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Original Research Article

Clinicopathological profile of male breast cancer: an institutional experience from Western Bihar, India

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ABSTRACT

Background: Male breast carcinoma (MBC) is rare (~1% of breast diagnoses) and often presents at advanced stages due to limited awareness, screening guidelines, and medical guidance. Data from Bihar, India, remains scarce. This study assessed institutional accrual alongside demographic, clinical, histological, and stage profiles at Netaji Subhas Medical College and Hospital (NSMCH), Bihta, Patna.
Methods: An ambispective observational cohort study (January 2019 to December 2025) histopathologically confirmed primary male breast cancer (MBC) cases were included (retrospective: 2019–2023; prospective: 2024–2025). Age, symptoms, histological subtype, and AJCC 8th Edition (pTNM) stage were recorded. Data were analyzed using descriptive statistics with exact binomial and Poisson confidence intervals.
Results: Over seven years, 36 patients were identified (mean accrual: 5.14 cases/year), predominantly aged 60–84 years. Painless breast lump was the chief symptom in 28 patients (77.7%). Invasive ductal carcinoma (no special type) was the predominant variant (33 cases, 91.7%). Advanced Stage III or IV disease was present in 27 patients (75.0%) at initial diagnosis.
Conclusions: MBC in western Bihar primarily affects older men and usually presented at advanced stages through symptom-driven detection, dominated by invasive ductal carcinoma. Improving public awareness, screening efficiency, rapid histopathological diagnosis, referral networks, and regional cancer registration is essential.

Keywords: Male breast carcinoma, Hospital case accrual, Bihar, Invasive ductal carcinoma, Clinicopathological profile

INTRODUCTION

Male breast carcinoma (MBC) is an uncommon but clinically important malignancy. It accounts for approximately 1% or less of breast cancers and occurs far less frequently in men than in women.[1,2] Its rarity has constrained epidemiological surveillance, male-specific prospective trials and the development of a large evidence base. Population-based studies have nevertheless established a reproducible clinical profile: men are generally older at diagnosis than women with breast cancer, temporal variation in incidence has been documented, and differences in stage, tumour characteristics and treatment patterns have been observed across populations.[3-5] Consequently, many principles of diagnosis and management have historically been derived from female breast cancer while being adapted to the anatomical, biological and clinical features of male disease.

The pathology of MBC reflects the structure of the male breast, which is composed predominantly of ducts with limited lobular development. International central-pathology data demonstrated that invasive ductal carcinoma/no special type constitutes the great majority of male breast cancers and that hormone-receptor expression is common.[6,7] This recurrent ductal/NST predominance provides a useful benchmark for hospital-based pathological series. At the molecular level, however, MBC should not simply be regarded as female breast cancer

occurring in men. Genomic profiling has demonstrated heterogeneity and differences in the frequency of alterations seen in otherwise comparable female breast cancers, including alterations involving DNA-repair pathways.[8]

Hereditary susceptibility is particularly important in MBC. Multigene panel studies have identified pathogenic variants in BRCA2 and other cancer-predisposition genes, including CHEK2 and PALB2, among affected men.[9] Genome-wide association work has further shown that common susceptibility loci overlap substantially with the inherited architecture of oestrogen-receptor-positive female breast cancer.[10] Large family-based analyses confirm that BRCA2 pathogenic variants confer a marked increase in male breast-cancer risk, with a smaller association for BRCA1.[11] Non-genetic and chromosomal risk settings are also recognized. Men with Klinefelter syndrome have a substantially increased risk of breast cancer[12], and a national case-control study from England and Wales reported associations between adult and abdominal obesity and male breast-cancer risk.[13] These observations support a multifactorial model involving inherited susceptibility, hormonal milieu, ageing and metabolic exposures.

Because routine population screening is not undertaken for average-risk men, diagnosis is usually symptom driven. The typical presentation is a unilateral, often retroareolar and painless breast mass; nipple retraction or discharge, skin involvement and axillary abnormalities may also occur. Psychosocial work has documented poor prior awareness, embarrassment and prolonged symptom-to-consultation intervals in some affected men, illustrating how delay can occur before formal diagnostic evaluation begins.[14] Once a suspicious symptom is recognized, clinical examination and appropriate breast imaging are central to assessment. Mammography and ultrasonography have both demonstrated high diagnostic utility in symptomatic male breast disease.[15,16] Tissue diagnosis is required for definitive classification, and contemporary management guidance emphasizes the importance of histopathological confirmation, receptor assessment and stage-directed multidisciplinary care.[17]

