

Epidemiological Factors in Breast Cancer and to Evaluate the Diagnostic Accuracy of Fine-needle Aspiration Cytology and Imprint Cytology in Palpable Breast Lump

Sadhana Tiwari¹, Sunil Kumar Bhat², Sana Tiwari³, Bikramjit Singh Sodhi⁴

¹Assistant Professor, Department of Surgery, G. S Medical College and Hospital, Pilkhuwa, Uttar Pradesh, India, ²Senior Resident, Department of Surgery, GMC Jammu, Jammu and Kashmir, India, ³Senior Resident, Department of Obstetrics and Gynecology, Safdarjung Hospital, Delhi, India, ⁴Senior Resident, Department of Surgery, G. S Medical College and Hospital Pilkhuwa, Uttar Pradesh, India

Abstract

Introduction: Breast cancer is of extreme public health importance, as it represents one of the leading causes of cancer morbidity and mortality in women. It accounts for 27% of all malignant neoplasms in American women and represents the leading cause of all deaths in women aged 40-44 years. It is the most common malignant disease of women in the United Kingdom and causes 10,000 deaths annually. In India, breast cancer is the second most common cancer after cancer of the uterine cervix in females.

Material and Methods: The present study included all patients of breast lump, who attended Outpatient Department and indoor of SVBP Hospital, Meerut, from 1st September 1985 to 31st August 1986. A detailed history of patients regarding the various risk factors of breast cancer was taken and recorded on a pre-defined and pretested pro forma. The present study comprises of 125 cases of breast lump, who attended the Outpatients Department and Indoor of S.V.B.P. Hospital, Meerut, from 1st September 1985 to 31 August 1986. A written consent was taken from every patient.

Results: Of the total of breast cancer patients, 64.2% belonged to the urban out and 35.7% were rural. 57.2% of patients were from high socioeconomic status. 35% were from upper to middle class and only 7.1% patients were from low social group. In majority of the cases, the disease was detected by themselves (87.5%). 67% of patients had delay in seeking local doctor. An avoidable delay was also caused by attending medical practitioners in sending the patients to the hospital in 28% of cases.

Conclusion: Among all cancer cases, 52% of patients were obese. 64% of cases had given the history of taking high-fat diet. 58% of females with breast cancer had high breast fat. All breast cancer patients were married and had children.

Key words: Aspiration, Breast, Cancer, Lump

INTRODUCTION

Breast cancer is of extreme public health importance, as it represents one of the leading causes of cancer morbidity and mortality in women. It accounts for 27% of all malignant neoplasms in American women and represents the leading cause of all deaths in women aged 40-44 years.^{1,2}

It is the most common malignant disease of women in the United Kingdom and causes 10,000 deaths annually. In India, breast cancer is the second most common cancer after cancer of the uterine cervix in females. Hence, an understanding of its epidemiology with greater subsequent emphasis on prevention and early diagnosis in high-risk population is necessary.^{3,4} Epidemiology can be defined as “that field of science which deals with the relationship of various factors which determine the occurrence, frequency, and distribution of a disease or physiological state in a community or a group of people.” Epidemiological studies are being increasingly undertaken in the field of cancer. One of the primary goals of cancer epidemiology is to delineate disease distribution in population. This knowledge may then lead to the identification of high-risk groups,

Access this article online



www.ijss-sn.com

Month of Submission : 06-2017
Month of Peer Review : 07-2017
Month of Acceptance : 08-2017
Month of Publishing : 08-2017

Corresponding Authors: Dr. Sadhana Tiwari, G.S. Medical College and Hospital, Philkhuwa, Hapur, Uttar Pradesh, India.
Phone: +919810327151. E-mail- sadhanatiwari2509@gmail.com

thereby enabling more prudent planning for the delivery of health-care services. The epidemiology of breast cancer would also provide us with a few clues toward recognition of women at risk, early detection of cases, and hopefully early treatment of the disease.⁵

Early and correct diagnosis is of immense importance in deciding the line of management and its subsequent success in various breast tissue lesions. Innumerable attempts have been made since long, to find out a correct, safe, and simple method, by which a pre-operative, precise, and conclusive diagnosis can be made. Fine-needle aspiration biopsy was first introduced by Martin and Ellis in 1930 for revealing the pathological nature of tumors. Due to less cohesive nature of tumor cells, it is possible to aspirate ample amount of cells to be spread on slides for cytological examination. Fine-needle aspiration is safe, simple, and rapid method.

