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Awareness of Breast Cancer and Practice of Breast Self-Examination amongst Female Students of a Tertiary Institution in South-South Nigeria

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Abstract

Background: Breast cancer is the leading cause of cancer deaths presently, representing about 23% of all cancer cases and approximately 18% percent of deaths are attributed to it in Nigeria. It is presently the most prevalent kind of cancer worldwide, with 2.26 million cases reported in 2020. Breast self-examination (BSE) is a way to watch for signs of breast cancer. It is a step-by-step process women can use to examine their breasts. By looking at, and feeling their breasts regularly, they can observe abnormal changes.

Aim: To assess the awareness of breast cancer and practice of breast self-examination amongst female students in a tertiary institution in South-South Nigeria.

Methods: This was a cross-sectional descriptive study done amongst female students of the Federal University Otuoke from January to March 2018. Simple random sampling technique by simple balloting was used in the selection of the respondents until sample size was achieved. Data was collected using a semi-structured questionnaire and were analyzed using SPSS version 23.

Results: Most, 406 (95.8%) of the respondents have heard about breast cancer. Just 52.1% of the respondents practice Breast self-examination (BSE) and 203 (47.9%) do not. Amongst those that practice BSE, majority 113 (54.1%) do it at least once a month. Amongst those that do not practice BSE, 48 (27.6%) do not consider it important. Age, ethnic group/tribe and the religion of respondents have a statistically significant association with been aware of breast cancer and also with practice of BSE ($p > 0.05$).

Conclusion: Awareness about breast cancer was very high but practice of breast self-examination was on the average. There is need for more education on the risks of the disease in the general population and the need for early detection by practicing BSE and other screening measures.

Keywords: Awareness; Breast Cancer; Breast Self-Examination; Female students; South-South; Nigeria.

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INTRODUCTION

Breast cancer is a disease condition that is characterized by the abnormal growth of cells in the breast.[1] Recent years have witnessed an explosion in knowledge about the basic sciences of the disease, including the genetic basis and the pathology.[2] Breast cancer is presently the most prevalent kind of cancer worldwide, with 2.26 million cases reported in 20203. It is also the most common cancer among women both in developed

and developing countries, and a major burden of public health concern.[3] The developed countries have a higher incidence rate and the incidence rate also varies by ethnicity and race.[4] Breast cancer is also reported to be the 5th leading cause of cancer deaths worldwide in 2020, with 685,000 deaths attributed to it.[3]

In Nigeria, breast cancer cases were in the past very low but now increasing as a result of adoption of western lifestyles. It is the leading cause of cancer deaths presently, representing about 23% of all cancer cases and approximately 18% percent of deaths are attributed to it in the country.[3,4]

There are several risk factors attributed to the development of breast cancer, having these risk factors doesn't mean direct causation.[5] Some of these risk factors includes age, having a dense breast, gender, genes, early menstruation and family history, these are non-modifiable risk factors. Modifiable risk factors include excessive alcohol intake, hormone therapy, obesity among others.

Following a healthy lifestyle, getting regular screenings and being careful of the risk factors could help reduce the risk of developing the disease.[5] Breast self-examination (BSE) is a way to watch for signs of breast cancer. It is a step-by-step method women can use to examine their breasts. By looking at and feeling their breasts regularly, they can notice anything that seems abnormal.[6] BSE involves visualization and palpation of the breast by oneself for lumps, shape, texture, size, and contour.[7] Its best to be done at least once in a month, possibly at same time each month. The exam can help women notice changes in their breast in case it occurs and also have better knowledge about their breast.[5] However, this should not replace clinical breast exams and screening tests such as breast mammogram that are usually recommended by doctors. You should still see your healthcare providers and/or gynecologist regularly.[6] This study aims to assess the awareness of breast cancer and the practice of breast self-examination amongst female students of a tertiary institution in south-south Nigeria.

Several studies on awareness of breast cancer, BSE and practice of BSE have been done in Nigeria and other parts of Africa. Amongst these was a review of literature that was conducted to assess the awareness and practice of BSE among women in different countries in Africa. A total of 28 out of 80 articles were reviewed from 15 African countries based on relevance. Majority of the reviewed studies showed adequate awareness, mainly from the media, but poor practice of BSE among women in various countries in Africa. A major barrier identified was inadequate knowledge of BSE technique. Although awareness of BSE was relatively high in many of the reviewed studies, the practice was low.[8]

A pre-post intervention study on improving knowledge about breast cancer and breast self-examination in female Nigerian adolescents using peer education, reported knowledge score (20.61±13.4) prior to training was low and it statistically significantly improved to 55.93±10.86 following training $p<0.0001$ Following peer training, statistically significant improvement (p 0.037-<0.001) occurred in most knowledge domains apart from symptomatology. Pre-peer training 906 (67.8%) students knew about BSE. Significantly more students 1134 (94.7%) knew about BSE following peer training.[9]

A cross sectional descriptive study on awareness of breast cancer risk factors and practice of breast self-examination among high school students in Turkey, reported that alow percentage of students reported that they had performed breast self-examination monthly. The most common reason for not doing breast self-examination was "not knowing how to perform breast self-examination" (98.5%). Most of the students had little knowledge of breast cancer and its risks. The most widely known risk factor by the students was personal history of breast cancer (68.7%). There was a significant relation between breast self-examination practice and age, school grade, knowledge about breast cancer and knowledge about breast self-examination.[10]

Another cross-sectional descriptive study in Uganda on breast cancer knowledge and breast self-examination practices among female university students in Kampala, reported high awareness of breast cancer (98.0%) and BSE practices (76.5%) among female students. Over half the students (61.3%) had an intermediate level of knowledge about risk factors related to breast cancer and the signs and symptoms of the disease. Skills related to BSE practices were found to be low (43.6%). The majority (56.9%) of students received information about breast cancer via mass media.[11]

A similar descriptive cross-sectional study in South-South, Nigeria amongst university students on knowledge and awareness of breast cancer, reported that all respondents (100%) had heard of breast cancer with radio (52.9%) and television (47.3%) respectively as the major sources of information. Level of knowledge and awareness of risk factors for respondents from Delta State University and

University of Port Harcourt was poor (51.2%, 49.8%) respectively. For both universities, respondents had excellent knowledge and awareness of breast cancer symptoms (75.5%, 72.7% respectively); breast cancer prevention and treatment (89.2%, 87.8%) respectively; and breast cancer detection methods (94.0%, 93.5%) respectively. The study revealed excellent knowledge and awareness of breast cancer symptoms, breast cancer prevention and treatment and breast cancer detection methods, but poor knowledge and awareness of breast cancer risk factors.[12]

Another descriptive cross-sectional study on knowledge of breast cancer and need for its Screening among female healthcare workers in Oshimili South Local Government Area of Delta State, Nigeria reported that a total of 406 respondents (97.1%) were aware of breast cancer; 340(81.3%) practice breast self-examination (BSE); 117(41.9%) knew about breast mammography. The commonest source of information about breast cancer was from fellow healthcare workers (45.3%).[13]

METHODS

The study was conducted at the Federal University Otuoke. Otuoke is a semi-urban multicultural society in Ogbia Local Government Area of Bayelsa State, South-South Nigeria. The university has five faculties and twenty-nine departments with undergraduate students' population of over 3,500. The female student's population is estimated to be about 2100. This area is connected to the National grid of the Power Holding Company of Nigeria. The main religion in this area is Christianity and the language spoken by the people are Ijaw, English language and Pidgin English.

This is a cross-sectional descriptive study done amongst female students of the Federal University Otuoke from January to March 2018. Simple random sampling technique by simple balloting was used in the selection of the respondents until sample size was achieved. Consent to participate in this study was sought from the respondents after detailed explanations to them about what the study entails, as well as assuring them of confidentiality of information to be given. The approval for the study was obtained from the ethical committee of the university.

The minimum sample size was calculated using the Cochrane one proportion sampling size formular 14 with population greater than 10,000;

$n = Z2pq/d2$

Where,

n = the minimum sample size

z = standard normal deviate, set at 1.96 corresponding to 95% significance level.

P = 50% proportion of characteristics (attributes) in the population because there are no reports of previous studies on this in this area.

$q = 1 - p$

$q = 1 - 0.5 = 0.5$

d = precision or degree of accuracy i.e., acceptable margin of sample error set at 5% or 0.05.

Substituting the above figures in the formula, the desired sample size, n, for the study will be

$n = (1.96)2 \times 0.5 \times 0.5 / 0.052 = 385$. This therefore means that a minimum sample size of 385 is required for the study to be valid.

Adjusting by 10% for non-response

n = 424 is now the sample size for the study.

The data obtained were analyzed using SPSS version 22. Test of associations were done using chi square statistics at 95% confidence levels.

A total of 424 female students were interviewed in this study. The questionnaires for this study were a semi-structured questionnaire and it was self-administered.

RESULTS

A total number of four hundred and twenty-four (424) female students of the Federal University,

Table 1: Socio-demographic characteristics of respondents.

Variable	Frequency	Percentage
Age in years (n = 328)		
15 – 20	15547.3	
21 – 25	16150.6	
26 – 30	6	1.8
31 – 35	6 1.8	

Ethnicity (n = 413)		
Ijaw	167	40.4
Igbo	119	28.8
Hausa	12	2.9
Yoruba	33	8.0
Urhobo	46	11.1
Edo	12	2.9
Others	24	5.8
Marital Status (n = 424)		
Single	406	95.8
Married	12	2.8
Separated	2 1.4	
Religion (n = 419)		
Christianity	408	96.2
Islam	11	2.6
Christian denominations (n = 408)		
Catholic	101	24.1
Pentecostal	234	55.8
Anglican	57	13.6
Others	16	3.8
If currently employed (n = 424)		
Yes	12	2.8
Student	412	97.2

Otuoke were included in the study.

The socio-demographic characteristics of respondents are shown on table 1 above. The mean age of respondents was 21.0 ± 3.1 years. The predominant age group was 20 – 25 years 161 (50.6%); followed closely by age group 15 – 20 years 155 (47.3%). Majority 167 (40.4%) of the respondents were of the Ijaw ethnicity; followed by the Igbo ethnicity 119 (28.8%). The respondents were predominantly Christians 408 (96.2%), with denominations more of Pentecostal 234 (55.8%), followed by Catholics 101 (24.1%). All the respondents (100%) were students but 12 (2.8%) were employed.

Table 2: Awareness of breast cancer and breast cancer risks

Variable	Frequency	Percentage (%)
Have you ever heard of breast cancer? (n=424)		
Yes	406	95.8
No	18	4.2
If yes, source of information (n =400)		
Mass media	222	55.5
Newspaper	30	7.5
Health workers	118	29.5
Others	30	7.5
How does breast cancer present? (n=407)		
Painless lump	125	30.7
Painful lump	252	61.9
Breast ulcer	30	7.4

Most, 406 (95.8%) of the respondents have heard about breast cancer. Just above average number of the respondents 222 (55.5%) got their information about breast cancer from the mass media; this was

followed by healthcare workers, 118 (29.5%) as source of information about breast cancer. Majority, 252 (61.9%) know that breast cancer presents with a painful lump. One hundred and twenty-five, (30.7%) respondents believes that breast cancer presents with a painless lump; and 30 (7.4%) believes that it presents with breast ulcer.

Table 3: Practice of breast self-examination (BSE)

Variable	Frequency	Percentage (%)
Do you practice BSE? (n=424)		
Yes	221	52.1
No	203	47.9
If yes, how often? (n=209)		
At least once a month	113	54.1
Twice a month	43	23.0
Once a year	12	5.7
Others	36	17.3
If no, what are the reasons for not practicing BSE? (n=174)		
Ashamed of my breast size	6	3.4
Too busy to do it	12	6.9
Do not consider it important	48	27.6
Other	108	62.1

Just above average number of the respondents 221 (52.1%) practice Breast self-examination (BSE) and 203 (47.9%) do not. Amongst those that practice BSE, majority 113 (54.1%) do it at least once a month. Amongst those that do not practice BSE, 48 (27.6%) do not consider it important; 12 (6.9%) feels they are too busy; 6 (3.4%) are ashamed of their breast size; and majority 108 (62.1%) gave other reasons for not practicing BSE.