Stage at diagnosis is among the most clinically consequential descriptors of MBC. Large contemporary registry analyses show progressively poorer outcomes with increasing tumour burden, nodal involvement and stage.[18,19] Biological subtype also contributes prognostic information in male breast cancer.[20] Long-term follow-up data are particularly relevant: among men with stage I-III hormone-receptor-positive disease, 20-year breast-cancer-specific mortality increased substantially with advancing stage, reaching approximately 46% for stage III disease compared with approximately 12% for stage I disease in one large analysis.[21] These data underscore why a high proportion of locally advanced or metastatic disease in a hospital series has clinical significance even when survival outcomes are not measured locally. At the same time, emerging multigene profiling has identified potentially actionable molecular alterations in subsets of male tumours, supporting the need for increasingly complete pathological and molecular characterization in future cohorts.[22]

The evidence gap is particularly relevant in India, where national cancer-registry data demonstrate marked geographic heterogeneity in cancer patterns and highlight the complementary roles of population-based and hospital-based surveillance.[23] Published Indian MBC series are generally small and institution specific. An eastern Indian clinicopathological study reported a substantial burden stage III-IV disease.[24] Other Indian institutional reports have similarly described the rarity and heterogeneous presentation of MBC.[25] The AIIMS experience documented a predominance of advanced disease and a prolonged median symptom duration[26], whereas a tertiary cancer-centre series from Delhi reported stage II as the most frequent stage, illustrating that patterns are not uniform across institutions.[27] A rural cancer-centre cohort reported a high metastatic burden at presentation, and a long-duration tertiary-care series further emphasized the persistence of delayed presentation in Indian practice.[28,29] A recent South Indian cohort again reported predominantly advanced-stage disease while also illustrating the value of biomarker-rich pathological characterization.[30] The variability among these studies cautions against extrapolating the case mix of one centre to an entire region.

Against this background, indexed clinicopathological evidence specifically describing MBC presenting to tertiary services in Bihar remains limited. The present study was therefore undertaken as a seven-year ambispective, hospital-based observational analysis of histopathologically confirmed primary MBC diagnosed from January 2019 through December 2025 at a tertiary care teaching hospital in Bihar. The study focuses on institutional case accrual rather than population incidence and describes age at diagnosis, presenting symptoms, histological subtype and stage at presentation. Based on the established literature, the working expectation was that the cohort would predominantly comprise older men, commonly present with a painless breast mass, show a strong predominance of invasive ductal/NST carcinoma and include a substantial proportion of advanced-stage disease.[1,6,24] By documenting these features in a Bihar tertiary-care setting, the study aims to provide a regional baseline for improved symptom awareness, pathology documentation, referral planning and future multicentre or registry-linked research.

METHODS

Study design and population

The study design is an ambispective hospital-based, observational cohort study. This study was conducted at Netaji Subhas Medical College and Hospital, Bihta, Patna

to assess the clinicopathological profile of MBC in the Department of Pathology. The centre receives referrals from urban and rural districts of western Bihar and neighbouring regions of Uttar Pradesh and provides diagnostic and surgical services. The study covered the period from January 2019 to December 2025.

Cases diagnosed between year 2019-2023 were retrospectively retrieved from histopathology registers and archived clinical records, while cases from January 2024 to December 2025 were prospectively enrolled consecutively following biopsy samples submitted for histopathological examination from surgical department. The manuscript was prepared in accordance with accepted principles for reporting observational studies.

The source population consisted of men diagnosed with a primary malignant epithelial tumour of the breast during the study period. A case was accepted as male breast carcinoma only after histopathological confirmation.

Inclusion criteria

Patients of male sex and age 18 years or older at diagnosis, histopathologically confirmed primary carcinoma arising in the breast, and diagnosis established between January 2019 and December 2025 were included.

Exclusion criteria

Patients with benign breast lesions, metastatic deposits from a non-breast primary, recurrent tumours first treated elsewhere without adequate records, and cases lacking definitive histopathological confirmation were excluded.

Sample collection and analysis

Information was recorded on a structured data collection form. Variables included age at diagnosis, presenting complaint, laterality where documented, relevant clinical findings, histological subtype and stage at presentation. All cases underwent strict pathological staging (pTNM) in accordance with the American Joint Committee on Cancer (AJCC) 8th Edition.

