC)	114	28.5
Age (Years)	18-24	68	17
	25-34	114	28.5
	35-44	110	27.5
	45-54	108	27
Education Level	Illiterate	56	14
	Primary	82	20.5
	Matric	97	24.3
	Intermediate	78	19.5
	Graduate	60	15
	Postgraduate	27	6.8
Channels	Hospital website	35	8.75
	Posters	68	17
	Face-to-face counselling	83	20.75
	Social media	107	26.75
	All of these	107	26.75

The results represented in Table 1 reveal that the maximum number of participants belongs to Shaukat Khanum Hospital (28.5%) and Inmol Hospital (26%), ensuring adequate representation from both public and private hospitals. The majority of participants belonged to the age group of 25–34 years (28.5%). When considering educational qualifications, matriculation (24.3%) emerged as the most prevalent category, followed by primary (20.5%) and intermediate education (19.5%). In addition, participants also disclosed the medium through which they came across the breast cancer awareness campaign. Social media and more than one source constituted the most common mediums (26.75% each), highlighting the significance of an integrated approach, while personal counseling comprised 20.75%.

Table 2: *Reliability Analysis*

Themes	Cronbach's Alpha	No. of Items
Exposure Score	0.660	3
Campaign Impact Score (CIS)	0.875	5
Communication Clarity and Design	0.705	4
Perceived Value of Message (PVM)	0.790	3
Emotional and Behavioral Engagement	0.700	5
Intent and Satisfaction	0.787	4

In order to determine the internal consistency reliability of the themes employed in the research, an analysis was done based on Cronbach's alpha coefficient, as presented in Table 2. It is clear from the findings that the reliability of all thematic dimensions is satisfactory to high. The CIS dimension produced the highest value of Cronbach's alpha with a coefficient of 0.875 for five items, representing high internal consistency. Likewise, the internal consistency reliability coefficients of the themes Intent and Satisfaction ($\alpha = 0.787$) and PVM ($\alpha = 0.790$) are good, surpassing the minimum requirement of 0.70 (Nunnally & Bernstein, 1994). The reliability coefficient values are indicative of internal consistency in the measurement of constructs, thus justifying the use of composite measures for analysis.

Table 3: Association between Hospitals and Campaign exposure and campaign impact variables

		No	Yes	Total	Pearson Chi-Square	df	P - value
Hospital * Encouraged screening	Cancer Care Hospital & Research Center (CCHRC)	31	26	57	1.168a	4	0.88
	Doctors Hospital & Medical Center (DHMC)	38	23	61			
	Evercare Hospital Lahore (EHL)	35	29	64			
	INMOL Hospital (INMOLH)	62	42	104			
	Shaukat Khanum Memorial Cancer Hospital & Research Center (SKMCH&RC)	66	48	114			
Hospital * Took preventive action	CCHRC	27	30	57	2.080a	4	0.72
	DHMC	32	29	61			
	EHL	37	27	64			
	INMOLH	57	47	104			
	SKMCH&RC	66	48	114			
Hospital * Recommended to others	CCHRC	29	28	57	1.809a	4	0.77
	DHMC	38	23	61			
	EHL	38	26	64			
	INMOLH	61	43	104			
	SKMCH&RC	68	46	114			
Hospital *Early information help	CCHRC	31	26	57	3.942a	4	0.41
	DHMC	41	20	61			
	EHL	44	20	64			
	INMOLH	66	38	104			
	SKMCH&RC	67	47	114			
Hospital * Seen the campaign	CCHRC	23	34	57	1.690a	4	0.79
	DHMC	18	43	61			
	EHL	24	40	64			
	INMOLH	37	67	104			
	SKMCH&RC	42	72	114			

**Significant results ($P \leq 0.05$). df = degree of freedom

Chi-square tests were performed to determine whether participants' answers on the behavioral and attitudinal measures related to the campaign differed based on the hospital to which they belong. Based on the findings presented in Table 3, these results suggest that participants' responses related to the breast cancer awareness campaign are similar regardless of the hospital they belong to is supported.