Table 4: Association between the awareness of breast cancer and the social demographic characteristics of respondents

Variable	Have you ever heard of breast cancer?		Total	Test/p-value
	Ye	No		
Age in years (n = 328)				
15 – 20	155 (100.0)	–	155(100.0)	$x^2 = 10.2$
21 – 25	155 (96.3)	6 (3.7)	161 (100.0)	p = 0.0165
26 – 30	6 (100.0)	–	6 (100.0)	df = 3
31 – 35	6 (100.0)	–	6 (100.0)	
Ethnic group/Tribe (n = 418)				
Ijaw	167 (96.5)	6 (3.5)	173(100.0)	$x^2 = 28.7$
Igbo	113(100.0)	–	113 (100.0)	p = 0.0001
Hausa	12(100.0)	–	12(100.0)	df = 6
Yoruba	30(83.3)	6 (16.7)	36 (100.0)	
Urhobo	42(87.5)	6(12.5)	48 (100.0)	
Edo	12(100.0)	–	12 (100.0)	
Others	24 (100.0)	–	24(100.0)	
Religion (n =418)				
Catholic	101 (100.0)	–	101 (100.0)	$x^2 = 12.4$
Pentecostal	221 (94.8)	12 (5.2)	233 (100.0)	p = 0.015
Anglican	48 (88.9)	6 (11.1)	54 (100.0)	df = 4
Islam	12 (100.0)	–	12 (100.0)	
Others	18 (100.0)	–	18 (100.0)	

The table above shows that the age, ethnic group/ tribe and the religion of respondents have a statistically significant association with been aware of breast cancer ($p > 0.05$).

Table 5: Association between the practice of breast self-examination and the social demographic characteristics of respondents.

Variable	Practice of Breast Self-Examination		Total	Test/p-value
	Yes	No		
Age in years (n = 328)				
15 – 20	54 (34.8)	101(65.2)	155(100.0)	$x^2 = 31.7$
21 – 25	101 (62.7)	60 (37.3)	161 (100.0)	p = 0.0001
26 – 30	0 (0)	6(0)	6 (100.0)	df = 3
31 – 35	6 (100.0)	0(0)	6 (100.0)	
Ethnic group/Tribe (n = 418)				
Ijaw	102 (59.0)	71 (41.0)	173(100.0)	$x^2 = 32.4$
Igbo	47(41.6)	66 (58.4)	113 (100.0)	p = 0.0001
Hausa	0(0)	12(100.0)	12(100.0)	df = 6
Yoruba	18 (50.0)	18 (50.0)	36 (100.0)	
Urhobo	24 (50.0)	24 (50.0)	48 (100.0)	
Edo	12(100.0)	0(0)	12 (100.0)	
Others	12 (50.0)	12 (50.0)	24(100.0)	
Religion (n =418)				
Catholic	53 (52.5)	48 (47.5)	101 (100.0)	$x^2 = 37.2$
Pentecostal	108 (46.4)	125 (53.6)	233 (100.0)	p = 0.0001
Anglican	36 (66.7)	18 (33.3)	54 (100.0)	df = 4
Islam	0 (0)	12 (100.0)	12 (100.0)	
Others	18 (100.0)	0 (0)	18 (100.0)	

The table above shows that the age, ethnic group/ tribe and the religion of respondents have a statistically significant association with the practice of breast self-examination ($p > 0.05$).

DISCUSSION:

This study revealed that most, (95.8%) of the respondents were aware of breast cancer before the interview, this shows a slightly lower but similarly high level of awareness as compared to the study in Oshimili- South LGA of Delta State[13] done amongst female healthcare workers with 97.1% awareness and the study in Kampala, Uganda[11] with 98.0% awareness and also with the study in South-South, Nigeria[12] with a 100.0% awareness. The level of awareness in this study is higher than the level of awareness in the study in Turkey,[10] amongst high school students that reported low level of awareness of breast cancer. This could be due to the fact that, this study and the other studies that reported high awareness were done amongst university students and health workers who have a higher level of education and exposure. In this study, information about breast cancer were gotten more from mass media (55.5%) and then from healthcare workers (29.5%).

This is a similar finding from the study done in Kampala, Uganda[11] that reported that 56.9% of their respondents got their information on breast cancer from the mass media but a higher finding as compared to that reported by the study in South-South, Nigeria[12] that reported 52.9% radio and 47.3% television as source of information by their respondents on breast cancer. All the three above studies had mass media as their main source of information of their respondents. This contrary to the study in Oshimili-South LGA, Delta State[13] that reported that healthcare workers (45.3%) were their most source of information to their respondents. This may not be surprising, since the study was done amongst female healthcare workers who were mostly taught by more senior healthcare workers both at school and during actual practice of their profession.

Majority, (61.9%) know that breast cancer presents with a painful lump, while, 30.7% respondents believes that breast cancer presents with a painless

lump; and 7.4% believes that it presents with breast ulcer, this show less level of knowledge as compared to the study in South-South, Nigeria[11] that reported that the level of breast cancer detection knowledge was 94.0% and 93.5% in the two centers used in their study respectively.

Just above average number of the respondents (52.1%) practice Breast self-examination (BSE) in this study. This level of practice of BSE is higher as compared to the study in Oshimili-South LGA, Delta State[13] that reported practice of BSE amongst female healthcare workers to be 41.9% and also in the study in Africa[8] that reported poor practice of BSE. But however, the finding from this study on practice of BSE (52.1%) was lower to the report from the study in Kampala, Uganda[11], that reported 76.5% practice of BSE amongst university students. In this study, amongst those that practice BSE, majority (54.1%) do it at least once a month. Twenty-seven-point six percent of those that do not practice BSE do not consider it as important; 6.9% feels they are too busy; 3.4% are ashamed of their breast size; and majority 62.1% gave other reasons for not practicing BSE. The reasons given for not practicing BSE in this study is contrary to the main reason given by respondents in the study in Turkey[10], where respondents said they do not practice BSE because they do not know how to do it.

Findings from this study shows that the age, ethnic group/tribe and the religion of respondents have a statistically significant association with been aware of breast cancer. This is not surprising as university undergraduates are usually above the ages of 16 years and well exposed to peer discussions that may help increase enlightenment. Findings from this study also shows that the age, ethnic group/ tribe and the religion of respondents have a statistically significant association with the practice of breast self-examination. This finding is similar to what the study in Turkey 10 amongst high school students reported, that there was significant relation between breast self-examination practice and age, and school grade.

CONCLUSION

The level of awareness about breast cancer was very high but practice of breast self-examination was on the average and awareness of presenting symptoms for breast cancer was also on the average. There is need for more education on the risks of the disease in the general population and the need for early detection by practicing BSE and other screening measures.

REFERENCES

1. What Is Breast Cancer?Centers for Disease Control and Prevention. (2021). Accessed on 29/05/2022 at https://www.cdc.gov/cancer/breast/basic_info/what-is-breast-cancer.htm.
2. Adebamowo CA, Ajayi OO. Breast cancer in Nigeria. West Afr J Med. 2000 Jul-Sep;19(3):179-91. PMID: 11126081.
3. Cancer. Who.int. (2021). Accessed on 29/05/2022 at: https://www.who.int/news-room/fact-sheets/detail/cancer.
4. DeSantis, C., Ma, J., Bryan, L., & Jemal, A. Breast cancer statistics, 2013. CA: A Cancer Journal For Clinicians, 64(1), 52-62. https://doi.org/10.3322/caac.21203.
5. Liberty Health Nigeria. Breast Cancer Awareness. Accessed on 29/05/2022 at: https://www.libertyhealth.net/nigeria/en/breast-cancer-awareness/.
6. Cleveland clinic. Breast Self-Examination. Accessed on 29/05/2022 at: https://my.clevelandclinic.org/health/diagnostics/3990-breast-self-exam.
7. Segni MT, Tadesse DM, Amdemichael R, Demissie HF. Breast self-examination: knowledge, attitude, and practice among female health science students at Adama science and technology university, Ethiopia. GynecolObstet (Sunnyvale) 2016;6:368.
8. Johnson O.E. Awareness and practice of breast self-examination among women in different African countries: A 10-year review of literature. Niger Med J. 2019; 60: 219-25.
9. Sadoh, A.E., Osime, C., Nwaneri, D.U. et al. Improving knowledge about breast cancer and breast self-examination in female Nigerian adolescents using peer education: a pre-post interventional study. BMC Women's Health. 2021; 21, 328. https://doi.org/10.1186/s12905-021-01466-3.
10. Karayurt, Ö., Özmen, D. &Çetinkaya, A.Ç. Awareness of breast cancer risk factors and practice of breast self-examination among high school students in Turkey. BMC Public Health. 2008; 8, 359. https://doi.org/10.1186/1471-2458-8-359.
11. Godfrey K, Agatha T, Nankumbi J. Breast Cancer Knowledge and Breast Self-Examination Practices Among Female University Students in Kampala, Uganda: A Descriptive Study. Oman Med J. 2016;31(2):129-134. doi:10.5001/omj.2016.25.
12. Onwusah D.O,Eboigbe M.U, Arute J.E, Mgbahurike A.A. Knowledge and Awareness of Breast Cancer among University Students in South-South Nigeria. Sch. Acad. J. Pharm., 2017; 6(1): 4-15.
13. Eguvbe AO, Akpede N, Arua N E. Knowledge of

Breast Cancer and Need for its Screening Among Female Healthcare Workers in Oshimili South Local Government Council Area of Delta State, Nigeria: Afrimedic Journal. 2014; 5 (1): 59 – 64. Accessed on 30/05/2022 at: https://www.ajol.info/index.php/afrij/article/view/109315.

14. Cochran, W. G. Sampling techniques (3rd ed.) 1977. New York: John Wiley & Sons.

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Role of Radiofrequency in Keystone Flap

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Abstract

Various energy sources are available in medical fields for multiple applications. Radiofrequency energy has been used in a variety of medical sectors and applications. Radiofrequency is now the foundation of a wide range of medical devices used in practically all medical professions. Its regionally concentrated effects make it particularly useful in a variety of minimally invasive procedures. In this case report we are assessing the role of radiofrequency electro surgery in raising the keystone flap.

Keywords: Radiofrequency; Keystone flap; Energy sources.

INTRODUCTION

Radiofrequency energy source probe with a power of 1.7W was used in making cutaneous incision. The use of radio frequency energy causes regulated tissue heating, which results in controlled cell protein denaturation and desiccation, resulting in minimal cell death and tissue damage. Radiofrequency's main premise is that the generated heat can be utilized to cut, coagulate, or trigger metabolic processes in the target tissue. The role of radiofrequency energy sources in elevating the local keystone flap will be discussed in this article.

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MATERIALS AND METHODS

In this case report, 32 year old male came to Jipmer Hospital with the chronic non healing ulcer over the lower back of size 5 X 5 cm for past 10 year post electrical burns. After wide local excision of the ulcer histopathology report came as Squamous cell carcinoma with all margins negative for tumor. After tumor removal size of the tumor ulcer size was around 8 x 8 cm. In view of scarred tissue all around the ulcer, local keystone flap based on the perforator was planned. In surgery we use the radiofrequency energy source to raise the keystone flap. Radiofrequency energy source machine was available in our hospital, cost of the machine is 4,50,000 (4500 US dollars). The Ellman surgitron Radiofrequency machine is easily purchasable and

easily available (Figure 1). The Ellman Surgitron FFPF EMC Electrosurgical Unit comes with foot pedal and patient plate. This unit is a high-frequency radio-surgical device that is equipped with an audio tone that indicates when the device is activated. The tone will be heard immediately upon activation of the Surgitron device.

