Influence of Cues to Action towards Uptake of Immunohistochemistry Services among Women with Breast Cancer Attending Tertiary Health Facilities

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Abstract

Background: Breast cancer is the most frequently diagnosed cancer among women, making it a significant global public health issue. Although developed countries have a higher incidence of breast cancer, developing countries like Nigeria have a low incidence rate but higher rates of morbidity and mortality from the disease. **Objective:** This study explored how cues to action influenced the use of immunohistochemistry by women in Imo State and how many of them used immunohistochemistry (IHC) to diagnose their condition. **Methodology:** We used a descriptive study methodology for the investigation, and 121 participants were chosen at random from the 891 total population. The respondents were chosen through a systematic sampling procedure. Structured questionnaire was used as the data collection tool, and the statistical software for social science (SPSS) was used to analyze the data. **Results:** The mean age of the 121 participants in the study was 45.2 ± 0.7 years. The study found that awareness of IHC services is a significant influencing factor for the uptake and health personnel is the major source of awareness of IHC services. Cues to action particularly from health workers, as well as knowledge of any victim of breast cancer and user of IHC services, also significantly influenced uptake of the IHC services ($P < 0.0001$). **Conclusion:** In our study, utilization of IHC services was also impacted by cues to action, particularly from healthcare professionals, as well as awareness of any breast cancer victims and those who used IHC services thus cues to action is a major predictor of immunohistochemistry uptake among women with breast cancer.

1. Introduction

Worldwide, breast cancer is the most frequently diagnosed life-threatening cancer in women. In many less-developed countries, it is the leading cause of cancer death in women; in developed countries, however, it has been surpassed by lung cancer as a cause of cancer death in women [1]. In the United States, breast cancer accounts for 31% of all cancers in women and is second only to lung cancer as a cause of cancer deaths in women [2]. The incidence and mortality rates are increasing rapidly with over 500,000 deaths recorded each year, making it the leading cause of cancer death in women [3]. Breast cancer accounts for 25% of all cancers in females worldwide. In Africa, the incidence of breast cancer is relatively low compared to the western developed countries, however, morbidity and mortality rates are alarmingly high, reflecting the relatively poor survival from the disease in the continent [2] [4] [5]. The American Cancer Society (ACS) estimated an average of 93,600 new cases of breast cancer annually in Africa with about 50,000 deaths. In Nigeria, breast cancer is recognized as major cause of morbidity and mortality with incidence rate ranging from 36.3 to 50.2/100,000 women [6]. Also, in Imo state breast cancer has been reported to be the most common cancer among women [7].

Surgery and radiation therapy, along with adjuvant hormone or chemotherapy when indicated, are now considered primary treatment for breast cancer. For many patients with low-risk early-stage breast cancer, surgery with local radiation is curative. However, of these four approaches, the use of hormonal therapy stands out because of its increased survival advantage. Adjuvant breast cancer therapies are designed to treat micrometastatic disease or breast cancer cells that have escaped the breast and regional lymph nodes but do not yet have an established identifiable metastasis. Depending on the model of risk reduction, adjuvant therapy has been estimated to be responsible for 35% - 72% of the decrease in mortality [8]. The use of hormone therapy can only be employed when hormone receptors status of a breast cancer patient is known and this can only be achieved through immunohistochemistry (IHC). Immunohistochemistry is a technique that combines anatomical, immunological and biochemical techniques to identify discrete tissue components by the interaction of target antigens with specific antibodies tagged with a visible label. Immunohistochemistry (IHC) has an expanding role in the diagnosis and management of mammary disease [9].

Significant breast cancer-related morbidity and mortality in Nigeria may not be unrelated to a number of variables, such as patients' knowledge, attitudes and practice toward the disease as well as the use of immunohistochemistry diagnos-

tic services, and other socioeconomic variables. Therefore, we investigated the influence of cues to action on breast cancer immunohistochemistry diagnostic services uptake among women with breast cancer in Imo state tertiary hospitals.

2. Material and Methods

The research adopted descriptive study design to determine the influence of cues to action on the uptake of immunohistochemistry services among women in Imo State, with the view of understanding their inter-relationship between the two factors. The study was carried out at the two tertiary hospitals in the Imo state, Nigeria which are Federal Medical Centre Owerri (FMCO) and Imo State University Teaching hospital, Orlu (IMSUTH). Imo State is one of the 36 States in Nigeria.