Besides needle aspiration, tumor imprints have been used for many years by cellular pathologist in their study of biopsied material obtained. Before fixation in formalin, Dudgeon and Patrick (1927) were the first to use imprint cytology for the diagnosis of breast lump. Subsequently, many workers have used this method. It is a simple, rapid, and economical method. It is of much help at places where facilities of frozen sections are not available.⁵⁻¹⁰

Aims

1. To study the epidemiological variables related to the breast cancer in the present study.
2. To evaluate the accuracy of the needle aspiration cytology in the diagnosis of the palpable breast lump.
3. To evaluate the diagnostic accuracy of the imprint cytology in palpable breast lump.

MATERIALS AND METHODS

The present study included all patients of breast lump, who attended Outpatient Department and Indoor of SVBP Hospital, Meerut, from 1st September 1985 to 31st August 1986. A detailed history of patients regarding the various risk factors of breast cancer was taken and recorded on a pre-defined and pretested pro forma. The present study comprises of 125 cases of breast lump, who attended the Outpatients Department and Indoor of S.V.B.P. Hospital, Meerut, from 1st September 1985 to 31 August 1986. These patients were thoroughly interrogated for detailed history and various epidemiological factors related to the breast cancer were studied. Relevant hematological, biochemical, and radiological investigations were carried out. Fine-needle aspiration was performed in 116 cases of breast lump pre-operatively, and cytological diagnosis was made. These patients were subjected to either definitive

operative procedure or excisional biopsy and specimens so moved were used for imprint cytology and paraffin sections. In 111 cases, imprints were made. The results of needle aspiration cytology and imprint cytology were compared with histopathological studies of their paraffin sections.

Inclusion Criteria

All female patients with breast lump were included in the study.

Exclusion Criteria

Patients with significant comorbidities, cardiovascular, and renal complications were excluded from the study.

RESULTS

Maximum patients (71.4%) with breast cancer were Hindus and 28.6% of patients were Muslims and Sikhs. In control group, 85.7% of patients were Hindus and 10.3% were Muslims and Sikhs. This difference in the incidence of cancer breast in relation to religion was not significant ($P = 0.05$). Out of the total male patients and 92.9 (Table 1).

Maximum patients (71.4%) with breast cancer were Hindus and 28.6% patients were Muslims and Sikhs. In control group, 85.7% of patients were Hindus and 14.3% were Muslims and Sikhs. This difference in the incidence of cancer breast in relation.

The mean age in cancer breast patients was 41.5 years, whereas in benign group, it was found to be 30 years. Of the total 56 breast cancer patients, 7.1% were male patients and 92.9% were females, whereas in control group, only one patient (1.4%) was male and rest of the patients were females as shown in Table 2. The sex has no relation with the incidence of breast cancer ($P = 0.05$).

Thirty-six (64.3%) breast cancer patients belonged to urban areas and 20 (35.7%) patients belong to rural areas, whereas the incidence of breast cancer in different socioeconomic classes was found to be statistically significant ($P = 0.001$) as depicted. Majority of the breast cancer patients (87.5%) discovered their breast lump by themselves on self-palpation and only in 12.5% cases, the lesion was discovered by other people.