Fig. 1: Radiofrequency electro surgery machine.

RESULTS

Radiofrequency energy source is very helpful in raising keystone flap (Fig. 2) in this case with minimal blood loss with less damage to the surrounding tissues. It helps in achieving early hemostasis, little wound contraction, less postoperative edema and minimal postoperative pain.

Fig. 2: Radiofrequency energy assisted keystone flap

DISCUSSION

The Ellman Surgitron radiosurgery dual frequency combines two optimised frequencies Mono polar (4.0 MHz) and Bipolar (1.7 MHz) for maximum precision and control. This machine has digital Control Panel for ease of operation and a clear view of settings and a Solid State circuitry for dependable and consistent energy emission.[1] It comes with the Safety Indicators for visual and auditory alerts. This machine has Less Thermal Spread, causes minimal scar tissue. The positive features arequick Recovery with less tissue destruction, healing is hastened, decreased Post-operative Pain.[2] High frequency RF surgery causes less trauma, less burning or Charring of Tissues unlike laser or conventional

electro surgery. Minimal Heat Dissipation helps in maximum readability of histologic specimens.[3,4]

Electrosurgical generators can produce electromagnetic waves at a variety of frequencies. The type of electromagnetic (EM) radiation utilised in these electro surgery is radio frequency (RF), which varies from 3 kHz to 300 MHz because Radiofrequency waves have the lowest frequency of all the electromagnetic waves, they take longer to create heat in the tissue than other EM waves.[5] Radiofrequency ablation (RFA), also known as LRFA (laparoscopic radiofrequency ablation) in the laparoscopic context, is the most prevalent application of the RF. RFA was found to be more successful than stripping and foam sclerotherapy in the treatment of lower extremities varicosities (a less invasive aesthetic technique), however not as effective as laser therapy. In a study of bipolar RF in the treatment of plantar fasciitis in patients who couldn't be cured with conservative approaches.

CONCLUSION

Radiofrequency radiation is a key component of a wide range of medical devices, making it a very useful instrument in the hands of clinicians. It was helpful in raising the flaps with less bleeding and minimal energy with minimal burns to the surrounding tissues. As a result, all healthcare providers must be familiar with the basic physical principles and biological consequences of radiofrequency energy on the human body. This insight would lead to the right use of Radiofrequency energy and increased procedure safety.

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REFERENCES

1. High frequency RF surgery minimizes burning of tissue, unlike laser or conventional electrosurgery. Olivar, AC, et al, Ann. Clin. Lab Sci. (1999); 29 (4): p281-5.
2. Niamtu, J. Chapter 4B, "Radiowave Surgery in Oral and Maxillofacial Surgery", in Distraction Osteogenesis of the Facial Skeleton, 2007, p30-37.
3. Bridenstine, J.B., Derm Surgery (1998); vol 24, p397-400.
4. Ericsson, E, et al, The Laryngoscope (2007); vol 117, p654.
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Review on Modern Strategies for Bulk Detection of Explosives

Prasansha Singla

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Abstract

Several explosives detecting technologies are now available or in development that could aid in the security of systems. While these technologies show promise in some situations, their environmental limits must be recognised, and their application adapted to individual systems. With several conventional explosive hazards, proven technologies such as handheld, desktop, and kit based trace detection systems, x-ray imaging systems, and canines have proved good detection capacity, and some are in use. While newer technologies like as explosive trace portals, improved imaging technology, and standoff detection systems are available, they are still in the early phases of development, and more operational experience would be required to evaluate how well they will function if deployed. When implementing any of these technologies to secure, it's critical to consider both the underlying technology' inherent limits as well as the security implications. Other factors to consider include throughput, portability, and durability and station physical space constraints.

Keywords: Explosives, X ray detection; Computer tomography (CT); Compton dispersing; Electron turn reverberation (ESR); NQR.

INTRODUCTION

Contingent upon tension and temperature, strong and fluid materials produce fumes, whose sum decides unpredictability of a substance. Use of appropriate gas examining and examination strategies nearby specific materials permits their initial discovery at an agreeable fixation level. The strategies for explosives recognition ought to be harmless and in light of direct identification at the source. The chance of recognition of specific fumes is straight forwardly subject to material's unpredictability.[1-4] Examination of explosives is right now centred fundamentally around the advancement of methods for ID and limitation of IEDs (Improvised Explosive Devices). Additionally, natively constructed explosives (HME) represent a genuine danger to interior security because of the simplicity of their procurement and assembling. There is the need to put resources into advancement of gadgets for their initial location and ID of the HME forerunners. Because of the one of a kind and different sciences of HMEs, their fume marks can be more convoluted than those of conventional explosives. The examinations on HMEs fume marks uncover that arrangement of fume goes through unique changes with time and ecological circumstances, this requires extra responsibility.[5-6] General accentuation is placed on the discovery of follow amounts of the explosives on surfaces (for example hand gear) or in spaces intended to be sans explosives (for example air terminals). Aside from

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customary distinguishing proof of the explosives afterward, by means ofexamination of the blast site to decide beginning of the hazardous materials, there is pre-requisite of continuous recognition of the explosives. It is likewise important to distinguish the IEDs hazard before explosion, this including the exercises associated with assembling, shipment, and so on It very well may be expressed that recognizable proof of the explosives is the type of identification of unstable natural mixtures (VOCs), however it is combined with extra difficulties and impediments. Public security, particularly in the midst of high gamble of fear monger assault, has become dire and basic issue in numerous nations all over the planet.[7] Arrangements in this field are basically centred around early recognition of explosives as well as nerve specialists. Because of the low fume strain of most famous explosives, for example TNT, RDX, HMX (9 ppb, 4,9 ppt and 0,25 ppt, individually), their discovery requires activity at very low focus levels. The fume strain of nerve specialists is higher yet practically all examinations depend on simulant gases, for example dimethyl methyl-phosphonate (DMMP), tricresyl-phosphate (TCP), methyl dichloro-phosphate (MDCP), trimethyl phosphate (TMP), and so forth Dynamite is quite possibly the most well known dangerous, exposed to routine investigation. It has a place with nitroaromatic substances, utilized in military applications, poisonous to people and watery environments. Consequently, there is an appeal for successful disinfecting frameworks as well as touchy and particular TNT sensors to be utilized in the fields of flight well being, line control, food handling and natural checking. Some of the time it is important to expand awareness and accomplish ppb/sub-ppb level or lower for viable applications (for example the drinking water standard for a lifetime openness to TNT managed by the United States Environmental Protection Agency is 2 ppb).[8]

One of the vital difficulties in examination of the explosives is execution of in field investigation in view of direct recognizable proof of the mixtures in the strong or fume states. The Holy Grail in investigation of the inside security dangers is a dependable recognition framework offering exact ID of substance, natural as well as touchy perils and working over a wide region. Current frameworks for explosives investigation depend basically on contact with the material or with fumes over a specific surface and they don't give solid far-off examination. Advancement and improvement likewise relate to such issues as the speed of recognition, aspects and mass of a gadget and recuperation time after examination that is additionally connected with a long period of a gadget. In addition, it is critical to have an instrument, which doesn't call for expert preparation of the staff and which is easy to understand. Because of quality of organic perils, the frameworks for recognition of the explosives can be joined with those for distinguishing proof of natural dangers (for example infections). Recognizable proof of follow measures of explosives and nerve specialists utilizing fake olfaction is one of the painless methodologies and depends on direct ID of the fumes discharged from the touchy material. Discovery capacity is straight forwardly reliant upon unpredictability of the explosives. The frameworks of explosives discovery should have the option to distinguish a wide scope of mixtures at wanted low focus level, like TNT and other less well known ones, for example ammonium nitrate (AN), which are used in IEDs.[21-23] Extraordinary examinations are pointed toward diminishing the constraint of discovery of tactile procedures as well as at advancement of location frameworks. Additionally, there is a lot of interest in planning new devices equipped for looking and observing a smell source e.g., to follow synthetic compounds radiated by drugs, explosives, substance breaks and mines. In this paper, present day approaches for explosives recognition have been thought about. Arising fields and conceivable new bearings of tactile procedures applications have been introduced, showing the way to fruitful execution through progress of convenience, selectivity, awareness, and so on.[24-26]

DIFFERENT TECHNIQUES

X-Ray detection entering profundity of radiation is high in many materials. This righteousness makes it conceivable to explore the substance in holders, parcels, and bags. For the discovery of explosives X-beams are utilized with energy from 1,000 up to huge number of electron volts (10-4 - 10-7 μm). In these strategies the light emission beams going through a material is retained. The constriction coefficient relies upon the energy of the X-beams and the powerful nuclear number of the material. The quantity of X-beam photons in the not entirely settled by three impacts:

- photoelectric assimilation
- Compton dissipating
- positron and electron creation

There are two principles discovery procedures in view of examinations of radiation going through the researched material (sent radiation).[27-29]

Single energy X-beam frameworks worked at air

terminals use electron energies of 120 keV. They give great goal pictures to identify weapons with metal components. On account of explosives set behind or inside things portrayed by a higher nuclear number, the method is wasteful. These gadgets can't recognize a dainty sheet of a solid safeguard and a thick chunk of a powerless safeguard. The standard framework can't recognize the genuine unstable material, yet permits to identify control wires, batteries, detonators and different parts of a bomb. Improve, the framework doesn't distinguish explosives however just unstable gadgets.[30]

Double energy X-beam frameworks two unique constriction not entirely settled. It is feasible to recognize particles of higher and lower nuclear number in the researched object, for instance thick components (metals) and less thick ones (food, garments, and so on) Be that as it may, the X-beam forces for each article are connected not exclusively to its material arrangement which mirrors the natural property, yet in addition to a few extraneous boundaries like position, direction and thickness. To that end the basic double energy examination is superior to single energy one, which can be effortlessly befuddled without the information on material thickness.[31]

Compton dispersing, the energy of a dissipated not set in stone by the frequency of the occurrence photon and the dissipated point. This impact is utilized in backscattered recognition frameworks. Contrasted and transmission radiation, the distinction between the acquired picture of natural and inorganic materials is higher. For all intents and purposes, the backscattering framework is typically more successful for the location of materials with a low nuclear number (for example explosives, opiates) than the transmission framework which is helpful for metal imaging. There are a few recognition strategies in light of dispersing radiation. It has been seen that at large angle, it is feasible to gauge both dispersed and sent photons. The two estimations demonstrate high thickness, low nuclear number materials, the marks of explosives. There are additionally frameworks in view of three identifiers: two dispersing and one transmission finder. The identifiers register both forward and in reverse photons. Basing on the enrolled signals, the profile of the explored object is gotten. For the discovery of sheet explosives (in traveller baggage), a low point dissipating strategy has additionally been proposed. Changing the dispersing point, the energy of the episode photons is adjusted by the diffraction impacts. In this technique, the acquired example of energy conveyance is exceptional and characterizes the sub-atomic design of the material. Trial results have shown that the technique makes it conceivable to recognize PE4 and Semtex (measure of 250 g, state of sheet with 5 mm thickness and area of 280 cm2). For the recognition of explosives, likewise the high energy X-beam imaging is applied. This sort of framework is utilized to explore huge articles (compartments). For the high energy, for example 10MeV, expands the identification with the profundity of infiltration. The enlisted collaboration (forward Compton dispersing) is free of nuclear number; to that end two unique energies must be applied. In information investigations from the X-beams frameworks, the mathematical reproduction of a cross-segment picture is required.[32-34]