Table 4: Association between Education Levels and Campaign exposure and campaign impact variables

		No	Yes	Total	Pearson Chi-Square	df	P - value
Education Level *	Illiterate (IL)	37	19	56	6.748a	5	0.24
Encouraged screening	Primary (PR)	52	30	82			
	Matric (MT)	56	41	97			
	Intermediate (IN)	44	34	78			
	Graduate (GR)	27	33	60			
	Postgraduate (PG)	16	11	27			
Education Level * Took preventive action	IL	32	24	56	6.489a	5	0.26
	PR	46	36	82			
	MT	51	46	97			
	IN	41	37	78			
	GR	39	21	60			
	PG	10	17	27			
Education Level * Recommended to others	IL	33	23	56	1.287a	5	0.94
	PR	48	34	82			
	MT	57	40	97			
	IN	42	36	78			
	GR	38	22	60			
	PG	16	11	27			
Education Level *Early information Help	IL	42	14	56	8.308a	5	0.14
	PR	44	38	82			
	MT	65	32	97			
	IN	48	30	78			
	GR	35	25	60			
	PG	15	12	27			
Education Level *Seen the campaign	IL	19	37	56	1.638a	5	0.90
	PR	31	51	82			
	MT	38	59	97			
	IN	26	52	78			
	GR	19	41	60			
	PG	11	16	27			

**Significant results ($P \leq 0.05$). df= degree of freedom

In order to assess whether respondents of varying levels of education had different responses to the breast cancer awareness campaign, a number of chi-square tests were conducted. As seen in Table 4, all groups of people, irrespective of their literacy level and whether they were illiterate or postgraduate students, appeared to have a relatively similar reaction to the breast cancer awareness campaign. This is a positive finding since it implies that the campaign was equally successful for everyone and no one particular group benefited more from it than another.

Table 5: Correlation Analysis

Variables	1	2	3	4	5	6	7	8
Age	1.000							
Education Level	-0.066	1.000						
Exposure Score	-0.100*	-0.119*	1.000					
Campaign Impact	-0.009	0.067	-0.120*	1.000				
Communication Clarity & Design	0.046	0.057	-0.058	0.086	1.000			
Perceived Value of	-0.055	-0.141**	0.043	0.423**	-0.107*	1.000		

Message								
Emotional & Behavioral Engagement	0.016	-0.027	-0.155**	0.046	0.040	0.415**	1.000	
Intent and Satisfaction	0.050	-0.019	-0.405**	0.363**	0.059	0.426**	0.138**	1.000

*Correlation is significant at the 0.05 level (2-tailed).

**Correlation is significant at the 0.01 level (2-tailed).

According to Table 5, there were some minor influences of demographic factors because the younger generation felt exposed to the message to a greater extent compared to their older counterparts, and those who had higher levels of education felt less value in the campaign messages and perceived less exposure. However, the influence of message quality proved to be more significant, as the value perceived was found to be highly related to the impact, emotional involvement, and behavioral intentions. These findings indicate that the success of awareness campaigns conducted by hospitals is based more on the content value of the messages used and their ability to evoke emotions rather than the demographic features of those participating in such campaigns.