Due to the fact that the two major tertiary health facilities in Owerri and Orlu zones that was used for this study serve the needs of all cancer patients across the state, the study population for this study was 891, which is the population of women with breast cancer attending Federal Medical Centre (F.M.C), Owerri and Imo State University Teaching Hospital (IMSUTH), Orlu from 2017 to 2021 (Breast cancer registries, FMC Owerri and IMSUTH, Orlu, 2017-2021) while the target population was 178 being average of the five year period (2017-2021).

2.1. Inclusion Criteria

Women 18 years and above with histopathologically confirmed breast cancer, attending FMC, Owerri and IMSUTH, Orlu, during the period of the study and gave their consent.

2.2. Exclusion Criteria

1) Women 18 years and above with clinically diagnosed breast cancer but without histopathologically confirmed reports attending FMC, Owerri and IMSUTH, Orlu during the period of the study.

2) Women 18 years and above with histopathologically confirmed breast cancer, attending FMC, Owerri and IMSUTH, Orlu during the period of the study who did not give consent to participate in the study.

2.3. Sample Size and Sampling Methods

Sample Size

The sample size for this study was 121. This figure was determined using the formula by Cochran. (1963: 75) [10] for smaller population (<1000).

$$n = \frac{n_o}{1 + \frac{n_o - 1}{N}}$$

where; n = the desired sample size if the target population is small;

n_o = Cochran's sample size recommendation (384);

N = Target Population (178);

By substituting $n = \dfrac{384}{1 + \dfrac{384 - 1}{178}} = 121$.

Sample size for F.M.C, Owerri

Since the target population = 178, sample size = 121 and the average number of women with breast cancer for the 5year period (2017-2021) = $\dfrac{613}{5}$ = 123.

By substituting, % Sample size (n%) for F.M.C, Owerri = $\dfrac{100}{178} \times \dfrac{123}{1}$ = 69%.

Therefore, actual sample size (n) for FMC, Owerri = 69% of 121 = $\dfrac{69}{100} \times \dfrac{121}{1}$ = 84.

Sample size for IMSUTH, Orlu

Since the target population = 178, sample size = 121 and the average number of women with breast cancer for the 5year period (2017-2021) = $\dfrac{278}{5}$ = 56.

By substituting, % Sample size (n%) for F.M.C, Owerri = $\dfrac{100}{178} \times \dfrac{56}{1}$ = 31%.

Therefore, actual sample size (n) for IMSUTH, Orlu = 31% of 121 = $\dfrac{31}{100} \times \dfrac{121}{1}$ = 37.

2.4. Sampling Methods

The sampling method for the selection of individuals that met the eligibility criteria for this study was Systematic Sampling Techniques, which is a probability sampling method. This sampling method was chosen because it will be difficult to bring all the respondents for this study who are cancer patients in one place at the same time or visit their houses or place of work within the period of this study. The systematic sampling technique entails selection of members of the population at a regular sample interval, k. These Sampling Technique isquick and inexpensive, in which case the researcher selects the sample elements according to their convenient accessibility and proximity [11].

$$\text{To obtain the sample interval, } k = \frac{N}{n}$$

where N = Population size;

n = Sample size;

Substituting, for FMC, Owerri, $k = \dfrac{123}{82} = 1$.

Also, for IMSUTH, $k = \dfrac{53}{37} = 1$.

Therefore, by selecting every 1th on the list of the study population.

Trained research assistants who are paramedics attending to breast cancer patients in these tertiary health facilities, were chosen for the study and given questionnaires, which they administered to willing participants that gave informed consent. Since the sample interval, k had been determined as 1, on each

clinic day, the participants on appointment whose names were on oncology clinic list were selected based on the sample interval and were given copies of the questionnaires to complete and return to the researcher under the supervision or guidance of research assistants until required sample size was achieved.

The selection of participants for the study was based on the systematic sampling techniques, as it is not easy to reach out to all participants, and work with them at the same time, within the research period. This entails selection of members at regular sample interval in accordance with Gravetten and Forzano (2012) [11]. The consenting participants who signed the consent form were given a structured questionnaire aligned with the objectives of our study with the aid of qualified research assistants, in order to collect data.

Permission and clearance to carry out this study was obtained from the Ethical Review Committees of Federal University Teaching Hospital, Owerri and Imo State University Teaching Hospital, Orlu respectively. The Statistical analysis in this study was performed, using the Statistical Package for Social Sciences (SPSS) version 21.0, and descriptive and inferential data statistics deployed. Statistical significance was at 0.05.