Computer tomography (CT) is one of the two of information examinations in view of data from X-beam projections at a few points around an explored object. The CT picture is acquired utilizing both retention and dispersing weakening properties of every volume component. In the discovery system, the sent radiation is estimated. The indicator doesn't give the picture yet cumulates how much photons. The gathered beams are handled to get a genuine picture. The productivity of such a still up in the air by the quantity of projections used to shape the CT examine picture. The CT not set in stone by the spatial and differentiation boundaries. The X-beam strategies are as yet evolved. There are a ton of new logical thoughts of acquiring a low quick alert rate and a decent goal of imaging, for instance rakishdispersive X-beam diffraction (ADXRD), multi energy X-beam figured tomography, coded opening imaging utilizing back scattered X-beam radiation.[35-37]

Neutron discovery strategy, rather than photons, neutrons are utilized. This procedure gives better outcomes, yet at a greater expense and more slow speed. Inside the casing of this strategy, Thermal Neutron Activation (TNA), Fast Neutron Analysis (FNA), Pulsed Fast Neutron Analysis (PFNA), Pulsed Fast Thermal Neutron Analysis (PFTNA) and Nuclear Resonance Ingestion (NRA) have been characterized.[38]

TNA strategy bases on the ID of nitrogen in explosives. During the ingestion of a neutron by a core, the discharge of gamma radiation is noticed. The radiation energy is normal for the core. The examination of gamma beams force transmitted by a tried item after its neutron openness makes it conceivable to recognize a few touchy materials. The TNA technique is additionally applied to create a spatial circulation of nitrogen. It tends to be utilized to identify nitrogen yet not oxygen

or carbon. For that reason, the strategy doesn't recognize nitrogen oxides in explosives and in the climate. This restriction prompts a high misleading problem rate. Moreover, the responsiveness of the TNA identification framework is restricted andits cost is extremely high. It is applied for the discovery of medications and explosives in baggage and little bundles, fluid touchy in jugs and sacks, covered landmines and unexploded arms. Immediately, the TNA technique can portray High Explosives (HE) by their nitrogen and hydrogen signature, however with limited awareness.[39-41]

FNA strategy is the subsequent stage of TNA improvement. Utilizing high energy neutrons, the gamma radiation at various energies is identified and recognized. For instance, normal explosives are described by the particular thickness proportion of nitrogen and oxygen. Besides, the location of carbon and hydrogen is likewise conceivable. That makes this procedure more delicate and misleading problem safe. In rundown, FNA is delicate to virtually all componentsin explosives and licenses to distinguish the examined substance however for the most part it is undeniably more perplexing and costly.[42-44]

PFNA strategy utilizing a beat light emission. In any case, the energy of infiltrating neutrons is lower than FNA. In this method, it is conceivable to get 3D position data, applying shaft profile development and unique planning and picture reproduction. The fundamental benefit of PFNA isn't just the assurance of the piece of explosives yet in addition their spatial area and focus. The fundamental issue of the procedure is to build a particular beat lively neutron source. The upsides of PFNA are: an exceptionally instructive, dependable and low level of the gamma-foundation, since gamma-beams are estimated distinctly between the neutron beats. Notwithstanding, in request to have nanosecond neutron radiates, a PFNA gadget should utilize gas pedals of enormous particles, which are cumbersome and costly.[45,46]

Contrasted with this procedure, PFTNA applies neutron pillar beats with higher span time (10 microseconds). These days, the PFTNA discovery frameworks are compact. The principal benefits of PFTNA are: high dependability, versatile development, activity with one side admittance to the article.[47]

Nuclear Magnetic Resonance (NMR) spectroscopy distinguishes the nuclear design of particles. During the location method, a trademark ingestion of energy by certain turning cores in a solid attractive field is noticed. In the event that the core is put in an attractive field, connection between attractive second and the attractive field is noticed. The energy of the core changes with discrete qualities. Utilizing an outside electromagnetic field with a matched recurrence, the photons are retained. The recurrence of assimilated photons is called reverberation recurrence. By checking the recurrence of the sent RF field (opposite to the attractive field), an assimilation signal is recognized. The resounding atomic attractive minutes demonstrate a perceptible RF voltage signal. A range of sign amplitudes of variouscores can be acquired utilizing two different ways:

- The attractive field over the area is changed directly round the reverberation esteem.
- Applying a consistent attractive field and shifting the recurrence of the swaying field.

In the NMR, the determinants of the substances are: level of relaxations, turn grid unwinding time, turn unwinding time and coupling steady. This method might be utilized for the location of explosives covered in bundles, letters, and aircraft things. The standard of NMR generally includes two consecutive advances: first, the arrangement of the attractive atomic twists in consistent attractive field, and afterward the bother of this arrangement by radio recurrence beat. The bothering recurrence is subject to the static attractive field and the cores of perception. The twist turn unwinding time is normal for the sub-atomic designalso the condition of the example material. For all intents and purposes, in the identification of explosives, various communicated beats with explicit energy and reiteration rate are utilized. The beats give a potential open door to acquire great selectivity of two unwinding times and the 1H-14N cross-coupling. The outcomes showed that for the deliberate recurrence of 3 MHz the upsides of unwinding times are extremely trademark for explosives. The awareness of the strategy is impacted by the thickness of the objective cores in the material and by sensor boundaries. NMR spectroscopy was utilized in recognition of PETN, 1-Nitratoethyl-5-nitriminotetrazole subsidiaries.[48-50]

Electron turn reverberation (ESR) or Electron paramagnetic reverberation (EPR) spectroscopy is a method for concentrating on compound species that have at least one unpaired electron. The fundamental actual ideas of ESR are comparable to those of atomic attractive reverberation (NMR), yet these are electron turns that are invigorated rather than twists of nuclear cores. The attractive field divides the twists into two gatherings

(adjusted and inverse with the attractive field). Every direction is related with an alternate energy. Occurrence microwave radiation might initiate changes between the two conditions of the unpaired electron. On account of the particular quanta energy reverberation ingestion is noticed. Gigantic mass distinction among cores and electrons makes that for ESR the lower attractive fields and a lot bigger microwave frequencies are applied than for NMR. The responsiveness of the strategy relies upon the populace proportion of the dissected states. For that reason, the awareness of the technique is improved by utilizing of a low temperature. Consequently, an ESR range is acquired by recording how much microwave energy consumed by the example as an element of the attractive field. On account of the location of explosives, the ESR spectroscopy is restricted to certain materials having free twists. In examination with NMR, the ESR has a higher innate awareness (around 15000 times). The ESR instrument grants to identify dark powder with an amount of 18 mg.[51-53]

Atomic fourfold reverberation (NQR) spectroscopy depends on explicit characters of the material cores. The critical properties of the cores are attractive minutes and electric quadrupole minutes. A core might have a characteristic atomic twist filling in as a little magnet with attractive force. In certain cores, for example, 14N, 17O, 35Cl, 37Cl huge quadrupolar collaborations (turn relaxations) might be noticed. The relaxations are described by the huge line widths. Quadrupole parting can be noticed straight forwardly utilizing the NQR procedure. In the NMR strategy the parting is initiated by a huge outer attractive field. Hence gas, fluid or strong, can be investigated by NMR spectroscopy. On account of the NQR strategy, the estimations are taken without outer irritation. Accordingly, NQR examinations ought to be acted in the strong stage at low temperatures. NQR can be utilized for an exceptionally exact assurance of the nearby appropriation of the electron thickness in atoms, giving more precise outcomes than NMR. Unfortunately, NQR signals are likewise innately powerless and defenceless both to the warm clamour of the curl and any outer radio recurrence obstruction (RFI). In numerous NQR applications, RF impedance (RFI) can be a main pressing issue. There are additionally a few strategies to build the sign to commotion proportion. NQR is exceptionally agree able to hazardous investigation as these substances, like TNT, RDX,HMTD and so on, are commonly wealthy in 14N (nitrogen) cores with a twist quantum number of 1, having electric quadrupole minutes. The enrolled spectra are one of a kind for guaranteed touchy material and are not powerless to the obstruction of different materials containing nitrogen during the NQR estimation. The primary benefit of 14N-NQR reverberation spectroscopy in the recognition of explosives results from the high substance and crystallographic particularity of NQR spectra. The spectra rely emphatically upon changes in electronic charge dissemination over the entire atom. Then again, NQR location is described by moderately low responsiveness brought about by low reverberation frequencies (0.5-6 MHz). The outcomes showed that the NQR strategy can be utilized in the identification of explosives in baggage. Involving explicit progress frequencies of 3.4 MHz for RDX and 0.89 MHz for PETN, the unwinding times are 11 Ms/0.9 Ms and 32s/0.9 Ms, separately.[54-56]

γ−Ray location, radiation discharged by iotas from the energized cores is taken advantage of. Energized cores emanate the γ−photon with distinct energy because of progress to a lower state. The radiation from such source goes through the researched object and is constricted by three cycles: photoelectric impact, Compton impact and pair creation. The primary impact is most huge on account of weighty retaining components and for low photon energies. The Compton impact is significant on account of light components and photon energies beneath the worth of 3 MeV. Positrons and electrons are delivered by weighty components and high energy of γ−photons. On account of the γ−Ray framework in view of pair development, the γ−photons communicate with the explosives actuating the nitrogen. During the positron outflow two incidental photons with energy of 511 keV are made. The photons are identified by a normscintillaator. The high energy photons enter effectively most materials and allow to assess enormous articles (baggage, freight). The subsequent strategy utilizing γ−Rays is named γ−Ray atomic reverberation ingestion (NRA). By filtering with high energy γ−Rays and by estimating the transmission profile of the photons, the districts described by high nitrogen focus are imaged. The huge ingestion cross segment makes the strategy touchy to modest quantities of nitrogen. In any case, the entire recognition strategy is muddled as a result of basic necessities concerning extraordinary objective material and shape, as well as γ−Ray source power and soundness.[57-59]

ELECTRONIC NOSES

- The motivation with the mammalian feeling of smell brought about a plan of counterfeit gadgets, joining compound (bio) sensor cluster with an appropriate example acknowledgment framework. Starting around 1982 electronic nose (EN) instruments, on account of Dodd and Persaud, have been methodically created for quite a long time. Most ENs utilize sensor clusters that explicitly respond with reasonable analytes. Coming about signals are recorded what's more handled to give a scent finger impression. With advancement and wide execution of IoTs, the parts of sensor exhibits are profoundly requested as the gadgets for subjective and quantitative investigation of unpredictable mixtures.[60]
- Fundamental benefits of ENs are high consistency and reproducibility of the detecting results, brief time frame for acquiring results, high through put of examinations, extremely durable accessibility and dependability, non-destructive investigation, results associated with human insight due to multivariate information treatment. Those highlights not just guarantee functional utilization of ENs, yet all at once shed the light on the advancement of EN innovation later on, including recognition of explosives and unsafe mixtures. ENs are additionally frequently utilized in a round about way to distinguishing proof of bundles with touchy materials, particularly for observing of capacity period and debasement of the explosives on schedule.[61]
- The well known semiconductor varieties of gas sensors touchy to explosives are described by low creation cost, short reaction time, aversion to a wide range of analytes, generally high selectivity and multicomponent examination. In any case, utilization of the regular ENs with semiconductor exhibits has a few inconveniences, like a low responsiveness, changes in the pattern because of temperature, dampness and variances of natural circumstances. An original way to deal with this issue including a differential EN made out of two chemo-sensor exhibits working in equal was proposed by Brudzewski et al. One of these structures a 'estimation cluster' and the other a 'reference exhibit'. Differential sign obtained from two clusters diminished the in impact of obstructions and turned out to be steadier and more impervious to natural changes. Additionally, minimal expense metal oxide-based EN was proposed by Ratchapakorn et al. with capacity to distinguish the dangerous materials.[62]
- Horsfall et al. utilized WO3 and CTO heterojunction semiconducting metal oxide gas sensors as an instrument for discovery of explosives. The recently referenced methodology planned by Kwon et al. promising system to plan and acknowledge exceptionally particular ENs by using an assortment of mixes of metal-oxide hetero p-n intersections as the structure blocks. As of late, Giordano et al. proposed a special way to deal with tune capable substrates to preconcentrate and somewhat separate follow explosives in a mind boggling climate. It gives a bound together example preconcentration and division module that can be joined to an assortment of multichannel substance location gadgets.[63]
- In this methodology, analyte preconcentration and halfway detachment were joined into a solitary stage by utilizing a Joule-warmed silicon nanowire exhibit. In spite of the fact that MOS-based sensors have gained a critical headway for a couple last many years, their selectivity actually stays unacceptable. Further advancement is vital during functionalization utilizing various materials and blend with 2D materials. Patil et al. show that the polymer nano-composite microcantilever is appropriate for ENs applications and can prompt the improvement of a rough versatile, handheld gadget for quick and touchy discovery of dangerous fumes. The ultrahigh delicate piezoresistive polymer nano composite microcantilever gives touchy location (ppt level) under encompassing circumstances.[64]
- Discovery of explosives, including nitro-and peroxide-subsidiaries, on a nanotechnology-enlivened single electronic cluster was shown by Lichtenstein et al. NW-FETs empower the location, fingerprinting of various hazardous particles down to ppq level. Recognition of the multicomponent gas combinations requires the multi-sensor units, whose exhibits and suitable information handling frameworks ought to give dependable and quick data about the presence of specific explosives. Also, an increment in protection from ecological changes is fundamental for

productive execution of the gadgets in view of sensor clusters. Nano materials based sensors show a high potential for common sense application and they can establish another age of supersensitive, quick and continuous logical stages for ultra follow recognition and distinguishing proof of a wide scope of dangerous species.[65]

