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Pink Communication: The Mediating Role of Awareness and Fear in the Effects of Media Exposure on Breast Self-examination

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ABSTRACT:

This study examines the effects of media exposure on breast cancer knowledge, attitude, and practice (KAP). In addition to exploring the direct relationship between media exposure and breast cancer KAP, the study also investigates the mediating effects of breast cancer awareness and fear between media exposure and breast self-examination. The study is anchored on the Advertising Research Foundation's (ARF's) Hierarchy of Effects Model, integrating with the KAP model. Using a cross-sectional web-based survey design, the study collected data from 352 female university students. Results from structural equation modeling analysis illustrate that media exposure is positively associated with breast cancer awareness and breast self-examination. Findings further reveal that awareness significantly mediates between media exposure and breast self-examination. However, breast cancer fear is not found to be a significant mediator and all paths involving fear are insignificant. This research study suggests that utilizing various media channels and strategies, pink communication campaigns can play a pivotal role in raising awareness, promoting breast cancer screening, and supporting those affected by this lethal disease.

Keywords: Awareness, breast cancer, breast self-examination, fear, media exposure, pink communication.

Introduction

In the sphere of health communication, mass media outlets have a substantial influence on health promotion, education and disease prevention (Ahmed & Bates, 2016).

Media health representations promote healthy behaviour by providing accurate and objective information regarding fatal diseases (Seale, 2002). Breast cancer is the most common life-threatening disease, as one in every nine women in Pakistan is at a lifetime risk of developing it (Khan et al., 2021). Oncologists recommend breast cancer screening to reduce the mortality risk by detecting breast cancer at an early stage. In this regard, mass media campaigns have been helpful in imparting health education, raising breast cancer awareness and promoting the adoption of screening practices among women (Asuquo & Olajide, 2015; Chapman et al., 2005; Hall et al., 2012; Schliemann et al., 2020).

Breast cancer awareness campaigns disseminate knowledge regarding risk factors, warning signs and symptoms of this lethal disease and increase the uptake of breast self-examination behaviour (Anastasi & Lusher, 2017). In addition, breast cancer fear also facilitates screening practice by developing a favorable attitude regarding self-examination behavior (Consedine et al., 2004; Hay et al., 2006; Ruiter et al., 2001). Although previous scholarly studies have explored the direct effects of media exposure, awareness and fear on breast cancer screening practices, the nuanced mechanism underlying the relationship between media exposure and breast cancer screening practice remains under-explored.

Previous researches have studied the direct relationship between media exposure and breast cancer screening practices (Nelson et al., 2014; Wiharti et al., 2023). The role of fear appeal messages in promoting screening practices has also been studied (Chen & Yang, 2018; Kim, 2010; Ruiter et al., 2001). Moreover, breast cancer KAP surveys have been conducted in different countries (Khalid et al., 2018; Nafissi et al., 2012; Pal et al., 2021), however, little or nought is known concerning the indirect effects of awareness and fear. The study in hand fills this research gap.

Research Objectives:

- To examine the effects of media exposure on breast cancer knowledge (awareness), attitude (fear) and practice (breast self-examination).
- To identify the impacts of awareness on fear and breast self-examination.
- To assess the impact of fear on the practice of breast self-examination.
- To explore the mediating effects of awareness and fear between the relationship of media exposure and breast self-examination.

Literature Review

Empirical literature suggests that media play a vital role in health promotion and disease prevention. Hamid et al. (2020) studied the effect of media exposure on HIV KAP under the framework of ARF's HoE model integrating with the KAP model. Findings showed a positive effect of media exposure on HIV knowledge. Knowledge developed a favourable attitude that led to safe practices. Wakefield et al. (2010) found that mass mediated health communication campaigns bring positive changes in preventive health behaviour. Likewise, Li et al. (2009) argued that media is a major source of health information that reduces stigmatization and increases awareness. Moreover, empirical literature suggests a significant relationship between information exposure and preventive health behaviour (Bouanchaud, 2011; Redmond et al., 2010; Seo & Matsaganis, 2013; Xiao et al., 2015).