This study was carried out between October 2020 and March 2022. The relevant model applicable to this study is Health Belief Model (HBM) and was carried out in two purposefully selected tertiary health facilities in Imo state located at Orlu and Owerri zones of Imo State respectively with a population figure of women with breast cancer from 2017 to 2021 as 821.Independent Variables includes: Socioeconomic profile (age, income, occupation, education, social support), Perception of breast cancer disease, Cues to action, Cost of IHC services and Family cancer history. Dependent variable was Uptake of Immunohistochemistry diagnostic services. The study design used was descriptive cross-sectional study design. The study lasted for 18 months.

3. Results

3.1. Socio-Demographic Profile

A study of 121 respondents with age range 24 - 78 and mean of 45.2 years. Table 1 shows the socio-demographic profile of respondents in which more proportion of the respondents were between 40 - 49 years of age with a total number of 49 (40.5%), followed by the 30 - 39 years old and the 50 - 59 with total numbers 28 (23.1%) and 24 (19.8%) respectively. The less than 20 years old were the least of all the age groups having 0 (0%) followed by 20 - 29 years old having 10 (8.3%) members each. All the women had formal education with majority (82: 67.8%) having studied up to tertiary education level, 36 (29.8%) have secondary education level and 3 (2.5%) have primary education level of education. The group was dominated by married women 92 (76%), while 16 of them (13.2%) were single women, and the rest were either divorced (2.5%) or separated (8.3%).

Reasonable number of the subjects was either public servants (47.1%) or was

Table 1. Distribution of respondents by sociodemograpic profile (n = 121).

Sociodemographic Profile	Frequency	Percent (%)
Age (in years)		
Less than 20	0	0
20 - 29	10	8.3
30 - 39	28	23.1
40 - 49	49	40.5
50 - 59	24	19.8
60 - 69	10	8.3
Total	121	100.0
Education		
Primary	3	2.5
Secondary	36	29.8
Tertiary	82	67.8
Total	121	100.0
Marital Status		
Single	16	13.2
Married	92	76.0
Divorced	3	2.5
Separated	10	8.3
Total	121	100.0
Occupation		
Unemployed/Applicant	16	13.2
Public Servant	57	47.1
Business/trading	43	35.5
Farming	4	3.3
Others	1	0.8
Total	121	
Monthly Income in Naira (₦)		
Less than 30,000	34	28.1
30,000 - 49,000	20	16.5
50,000 - 69,000	25	20.7
70,000 - 89,000	12	9.9
90,000 - 109,000	22	18.2
110,000 and above	8	6.6
Total	121	

Continued

Religious denomination		
Catholic	73	60.3
Protestant	21	17.4
Pentecostal	24	19.8
Faith Tabernacle	3	2.5
Other Religion (Islam, African Trad, Religion etc)	0	0.0
Total	121	
When was the diagnosis of breast cancer made		
Less than 6 months	16	13.2
6 - 11 months	25	20.7
12 - 17 months	47	38.8
18 - 23 months	5	4.1
24 months and above	24	19.8
Not sure	4	3.3
Total	121	

engaged in business or trading activities (35.5%). Also, 13.2% were unemployed or job seekers.

In terms of monthly income, 34 (28.1%) earn below the national minimum wage of ₦30,000 per month, 25 (20.7%) earn between ₦50,000 - 69,000 while only 8 (6.6%) earn at least ₦110,000. The respondents were all Christians, dominated by Catholic denomination (60.3%), while 17.4% and 19.8% were respectively of Protestants (Anglican, Methodist, etc) and Pentecostal.

A total of 47 (38.8%) have been diagnosed of breast cancer for 12 - 17 months, and 25 (20.7%), were within 6 - 11 months. Those that were diagnosed of the disease within less than 6 months were 13.2%, while 19.8% were diagnosed within 24 months and beyond.

3.2. Cues to Action and IHC Service Uptake

Table 2 shows the association between cues to action and the uptake of IHC services among the respondents. Majority of the respondents, 61 (80.3%), in our study have knowledge of the IHC service, and utilized it, against 61 (80.3%), 13 (28.9%) that were ignorant and did not subscribe for the service. The statistical analysis demonstrates strong association existing between awareness and IHC services Utilization (P = 0.0001, X^2 = 31.407). Figure 1 shows that the major source of awareness is health personnel (86%), while electronic media and social media respectively contributed to 5% and 6.6% awareness.

