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Original Research Article

Analysis of delays in the stages of breast cancer care at the University Clinics of Kinshasa

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ABSTRACT

Background: The DRC faces the paradox of high mortality and low incidence of breast cancer due to late consultations and delayed treatment; however, it lacks studies detailing the different delays of breast cancer management. We initiated this study to assess these delays and identify the associated factors.
Methods: This was a cross-sectional study conducted on 201 records of women followed for breast cancer at the University Clinics of Kinshasa (UCK) from January 2020 to December 2024. Population characteristics and delays were described using descriptive statistics, logistic regression was used to identify factors associated with delays.
Results: The mean age was 48±12 years. 90.8% of patients were diagnosed at advanced stages, 67% received chemotherapy as first treatment. The median patient delay was 365 days, the median diagnostic delay was 26 days, the median treatment delay was 39 days, the median health system delay was 67 days, the median total delay was 398 days. Single women had a higher risk of consultation delay (aOR=2.48; p=0.02), diagnostic delay (aOR=1.79 p=0.01) and treatment delay (aOR=3.67; p=0.04). Women who followed alternative pathways had a higher risk of delay in consultation (aOR=9; p=0.01), diagnosis (aOR=3.27; p=0.02), and treatment (aOR=3.27; p=0.01). Consulting for symptoms other than breast lump was associated with a higher risk of treatment delay (aOR=3.44; p=0.02).
Conclusions: Efforts must be made to address the causes of delayed consultations and to improve the patient care pathway.

Keywords: Breast cancer, Delay, UCK

INTRODUCTION

Breast cancer is a public health problem because of its incidence and lethality, in addition to the cost of its management. Its incidence was estimated at 2.3 million new cases worldwide, with 670,000 deaths in 2022.[1] It is the most frequently diagnosed cancer globally and the leading cause of cancer-related death among women.[2]

Projections for 2050 indicate a 38% increase in new cases and a 68% increase in deaths, with a more pronounced impact in low-resource countries, including the Democratic Republic of Congo (DRC), compared with high-income countries.[3]

Among the factors that may explain this disparity, delays at the different stages of breast cancer management

observed in low-income countries have been cited in several studies as the most significant contributing factor.[4]

In the Democratic Republic of Congo, several studies on breast cancer have mainly shown that most patients seek medical care at advanced or even metastatic clinical stages.[5] However, none of these studies specifically focused on analysing delays at the various stages of breast cancer management, from consultation delay to diagnostic delay and treatment delay, an area of research that has become a priority for many countries in the fight against breast cancer. We therefore initiated the present study to assess the current situation of delays in breast cancer management in our setting, identify abnormal delays, and investigate the factors associated with these delays, in order to guide interventions and optimize resource allocation toward modifiable delays and associated factors.

METHODS

Patients

We conducted a cross-sectional analytical study, based on the review of 201 medical records of women managed for breast cancer at the University Clinics of Kinshasa from January 1, 2020 to December 31, 2024. Medical records of all patients with primary breast cancer, confirmed by histopathological examination, and who received at least one of the following treatments (chemotherapy or surgery) were included in the study.

Data collection

Data were collected using a standardized electronic form through the KoboCollect mobile application. The information was obtained from multiple sources to ensure comprehensive coverage of patient data. Medical records were used to collect socio-demographic, clinical, paraclinical, and therapeutic information. Operating room registers provided details about surgical procedures, such as lumpectomy and mastectomy, along with the corresponding dates, which were used to analyse treatment delays. In addition, pathology department registers were reviewed to obtain histopathological data and the dates of analysis, allowing the assessment of delays in diagnostic processing.

Variables of interest

The variables of interest included socio-demographic, clinical, paraclinical, therapeutic variables, and different types of delays. Socio-demographic variables comprised age and marital status. Clinical variables included history of cancer, parity, menopausal status, reason for consultation, the pathway followed after symptom discovery, and clinical stage. Paraclinical variables consisted of histopathological type, histological grade, and immunohistochemical profile. Therapeutic variables referred to the treatment received. In addition, several types of delays were analysed, including consultation delay, diagnostic delay, treatment delay, health system delay, and total delay.

Operational definitions

Consultation delay (patient delay): Time interval between symptom discovery and the first medical consultation.

Diagnostic delay: Time interval between consultation and histopathological confirmation, with intermediate delays defined as: i) Time between consultation and biopsy, ii) Time between biopsy and histopathological results (the only sampling method used was surgical biopsy).

Treatment delay: Time interval between diagnostic confirmation and initiation of the first treatment.

Health system delay: Time interval between consultation and initiation of the first treatment.

Total delay: Time interval between symptom discovery and initiation of the first treatment.

