Understanding Social Media Usage and Engagement among Women to inform Breast Cancer Knowledge and Prevention Practices: Cross - sectional study in Delhi -National Capital Region of India

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Abstract

Background: Breast cancer is the major concern worldwide and in India too. Lack of awareness is one of the causes of increasing mortality rate in India. Social media is playing an important role in health communication including breast cancer information. In India, number of women are using social media. **Objective:** To explore the impact of social media usage and engagement in enhancing knowledge and practices to prevent breast cancer among women of India. **Methodology:** A cross-sectional study was conducted in Delhi-National Capital Region of India with a sample of 649 women (response rate 83.51%). The questionnaire consisted of three sections. In first section, sociodemographic details (four items) were collected, second section contained five items on social media use and engagement and third part included items on knowledge about risk factors (seven items), symptoms (eight items), and screening (six items) of breast cancer and practice (seven items). Descriptive statistics, Chi-square, Cramer-V test, and structural equation modeling-Analysis of a moment structure were used to identify the relationship between social media engagement and knowledge and practices of women. **Results:** Around 80% (431/542) of women have medium level of social media engagement and 20% are highly engaged. The slope coefficient of the relationship between social media engagement and knowledge is 0.805 and between knowledge and practice is 0.309, Chi-square value is 52.053 and 29.624, Cramer-V statistics is 0.310 and 0.165, respectively, which indicates significant relationship. **Conclusion:** The study result justified significant impact of social media engagement on knowledge and practices of women to prevent breast cancer.

Keywords: Awareness, breast cancer, engagement, preventive practices, social media, women

INTRODUCTION

Breast cancer is the most widespread female cancer worldwide[1,2] including India where cases are rising,[3] advanced-stage cancer is diagnosed[4] and the mortality rate ranks to the highest.[5] Low cancer awareness among women contributes to advance stage diagnosis of breast cancer and high mortality rate.[5-7] Although long-standing national programs under 5 year plan were launched to increase awareness and early detection behavior,[8] mortality rates for breast cancer could not be curbed.[8] Less` informed coverage in newspapers and television is also a reason for low awareness about the disease.[9-11] In recent times, social media channels, known for its participatory and interactive features, have become a popular and preferred tool for health communication and promotion.[12,13] Facebook, Twitter, and YouTube are used as health information sources[14] and have large number of users, so education through these channels is accessible to more diverse population[15] in a country such as India.

Significant amount of breast cancer information (24.6%) is being posted in social media of all four cancers (Breast lung, prostate, and colorectal).[16] There are so many breast cancer campaigns

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in social media such as Facebook pages, communities, groups, and tweets on Twitter as well as by the various governmental and nongovernmental organizations.[17] Internet and Mobile Association, 2013 reports that 52% working women and 55% of nonworking women use social media in India.[18]

People of all demographics are accessing this convenient, cost-effective and easy media for their health purposes.[19] Few study findings suggest that eight out of ten Internet users are accessing health information online.[20,21] One study findings have suggested that almost 75% (out of 241 female students) women in Sharjah received breast cancer information through social media and almost 50% of them were getting knowledge of breast self-examination (BSE) from social media itself.[22] There was an urgent need to understand how social media engagement of Indian women is resulting in enhancing their awareness about breast cancer and practices to prevent it. Hence, the present study aimed to study the impact of social media engagement on breast cancer awareness and screening practices of women in Delhi-National capital region (NCR) of India.

METHODOLOGY

Face-to-face questionnaire survey was conducted to fill up the questionnaire with women using social media and staying in Delhi-NCR. Sampling method was purposive; nonprobability sampling, due to the unavailability of female population frame of social media users. A total of 649 women had given their consent for data collection. In total, 542 fully filled-up questionnaires were considered for analysis. Because of cultural factors, privacy reasons, and busy working schedule around 16% of women were not able to complete the questionnaire.[23] Study quality, utility, and validity were not affected by the nonresponses as the remaining sample was representative of study population[24] and sample size was taken more than required[25] for structural equation modeling (SEM); that is ten times of the number of variables (total = 33 variable × 10 = 330).[26] Data collection were done from March 2019 to December 2019.