The principal outcome was institutional case accrual, expressed as the total number of eligible cases and the mean number diagnosed per year. Secondary outcomes were the observed age range, distribution of presenting symptoms, histological subtype and AJCC stage, including the combined proportion of stage III and IV disease.

Age was summarised using the observed range. Categorical variables were reported as counts and percentages. Mean annual case accrual was obtained by dividing the total number of cases by the seven-year observation period, and an exact Poisson 95% confidence interval was calculated for this rate. Population incidence was not estimated because the study did not have a defined catchment denominator.

RESULTS

A total of 36 men with histopathologically confirmed primary breast carcinoma were included between January 2019 and December 2025. The average institutional case accrual was 5.14 cases per year over the seven-year period (95% CI 3.60-7.12). All patients were older adults, with age at diagnosis ranging from 60 to 84 years.

As summarized in Table 1, the most common presenting complaint was a painless breast lump in 28 patients [77.8%, 95% CI: 61.9-83.3%]. Other presentations were less frequent and included breast pain in 6 patients [16.6%, 95% CI: 7.9-31.9%], nipple discharge in 4 patients [11.0%, 95% CI: 4.4-25.3%] and skin ulceration in 2 patients [5.5%, 95% CI: 1.5-18.1%]. As some patients presented with more than one symptom, cumulative frequency exceeds 100%.

Table 1: Age and clinical presentation.

Variables	Value/ number	Percen-tage	95% confidence interval
Total patients	36	100	-
Age at diagnosis, years	60-84	-	Observed range
Painless breast lump	28	77	61.9-83.3
Pain	6	16.6	7.9-31.9
Nipple discharge	4	11	4.4-25.3
Skin ulceration	2	5.5	1.5-18.1

Categories are not mutually exclusive, hence percentages sum >100%.

On histology, invasive ductal carcinoma, no special type [IDC-NST] was the predominant subtype (Figure 1). It was identified in 33 patients [91.7%]. The remaining 3 cases [8.3%] comprised other epithelial subtypes including papillary and mucinous carcinomas.

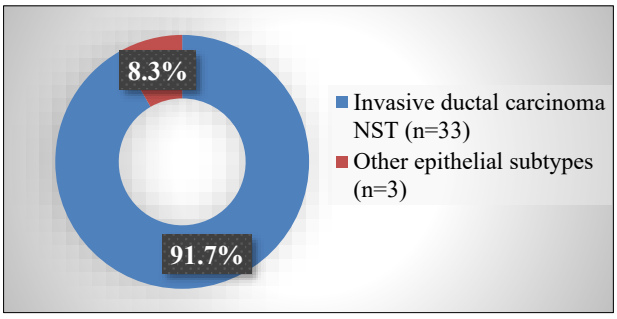

Figure 1: Histological subtype distribution.

Lobular features including single file arrangement of tumour cells and targetoid growth around benign glands a specific subtype of breast cancer characterized by a complete loss of cellular adhesion. Tendency to infiltrate

the surrounding tissue strands individually rather than forming tight structures (Figure 3).

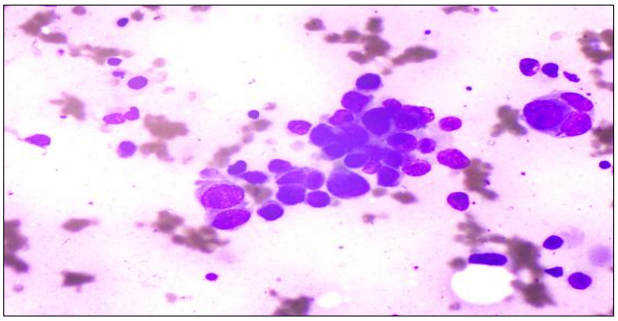

Figure 2: FNA cytology showing cellular pleomorphism and dyscohesion (40 X).

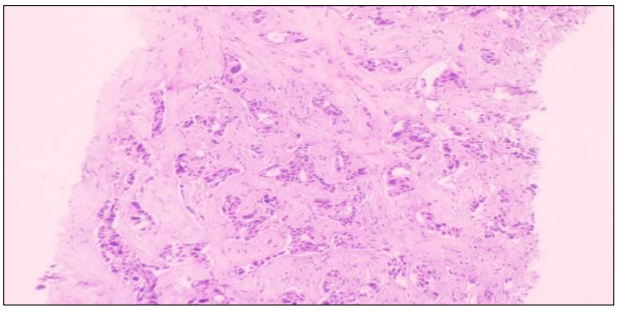

Figure 3: Lobular features including single file arrangement of tumour cells and targetoid growth around benign glands (4X).