Only two cases (3.5%) out of 56 breast cancer patients consulted the surgeon within 15 days of the onset of the symptoms and rest of the 54 patients (96.5%) reported to the doctor after 15 days. In majority of the cases (67.0%), the reason for delay was ignorance. 44.6% of breast cancer patients were illiterate and only 7.14% were graduates and postgraduates. In control group, 42.85%

Table 1: Distribution of social adaptive behavior among the study population

Social adaptive behavior	Types of disease			Fisher's exact test
	Salt-wasting (%)	Simple-virilizing (%)	Total (%)	P value
Adequate	16 (47)	13 (62)	29 (53)	0.5648
Moderately low	15 (44)	7 (33)	22 (40)	
Low	3 (9)	1 (5)	4 (7)	
Total	34 (100)	21 (100)	55 (100)	

Table 2: Distribution of IQ among the two types of CAH in the study population

IQ range	Types of disease			Fisher's exact test
	Salt-wasting (%)	Simple-virilizing (%)	Total (%)	P value
50-70	1 (3)	1 (5)	2 (4)	0.5473
70-90	20 (59)	9 (43)	29 (53)	
90-110	13 (38)	11 (52)	24 (43)	
Total	34 (100)	21 (100)	55 (100)	

patients were illiterate and 2.85% patients were graduates and postgraduates. The incidence of breast cancer has no relation with the education of the patient ($P = 0.05$).⁹

Nearly 64% of the breast cancer patients had consumed high amount of fat in their diet, whereas in control group, only 29% patients had taken high amount of fats in their diet. The incidence of breast cancer in relation with dietary fat consumption was highly significant ($P < 0.001$).

It was interesting to note that the body weights of a patient have a direct relation with the incidence of carcinoma breast. 52% of the cancer breast patients were obese and having body weight >60 kg, whereas in control group, 70% of patients were of average built and having their body weight between 45-60 kg. The difference in the incidence of breast cancer in relation to body weights was found to be statistically significant ($P = 0.001$). 57.69% of cancer breast patient were having high breast fat, and only 5.8% patients were having low breast fat, whereas in control group, 58% of females were having average breast fat. It was found that half of the breast cancer patients had their menarche at an early age between 12 and 13 years, whereas in control group, maximum number of patients (81.2%) had menarche between 14-15 years of age. The difference in the incidence of breast cancer in relation to the age of menarche was found to be highly significant ($P < 0.001$).

Nearly 46% of breast cancer patients were post-menopausal, whereas in control group, only one patient was post-menopausal. The difference in the incidence of breast cancer in relation to the menstrual status was found to be highly significant ($P < 0.001$). Out of 24 post-menopausal

women, 30% of patients were of average built and 70% of women were obese while in pre-menopausal group, only 20% females were obese.

Half of the breast cancer patients had either 3 or more than three male children, whereas in control group, it was only 11.2%. This difference was found to be statistically significant ($P < 0.001$). Maximum number (80.7%) breast cancer patients had their first child after 21 years of age, whereas in control group, majority of the patients (63.5%) had their first child before the age of 20 years. This finding was found to be highly significant ($P = 0.001$). No breastfeeding was carried out in 27% of breast cancer patients. 12% of breast cancer patients had breast-fed for more than a year, whereas in control group, it was 32%. The incidence of breast cancer in relation to the breastfeeding was significant ($P < 0.005$). Only 7% of breast cancer patients had the family history of breast cancer positive and in 93% cases, it was negative, whereas in control group, no patient was having family history positive for carcinoma breast.

DISCUSSION

The present study use conducted on 126 cases of breast lump who attended the Outpatient Department and Indoor of SVBP Hospital, Meerut, from 1st September 1985 to 1st August 1906. Out of 126 patients, 70 (55%) were benign breast disorder and 56 (45%) were of carcinoma breast. The highest incidence of breast cancer was seen in 41-50 years of age (35.71%) with average age of 47.5% years. Nagpal and Singh (1983) also recorded the highest incidence of breast cancer in 41-50 years of age. Vaidya et al., Pd and Sengupta (1983), and Sharma and Singh (1983) noted that the maximum number of patients in their series were between 40 and 50 years of age.¹¹⁻¹³