Several studies have explored the direct relationship between media exposure and breast cancer screening behaviour. Li et al. (2019) found that news exposure had positive effects on screening behaviour through health information-seeking behaviour. The experimental study of Occa and Suggs (2016) found video messages more effective as compared to the infographic in terms of breast cancer information. Likewise, Nelson et al.

(2014) concluded that mass media and interpersonal communication improve breast cancer care among women through creating awareness. Further implied that mass media channels could be utilized to change health behaviour. Lee et al. (2013) ascertained that media exposure and factual knowledge were positively associated with taking precautionary measures like breast self-examination. The study of Jones et al. (2007) identified the effects of media on screening for breast cancer among a sample of 284 respondents. The researchers found that media exposure was a significant predictor of middle-aged females' breast cancer screening. Besides, Ikhlaq and Ans (2021) in their study found that media exposure of breast cancer was indirectly associated with screening behaviour via interpersonal communication and awareness.

In addition, the facilitating role of breast cancer fear in adoption of screening practices has been identified in previous scholarly studies. Chen and Yang (2018) assessed the impact of fear appeal messages on breast self-examination. The results indicated that fear arousal messages containing high threat and efficacy had a significant effect on breast self-examination behaviour. Likewise, Nelissen et al. (2015) found breast cancer fear as a significant predictor of information exposure, scanning, and avoiding. The study also found that cancer-diagnosed individuals were more inclined towards acquiring information related to cancer.

Lemal and Bulck (2008) examined the influence of television exposure related to breast cancer content on fear. The results demonstrated a positive association between television exposure and fear. Moreover, the majority of respondents especially high television viewers had a great fear of being diagnosed with breast cancer. Hay et al. (2006) asserted that fear plays a significant role in developing screening behaviour. Roskos-

Ewoldsen et al. (2004) determined that fear appeal messages are effective in encouraging the efficiency of breast self-examination which eventually enhanced the attitude accessibility concerning adaptive behaviour. It ultimately leads to the behavioural desire to practice breast self-examination. Ruiter et al. (2001) asserted that fear arousal messages work as a positive mechanism for adopting preventive behaviour. However, Jones and Owen (2006) did not agree with the assertion of fear appeal in promoting cancer screening as their study found that high-threat messages had not led women to undergo screening tests.

A critical review of previous studies shows that mass media create awareness and encourage women to practice breast self-examination. In spite of the evidence for a strong influence of fear in enacting screening behaviours, no study introduces fear as a favourable attitude within the KAP framework. The mediating effects of awareness and fear remain underexplored. Therefore, this study fills this research gap by exploring the mediating effects of awareness and fear.

Theoretical Framework

The study is anchored on the Advertising Research Foundation's (ARF) version (1961) of the Hierarchy of Effects Model (HoE) integrating with the Knowledge, Attitude, and Practice Model (KAP) which has a great capacity to explain and predict the influence of media exposure on breast self-examination.

Hierarchy of Effect Model

Advertising Research Foundation's (1961) Hierarchy of Effect Model posits that human behaviour changes in a linear fashion. It begins with information exposure (e.g. from media) that influences the knowledge, attitude, and action (practice) of individuals. Subsequently, a change occurs in human behaviour (Barry, 1987). The said model has

broadened its extent as it is being employed in health communication (Hanan, 2009). Moreover, it provides a basic framework to influence public health strategies focusing on step-by-step progression from exposure to information, knowledge, attitude, and practices. ARF's HoE model encompasses all variables of KAP. Therefore, it has been integrated with the KAP model. Furthermore, all constructs of this study are in consonance with the ibid framework. Previous studies have also adapted ARF's HoE model integrating with KAP to explore the effects of health-related information exposure on HIV KAP (Bouanchaud, 2011; Hamid et al., 2020; Li et al., 2009).

KAP Model in Health Communication

KAP model has been applied extensively in health communication related research studies. It was developed in the 1950s to examine what is known, believed, and done about a specific issue (MT et al., 2018; WHO, 2008). Several studies have adopted the KAP model to examine the influence of medical education on healthcare outcomes (Hamid & Tamam, 2018; Odionye et al., 2019).