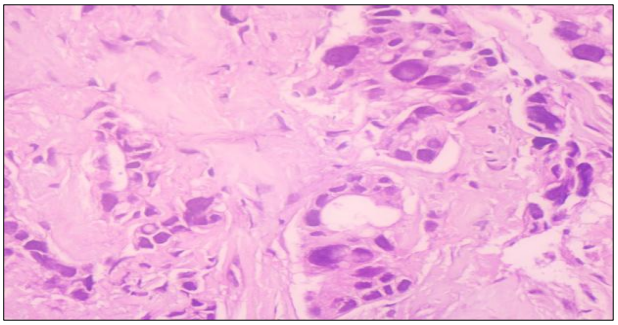

Figure 4: Tumours cells in sheets, cords, nests, clusters or individual cells (10X).

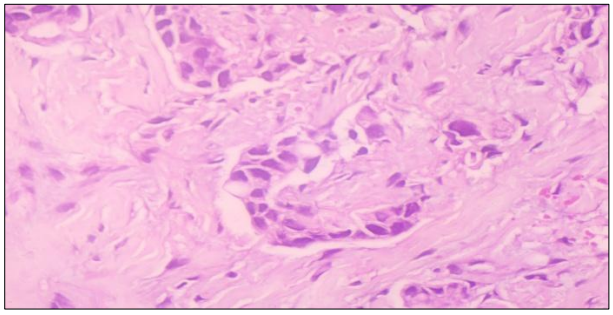

Figure 5: Haphazardly distributed nests of tumor cells without tubule formation (40 X).

Tumour cells arranged in sheets, cords, nests, clusters or as individual cells in solid pattern, clusters/aggregates toward an Alveolar variant, and broader strands represent trabecular growth patterns (Figure 4). Haphazardly distributed nests of tumor cells without tubule formation (Figure 5).

As shown in Table 2, disease stage at the time of presentation was predominantly advanced. According to AJCC 8th edition pathological staging only 2 patients (5.6%) were in stage I and 7 (19.5%) were in stage II, while 19 (52.7%) were in stage III and 8 (22.2%) were in stage IV. In total, three-quarters of the cohort (27/36, 75.0%) had stage III-IV disease at the time of diagnosis. Combined, 27 of 36 patients [75.0%, 95% CI: 62.1-85.3%] had stage III-IV disease at the time of diagnosis.

Table 2: AJCC 8th edition pathological stage distribution.

Stages	Number	Percentage	95% confidence interval
Stage I	2	5.6	1.8-16.2
Stage II	7	19.5	9.5-30.4
Stage III	19	52.7	40.0-66.3
Stage IV	8	22.2	12.1-34.2
Stage III-IV combined	27	75.0	62.1-85.3

DISCUSSION

This seven-year hospital-based study documents the pattern of male breast carcinoma encountered at a tertiary care teaching hospital in Bihar. Thirty-six histologically confirmed cases were diagnosed during the study period, with a mean institutional accrual of 5.14 cases per year. Although these figures represent data from a single institution and cannot be extrapolated to the entire population. These findings confirm that male breast carcinoma, while uncommon, is not an exceptionally rare encounter in routine tertiary care practice.[1,2]

Published reviews and population-based registry studies have consistently shown that male breast cancer accounts for less than 1% of all breast cancer diagnoses.[3-5] The relatively small yearly number in the present series is therefore in keeping with the established rarity of the disease. However, by aggregating cases over the study years, the present study provides a sufficient sample to delineate the predominant clinical and pathological profile in this region and underscores the importance of maintaining complete and systematic hospital records for rare malignancies. National registry evidence demonstrates substantial geographic heterogeneity in cancer patterns in India and illustrates why population-based surveillance and hospital-based series serve complementary rather than interchangeable purposes.[23]

Patients in the cohort were 60-84 years of age, confirming that the disease was confined to older adults in this series. This profile is consistent with the recognised increase in male breast cancer with advancing age and with reports by Giordano, Fentiman et al and Anderson et al.[4-6] Studies done by Shah et al reported a mean age of approximately 56 years in an eastern Indian series, while other Indian institutional cohorts have commonly reported central ages in the late fifties or early sixties.[24,26,28-30]