Table 6: One-Way ANOVA: Campaign Impact Scores by Hospitals

Campaign Impact Scores	Hospitals	Mean	Std. Deviation	95% Confidence Interval		F	Sig.
				Lower Bound	Upper Bound		
Exposure Score	Cancer Care Hospital & Research Center (CCHRC)	2.54	0.77	2.34	2.75	1.05	0.38
	Doctors Hospital & Medical Center (DHMC)	2.38	0.85	2.16	2.60		
	Evercare Hospital Lahore (EHL)	2.64	0.74	2.46	2.82		
	INMOL Hospital (INMOLH)	2.60	0.77	2.45	2.75		
	Shaukat Khanum Memorial Cancer Hospital & Research Center (SKMCH&RC)	2.57	0.75	2.43	2.71		
	Total	2.56	0.77	2.48	2.63		
Communication Clarity and Design	CCHRC	3.02	0.83	2.80	3.24	0.13	0.97
	DHMC	3.01	0.77	2.81	3.20		
	EHL	3.03	0.84	2.82	3.24		
	INMOLH	3.06	0.88	2.89	3.23		
	SKMCH&RC	2.98	0.83	2.82	3.13		
	Total	3.02	0.83	2.94	3.10		
Perceived Value of Message	CCHRC	2.22	0.77	2.01	2.42	0.13	0.97
	DHMC	2.19	0.79	1.98	2.39		
	EHL	2.15	0.70	1.97	2.32		
	INMOLH	2.14	0.88	1.97	2.31		
	SKMCH&RC	2.20	0.87	2.04	2.36		
	Total	2.18	0.82	2.10	2.26		
Emotional and Behavioral Engagement	CCHRC	2.23	0.70	2.04	2.41	0.92	0.45
	DHMC	2.37	0.75	2.18	2.56		
	EHL	2.25	0.58	2.10	2.39		

Intent and Satisfaction	INMOLH	2.39	0.69	2.25	2.52	1.78	0.13
	SKMCH&RC	2.27	0.66	2.14	2.39		
	Total	2.31	0.68	2.24	2.37		
	CCHRC	3.45	0.89	3.21	3.69		
	DHMC	3.35	0.91	3.12	3.58		
	EHL	3.28	0.98	3.03	3.52		
	INMOLH	3.07	1.03	2.87	3.27		
	SKMCH&RC	3.26	0.91	3.09	3.43		
	Total	3.25	0.95	3.16	3.35		

**Significant results ($P \leq 0.05$).

Results of ANOVA tests depicted in Table 6 reveal that hospital identity was not a significant factor in terms of affecting any aspect of campaign influence (exposure, clarity, value, engagement, or intention). This implies that breast cancer awareness campaigns conducted in five selected hospitals had the same effect, irrespective of whether a participant had been hospitalized in one hospital or another.

Table 7: One-Way ANOVA: Campaign Impact Scores by Education Level

Campaign Impact Scores	Hospitals	Mean	Std. Deviation	95% Confidence Interval		F	Sig.
				Lower Bound	Upper Bound		
Exposure Score	Illiterate (IL)	2.76	0.60	2.59	2.92	3.09	0.01
	Primary (PR)	2.52	0.75	2.35	2.68		
	Matric (MT)	2.68	0.77	2.53	2.84		
	Intermediate (IN)	2.57	0.77	2.40	2.75		
	Graduate (GR)	2.31	0.80	2.10	2.51		
	Postgraduate (PR)	2.33	0.96	1.95	2.71		
	Total	2.56	0.77	2.48	2.63		
Communication Clarity and Design	IL	2.92	0.75	2.72	3.13	1.12	0.35
	PR	2.92	0.80	2.74	3.10		
	MT	3.10	0.83	2.93	3.27		
	IN	2.97	0.80	2.79	3.15		
	GR	3.19	0.93	2.95	3.43		
	PG	2.98	0.94	2.61	3.35		
	Total	3.02	0.83	2.94	3.10		
Perceived Value of Message	IL	2.28	0.92	2.03	2.53	2.04	0.07
	PR	2.33	0.89	2.13	2.535		
	MT	2.15	0.76	1.99	2.30		
	IN	2.19	0.81	2.01	2.37		
	GR	2.06	0.71	1.87	2.24		
	PG	1.83	0.74	1.53	2.12		
	Total	2.18	0.82	2.09	2.26		
Emotional and Behavioral Engagement	IL	2.30	0.64	2.12	2.47	0.29	0.92
	PR	2.38	0.72	2.22	2.53		
	MT	2.28	0.63	2.15	2.40		
	IN	2.27	0.63	2.13	2.41		
	GR	2.33	0.74	2.14	2.52		
	PG	2.27	0.79	1.95	2.58		
	Total	2.31	0.68	2.24	2.37		