Out of 56 patients of breast cancer, 7.1% were males and 92.9% were females. Raddy et al. (1956) and Nagpal and Singh (1983) have reported 7.5% and 4.2% incidence of breast cancer among males, respectively. Sirsat (1957), Ian et al. (1962), Dubey and Agarwal (1971), Dutta et al., and Deodher et al. (1978) have also noted a higher incidence of breast cancer in males as compared to the incidence of breast cancer in males in Western countries. The

incidence of breast cancer was high among Hindus (71.45) as compared to Muslims (2570) and Sikhs (3.6%). Higher incidence along Hindus is possibly due to their large number in population.¹⁴⁻¹⁶

The incidence of breast cancer was relatively higher in urban areas compared to rural area (35.7%). This difference may be due to the fact that relatively better health services are available and people are more cancer conscious. In urban areas, Staszewski and Bertini *et al.* (1971) have also reported a lower incidence of breast cancer in rural areas. Majority of the patients were from high socioeconomic group (57.2%) and only 7.1% patients were belonging to low social class. Shapiro (1968), MacMahon *et al.* Shimkin, Sherman and Korenman, and Wilson have also observed a higher incidence of breast cancer in higher socioeconomic group.

In the present study, 87.5% of cancer breast patients noticed their disease by themselves on self-palpation and the importance of self-palpation have been emphasized by others also (Kelly *et al.*, 1979; Rao *et al.*, 1983). 67% are ignorant about their disease and did not seek early medical advice likely due to the fact that 44.64% of patients were illiterates and were not aware of the gravity of the disease. In 28% of patients, the delay in seeking the medical advice remained contributory to unawareness of attending medical practitioners. The importance of self-palpation and health education for breast cancer would provoke the awareness for seeking early medical advice.

64% of patients with breast cancer had given the history of baking high amount of fat in their diets which is attribute to their high socioeconomic status Carrol and Hopkins.¹⁶⁻²⁰

Buell (1973) and MacMohan *et al.* have also found the association between high-fat diet and high breast cancer risk, considerable number (46%) of breast cancer patients were post-menopausal, out of which 70% were obese. Thus, obesity might be acting through hormonal influences. Dewaard (1960) have also noted an association between obesity and post-menopausal breast cancer. He found that estrogenic cervical smears persisted in post-menopausal overweight women. Barlow *et al.* (1969), Hein (1970), Drasan (1973), Armstrong *et al.* (1973), and Hankin (1978) have also suggested that gain in weight may enhance certain imbalance in steroid pattern which may act as cancer promoter.

Thirty three breast cancer patients had increased breast fat. Similar data was shown by other studies in the past.

All the patients with breast cancer in this series were married. Shanna and Singn (1983) also found that all their

cancer. Shanna and Singn (1983) also found that all the cancer patients were married. However, Lane Claypton Barnett(1948) found 22% of patients in these series were unmarried. Wynder (1960) observed that 15% British, 10% Japanese, and 7% Indian breast cancer patients were married. Nair *et al.* (1983) noted that 1.6% of patients in their series were unmarried.^{21,22}

Among breast cancer patients, 76.9% of cases had either 3 or men than 3 children. However, Lane-Claypon, Lilienfeld (1955), MacMahon *et al.*, and Jussawalla *et al.* have noticed higher incidence of breast cancer among nulliparous women. This difference in the incidence of breast cancer in relation to this factor may be because the sample is very small. 61.5% of breast cancer patients had their first child after 24 years of age which is statistically significant ($P < 0.001$). MacMahon *et al.* have also noted a higher incidence of breast cancer in women whose 1st pregnancy has occurred after the age of 25 years. In 63% of the breast cancer patients, the first child was male. The total number of male children of breast cancer patients was more, and total number of female children of breast cancer patients was less as compared to control. These findings were statistically significant ($P < 0.001$).²³⁻²⁵