This research-validated a questionnaire using previous literature suitable for Indian context on seven-point Likert scale. This study had structured questionnaire consisting of three parts. Part one had four items about sociodemographic details. Part two had five items related to social media engagement, namely, social media is part of my daily life, I perform various activities on social media such as liking, sharing, commenting, and uploading posts, I come across various posts, content, and videos that benefit me a lot, I often learn interesting and new things while using social media, one can make her life better using social media. Part three consisted of seven items measuring knowledge of breast cancer risk factors, that is smoking, alcohol consumption, consumption of fatty food, obesity, use of contraceptive pills, hormonal replacement therapy, symptoms of the diseases (eight items), that is nipple discharge, pain in breast, enlargement of one breast, arm swelling, lump in the breast, axillary lump, nipple retraction, dimpling of breast size and screening knowledge measured with six items included BSE, clinical breast examination, ultrasound, mammography, mammography is a method of early detection, suitable time for BSE is 7 days after periods. Practice was measured with seven items, namely, I perform BSE, I go to specialist for clinical breast examination, I go for mammogram as suggested by the clinician, I go for ultrasound, I do not consume fatty food, I do not consume alcohol, I do not do smoking. Using confirmatory factor analysis, convergent and discriminant validity was checked and statistical fitness of the scale was calculated which were found to be as per required value. The independent variable of this study was social media engagement and dependant variable was women's knowledge about breast cancer and practice of screening and healthy lifestyle to prevent breast cancer.

SEM-Analysis of a moment structures, statistical software graphics, was used to examine the relationship between the independent and dependant variables. SEM is a multivariate (multi-variation equation model) regression model which is meant to represent causal relationship among variables in the model. Result of SEM was assessed by the overall model fit data which was evaluated in the study.[27] Descriptive statistics such as frequency, mean score, and standard deviation was calculated to understand the engagement, knowledge of breast cancer, and practices of women. To confirm the association and its strength between independent and dependent variables, Chi-square and Cramer-V test were applied. Further, Kruskal–Wallis test was conducted to test the association between selected sociodemographic variables with knowledge and practice domain scores. Following were the two hypotheses tested:

1. The social media engagement of women users had a significant positive impact on their knowledge about breast cancer
2. The knowledge gained from social media about breast cancer had a significant impact on the practices adopted by women in order to prevent breast cancer.

Ethical clearance was taken before the inception of the study. Consent of the women was obtained. Privacy and anonymity concern of the participants was ensured.

RESULTS

Out of total 542 complete responses, almost 40% women were of 18–35 years, 38.7% were 36–47 years and 21.8% were 48 and above years of age. Most of the women were graduates (54.4%) and one-fourth were postgraduate (28.6%). High school or equivalent degree holders were merely 17%. Almost half of the respondents (43.9%) were homemakers and 32.5% were students. Only 23.6% of them were in service. Out of 542 women, almost 85% of women acknowledged that their source of knowledge about breast cancer was social media.

The slope coefficient of the relationship between social media engagement and knowledge was 0.805 ($P < 0.05$) which indicated that interaction with social media engagement leads to significant enhancement of the knowledge about

Table 1: Relationship between social media engagement, knowledge of breast cancer risk factors, symptoms, screening, and practices by structural equation analysis

Endogenous construct	Path	Exogenous construct	Standardized construct loading	Estimate	SE	Critical ratio	P	R^2
Knowledge	<--	Social media engagement	0.805	0.490	0.062	7.908	0.000	64.8%
Practice	<--	Knowledge	0.390	0.901	0.154	5.870	0.000	15.2%
Knowledge risk	<--	Knowledge	0.495	1	-	-	-	
Knowledge screening	<--		0.705	1.384	0.178	7.756	0.000	
Knowledge symptoms	<--		0.578	1.598	0.214	7.474	0.000	

SE: Standard error

Table 2: Statistical fitness indices of structural equation model for social media engagement, knowledge, and practices

GFI	CMIN/df	GFI	AGFI	CFI	TLI	RMSEA
Calculated value	2.789	0.852	0.831	0.924	0.918	0.057
Expected value	<5	>0.8	>0.8	>0.9	>0.9	<0.08

CMIN/df: Chi-square value/degree of freedom, GFI: Goodness of fit index, AGFI: Adjusted GFI, CFI: Comparative fit index, TLI: Tucker lewis index, RMSEA: Root mean square error of approximation

breast cancer in the women users [Table 1]. Further, the slope coefficient of the relationship between knowledge of the women about breast cancer and practices to prevent breast cancer was 0.390 ($P < 0.05$) [Table 1].