Intent and Satisfaction	IL	3.19	0.85	2.96	3.41	0.60	0.70
	PR	3.37	0.92	3.17	3.57		
	MT	3.30	1.01	3.09	3.50		
	IN	3.13	0.96	2.92	3.35		
	GR	3.23	1.01	2.97	3.49		
	PG	3.28	0.96	2.90	3.66		
	Total	3.25	0.95	3.16	3.35		

**Significant results ($P \leq 0.05$).

Education level, as can be seen from Table 7, was significantly associated with campaign exposure; however, those with lower education levels and illiterate individuals were exposed more frequently than those who were highly educated. Such results indicate that although the levels of exposure differed somewhat based on education, both the quality and effectiveness of the messages provided remained consistent among all hospitals and levels of education, which highlights their widespread availability.

Table 8: Hierarchical Regression Analysis Predicting Intent and Satisfaction

Predictor	B	SE	β	t	p	95% CI
Hospital Name	-0.033	0.025	-0.049	-1.344	0.18	[-0.082, 0.015]
Age	0.013	0.033	0.015	0.397	0.691	[-0.052, 0.078]
Education Level	-0.031	0.024	-0.047	-1.276	0.203	[-0.078, 0.017]
Exposure Score	-0.589	0.047	-0.477	-12.632	0.0	[-0.680, -0.497]
Campaign Impact	0.584	0.101	0.246	5.783	0.0	[0.385, 0.783]
Communication Clarity	-0.128	0.043	-0.111	-2.998	0.003	[-0.211, -0.044]
Perceived Value	0.468	0.056	0.403	8.327	0.0	[0.358, 0.578]
Emotional & Behavioral Engagement	-0.327	0.059	-0.232	-5.546	0.0	[-0.443, -0.211]

B = unstandardized regression coefficient; SE B = standard error of the coefficient; β = standardized coefficient; $p < .05$ indicates statistical significance

However, as indicated in Table 8, the effects of demographic variables (age, education, and hospital) on intention and satisfaction independently were not significant (Model 1: $R^2 = .008$, ns). Nevertheless, adding campaign-specific variables to the model significantly increased the amount of explained variance, with Model 2 accounting for 50.1% of the variance in intention and satisfaction ($p < .001$). Variables such as exposure score, perceived value, clarity of communication, influence of the campaign, and emotional response emerged as strong predictors.

Table 9: Hierarchical Linear Regression Predicting Campaign Impact Score

Predictor	B	SE B	β	t	p	95% CI
Hospital Name	-.004	.012	-.015	-.345	.730	[-0.029, 0.020]
Age	.003	.017	.008	.179	.858	[-0.030, 0.036]
Education Level	.030	.012	.109	2.509	.013	[0.006, 0.054]
Exposure Score	-.065	.023	-.125	-2.824	.005	[-0.110, -0.020]
Communication Clarity	.064	.021	.132	3.040	.003	[0.023, 0.105]
Perceived Value	.300	.024	.611	12.655	.000	[0.253, 0.346]
Emotional & Behavioral Engagement	-.134	.029	-.226	-4.675	.000	[-0.191, -0.078]

B = unstandardized regression coefficient; SE B = standard error of the coefficient; β = standardized coefficient; $p < .05$ indicates statistical significance

Based on Table 9, demographic factors such as education, hospital, and age did not significantly contribute to predicting variance in campaign impact ($R^2 = .004$, $F(3, 396) = 0.56$, $p = .64$) using the first model. Upon the inclusion of variables related to communication in Model 2, the result showed a considerable improvement in the model's fit ($R^2 = .297$, $F(7, 392) = 23.64$, $p < .001$), where almost 30%

of the variance was accounted for in the campaign impact. The significant predictors identified from Model 2 were perceived value of the message ($\beta = .611$, $p < .001$), emotional and behavioral involvement ($\beta = -.226$, $p < .001$), communication design ($\beta = .132$, $p = .003$), exposure index ($\beta = -.125$, $p = .005$), and education ($\beta = .109$, $p = .013$). On the other hand, age and hospital were found to be insignificant.