- A unique accentuation should be additionally placed on translation of a sign from sensor exhibit, where exact insightful information is required. Characterization strategies can be separated into directed and solo ones. To accurately decipher a sign from multisensory table, the solo techniques work on the information, which were not stamped and are focused on recognizable proof of similitudes. A typical procedure utilized in solo techniques is head part examination (PCA). The techniques used in ENs likewise incorporate help vector machines (SVM), various sorts of neural organizations as well as different strategies in view of choice trees. By and large, SVMs strategies generally perform well when helped with the order of sensor inputs.[66]
- Some other calculation related undertakings with ENs incorporate the remuneration of sensor float, a characteristic element of the sensor that shows up with time, creating ways to deal with gradually add classes to the model without retraining it for each new class and the information on move between comparable sensors. Calculation based recalibration methods can altogether increment long haul execution and instrument-attainability appraisals, as well as approval process and the instrument plan.[67]
- As an option in contrast to recalibration of the sensor frameworks utilizing a full arrangement of alignment tests, adjustment update and float revision for ENs have been proposed. For instance, Gradi˘sek et al. investigate the utilization of the Random Forest AI calculation to recognize the exhibit reactions to various explosives focuses (TNT, DNT and RDX). Progress and advancement in calculation level for ENs with conversation of element extraction calculations, signal denoising calculations, design acknowledgment calculations, unsettling influence end, discreteness rectification and float pay calculations have been as of late completely examined.[64]

CONCLUSION

With increasing terrorist threats of different types, explosives detection for various types and forms of explosives is of growing interest. This paper reviews the broad array of possible methods of explosives detection, using both nuclear and non-nuclear based instruments, with their advantages and disadvantages for different scenarios. An explanation of the fundamental physics for each approach is accompanied by its general applicability and citations to the relevant scientific literature.

REFERENCES

1. L.E. Degreeff, K.J. Johnson, Considerations in the vapor analysis of traditional vs. homemade explosives, ISOEN 2017 - ISOCS/IEEE Int. Symp. Olfaction Electron. Nose, Proc. (2017). 10.1109/ISOEN.2017.7968849.
2. M.Y. Serrano-Gonzalez, ´ R. Chandra, C. Castillo-Zacarias, F. Robledo-Padilla, M. de J. Rostro-Alanis, R. Parra-Saldivar, Biotransformation and degradation of 2,4,6-trinitrotoluene by microbial metabolism and their interaction, Def. Technol. 14 (2018) 151–164. 10.1016/j.dt.2018.01.004.
3. S. Chatterjee, U. Deb, S. Datta, C. Walther, D.K. Gupta, Common explosives (TNT, RDX, HMX) and their fate in the environment: emphasizing bioremediation, Chemosphere (2017), https://doi.org/10.1016/j.chemosphere.2017.06.008.
4. J.S. Caygill, F. Davis, S.P.J.J. Higson, Current trends in explosive detection techniques, Talanta 88 (2012) 14–29, https://doi.org/10.1016/j.talanta.2011.11.043.
5. A. Cordner, V.Y. De La Rosa, L.A. Schaider, R.A. Rudel, L. Richter, P. Brown, Guideline levels for PFOA and PFOS in drinking water: the role of scientific uncertainty, risk assessment decisions, and social factors, J. Expo. Sci. Environ. Epidemiol. 29 (2019) 157–171, https://doi.org/10.1038/s41370-018-0099-9.
6. T.R. Fadel, D.F. Farrell, L.E. Friedersdorf, M.H. Griep, M.D. Hoover, M.A. Meador, M. Meyyappan, Toward the responsible development and commercialization of sensor nanotechnologies, ACS Sensors 1 (2016) 207–216, https://doi.org/ 10.1021/acssensors.5b00279.
7. A. Lewis, P. Edwards, Validate personal air-pollution sensors, Nature 535 (2016) 29–31, https://doi.org/10.1038/535029a.
8. M.J. Pavlovich, B. Musselman, A.B. Hall, Direct analysis in real time-Mass spectrometry (DART-MS) in forensic and security applications, Mass Spectrom. Rev. 37 (2018) 171–187, https://doi.org/10.1002/mas.21509.

9. P.-H. Stefanuto, K. Perrault, J.-F. Focant, S. Forbes, Fast chromatographic method for explosive profiling, Chromatography. 2 (2015) 213–224, https://doi.org/ 10.3390/chromatography2020213.

10. W. Zhang, Y. Tang, A. Shi, L. Bao, Y. Shen, R. Shen, Y. Ye, Recent developments in spectroscopic techniques for the detection of explosives, Materials (Basel). 11 (2018) 1364, https://doi.org/10.3390/ma11081364.

11. M. Tabrizchi, V. ILbeigi, Detection of explosives by positive corona discharge ion mobility spectrometry, J. Hazard. Mater. (2010). 10.1016/j.jhazmat.2009.11.087.

12. N. He, Y. Ni, J. Teng, H. Li, L. Yao, P. Zhao, Identification of inorganic oxidizing salts in homemade explosives using Fourier transform infrared spectroscopy, Spectrochim. Acta Part A Mol. Biomol. Spectrosc. 221 (2019), 117164, https://doi.org/10.1016/j.saa.2019.117164.

13. M. Lopez-L ´ opez, ´ C. García-Ruiz, Infrared and Raman spectroscopy techniques applied to identification of explosives, TrAC Trends Anal. Chem. 54 (2014) 36–44, https://doi.org/10.1016/j.trac.2013.10.011.

14. M. Bukshtab, Laser Spectroscopy, w: Springer Ser. Opt. Sci., 2019: ss. 363–402. 10.1007/978-981-10-7745-6_7.

15. A. Williams, L.D. Williams, Contrivance for automatically detecting the presence of certain gases and vapors, 1143473, 1915.

16. G. Korotcenkov, B.K. Cho, Metal oxide composites in conductometric gas sensors: achievements and challenges, Sensors Actuators B Chem. 244 (2017) 182–210, https://doi.org/10.1016/j.snb.2016.12.117.

17. S.M.J. Rogge, A. Bavykina, J. Hajek, H. Garcia, A.I. Olivos-Suarez, A. SepúlvedaEscribano, A. Vimont, G. Clet, P. Bazin, F. Kapteijn, M. Daturi, E. V. Ramos Fernandez, F.X. Llabr´esiXamena, V. Van Speybroeck, J. Gascon, Metal–organic and covalent organic frameworks as single-site catalysts, Chem. Soc. Rev. 46 (2017) 3134–3184. 10.1039/C7CS00033B.

18. W.-T. Koo, S.-J. Choi, S.-J. Kim, J.-S. Jang, H.L. Tuller, I.-D. Kim, Heterogeneous sensitization of metal-organic framework driven metal@metal oxide complex catalysts on an oxide nanofiber scaffold toward superior gas sensors, J. Am. Chem. Soc. 138 (2016) 13431–13437, https://doi.org/10.1021/jacs.6b09167.

19. B. Szulczynski, ´ J. Gębicki, currently commercially available chemical sensors employed for detection of volatile organic compounds in outdoor and indoor air, Environments 4 (2017) 21, https://doi.org/10.3390/environments4010021.

20. R.A. Potyrailo, toward high value sensing: monolayer-protected metal nanoparticles in multivariable gas and vapor sensors, Chem. Soc. Rev. 46 (2017) 5311–5346, https://doi.org/10.1039/C7CS00007C.

21. F. Karagulian, M. Barbiere, A. Kotsev, L. Spinelle, M. Gerboles, F. Lagler, N. Redon, S. Crunaire, A. Borowiak, Review of the performance of low-cost sensors for air quality monitoring, Atmosphere (Basel). 10 (2019) 506, https:// doi.org/10.3390/atmos10090506.

22. K.E. Kelly, J. Whitaker, A. Petty, C. Widmer, A. Dybwad, D. Sleeth, R. Martin, A. Butterfield, Ambient and laboratory evaluation of a low-cost particulate matter sensor, Environ. Pollut. (2017), https://doi.org/10.1016/j.envpol.2016.12.039.

23. K. Persaud, G. Dodd, Analysis of discrimination mechanisms in the mammalian olfactory system using a model nose, Nature 299 (1982) 352–355, https://doi. org/10.1038/299352a0.

24. A. Lichtenstein, E. Havivi, R. Shacham, E. Hahamy, R. Leibovich, A. Pevzner, V. Krivitsky, G. Davivi, I. Presman, R. Elnathan, Y. Engel, E. Flaxer, F. Patolsky, Supersensitive fingerprinting of explosives by chemically modified nanosensors arrays, Nat. Commun. 5 (2014) 4195, https://doi.org/10.1038/ncomms5195.

25. T. Wasilewski, J. Gębicki, W. Kamysz, G. Jacek, W. Kamysz, J. Gębicki, W. Kamysz, Bioelectronic nose: current status and perspectives, Biosens. Bioelectron. 87 (2017) 480–494, https://doi.org/10.1016/j.bios.2016.08.080.

26. P. Wen, M. Amin, W.D. Herzog, R.R. Kunz, Key challenges and prospects for optical standoff trace detection of explosives, TrAC Trends Anal. Chem. 100 (2018) 136–144, https://doi.org/10.1016/j.trac.2017.12.014.

27. Singh, S., Singh, M. (2003). Review of Explosives detection systems for aviation security. Signal Processing, 83, 31-55.

28. Harding, G. (2004). Radiation, X-ray scatter tomography for explosives detection. Physics and Chemistry, 71, 869-881.

29. Vogel, H. (2007). Search by X-rays applied technology. European Journal of Radiology, 63, 227-236.

30. Liu, Y., Sowerby, B.D., Tickner, J.R. (2008). Comparison of neutron and high-energy X-ray dual-beam radio- graphy for air cargo inspection. Applied Radiation and Isotopes, 66, 463-473.

31. Dicken, A., Rogers, K., Evans, P., Rogers, J., Chan, J.W. (2010). The separation of X-ray diffraction patterns for threat detection. Applied Radiation and Isotopes, 68, 439-443.

32. Eger, L., Do, S., Ishwar, P., Karl, W.C., Pien, H. (2011). A learning-based approach to explosives detection using multi-energy x-Ray computed tomography. Acoustics, Speech and Signal Processing (ICASSP), IEEE International Conference in Prague, 2004-2007.

33. Faust, A.A., Rothschild, R.E., Leblanc, P., McFee, J.E. (2009). Development of a Coded Aperture X-Ray Backscatter Imager for Explosive Device Detection. IEEE Transactions on Nuclear Science, 56(1).