The R^2 (a squared multiple correlation) of the knowledge as endogenous construct was found to be 0.64 which means 64% of the variance of knowledge was explained with the help of the model. The R^2 of practice was found to be 0.152 which means 15.2% of the variance of screening and healthy lifestyle practices of women to prevent breast cancer can be explained with the help of this model [Table 1]. The statistical accuracy of the structural equation model was also examined with the measures of goodness fit which indicated the presence of significant statistical fitness [Table 2].

The mean score of all the constructs was close to five (agree) which is lying on the higher side of the seven-point scale. The respondents were further divided into three categories, i.e., low level, moderate level, and high level of social media engagement, knowledge, and practice. Almost 80% of women were moderately engaged in social media and 20% of them were highly engaged. Around 60% of women were having moderate knowledge of risk factors, symptoms, and screening of breast cancer and taking some actions moderately to prevent it. Thirty percent of women were having good knowledge of risk factors, symptoms, and screening. They practiced BSE, sometimes went for clinical check and ultrasound and some of them went for mammography as per doctor's suggestions. They take care of physical fitness and do not do smoking or consume alcohol. Result also indicated that high engagement in social media was resulting in positive outcome for breast cancer awareness and practice [Table 3].

To examine the association between the engagements of women in social media and their knowledge of risk factors, symptoms, and screening of breast cancer, the Chi-square test was applied.

The Chi-square statistics was found to be 52.053 ($P < 0.05$) and Cramer's v statistics was 0.310 ($P < 0.05$), which indicated the presence of moderate level of association between social media engagement and knowledge of breast cancer risk factors, symptoms, and screening was significant [Table 4].

Chi-square test and Cramer's v statistics were calculated to examine the association and its strength between knowledge of breast cancer and practices to prevent the disease. Chi-square value was 29.624 ($P < 0.05$) and Cramer's v value was 0.165 ($P < 0.05$) which indicated moderate level of association was significant [Table 5]. Knowledge and practice domain scores were significantly associated with some sociodemographic variables such as age, education status, and occupation of the participants [Table 6].

DISCUSSION

To the best of our knowledge, this was the first study that summarized the evidence of social media engagement impact on knowledge and practice of women users to prevent breast cancer. This study aimed to test two hypotheses, that social media usage and engagement of women had significant positive impact on their knowledge of breast cancer risk factors, symptoms, and screening methods. Further, knowledge of breast cancer had a significant impact on their healthy lifestyle practices and screening behavior. We found that around 65% of knowledge of risk factors, symptoms, and screening methods of women regarding breast cancer can be explained with the help of this model. This means 65% of knowledge of breast cancer risk factors, symptoms, and screening methods was coming from social media. Fifteen percent of healthy lifestyle and screening behavior practice among women was coming from the knowledge they had received from social media about breast cancer.

These study findings justified that engagement in social media helped in providing significant knowledge about breast cancer and this knowledge helped some of the women to go for preventive practices such as BSE, clinical examination, ultrasound, mammography, and lifestyles changes to prevent the disease. This finding was in accordance with earlier studies where educational programs and interventions made positive impact on breast cancer knowledge of women.[28,29] However, ours was not intervention study but health information available on social media made an impact on knowledge and preventive practices of women. This study result also

Table 3: Descriptive analysis of social media engagement, knowledge, and practice for breast cancer