KAP model postulates that a linear relationship and logical connection exists between knowledge, attitude, and practice. Knowledge and attitude refer to the understanding/feeling of people regarding a specific issue. The demonstration of knowledge and attitude is called practice. This model posits that a higher level of knowledge leads to behaviour change. Ignorance/lack of proper knowledge is a major problem that prevents an individual from acting in a rational manner. However, authentic information can change human behaviour by removing obstacles to knowledge (WHO, 2012). The first component of KAP sheds light on an individual's ability to obtain and consume information that is mixed with skills and experience. Secondly, attitude may be positive or negative that is directly linked with an

individual's knowledge, beliefs, and emotions (Launiala, 2009). Thirdly, practice is the application of knowledge that leads towards action (Badran, 1995).

This research study treats the components of the KAP Model in the following manner:

Breast Cancer Knowledge: In this study, knowledge means to be aware of risk factors and warning signs of disease in question. The awareness level of respondents has been measured by evaluating their knowledge regarding breast cancer. According to McMenamin et al. (2005), breast cancer knowledge means to be conscious or have sufficient knowledge about this disease via seeing, reading, or hearing anything about it.

Breast Cancer Attitude: Attitude means positive or negative emotions/feelings after acquiring information/knowledge related to breast cancer. Considering the facilitating role of fear-arousing communications in the acceptance of preventive health practices, this study treats fear as a favourable attitude that leads toward breast self-examination. Fear appeal used in persuasive messages encourages in adoption of preventive health behaviour (Roskos-Ewoldsen et al., 2004). In essence, fear is only one dimension of attitude.

Safe Practice of Breast Cancer: Practice means any action or preventive measure that reduces the risk of breast cancer. It typically involves mammography, clinical examination and self-examination. This study considers screening behaviour of breast self-examination as practice. Clinical practitioners recommend the said screening technique on monthly basis for women age 18 and older. It is operationalized as a preventive health behaviour adopted by women to examine their breasts, aiming to avoid inconvenient health situations in the future.

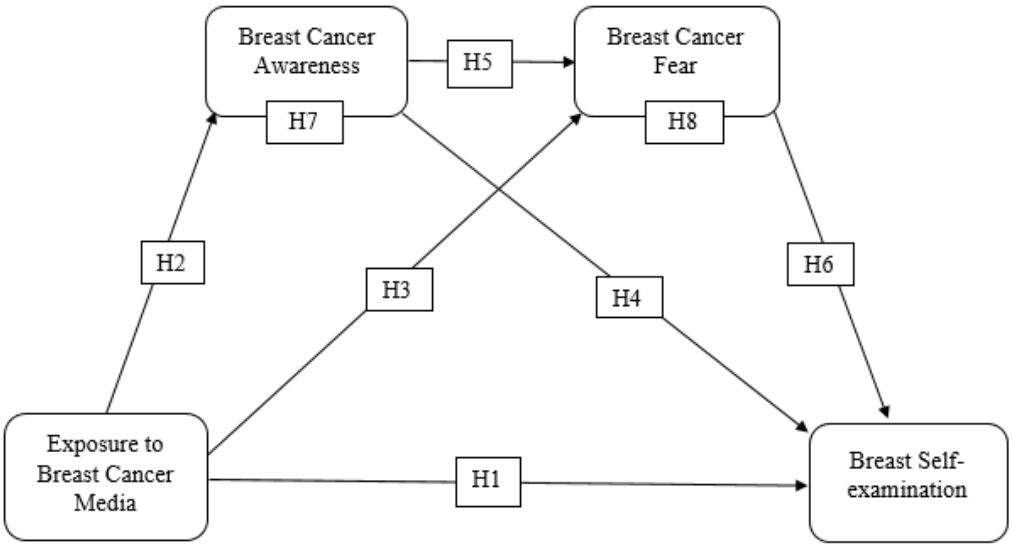

Figure 1: *Proposed Hypothesized Model of the Study*

The above hypothetical model considers media exposure as a predictor that stimulates awareness (knowledge). Awareness develops a favourable 'attitude' by creating fear. Resultantly, breast cancer fear leads to breast self-examination (practice). In addition to exploring the direct effects of media exposure on breast cancer KAP, this study tests the mediating effects of awareness and fear in a hypothetical relationship between media exposure and breast self-examination.

Hypotheses

H1: Media exposure is positively associated with breast self-examination.