34. Buffler, A. (2004). Contraband detection with fast neutrons. Radiation Physics and Chemistry, 71, 853-861.

35. Reber, E.L., Larry, C., Blackwood, G. (2007). Explosives Detection System: Development and Enhancements. Sens Imaging, 8, 121-130.

36. Runkle, R.C., White, T.A. (2009). Photon and neutron interrogation techniques for chemical explosives detection in air cargo. Nuclear Instruments and Methods in Physics Research A, 603, 510-528.

37. Brooks, F.D., Drosg, M., Smit, F.D., Wikner, C. (2011). Detection of explosive remnants of war by neutron thermalisation. Applied Radiation and Isotopes, 70(1), 119-127.

38. Sharma, S.K., Jakhar, S., Shukla, R., Shyama, A., Raob, C.V.S. (2010). Explosive detection system using pulsed 14MeV neutron source. Fusion Engineering and Design, 85, 1562-1564.

39. Papp, A., Csikai, J. (2011). Detection and identification of explosives and illicit drugs using neutron-based techniques. J. Radioanal. Nucl. Chem., 288, 363-371.

40. Smith, J.A.S., Rayner, T.J., Rowe, M.D., Barras, J., Peirson, N.F., Stevens, A.D., Althoefer, K. (2010). Magnetic field-cycling NMR and 14N, 17O quadrupole resonance in the explosive pentaerythritoltetranitrate (PETN). Journal of Magnetic Resonance, 204, 139-144.

41. Fischer, N., Klapötke, T.M., Stierstorfer, J., Wiedemann, C. (2011). 1-Nitratoethyl-5-nitriminotetrazole derivatives – Shaping future high explosives. Polyhedron, 30, 2374-2386.

42. Regulla, D. (2000). From dating to biophysics D20 years of progress in applied ESR spectroscopy. Applied Radiation and Isotopes, 52, 1023-1030.

43. Gudmundson, E., Jakobsson, A., Stoica, P. (2009). Based Explosives Detection-An Overview. IEEE - Transection on Signal Processing, 56(3) 887-894.

44. Zhang, X., Balkır, S., Hoffman, M.W., Schemm, N., Robust, A. (2010). CMOS Receiver Front-end for Nuclear Quadrupole Resonance Based Explosives Detection. IEEE – Circuits and Systems, 53(8), 1093-1096.

45. Wang, X., Liu, P., Fox, K.A., Tang, J., Colón Santana, J.A., Belashchenko, K., Dowben, P.A., Sui, Y. (2010). The effects of Gd doping and oxygen vacancies on the properties of EuO films prepared via pulsed laser deposition. IEEE Trans. Magn., 46, 1879-1882.

46. Smith, J.A.S., Blanz, M., Rayner, T.J., Rowe, M.D., Bedford, S., Althoefer, K. (2011). 14N Quadrupole Resonance and 1H T1 Dispersion in the Explosive RDX. Journal of Magnetic Resonance, 213(1), 191-196.

47. Gregorovic, A., Apih, T. (2009). TNT detection with 14N NQR: Multipulse sequences and matched filter. Journal of Magnetic Resonance, 198, 215-221.

48. Osa, T.M., Cerionia, L.M., Forguez, J., Olle, J.M., Pusiola, D.J. (2007). NQR: From imaging to explosives and drugs detection. Physica B, 389, 45-50.

49. Ostafin, M., Nogaj, B. (2007). 14N-NQR based device for detection of explosives in landmines. Measurement, 40, 43-54.

50. Kuznitsov, A.V., Osetrov, O.I. (2006). Detection of improvised explosives and explosive devices in Detection and disposal improvised explosives. Springer.

51. Stitzel, S.E., Cowen, L.J., Albert, K.J., Walt, D.R. (2001). Array-to-Array Transfer of an Artificial Nose Classifier. Anal. Chem., 73(21), 5266-5271.

52. Koscho, M.E., Grubbs, R.H., Lewis, N.S. (2002). Properties of Vapor Detector Arrays Formed through Plasticization of Carbon Black-Organic Polymer Composites. Anal. Chem., 74, 1307-1315.

53. Wohltejen, H., Snow, A.W. (1998). Colloidal metal-insulator-metal ensemble chemiresistor sensor. Anal. Chem., 70, 2856-2859.

54. Pearce, T.C., Schiffman, S.S., Nagle, H.T., Gardner, J.W. (2003). Handbook of machine olfaction. WileyVCH, Weinheim.

55. Jakubik, W., Urbanczyk, M., Maciak, E., Pustelny, T. (2008). Bilayer structures of NiOx and Pd in surface acoustic wave an electrical gas sensor-system. Bulletin of Polish Academy of Sciences: Technical Sciences, 56(2), 133-138.

56. Murugarajan, A., Samuel, G.L. (2011). Measurement, modeling and evaluation of surface parameter using capacitive-sensor-based measurement system, Metrology and Measurement Systems, 18(3), 403-418.

57. Gut, K., Zakrzewski, A., Pustelny, T. (2010). Sensitivity of polarimetric waveguide interferometer for different waveguides. ActaPhysicaPolonica A, 118(6), 1140-1142.

58. Toaland, S.J., Trogler, W. (2006). Polymer sensors for nitroaromatic explosives detection. J. Mater. Chem., 16, 2871-2883.

59. Staples, E.J. (2004). Detecting Chemical Vapours from Explosives Using the zNose®, an Ultra-High Speed Gas Chromatograph, Electronic Noses & Sensors for the Detection of Explosives. NATO Science Series, 159, 235-248.

60. J. Burgu´es, S. Marco, Environmental chemical sensing using small drones: a review, Sci. Total Environ. 748 (2020), 141172, https://doi.org/10.1016/j. scitotenv.2020.141172.

61. H. Wan, H. Yin, L. Lin, X. Zeng, A.J. Mason,

Miniaturized planar room temperature ionic liquid electrochemical gas sensor for rapid multiple gas pollutants monitoring, Sensors Actuators, B Chem. 255 (2018) 638–646, https:// doi.org/10.1016/j.snb.2017.08.109.

62. E. Singh, M. Meyyappan, H.S. Nalwa, Flexible graphene-based wearable gas and chemical sensors, ACS Appl. Mater. Interfaces. 9 (2017) 34544–34586, https:// doi.org/10.1021/acsami.7b07063.

63. J.R. Sempionatto, R.K. Mishra, A. Martín, G. Tang, T. Nakagawa, X. Lu, A. S. Campbell, K.M. Lyu, J. Wang, Wearable ring-based sensing platform for detecting chemical threats, ACS Sensors 2 (2017) 1531–1538, https://doi.org/ 10.1021/acssensors.7b00603.

64. L.J. Hubble, J. Wang, Sensing at your fingertips: glove-based wearable chemical sensors, Electroanalysis 31 (2019) 428–436, https://doi.org/10.1002/ elan.201800743.

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Role of Magnetic Resonance Imaging in Gynecomastia

Barath Kumar Singh P[1], Ravi Kumar Chittoria[2]

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Abstract

Gynecomastia is the benign enlargement of male breast glandular tissue and is the most common breast condition in males. At least 30% of males will be affected during their life. Since it causes anxiety, psychosocial discomfort and fear of breast cancer, early diagnostic evaluation is important and patients usually seek medical attention. Gynecomastia was reported to cause an imbalance between oestrogen and androgen action or an increased oestrogen to androgen ratio, due to increased oestrogen production, decreased androgen production or both. Evaluation of gynecomastia must include a detailed medical history, clinical examination, specific blood tests, imaging and tissue sampling. Individual treatment requirements can range from simple reassurance to medical treatment or even surgery. The main aim of any intervention is to relieve the symptoms and exclude other etiological factors. Preoperative imaging done with ultrasound breast tissue to assess the component of breast tissue which helps in planning the surgery. Magnetic resonance imaging is useful in the quantification amount of tissue and lesions before surgery in a three-dimensional way. In this case report we will assess the role of Magnetic resonance imaging in preoperative assessment of gynecomastia.

Keywords: Gynecomastia; Magnetic resonance imaging; Assessment.

INTRODUCTION

Gynecomastia is a benign enlargement of the male breast resulting from a proliferation of the glandular component of the breast (Fig. 1). Gynecomastia is defined clinically by the presence of a rubbery or firm mass extending concentrically from the nipples. Although the condition is usually bilateral, it can be unilateral. The condition known as pseudo gynecomastia, or lipomastia, is characterized by fat deposition without glandular proliferation. Male androgen production is primarily caused by the enzyme aromatase's peripheral conversion of androgens (testosterone and androstenedione) into oestradiol and estrone (mainly in muscle, skin, and adipose tissue). Only 6–10 mg of oestradiol and 2.5 mg of estrone are secreted daily by the testes. The remaining oestrogen in males is produced via the extra glandular aromatization of testosterone and androstenedione to oestradiol and estrone, which only accounts for a small portion of the oestrogens in circulation (15 percent of oestradiol and 5 percent of estrone). Therefore, any cause of excess oestrogen, such as overproduction or peripheral androgen aromatization, might start the chain reaction that leads to breast growth. Increased production and/or action of oestrogen can happen in the testicles or

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around the periphery.[1] Gynecomastia is evaluated by clinical examination and by imaging using Ultrasound and Magnetic resonance imaging. In this case report we will assess the role of MRI in gynecomastia assessment.

Fig. 1: Clinical picture of the patient – front view

MATERIALS AND METHODS

The patient came with the chief complaints of Pain and swelling over the left breast 1 and half years (Fig. 1). Thepatient was apparently normal 1 and half years back when he noticed sudden sharp pain over the left side of the left breast which was associated with pressure over the same area, pain happens almost daily and was decreased by itself with analgesics. The patient started noticing swelling over the left breast for 6 months which was not associated with any discharge/swelling elsewhere. He was not associated with any comorbidities. The patient took anabolic steroids before 5 years and testosterone for 5 months for body building and fitness. The ultrasound shows Right breast was normal and the left breast shows Multiple hypoechoic solid appearing lobulated parallel to skin lesions with internal vascularity and no posterior features collectively measuring 1.7 X 0.6 X 0.6 noted in at the 3 4'0 clock position approx. 2.2 cm from the nipple areolar complex (Fig. 2). Rest of the breast tissues appears normal with no significant lymphadenopathy. Magnetic resonance imaging shows Multiple lobulated Hypoechoic parallel to skin lesions with internal vascularity at 3 4'0 clock as described BIRADS 4A. In view of suspicious lesion in the left breast MRI report shows left breast with fan shaped increased retro-areolar fibro-glandular tissue extending into left upper quadrant which shows Type 1 enhancement curves persistent progressive (Fig. 3). Few patchy areas of mild diffusion restriction are seen inside the parenchyma. Heterogeneously dense breast tissue. No evidence of retraction of nipple seen with Left axilla: Sub centimetric lymph nodes with maintained fatty hilum noted, largest SAD 4mm. The patient planned for biopsy of the lesion before planning surgery for gynecomastia. The biopsy result came as normal glandular tissue and no evidence of malignancy followed by patient underwent bilateral liposuction assisted webster procedure.

Fig. 2: USG imaging of the left breast lesion

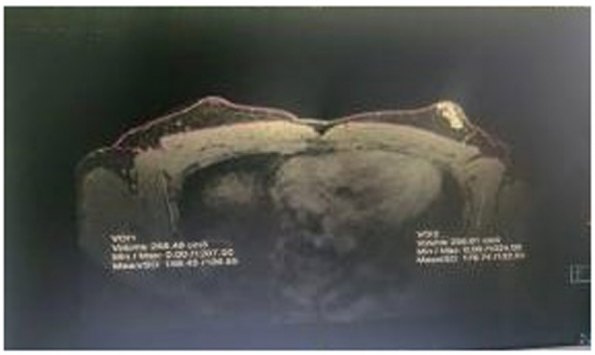

Fig. 3: MRI showing hyperenhanced lesion in the left breast

RESULTS

Gynecomastia affects the younger males, adolescents most commonly. It needs psychological counselling, reassurance before planning for surgery. Hormonal evaluation and imaging were done before planning for surgery. Imaging helps in quantifying the amount of lipomatous and stromal tissue in the breast, which helps in deciding the surgery. Liposuction is done when there is more lipomatous tissue. Webster procedure is done when there is more stromal tissues. In this case magnetic resonance imaging helps in identifying the stroma and lipomatous tissue in the breast. MRI will be helpful in identifying the suspicious lesions in the breast of gynecomastia patients.