Dimensions	Mean score	SD	Frequency distribution		
			Low (%)	Medium (%)	High (%)
SME	4.638	0.889	0	431 (79.5)	111 (20.5)
Knowledge risk factors	4.528	1.397	56 (10.3)	318 (58.7)	168 (31)
Knowledge screening	4.889	1.108	18 (3.3)	361 (66.6)	163 (30.1)
Knowledge symptoms	4.819	1.338	34 (6.3)	321 (59.2)	187 (34.5)
Practice to prevent breast cancer	4.566	1.380	48 (8.9)	338 (62)	156 (28.8)

SD: Standard deviation, SME: Social media engagement

Table 4: Chi-square and Cramer's-V statistics for association and strength between social media engagement and knowledge of breast cancer

SME	Knowledge level			Chi-square statistic	Cramer's V statistic
	Low	Moderate	High		
Moderate					
Observed count	9	353	69	52.053 (0.000)	0.310 (0.000)
Expected count	7.2	326.8	97.0		
High					
Observed count	0	58	53		
Expected count	1.8	84.2	25.0		

SME: Social media engagement

Table 5: Chi-square and Cramer's-V statistics for association and strength between breast cancer knowledge and practice

Knowledge	Practice level			Chi-square statistic	Cramer's V statistic
	Low	Moderate	High		
Low					
Observed count	1	8	0	29.624 (0.000)	0.165 (0.000)
Expected count	0.8	5.6	2.6		
Moderate					
Observed count	40	273	98		
Expected count	36.4	256.3	118.3		
High					
Observed count	7	57	58		
Expected count	10.8	76.1	35.1		

confirmed that mostly women had received the knowledge of breast cancer through social media which was consistent with previous study findings.[22] Our study result indicated that women were getting more knowledge from social media but their practices were limited.

In our study, we found that age played an important role in receiving knowledge through social media about breast cancer. Higher age women significantly gained more knowledge of risk factors, symptoms, and screening methods of breast cancer than younger age women. This result was not consistent with earlier study where younger age women gained more knowledge after intervention.[28] However, it may be analyzed with the fact that higher age women were more prone to breast cancer disease[30] so they were more receptive to breast cancer information and practicing various screening methods and healthy lifestyles to prevent the disease.

Our study result indicated that education significantly impacted knowledge enhancement of breast cancer through social media and preventive practices among women. Postgraduation and above degree holders were getting more knowledge through social media than intermediate and graduates. This may be explained with the fact that education makes people more receptive to knowledge and its execution. This fact can also be added that educated women were having extended social network[30] on social media and getting more exposure to breast cancer information. This finding was consistent with earlier study finding where educational intervention increased knowledge of breast cancer among more educated women.[29]

Occupational status of women was also found significantly associated with knowledge enhancement. Homemakers were found to be receiving more knowledge through social media about breast cancer than students and service women. They were also practicing more screening methods and healthy lifestyle than women in service and students. This finding was not as per earlier study finding where working women were more aware[30] and practicing more after intervention.[29]

Our study holds limitation of having purposive sampling method and restricted to Delhi-NCR. Hence, the result cannot be generalized on the total population of the country. This study was conducted on overall social media. Separate social media such as YouTube and Facebook should be taken into consideration by future researchers to understand comparative impact on breast cancer awareness. Future study should also be conducted on smartphone users that were the limitation of this study.

Table 6: Association of some demographic variables with breast cancer knowledge and practice scores

Club Demographic characteristics and Category column.	Knowledge domain scores (median)	Practice domain scores (median)
Age (years)[*,#]		
18-35	86	31
36-47	92	34
48 and above	104	38
Education[*,#]		
Intermediate	81.5	26
Graduation	90	34
Postgraduation and above	100	37
Occupation[*,#]		
Service	90	27
Student	92.5	35
Homemaker	95	33

[*]Knowledge scores: Significant, $p<0.001$, [#]Practice scores: Significant, $p<0.001$

CONCLUSION

This study summarizes the evidence of social media engagement impact on breast cancer knowledge of women and their practices to prevent the disease. In a vast country such as India social media can be a cost-effective tool for health communication with wide reach and interactive features. It also enables users' anonymity and social networking where discussions, suggestions, and clarification of confusions are possible. Special attention should be given to diverse language need, data security, and reliability.

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Conflicts of interest

There are no conflicts of interest.

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