H2: Media exposure is positively associated with breast cancer awareness.

H3: Media exposure is positively associated with breast cancer fear.

H4: Awareness is positively associated with breast self-examination.

H5: Breast cancer awareness is positively associated with fear.

H6: Breast cancer fear is positively associated with breast self-examination.

H7: Awareness mediates the relationships between media exposure and breast self-examination.

H8: Fear mediates the relationship between media exposure and breast self-examination.

H9: Breast cancer awareness and fear serially mediate the relationship between media exposure and breast self-examination.

Research Methodology

The study in hand is based on quantitative methodology, realism ontology, empiricism epistemology, and positivist paradigm. A cross-sectional voluntary web-based survey of 352 female students of higher education institutes of Lahore aged 18 to 33 was conducted. A first invitation was sent on March 26, 2020, and a concluding reminder was sent on May 10, 2020, to improve the response rate.

Measures

Media Exposure

By adopting media exposure scale from Morton and Duck (2001), this study measured exposure to breast cancer media. Respondents were asked how often they had come across any material regarding breast cancer on different information mediums. Their response was evaluated on a five-point scale ranging from 1=*Never* to 5=*Very often*. All items were averaged to form an index of media exposure (Cronbach's α = .80).

Breast Cancer Awareness

As stated above, breast cancer awareness in this study was assessed through breast cancer knowledge which was measured using a 10-item self-report measure. The instrument was adapted from the study published by Rakkapao et al. (2016) whereby the researcher had evaluated the breast cancer awareness level of the respondents by asking questions related to

risk factors and warning signs. The respondents were asked to indicate "Yes", "No" and "Don't know" for ten statements such as "Having a strong family history of breast cancer increases the risk of breast cancer" (α = .81). An index was created by counting up the number of correct answers. The highest possible score was 10.

Breast Cancer Fear

Breast cancer fear was measured by adopting a scale from the study of Nelissen et al. (2015). Participants' response was evaluated on Likert Scale (1 = *Strongly disagree*, 5 = *Strongly agree*). This scale included eight items such as "The thought of breast cancer scares me" (α = .91).

Breast Self-examination

Adopting a scale from previous studies of Ogata Jones et al. (2007) and Ronis and Harel (1989), this study measured breast self-examination on a five-point scale ranging from 1=*Never* to 5=*Very often*. It included three items such as "To what extent do you perform breast self-examination in a normal routine?" (α = .89).

Control Variables

Demographics such as age, marital status and qualification were included as control variables.

Data Analysis

For statistical analysis of data, partial least square based structural equation modeling (PLS-SEM) was used using Smart PLS 4. The said statistical technique was employed due to two reasons. Firstly, it is worthwhile to use in testing complex models (Hair et al., 2019). Secondly, this technique is highly effective, especially when research objectives do not confirm a strong theory (Hair et al., 2017). Moreover, it provides accurate results even with a smaller sample size. In this context, PLS-SEM is suitable to test the proposed hypothetical

model. Initially, the convergent and discriminant validity were assessed in the measurement model by running the PLS Algorithm. Thereafter, PLS bootstrapping at 5000 subsamples, a two-tailed significance level 0.05, was run to empirically test the hypothetical model.

Results

Table 1

Assessment of Convergent Validity

Constructs	Items	Loadings	CR	AVE
Media Exposure	ME_1	.798	.85	.50
	ME_2	.773		
	ME_3	.641		
	ME_4	.722		
	ME_5	.536		
	ME_6	.745		
Breast Cancer Awareness	BCA_1	.650	.84	.52
	BCA_2	.628		
	BCA_3	.759		
	BCA_4	.810		
	BCA_5	.770		
	BCA_6	.650		
	BCA_7	.610		
	BCA_8	.716		
	BCA_9	.681		
	BCA_10	.648		
Breast Cancer Fear	BCF_1	.842	.92	.63
	BCF_2	.855		
	BCF_3	.827		
	BCF_4	.835		
	BCF_5	.676		
	BCF_6	.759		
	BCF_7	.776		
Breast Self-examination	BSE_1	.906	.93	.82
	BSE_2	.919		
	BSE_3	.906		

Note. CR= Composite Reliability; AVE= Average Variance Extracted

As demonstrated above, the composite reliability ranges from .84 to 93, surpassing the recommended threshold value of .70. Likewise, all latent variables indicated satisfactory

AVE scores. According to Hair et al. (2019), loadings above 0.708 are recommended. Loadings of different items can be observed in Table 1. In this study, the R^2 value of breast cancer awareness is 0.056, breast cancer fear 0.012, and breast self-examination 0.172. Overall results of R^2 value are weak.