It was surprised to find that 27% of breast cancer patients had not breast-fed their children and only 12% of breast cancer patients had breast-fed for more than a year. This difference in the incidence of breast cancer was found to be statistically significant ($P = 0.005$). Lane-Claypon, Schaefer (1969), Miller *et al.* (1976), Anderson (1975), Lubin *et al.* (1982), Byers *et al.* (1985), McTiernan and Thomas also noted a higher incidence of breast cancer among those women who have not breast-fed their children or have breast-fed only for short periods. 70% of patients had their menopause after 45 years of age and had a menstrual life of more than 30 years. Trichopolous (1972) also noted the similar observations. Vaidya *et al.* reported that 91.5% of cancer breast patients in their series had menopause after 45 years of age. Only 2% of patients with cancer breast had given the history of taking contraceptive pills for 1 year. The number of patients in present series is too less to comment on this. It was found that about 35% of cancer breast patients were having more than three X-rays exposures in the past, which was statistically significant ($P = 40.001$). Simon Nolo (1975) have also observed that women who exposed to high dose of ionizing radiation had higher incidence of cancer breast carcinoma breast.

In 116 patient of breast pump, needle aspiration smears have shown a correct diagnosis of benign in 97% of cases and correct diagnosis of malignant in 95.8% of cases. Overall, a diagnostic accuracy of 96.5% was obtained. Aspiration smears revealed that malignant cells were

larger than benign cells having characteristic features of malignancy including altered nucleocytoplasmic ratio, fine and irregular chromatin reticulum, hyperchromasia, and pleomorphism either observed single or in sheets depending on cellular and fibrous component of the tumor, as later on confirmed by histopathology.²⁶⁻²⁹ Other workers have also reported similar results.

CONCLUSION

Of the total breast cancer patients 64.2%. Belonged to urban area and 35.7% were from urban area. 57.2% patients were of high socioeconomic status, 35.7% from upper to middle class and only 7.1% patients were from low socioeconomic status. In majority of the cases the disease detected by themselves (87.5%). 15. 67% of patients had delay in seeking local doctor and an avoidable delay was caused by attending medical practitioners in sending the patients to hospital in about 28% of cases. Among all cancer cases, 52% of patients were obese. 64% of cases had given the history of taking high-fat diet. 58% of females with breast cancer had high breast fat. All breast cancer patients were married and had children. 76.9% of breast cancer patients had either 3 or more than 3 children. In 63% of cases, the first child was male. The total more and total number of female children born to cancer breast patients was less as compared to control. The age at 1st pregnancy was between 24 and 26 years of age in 61.5% of breast cancer patients. 27% of patients had not breast-fed their children at all and only 12% had breastfed for more than a year. For more than a year, 98% of females with breast cancer had their menarche before 15 years of age. 77% of patients had regular menstrual cycles. 71% of patients were menopausal, out of which, 70% had their menopause after 45 years of age and menstrual life of more than 30 years. The history of taking oral contraceptives was present in 2% of cases. Family history of breast cancer was positive in 7% of cases. History of benign breast disease in the past was present in 11% of cases.

REFERENCES

1. Agarwal PK, Gosh M, Wahal KM, Mehrotra RM. Study of imprint smears of lymph nodes. *Indian J Cancer* 1977;15:157.
2. McTiernan A, Thomas DB. Evidence for a protective effect of lactation on risk of breast cancer in young women. *Am J Epidemiol* 1986;124:353-8.
3. Armstrong B, Stevens N, Doll R. Retrospective study of the association between use of rauwolfia derivatives and breast cancer in English women. *Lancet* 1974;2:672-5.