DISCUSSION

Patients that have physiologic gynecomastia don't need any more testing. Similar to asymptomatic gynecomastia, pubertal gynecomastia doesn't need any additional testing and has to be checked again in six months. In the following circumstances,

additional analysis is required, A breast size of at least 5 cm (macromastia). A lump that is sensitive, recently developed, advancing, or long-lasting.[2] Malignancy indicators (e.g., hard or fixed lymph nodes or positive lymph node findings) are indications for imaging before surgery. The following list of laboratory examinations could be taken into account are Panel for serum chemistry, Levels of dehydroepiandrosterone sulphate, luteinizing hormone (LH), oestradiol, and free or total testosterone, Free thyroxine and thyroid-stimulating hormone (TSH) levels. The following imaging tests are a few that could be beneficial are Mammography followed by a breast biopsy or fine needle aspiration, when necessary.[2] If the serum oestradiol level is high and the findings of the clinical examination suggest the possibility of a testicular tumour, testicular ultrasonography is advised. Breast ultrasonography, not with standing the modest positive predictive value of imaging in men.[3] On CT scans, gynecomastia is frequently detected. MRI defines the soft tissue in detail compared to other imaging modalities.[4]

CONCLUSION

Gynecomastia affects two third of adolescent and young male, majority of which are idiopathic in nature, and patients undergo routine endocrine evaluation. Endocrinology evaluationshould be judiciously used when indicated byproper history taking and thorough clinical examination. Imaging helps in quantifying the amount of glandular and fatty tissues in the breast which helps in planning the surgery and helpful in the assessment of suspicious lesion in the gynecomastia.

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REFERENCES

1. Carlson HE. Approach to the patient with gynecomastia. J ClinEndocrinolMetab. 2011;96:15–21.
2. Binder G, Iliev DI, Dufke A, Wabitsch M, Schweizer R, Ranke MB, et al. Dominant transmission of prepubertal gynecomastia due to serum estrone excess: Hormonal, biochemical and genetic analysis in a large kindred. J ClinEndocrinolMetab. 2005;90:484–92.
3. Johnson RE, Kermott CA, Murad MH. Gynecomastia-evaluation and current treatment options. TherClin Risk Manag. 2011;7:145–8.
4. Gikas P, Mokbel K. Management of gynaecomastia: an update. Int J ClinPract. 2007;61:1209–15.

Review Article

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Practice of Clinical Breast Examination, Awareness and use of Mammography as a Breast Cancer Screening Method amongst Female Students of a Tertiary Institution in South-South Nigeria

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Abstract

Background: Breast cancer remains the leading cause of cancer deaths presently, representing about 23% of all cancer cases and approximately 18% percent of deaths in Nigeria. It is estimated that 26,310 new cases occurred in 2018. Clinical breast examination (CBE) is a physical examination that is carried out by a health care provider in an attempt at early detection of breast abnormality and diseases. Healthcare practitioners also use mammogram to assess early signs of breast cancer.

Aim: To assess the practice of CBE, awareness and use of mammography as a breast cancer screening method amongst female students in a tertiary institution in South-South, Nigeria.

Methods: This was a cross-sectional descriptive study done amongst female students of the Federal University Otuoke from January to March 2018. Simple random sampling technique by simple balloting was used in the selection of the respondents until sample size was achieved. Data was collected using a semi-structured questionnaire and were analyzed using SPSS version 23.

Results: Majority, 215 (54.6%) has never had CBE; Few, 78 (19.8%) of the respondents had CBE in the last three months; 35 (8.9%) in the last 1 year; 66 (16.8%) had it in the last 2 years. A total of 179 (45.4%) of respondents have had CBE at one time in the last two years. Majority, 287 (73.8%) haven't heard of mammography; 102 (26.2%) have heard of it; majority, 132 (78.6%) have never done it; while 18 (10.7%) did it in the last three months; 6 (3.6%) did it in the last one year; 12 (7.1%) did itin the last two years. A total of 36 (21.4%) did it in last two years.

Conclusion: There was low level of practice of CBE; very low awareness and use of breast mammography as a breast cancer screening method. There is need for more advocacy and education of the general population as regards breast cancer screening methods.

Keywords: Practice; Clinical breast examination; Awareness; Use; Mammography; Breast cancer.

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INTRODUCTION

Breast cancer accounts forthe second cause of cancer deaths in women and it is of global public health concern. Over one million breast cancer cases are diagnosed annually worldwide.[1] These amount to a total 411,000 deaths from breast cancer accounting for 14% of female cancer deaths globally.[2,3] It is estimated that about a little more than half (60%) of breast cancer deaths occur in economically developing countries like Nigeria.[3,4]

Breast cancer cases were in the past less prevalent in Nigeria, but now there is increasing number of cases probably due to the adoption of western lifestyles, culture and diet that consequently result in increased exposure to breast cancer risk factors. Breast cancer remains the leading cause of cancer deaths presently, representing about 23% of all cancer cases and approximately 18% percent of deaths in the country attributable to it.[5,6] It is estimated that 26, 310 new cases occurred in 2018.[6] This was projected to increase by approximately 4000 cases annually over the next 10 years.[7] It is unclear whether this trend could be attributed to increased exposure to putative breast cancer risk factors, increasing life expectancy, population ageing or improved detection of incident cases.

Clinical breast examination (CBE) is a physical examination that is usuallycarried out by a health care provider. It is often done during a patient's regular medical check-up. A CBE should be performed by a health care provider that is well trained in the technique.[8] This may be a physician, nurse practitioner or other healthcare worker. Not all health care providers have this training. If a CBE is not offered to the patient or client at the time of check-up and if such client would like one, they should ask the health care provider to perform one or refer such client to someone who has the expertise to perform one.[8]

A mammogram is an X-ray picture of the breast. Healthcare practitioners use mammogram to assess early signs of breast cancer. Regular mammograms are the best tests doctors have to find breast cancer early, sometimes up to three years before it can be felt.[9] The American Cancer Society recommends yearly mammograms starting at age 40 and continuing for as long as a woman is in good health. Clinical breast exam (CBE) is recommended to be done every year for women 40 and over. All major US medical organizations recommend screening mammography for women aged 40 years and older. Screening mammography reduces breast cancer mortality by about 20%–35% in women aged 50–69 years and slightly less in women aged 40–49 years at 14 years of follow-up.[9] The WHO recommends mammography every 1–2 years for women aged 50–69 years.[10]

Several studies on CBE and mammography as screening methods for breast cancer have been done in Nigeria and other parts of the world. In a prospective, cluster randomized controlled trial on the effect of screening by CBE on breast cancer incidence and mortality after 20 years in Mumbai, India, showed that breast cancer was detected at an earlier age in the study group as compared to the control group, with a significant reduction in the proportion of women with stage 3 or 4 disease.[11]

A cross-sectional study conducted on female health professional of King Fahad Medical City (KFMC), Saudi Arabia reported that 370 (93.7%), 339 (85.8%), and 368 (93.2%) participants had heard of breast self-examination, clinical breast examination, and mammography, respectively. A total of 295 (74.7%) participants reported practicing breast self-examination, 95 (24.1%) had undergone clinical breast examination and 74 (18.7%) had ever undergone mammography.[12]

A study on the knowledge, attitudes and practices of radiology professionals in Jordan as regard to breast cancer screening methods reported that although 61.8% of participants were knowledgeable about breast cancer prevention, only 65.7% of respondents practiced breast self-examinations (BSE), 28.7% underwent clinical breast examination (CBE) and 15.1% underwent screening mammography.[13]

A cross-sectional descriptive study in Malaysia to determine the prevalence of breast cancer screening, specifically, clinical breast examination was done in five selected districts amongst women aged between 20 to 64 years, from a total of 1000 households. The study reported that 53.3% had done clinical breast examination. There were significant associations of clinical breast examination with notably, income and distance from the hospital.[14]

A cross-sectional study on clinical breast examination practices among women undergoing screening mammography reported an uptake of 38.5% amongst non white women and 57.4% amongst white women.[15] Another cross-sectional study in the Kingdom of Saudi Arabia reported results showingthat 35.5%, 27.4% and 37.8% of participants reported that they practiced BSE, CBE and annual mammography, respectively.[16]

Table 1: Socio-demographic characteristics of respondents.

Variable	Frequency	Percentage
Age in years (n = 328)		
15 – 20	155	47.3
21-25	161	50.6
26-30	6	1.8
31-35	6	1.8
Ethnicity (n = 413)		

Ijaw	167	40.4
Igbo	119	28.8
Hausa	12	2.9
Yourba	33	8.0
Urhobo	46	11.1
Edo	12	2.9
Others	24	5.8
Marital Status (n = 424)		
Single	406	95.8
Married	12	2.8
Separated	2	1.4
Religion (n = 419)		
Christianity	408	96.2
Islam	11	2.6
Christian denominations (n = 408)		
Catholic	101	24.1
Pentecostal	234	55.8
Anglican	57	13.6
Others	16	3.8
If currently employed (n = 424)		
Yes	12	2.8
Student	412	97.2

The socio-demographic characteristics of respondents are shown on table 1 above. The mean age of respondents was 21.0 ± 3.4 years. The predominant age group was 20 – 25 years 161 (50.6%); followed closely by age group 15 – 20 years 155 (47.3%). Majority 167 (40.4%) of the respondents were of the Ijaw ethnicity; followed by the Igbo ethnicity 119 (28.8%). The respondents were predominantly Christians 408 (96.2%), with denominations more of Pentecostal 234 (55.8%), followed by Catholics 101 (24.1%). All the respondents (100%) were students but 12 (2.8%) were employed.

Table 2: Clinical breast examination (CBE)

Variable	Frequency	Percentage (%)
When last did you have your breast clinically examined by a health professional? (n=394)		
Within the last 3 months	78	19.8
Within the last one year	35	8.9
Within the last two years	66	16.8
Never	215	54.6

The above table shows that 78 (19.8%) of the respondents had CBE in the last three months; 35 (8.9%) in the last 1 year; 66 (16.8%) had it in the last 2 years; and 215 (54.6%) has never had CBE ever.

This also shows that a total of 179 (45.4%) of respondents have had CBE at one time in the last two years.

Table 3: Awareness of breast mammography

Variable	Frequency	Percentage (%)
Have you heard of breast mammography? (n=389)		
Yes	102	26.2
No	287	73.8
If yes, when last did you do mammography? (n=168)		
Within the last 3 months	18	10.7
Within the last one year	6	3.6
Within the last two years	12	7.1
Never	132	78.6

The table above shows that 102 (26.2%) of the respondents have heard of breast mammography and the majority, 287 (73.8%) haven't heard of it.

Amongst those that have heard of breast mammography, 18 (10.7%) have done it in the last three months; 6 (3.6%) have done it in the last one year; 12 (7.1%) have done for the last two years; while, 132 (78.6%) have never done it.

This also shows that a total of 36 (21.4%) of respondents had done breast mammography at one time in the last two years.