Table 2

Discriminant Validity as per the criteria of 'Fornell and Larcker (1981)'

	1	2	3	4
1. Awareness	**0.605**			
2. Fear	0.098	**0.798**		
3. Breast self-examination	0.327	0.11	**0.91**	
4. Media exposure	0.236	0.07	0.318	**0.708**

Note. Diagonals are square roots of AVE. The remaining values indicate the correlation among latent variables.

Table 3

Results of the Hypotheses Testing

Hypothesis Path	*ß*	*SD*	*t-value*	*p-value*
ME -> BSE	0.251	0.056	4.45	.000
ME -> BC Awareness	0.236	0.056	4.19	.000
ME -> BC Fear	0.049	0.070	0.70	.481
BC Awareness -> BSE	0.261	0.052	5.03	.000
BC Awareness -> BC Fear	0.086	0.091	0.94	.346
BC Fear -> BSE	0.067	0.056	1.19	.233
ME -> BC Awareness -> BSE	0.062	0.021	2.88	.004
ME -> BC Fear -> BSE	0.003	0.006	0.56	.574
ME -> Awareness -> Fear -> BSE	0.008	0.009	0.85	.621

Note. ME = Media Exposure; BC = Breast Cancer; BSE = Breast Self-examination

The structural model (See Figure 2) showed the values of path coefficients (β) and probability values in the inner model. The relationship was tested at a .05 level of significance. Results showed a positive relationship between media exposure and self-

examination practice (β = 0.251, t = 4.45, p < .001). H1 was supported. As suggested in H2, the frequency of media exposure was positively associated with awareness (β = 0.236, t = 4.19, p < .001). H2 was also supported. However, the association between media exposure and breast cancer fear was nonsignificant (β = 0.049, t = 0.70, p = 0.481). H3 was not supported. As predicted in H4, breast cancer awareness had positive effects on breast self-examination (β = 0.261, t = 5.03, p < .001). Thus, H4 was supported. In H5, breast cancer awareness was expected to be directly and positively associated with fear. Nevertheless, no empirical support for H5 was found (β = 0.086, t = 0.94, p = 0.346). Likewise, the relationship between fear and breast self-examination remained insignificant (β = 0.067, t = 1.19, p = 0.233). Therefore, H6 was not supported.