5. DISCUSSION

This study presents a thorough assessment of the awareness campaigns of breast cancer in terms of their reach, effectiveness, credibility, and behavior. No relationship was observed between breast cancer awareness and the education and socio-economic status of the people in Pakistan by Shoukat & Shah (2023).

Wassie et al. (2024) observed an equal distribution of breast self-examination awareness among different population segments in Kenya, whereas in the case of Armenia, no significant differences were observed among the demographic groups for beliefs about breast cancer screening. These results indicate that despite differences in the demographics and environment, the impact of awareness campaigns on health beliefs is rather uniform.

ANOVA results showed the presence of differences in exposure to campaigns depending on education ($p = .01$), as more exposure was observed for individuals with lower education levels. This indicates that the campaigns managed to reach populations usually underrepresented in health communication campaigns. The obtained results are supported by the fact that less educated women respond better to breast cancer awareness campaigns via mass media (Aslam et al., 2024). The same results have been found internationally, as mass media interventions were found to be more effective for less educated women compared to educated women whose behavior is driven by physicians' recommendations.

Findings from correlation and regression tests revealed that communication variables had a greater influence on campaign outcomes compared to demographic variables. Despite confirming Hypothesis 4, emotional involvement was found to have an unexpected negative effect on the perception of campaign influence. The current findings agree with other past studies stressing the significance of message credibility and value in increasing the awareness and prevention of breast cancer (Saeed et al., 2019).

In general, this study highlights the significance of message quality for health communication interventions. Indeed, following past literature (Tariq et al., 2021), an effective intervention is not necessarily dependent upon the level of exposure, but it is rather on the quality of the message. Literature based on fear appeals also shows that message quality is a better predictor of behavioral intentions than sociodemographic variables (Ghazanfar et al., 2021). Thus, while demographics may affect the levels of awareness, behavioral changes are more dependent on the quality of messages. Hence, breast cancer awareness campaigns in Pakistan must consider meaningful messages for audiences.

5.1 Theoretical Implications

The findings of this study provide evidence regarding the relevance of applying the Health Belief Model (HBM) to comprehend the efficiency of breast cancer awareness campaigns in Pakistan. Exposure to campaign messages served as one of the cues for the action. This result is in agreement with the assumption of HBM, which implies that exposure to certain health messages can motivate individuals to undertake some preventive actions. However, the results of the study imply that the level of awareness might not be sufficient to impact the level of perceived susceptibility and perceived severity. The low level of emotional connection to campaign messages could lead to low levels of awareness about individual risks related to breast cancer.

5.2 Limitations

The present study has analysed self-reported data collected from Lahore's leading urban cancer hospitals, which can be subject to social desirability bias or recall bias.

6. CONCLUSION

The current study brings out the significance of communication in hospitals as a means through which breast cancer awareness and early detection are promoted amongst Pakistani women. There is a need for more formalized and sustainable communication mechanisms that will help in supporting national-level campaigns aimed at increasing public awareness. Efficient communication can play a critical role in improving awareness and overcoming any cultural obstacles. This study has contributed immensely to existing literature on the subject and has provided practical insights into enhancing cancer awareness initiatives. Future research should build on this study by taking it to different geographical locations and examining the psychological and behavioral aspects of successful campaigns.

Acknowledgements

We acknowledge the respondents who participated in this study.

Disclosure Statement

No potential conflict of interest was reported by the authors.

Funding Source

The authors received NO funding to conduct this study.

Data Availability

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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