Table 4: Association between practice of clinical breast examination and the social demographic characteristics of respondents

Variable	When last have you had clinical breast examination Total					Test/p-value
		last 3 months	last 1 year	last 2 years	Never	
Age in years (n = 316)						
15 – 20	6 (2.9)	18 (8.6)	30 (14.4)	155 (74.2)	209(100.0)	x2 = 46.2
21 – 25	42 (19.1)	5 (2.3)	24 (10.9)	149 (67.7)	220 (100.0)	p = 0.0001
26 – 30	0 (0)	0(0)	0(0)	6 (100.0)	6 (100.0)	df = 9
31 – 35	6 (50.0)	0(0)	0(0)	6 (50.0)	12 (100.0)	
Ethnic group/Tribe (n = 388)						
Ijaw	36 (21.5)	6 (3.6)	30(17.9)	95 (56.9)	167(100.0)	x2 = 93.8

Igbo	24 (21.2)	23 (20.4)	30 (26.5)	36 (31.9)	113 (100.0)	p = 0.0001
Yoruba	–	–	–	30 (100.0)	30 (100.0)	df =15
Urhobo	12(28.6)	6(14.3)	–	30 (71.4)	42 (100.0)	
Edo	–	–	6 (50.0)	6 (50.0)	12 (100.0)	
Others	6 (25.0)	–	–	18 (75.0)	24(100.0)	
Religion (n =388)						
Catholic	18(17.8)	5(4.9)	30 (29.7)	48 (47.5)	101 (100.0)	x2 = 69.5
Pentecostal	42 (19.0)	18 (8.1)	36 (16.3)	125 (56.6)	221 (100.0)	p = 0.0001
Anglican	6 (14.3)	12 (28.6)	–	24 (57.1)	42 (100.0)	df = 12
Islam	–	–	–	6 (100.0)	6 (100.0)	
Others	12 (66.7)	–	–	6 (33.3)	18 (100.0)	

The table above shows that the age, ethnic group/tribe and the religion of respondents have a statistically significant association with practice of clinical breast examination (p > 0.05).

Table 5: Association between awareness of breast mammography and the social demographic characteristics of respondents

Variable	Awareness of breast mammography			Test/p-value
	Yes	No	**Total**	
Age in years (n = 317)				
15 – 20	12 (7.7)	143 (92.3)	155(100.0)	x2 = 64.5
21 – 25	66 (44.0)	84 (56.0)	150 (100.0)	p = 0.0001
26 – 30	–	6 (100.0)	6 (100.0)	df = 3
31 – 35	6 (100.0)	–	6 (100.0)	
Ethnic group/Tribe (n = 383)				
Ijaw	54 (33.5)	107 (66.5)	161 (100.0)	x2 = 25.3
Igbo	24 (22.2)	84 (77.8)	108 (100.0)	p = 0.0001
Hausa	–	6 (100.0)	6 (100.0)	df = 6
Yoruba	12(40.0)	18(60.0)	30(100.0)	
Urhobo	6 (14.3)	36(85.7)	42 (100.0)	
Edo	6(50.0)	6 (50.0)	12 (100.0)	
Others	–	24(100.0)	24 (100.0)	
Religion (n =383)				
Catholic	24 (26.7)	66 (73.3)	90 (100.0)	x2 = 13.2
Pentecostal	48 (21.7)	173 (78.3)	221 (100.0)	p = 0.010
Anglican	18 (42.9)	24 (57.1)	42 (100.0)	df = 4
Islam	–	12(100.012	(100.0)	
Others	6 (33.3)	12 (66.7)	18 (100.0)	

The table above shows that the age, ethnic group/tribe and the religion of respondents have a statistically significant association with been aware of breast mammography(p > 0.05).

DISCUSSION

The study shows that 19.8% of the respondents had CBE in the last three months; 8.9% in the last 1 year; 16.8% in the last two years and this gives a total of 45.4% of the respondents that has had CBE at one time in the past two years. This is a higher rate of practice of CBE as compared to the studies in the Kingdom of Saudi Arabia 12 amongst female health professionals that reported that practice of CBE was 24.1%; the findings from this study was also higher than that of the study in United tates 15 amongst black womenthat reported practice of CBE to be 38.5%; and the second study in the Kingdom of Saudi Arabia[16] that reported practice of CBE to be 27.4% and the study in Jordan[13] with practice of CBE of 28.7%.The practice of CBE in this study was lower than the findings on practice of CBE from the study in Malaysia[14] that reported the practice of CBE to be 53.3% and also in the study in the United States[15] amongst white women that reported practice of CBE to be 57.4%. This higher

level of practice could be due the level of economic, social and educational development in these two countries as compared to Nigeria, Jordan and the Kingdom of Saudi Arabia.

This study found that only 26.2% of the respondents have heard of breast mammography. This is far a lower level of awareness as compared to the study amongst female health professionals in the Kingdom of Saudi Arabia 12 that reported that the awareness level of breast mammography was 93.2%. This higher awareness level could be attributed to the fact the respondents in their study were healthcare professionals who have more exposures to information on breast mammography in the course of their training and practice of their profession. This study showed that 21.4% of respondents had done breast mammography at one time in the last two years. This is a higher level of utilization of breast mammography as compared to the study in Jordan[13] and the study amongst health professionals in Saudi Arabia 12 with a 15.1% and 18.7% utilization respectively. The findings from this study are lower to the second study in Saudi Arabia with a utilization of breast mammography of 37.8%.

This study showed that the age, ethnic group/ tribe and the religion of respondents have a statistically significant association with practice of clinical breast examination. The study found that increasing age is slightly associated with increasing practice of CBE. Tribe and religion have a significantly negative association with association with CBE. This could be due to the cultural and religions factors associated with the upbringing of the respondents. This study also shows that the age, ethnic group/tribe and the religion of respondents have a statistically significant negative association with been aware of breast mammography. The age, tribe and religion of the respondents negatively affect awareness of breast mammography. The reasons are as stated earlier, cultural and religious inclinations and backgrounds.

CONCLUSION

There was low level of practice of CBE; very low awareness and use of breast mammography as a breast cancer screening method. There is need for more advocacy and education of the general population as regards breast cancer screening methods including breast self-examination (BSE).

REFERENCES

1. Ferlay J, Soerjomataram I, Dikshit R, Eser S, Mathers C, Rebelo M, et al. Cancer incidence and mortality worldwide: sources, methods and major patterns in GLOBOCAN 2012. Int J Cancer 2015;136(5):E359-E386. 10.1002/ijc.29210.
2. Akpo EE, Akpo MO, Akhator A. Breast cancer knowledge and screening practices among Nigerian medical students. Int J Health 2010;11(2).
3. Battaglia F, Plotti F, Zullo MA, Panici PB, Plotti G, Brown LA, et al. Gynecologic cancer. Cancer 2006;16:29-35.
4. Jemal A, Bray F, Center MM, Ferlay J, Ward E, Forman D. Global cancer statistics. CA Cancer J Clin 2011;61(2):69-90. 10.3322/caac.20107.
5. Cancer. Who.int. (2021). Accessed on 29/05/2022 at: https://www.who.int/news-room/fact-sheets/detail/cancer. DeSantis, C., Ma, J., Bryan, L., & Jemal, A. Breast cancer statistics, 2013. CA: A Cancer Journal for Clinicians. 2013;64(1), 52-62. https://doi.org/10.3322/caac.21203.
6. International Agency for Research on Cancer. Cancer today: data and methods. 2018. Accessed 02/06/2022.
7. International Agency for Research on Cancer. Cancer tomorrow. 2018. Accessed 02/06/2022.
8. Komen S.G. (2021). Breast Cancer Information; Screening & Early Detection: Clinical Breast Exam. Accessed at https://www.komen.org/breast-cancer/screening/clinical-breast-exam/.On o4/06/2022.
9. Centre for Disease Control Prevention. Breast Cancer. What is Mammogram? Accessed on 04/06/2022 at: https://www.cdc.gov/cancer/breast/basic_info/mammograms.htm#:~:text=A%20mammogram%20is%20an%20X,before%20it%20can%20be%20felt.
10. Screening for Breast Cancer. Geneva: World Health Organization; 2009. Accessed on o4/06/2022 at: from: http://www.who.int/cancer/detection/breastcancer/en/index.html.
11. Mittra I, Mishra G.A,Dikshit R.P, Gupta S, Kulkarni V.Y, Shaikh H.K.A, Shastri S, Hawaldar R, Gupta S, Pramesh C.S, Badwe R.A. Effect of screening by clinical breast examination on breast cancer incidence and mortality after 20 years: prospective, cluster randomised controlled trial in Mumbai. BMJ 2021; 372 doi: https://doi.org/10.1136/bmj.n256.
12. Heena, H., Durrani, S., Riaz, M. et al. Knowledge, attitudes, and practices related to breast cancer screening among female health care professionals: a cross sectional study. BMC Women's Health. 2019; 19, 122. https://doi.org/10.1186/s12905-019-0819-x.
13. Rawashdeh M, Zaitoun M, McEntee M.F, Abdelrahman M, Gharaibeh M, Ghoul S, Saade C. Knowledge, attitude and practice regarding clinical and self-breast examination among radiology professionals. Future Medicine. 2019; 7: (3); 2018-

0014. https://doi.org/10.2217/bmt-2018-0014.

14. Nik Farid ND, Abdul Aziz N, Al-Sadat N, Jamaludin M, Dahlui M. Clinical Breast Examination as the Recommended Breast Cancer Screening Modality in a Rural Community in Malaysia; What Are the Factors That Could Enhance Its Uptake? PLoS ONE. 2014; 9(9): e106469. https://doi.org/10.1371/journal.pone.0106469.
15. McGreevy KM, Baron LF, Hoel DG. Clinical breast examination practices among women undergoing screening mammography. Radiology. 2002 Aug;224(2):555-9. doi: 10.1148/radiol.2242011370. PMID: 12147856.
16. Aljohani, S., Saib, I. and Noorelahi, M. Women's Performance of Breast Cancer Screening (Breast Self -Examination, Clinical Breast Exam and Mammography). Advances in Breast Cancer Research. 2017; 6, 16-27. doi: 10.4236/abcr.2017.61002.

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Standard journal article

[1] Flink H, Tegelberg Å, Thörn M, Lagerlöf F. Effect of oral iron supplementation on unstimulated salivary flow rate: A randomized, double-blind, placebo-controlled trial. J Oral Pathol Med 2006; 35: 540–7.

[2] Twetman S, Axelsson S, Dahlgren H, Holm AK, Källestål C, Lagerlöf F, et al. Caries-preventive effect of fluoride toothpaste: A systematic review. Acta Odontol Scand 2003; 61: 347–55.

Article in supplement or special issue

[3] Fleischer W, Reimer K. Povidone-iodine antisepsis. State of the art. Dermatology 1997; 195 Suppl 2: 3–9.

Corporate (collective) author

[4] American Academy of Periodontology. Sonic and ultrasonic scalers in periodontics. J Periodontol 2000; 71: 1792–801.

Unpublished article

[5] Garoushi S, Lassila LV, Tezvergil A, Vallittu PK. Static and fatigue compression test for particulate filler composite resin with fiber-reinforced composite substructure. Dent Mater 2006.

Personal author(s)

[6] Hosmer D, Lemeshow S. Applied logistic regression, 2nd edn. New York: Wiley-Interscience; 2000.

Chapter in book

[7] Nauntofte B, Tenovuo J, Lagerlöf F. Secretion and composition of saliva. In: Fejerskov O,

Kidd EAM, editors. Dental caries: The disease and its clinical management. Oxford: Blackwell Munksgaard; 2003. pp 7–27.

No author given

[8] World Health Organization. Oral health surveys - basic methods, 4th edn. Geneva: World Health Organization; 1997.

Reference from electronic media

[9] National Statistics Online—Trends in suicide by method in England and Wales, 1979–2001. www.statistics.gov.uk/downloads/theme_health/HSQ20.pdf (accessed Jan 24, 2005): 7–18. Only verified references against the original documents should be cited. Authors are responsible for the accuracy and completeness of their references and for correct text citation. The number of reference should be kept limited to 20 in case of major communications and 10 for short communications.

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