The number of women who used the IHC services was higher among those who had attended breast cancer-related seminars, workshops, and conferences,

**Table 2.** Cues to action and the IHC services uptake.

Cues to action	Uptake Yes		Uptake No		Total	X²	P
	Freq	%	Freq	%			
Awareness of IHC services							
Yes	61	80.3	15	19.7	76 (62.8%)		
No	13	28.9	32	71.1	45 (37.2%)		
Total	74	61.2	47	38.8	121 (100)	31.407	0.0001
Ever attended educational program that focused on breast cancer and its management							
Yes	20	66.7	10	33.3	30 (24.8%)		
No	47	60.3	31	39.7	78 (64.5%)		
Not sure	7	53.8	6	46.2	13 (10.7%)		
Total	74	61.2	47	38.8	121 (100)	0.702	0.704
Do you know anyone who has breast cancer							
Yes	43	81.1	10	18.9	53 (43.8%)		
No	22	37.3	37	62.7	59 (48.8%)		
Not sure	9	100	0	0.0	9 (7.4%)		
Total	74	61.2	47	38.8	121 (100)	28.768	0.0001
Do you know anyone who has done breast cancer additional/follow-up test (IHC)							
Yes	30	100	0	0.0	30 (24.8%)		
No	24	38.7	38	61.3	62 (51.2%)		
Not sure	20	69.0	9	31.0	29 (24.0%)		
Total	74	61.2	47	38.8	121 (100)	32.950	0.0001
Whom do you know that have done the additional/follow-up test (IHC)							
Nobody	31	41.3	44	58.7	75 (62.0%)		
Immediate family Member	11	91.7	1	8.3	12 (9.9%)		
Extended Family Member	3	100	0	0.0	3 (2.5%)		
Friend/Associate	25	96.2	1	3.8	26 (21.5%)		
Others	4	80.0	1	20.0	5 (4.1%)		
Total	74	61.2	47	38.8	121 (100)	39.593[L]	0.0001
Has anyone you know died of breast cancer?							
Yes	33	86.8	5	13.2	38 (31.4%)		
No	30	53.6	26	46.4	56 (46.3%)		
Not sure	11	40.7	16	59.3	27 (22.3%)		
Total	74	61.2	47	38.8	121 (100)	16.647	0.0001
Do you think going for additional/follow-up test (IHC) is beneficial?							
Yes	67	66.3	34	33.7	101 (83.5%)		

Continued

No	7	35.0	13	65.0	20 (16.5%)		
Not sure	0	0					
Total	74	61.2	47	38.8	121 (100)	32.346	0.0001
Do you see prompt uptake of additional/follow-up test (IHC) as beneficial							
Yes	68	68.7	31	31.3	99 (81.8%)		
No	6	27.3	16	72.7	22 (18.2%)		
Not sure	0	0	0				
Total	74	61.2	47	38.8	121 (100)	16.540[L]	0.0001
Prompt uptake of additional/follow-up test (IHC) is essential for better management of breast cancer							
Yes	68	70.1	29	29.9	97 (80.2%)		
No	6	25.0	18	75.0	24 (19.8%)		
Not sure	0	0					
Total	74	61.2	47	38.8	121 (100)	16.476	0.0001

L: likelihood ratio, X^2 = Chi-square, P = probability value, *: significance at 5%.
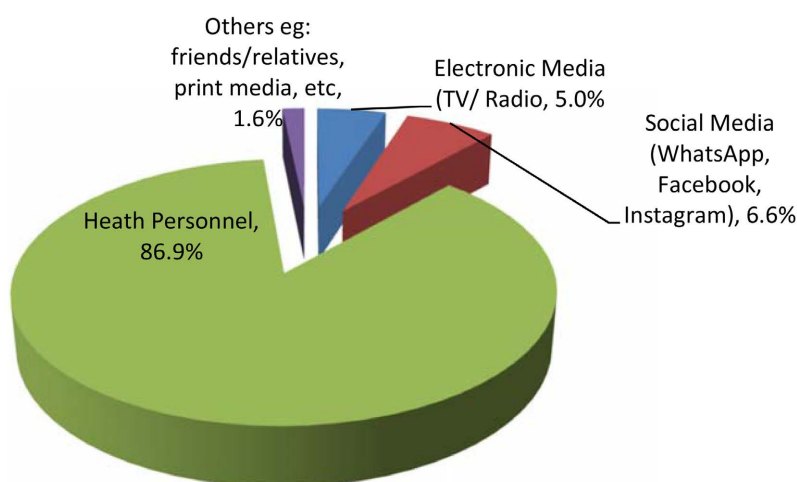
Figure 1. Pie chart showing various sources of awareness.

20 (66.7%), as opposed to 10 (33.3%), who had not. However, 47 (60.3%) of the women, who had not been exposed to any program of this nature, made use of IHC services. However, there is no statistically significant link between IHC uptake and program attendance for breast cancer (P = 0.704, X^2 = 0.702).