4. Armstrong B, Doll R. Environmental factors, cancer incidence and mortality in different countries, with special reference to dietary practices. *Int J Cancer* 1975;15:617.
5. Aromaa A, Hakama M, Hakulinen T, Saxén E, Teppo L, Idä lan-Heikkilä J. Breast cancer and use of rauwolfia and other antihypertensive agents in hypertensive patients: A nationwide case-control study in Finland. *Int J Cancer* 1976;18:727-38.
6. Breslow L, Upton AC. Role of early detection of ca breast. *Obstet Gynecol News* 1977;12:13.
7. Carroll KK, Hopkins GJ. Dietary polyunsaturated fat versus saturated fat in relation to mammary carcinogenesis. *Lipids* 1979;14:155-8.
8. de Waard F. The epidemiology of breast cancer: Review and prospects. *Int J Cancer* 1969;4:577-86.
9. de Waard F. Breast cancer incidence and nutritional status with particular reference to body weight and height. *Cancer Res* 1975;35:3351-6.
10. de Waard F, van der Velden JW, de Does M. Influence of relative body weight on the prognosis of breast cancer in women. *Ned Tijdschr Geneesk* 1985;129:454-9.
11. Dubey MM, Agarwal S. Carcinoma of the male breast. *Indian J Surg* 1971;33:62-5.
12. Dutta TK, Deka AC, Gupta BD, Kaushik SP. Carcinoma of the male breast. *Indian J Cancer* 1975;12:67-71.
13. Jussawalla DJ, Yeole BB, Natekar MV, Narayan RA. Epidemiology of breast cancer in India. *Indian J Cancer* 1975;12:231.
14. Lane-Clayton EJ. A follow-up report on cancer of the breast. In: Rep. Min. Health No. 32. London: H. M. Stationery Office; 1926.
15. Lilienfeld AM. The relationship of cancer of the female breast to artificial menopause and Marital status. *Cancer* 1956;9:927-34.
16. Lilienfeld AM, Coombs J, Bross ID, Chamberlain A. Marital and reproductive experience in a community-wide epidemiological study of breast cancer. *Johns Hopkins Med J* 1975;136:157-62.
17. Lilienfeld AM, Chang L, Thomas DS, Levin ML. Rauwolfia derivatives and breast cancer. *John Hopkins Med J* 1975;139:41-50.
18. Lubin JF, Ruder AM, Wax Y, Modan B. Overweight and changes in weight throughout adult life in breast cancer etiology. A case-control study. *Am J Epidemiol* 1985;122:579-88.
19. MacMahon B, Lin TM, Lowe CR, Mirra AP, Ravnihar B, Salber EJ, *et al.* Lactation and cancer of the breast. A summary of an international study. *Bull World Health Organ* 1970;42:185-94.
20. MacMahon B, Cole P, Lin TM, Lowe CR, Mirra AP, Ravnihar B, *et al.* Age at first birth and breast cancer risk. *Bull World Health Organ* 1970;43:209-21.
21. Miller AB, Kelly A, Choi NW, Matthews V, Morgan RW, Munan L, *et al.* A study of diet and breast cancer. *Am J Epidemiol* 1978;107:499-509.
22. Mole RH. The sensitivity of the human breast to cancer induction by ionizing radiation. *Br J Radiol* 1978;51:401-5.
23. Shimkin MB. Recent Results of Cancer Research. Vol. 42. New York: Springer-Verlag; 1973. p. 6.
24. Sherman BM, Korenman SG. Inadequate corpus luteum function: A pathophysiological interpretation of human breast cancer epidemiology. *Cancer* 1974;33:1306-12.
25. Simon N. Breast cancer induced by radiation. Relation to mammography and treatment of acne. *JAMA* 1977;237:789-90.
26. Staszewski J. Cancer in Poland in 1959. *Br J Cancer* 1964;18:1-13.
27. Trichopoulos D, MacMahon B, Cole P. Menopause and breast cancer risk. *J Natl Cancer Inst* 1972;48:605-13.
29. Vaidya MP. Epidemiology of breast cancer in India. In: Vaidya MP, Shulka HS, editors. *A Text Book of Breast Cancer*. New Delhi: Vikas Publishing House Pvt. Ltd.; 1983.
30. Wilson E. In: Sabiston DF Jr, editor. *The Breast-The Textbook of Surgery*. 11th ed. Philadelphia, PA: W.B. Saunders and Co.; 1976. p. 623-63.

How to cite this article: Tiwari S, Bhat SK, Tiwari S, Sodhi BS. Epidemiological Factors in Breast Cancer and to Evaluate the Diagnostic Accuracy of Fine-needle Aspiration Cytology and Imprint Cytology in Palpable Breast Lump. *Int J Sci Stud* 2017;5(5):102-106.

Source of Support: Nil, **Conflict of Interest:** None declared.