A painless breast lump was the leading presentation, occurring in 28 of 36 patients (77%). This agrees with the National Cancer Institute summary and major clinical reviews, which identify a palpable mass as the usual first manifestation in men.[3-5] Because screening is not routinely performed in the male population, early diagnosis depends primarily on recognition of symptoms. A persistent unilateral or retroareolar mass, nipple alteration, discharge, ulceration or axillary swelling should therefore prompt immediate assessment. Clinical assessment followed by appropriate mammography and/or ultrasonography can effectively evaluate symptomatic male breast disease and identify lesions requiring biopsy.[15,16]

The pathological findings were also in keeping with established male breast cancer morphology. Invasive ductal carcinoma, NST, represented 91.7% of the cohort. The WHO classification and major reviews similarly describe ductal carcinoma as the dominant type.[4,5,8] This pattern reflects the predominantly ductal architecture of the male breast and the limited development of lobular structures. Other epithelial subtypes were uncommon in the present series.

The most concerning observation was the stage distribution. Three-quarters of patients had stage III or IV disease at diagnosis. Such a concentration of advanced tumours strongly suggests delay before definitive assessment at the tertiary centre. Compared with population-based series that include a larger proportion of early-stage cancers, referral-centre cohorts from settings with limited awareness and restricted access frequently contain more locally advanced and metastatic disease.[4,6,14] Patient hesitation, distance, cost, delayed referral and limited availability of specialised services are plausible contributors. Leone et al reported a marked increase in 20-year breast-cancer-specific mortality with advancing stage among men with hormone-receptor-positive disease, from approximately 12% in stage I to approximately 46% in stage III.[21] Although survival was not measured in the present cohort, the high proportion of stage III-IV disease therefore has clear clinical significance.

This finding is relevant to cancer surveillance in India. National Cancer Registry Programme reports demonstrate the importance of systematic regional data collection.[11,12] Yet uncommon tumours can be obscured within aggregated statistics. The present cohort adds structured evidence from Bihar and highlights the need for dedicated institutional reporting and future linkage with population-based registries.

Overall, the cohort closely resembles established descriptions of male breast carcinoma with respect to older age, presentation as a palpable lump and predominance of invasive ductal carcinoma. The major divergence is the exceptionally high burden of stage III and IV disease. Tumour biology alone is unlikely to account for this pattern; delayed symptom recognition and delayed access to definitive care are more probable explanations.

The distinction between institutional accrual and population incidence remains important. The figure of 5.14 cases per year indicates the average number diagnosed at this hospital during the study period. Estimation of incidence for Bihar would require a clearly defined population denominator, comprehensive ascertainment across institutions and registry validation. Hospital-based accrual nevertheless remains useful for planning pathology, surgery and oncology services.

The clinical implications are direct. Suspicious male breast lesions should not be observed for prolonged periods or treated repeatedly without diagnosis. Timely imaging and core biopsy can shorten the diagnostic interval, while education at primary and secondary care levels can facilitate earlier referral. Public messages should explicitly acknowledge that breast cancer occurs in men, as the belief that it is exclusively a female disease may postpone consultation.

In summary, this study contributes a regional description of male breast carcinoma from a tertiary referral hospital in Bihar. The patients were older men, most presented with a painless lump, invasive ductal carcinoma was the dominant histological diagnosis, and 75% had advanced-stage disease. These findings support targeted awareness, rapid diagnostic pathways, improved referral networks and strengthened registration of rare cancers.

CONCLUSION

Male breast carcinoma was uncommon but clinically significant in this tertiary care cohort. Thirty-Six cases were diagnosed over seven years, corresponding to a mean institutional accrual of 5.14 cases annually. Patients were 60-84 years old, and the usual presentation was a painless breast lump. Invasive ductal carcinoma, NST, was the predominant histological subtype. The finding that three-quarters of patients had Stage III or IV disease identifies delayed diagnosis as a major concern.

Improved awareness among patients and frontline clinicians, prompt tissue diagnosis, timely referral, accessible pathology services and robust cancer registration are necessary to promote earlier detection and improve understanding of male breast carcinoma in Bihar and similar settings.

The principal strength of the study is the inclusion of only histopathologically confirmed primary breast carcinomas, which minimises diagnostic misclassification. It also provides an institution and, region-specific account from Bihar, where published data on male breast carcinoma remain sparse.

Although few limitations are recognised, like single-centre study and referral bias may have increased the proportion of advanced tumours. The sample size was constrained by the rarity of the disease. A population incidence rate could not be calculated because the hospital did not have a defined catchment denominator. The findings suggest of a population based multicentric study for better understanding of this pathological condition.

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