Out of the 53 respondents in our study, who acknowledged knowing any breast cancer patient, 43 (81.1%) made use of IHC services, while 10 (18.9%) failed to do the same. A total of 59 women in the study do not know any victim of breast cancer, and yet 22 (37.3%) of them utilized IHC services, while the rest 37 (62.7) did not. There is statistically significant association between knowing any victim of breast cancer and uptake of immunohistochemistry follow-up services (P = 0.0001, X^2 = 28.768).

All 30 women (100%) who responded in the affirmative in knowing someone

that took up IHC services had the uptake against 38.7% uptake and 59% uptake respectively obtained among those that do not know or not sure the know of such a person. The statistical analysis revealed that there is a significant association between knowledge of someone who has taken up IHC services (P = 0.0001, X^2 = 32.950).

Thirty three (33, 86.8%) of the 38 (31.4%) of the respondents with the knowledge of someone who died of breast cancer made use of IHC services in the study. In the vein, 30 (53.6%) of those who not know 56 (46.3%) anybody dead as a result of breast cancer did the same. There is significant association between knowledge of death of someone due to breast cancer and uptake of IHC services (P = 0.0001, X^2 = 16.647).

100 (83.5%) of the respondents believed that using the IHC service was advantageous, and 67 (66.3%) of them actually used the service. However, just 20 (16.5%) of the participants believed that the IHC services might not be helpful, leading to an uptake of 7 (35.0%).

Majority of the respondents 97 (80.2%) who affirmed that prompt uptake of IHC services was essential for better management, had uptake of 68 (68.7%). Of those who do not concur, were 22 (18.2%) and 6 (27.3%) utilized the service. Significant association between patient's positive affirmation of the importance of prompt IHC service and IHC service uptake (P = 0.0001, X^2 = 16.476).

4. Discussion

The idea that knowledge comes before perception and that both knowledge and perception anticipate and come before behavior is based on the idea that knowledge modifies perception. A good perception and consequent preventative health activity are anticipated to result from increasing people's knowledge of a health issue [12]. This study revealed that cues to action constitute a good predictor of uptake of IHC services and this awareness/knowledge mainly comes mostly from health professionals. The knowledge of someone who had suffered breast cancer, as well as one who had utilized IHC services also contributed to increased IHC services uptake in this study.

This study found that awareness of IHC services is a significant influencing factor for the uptake and health personnel is the major source of awareness of IHC services. Awareness and knowledge are established influencing factors of uptake [13].

Ever attended educational programme on breast cancer and its management was not found as a significant factor of uptake in IHC services in this study. This finding is surprising as attending educational programme on breast cancer and management ought to increase awareness that could drive desire for uptake of IHC. Furthermore, this result also appeared contrary to some other findings that established the significance of attending educational programme in breast cancer management and prevention [14] [15] [16]. Reasons for disparity in this particular finding may be linked to variations in structural content and tutorial pattens

for the educational programme.

In this study, all women who responded in the affirmative in knowing someone that has done breast cancer IHC services had the uptake. This is not a surprise considering that knowing someone that has breast cancer is likely to reveal lot of knowledge that are capable of defusing some negative perception on IHC services.

Also, prompt uptake of IHC services as beneficial and also, regarding prompt uptake of IHC services as essential for better management of breast cancer led to rise in uptake in this study and that couldn't be a surprise since understanding the benefit of IHC services as well as the breast cancer subtype is a prerequisite step required in going for the additional test which is essential for better management of breast cancer [17].

The proportion of breast cancer screening uptake was significantly lower in women from poorer households and women with less education. It has been reported that manual workers and housewives are more likely to delay their breast cancer IHC services uptake because of lower income [18].

Poorer and less-educated women had less knowledge about self-breast examination, and had considerably less adherence to further screening services and uptakes [19].

5. Conclusions and Recommendations

Cues to action, particularly from health, as well as having knowledge of any victim of breast cancer, and knowing someone who has utilized IHC services, contributed to the uptake in this study.

Being recommended by the doctor is a significant factor of uptake. Majority among the women who are aware of the IHC services, had the uptake against those that were not aware beforehand. This confirms that awareness of IHC services is an influencing significant factor for its uptake.

We hereby, recommend that the health workers should be further encouraged in their role of giving all information that will motivate cancer patients to complete all necessary protocols for a full treatment of breast cancer patients. Government and all enlightened individuals should be involved in awareness campaign on he needs IHC service uptake.

Acknowledgements

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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