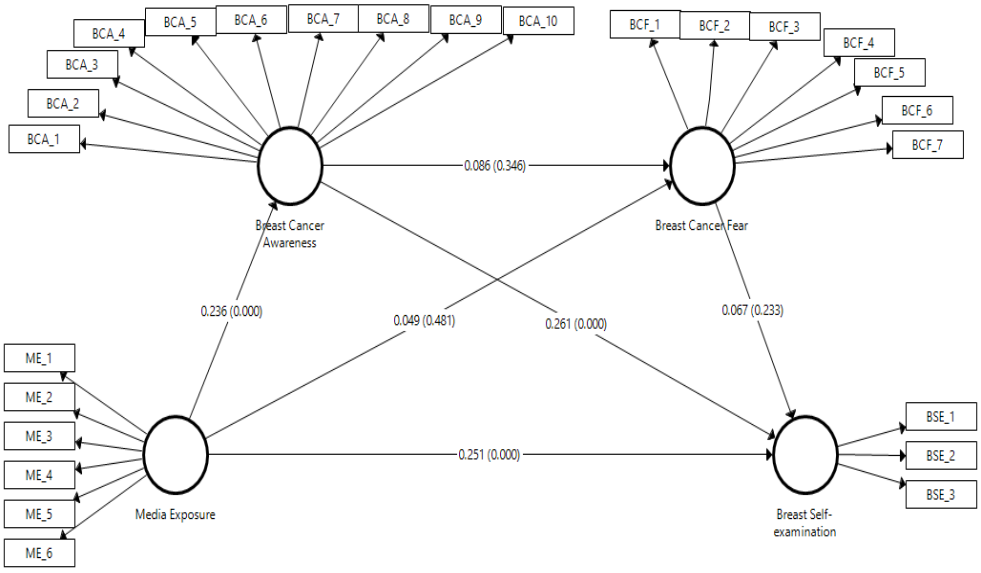

Figure 2: *Structural Model*

With regard to the results of mediating mechanisms, it was found that breast cancer awareness significantly mediated between media exposure and breast self-examination (β = 0.062, t = 2.88, p = .004). H7 was supported. As regards H8, breast cancer fear was not found

to be a significant mediator between media exposure and breast self-examination (β = 0.003, t = 0.56, p = 0.574). H8 was not supported. Results concerning serial mediation illustrated that awareness and fear didn't mediate serially (β = .008, t = .85, p = .621). Hence, H9 was not supported.

Discussion

Drawing on the ARF's Hierarchy of Effects Model integrated with the KAP Model, this study empirically tests the association between media exposure and breast cancer KAP alongside the indirect effects of awareness and fear. The proposed roles of cognitive and affective factors examined in this study are not only theoretically and practically interesting but also worth exploring from a research point of view.

Results of the study suggest that exposure to mass media health information has significant effects on the practice of breast self-examination. Findings further revealed a positive association between media exposure and breast cancer awareness. These results are compatible with previous studies (Li et al., 2019; Nelson et al., 2014; Occa & Suggs, 2016; Ogata Jones et al., 2007). With regard to the theoretical framework adopted in this study, it is reflected from the results that human behaviour doesn't change in a linear fashion as knowledge/awareness can influence practice even without building a favourable attitude. However, ARF's Hierarchy of Effects integration with the KAP framework seems compatible with the current study as media is found to have a direct influence on awareness and breast self-examination. In addition, the results lend support to the notion that awareness provides a linkage between information exposure and practice as the indirect effects of breast cancer awareness have been found significant in this study. Unlike previous studies (Chen &

Yang, 2018; Lemal & Bulck, 2008), the results of this study negate the effectiveness of fear appeals in health-promoting behaviour.

It can be inferred from the aforementioned results that media play a significant role in creating awareness regarding breast cancer preventive behaviour. Results further suggest that breast cancer screening practices can be improved by promoting preventive health behaviour instead of creating fear among women. In a nutshell, mass media pink communication campaigns (pink ribbon campaigns) can play a significant role in promoting breast cancer screening practices by disseminating health information through communication strategies like celebrity endorsement. The overall results of this study advocate that pink communication campaigns should be encouraged to disseminate accurate information pertaining to breast cancer prevention, screening, diagnosis, and treatment options. Such campaigns can play a crucial role in creating awareness, changing health behaviour, providing support to affectees and above all mobilizing resources to combat breast cancer.

As regards the limitations of this study, the researchers have not monitored the behaviour of respondents but rather relied on the quantitative assessment of self-reported information. Therefore, this study limits generalizability and recall bias can be raised. Moreover, the findings can't be generalized to all Pakistani women because of using a sampling technique of non-probability sampling. Despite these limitations, the significance of this study can not be denied as its results are helpful for communication and healthcare practitioners / allied health professionals. With respect to future research agenda, it is proposed that future studies may explore the effects of information exposure on other screening techniques such as mammography and clinical breast exams under the framework

of the Health Belief Model. Likewise, the mediating role of different constructs such as health insurance, health motivation, attitude strength, and interpersonal health communication especially family communication needs to be explored in future studies. Apart from mediating effects, researchers may explore the moderating effects of religiosity, marital status, age, level of education, narcissism, and health literacy. It also remains for future studies to generalize results by having a truly representative sample.

Conclusion

Foregoing in view, mass media play a significant role in promoting breast cancer screening practices by creating awareness among women. It is evident from the results that awareness and appropriate health knowledge can lead women towards breast self-examination without creating fear of breast cancer. The results further suggest that pink communication campaigns can raise awareness regarding the adoption of breast cancer screening practices.

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