Alternative pathways: Traditional medicine, prayer.

Data analysis

Data collected via KoboCollect were exported in XLS format and analysed using R software (version 4.4.1). Delays were calculated in days following the chronological sequence of cancer care, namely: symptom onset, medical consultation, biopsy, histopathological analysis, and treatment. Only positive delays (events occurring in the expected chronological order) or zero delays (both events occurring on the same date) were included in the calculations. Qualitative data are presented as proportions (%). For quantitative data, age (in years) is presented as mean ± standard deviation, while delays (in days) were presented by the median and interquartile range (IQR) as they did not follow a normal distribution. Logistic regression analysis was used to identify associations between the different delays and socio-demographic, clinical, paraclinical, and therapeutic variables. Results are presented as crude and adjusted odds ratios (OR) with 95% confidence intervals, with the level of statistical significance set at $p<0.05$.

RESULTS

Socio-demographic, clinical, paraclinical, and therapeutic characteristics of the studied patients

The study included 201 patients, with a mean age of 48±12 years, ranging from 18 to 78 years. The majority of patients (60%) were married, 17.8% had a history of cancer, and more than half of the patients (52%) were premenopausal.

More than one quarter of the patients (28%) initially followed alternative pathways before seeking medical consultation. The main reason for medical consultation

was a breast mass (74%). A total of 63.6% of patients were diagnosed at stage III and 27.2% at stage IV, representing 90.8% of locally advanced or metastatic stages. Invasive ductal carcinoma was the most frequent histological subtype (73.1%). Histological grade II (51%) was the most commonly observed. Among the 84 patients who underwent immunohistochemical evaluation, 71% of tumors were hormone receptor-positive. The majority of patients (67%) received chemotherapy as the initial treatment, whereas 33% underwent primary surgery. The socio-demographic, clinical, paraclinical, and therapeutic characteristics were detailed in Table 1.

Table 1: Socio-demographic, clinical, paraclinical and therapeutics characteristics of patients.

Variable	Number (%)
Age (in years)	n=201
Average	48±12
<40	47 (25)
40-55	121 (64)
>55	20 (11)
Matrimonial status	n=127
Married	76 (60)
Single	42 (33)
Others	9 (7)
Cancer history	n=163
No	134 (82)
Yes	29 (18)
Menopause	n=201
No	104 (52)
Yes	97 (48)
Parity	n=161
No child	33 (21)
1 child	57 (35)
2-3 children	45 (28)
4 and over children	26 (16)
Chief complain	n=201
Breast lump	148 (74)
Other signs besides a breast lump	53 (26)
Routes	n=198
Medical consultation	142 (72)
Others	56 (28)
Clinical stage	n=184
Stage I	4 (2)
Stage II	13 (7)
Stage III	117 (64)
Stage IV	50 (27)
Histological type	n=201
Invasive ductal carcinoma	147 (73)
Others	54 (27)
Histopronostic grade	n=185
Grade I	14 (8)
Grade II	95 (51)
Grade III	76 (41)
Immunohistochemistry	n=84
Luminal A	33 (40)
Luminal B	26 (31)
Her2 +	19 (22)
Triple negative	6 (7)
Initial treatment modality	n=201
Surgery	66 (33)
Chemotherapy	135 (67)

Analysis of delays across the stages of care

Delays (in days) are presented as median (IQR) for each stage of breast cancer care (Table 2). Patient delay, corresponding to the time interval between symptom recognition and medical consultation, was 365 days. Diagnostic delay (time interval between medical consultation and diagnostic confirmation) was 26 days, with intermediate delays of 12 days between consultation and biopsy and 14 days between biopsy and histopathological confirmation. Treatment delay (time interval between diagnostic confirmation and initiation of treatment) was 39 days. Health system delay (time interval between medical consultation and initiation of treatment) was 67 days. Total delay was 398 days. The delays at each stage of care among the studied patients are presented in Table 2.

Table 2: The delays (days) at each stage of care among the studied patients.

Variable	Number	Median (IQR)
Patient delay	189	365 (180-730)
Diagnostic delay	163	26 (17-45)
Consultation-Biopsy delay	158	12 (6-23)
Biopsy-Pathology delay	176	14 (7-22)
Treatment delay	159	39 (21-62)
Health system delay	177	67 (35-98)
Total delay	168	398 (228-766)

Factors associated with delays

Factors associated with delayed consultation

We used a threshold of 180 days (6 months) as a reference to dichotomize the patient delay variable (Threshold found in the meta-analysis of Espina et al, for sub-Saharan African countries) 6 we considered a delay greater than this threshold as a delay in consultation and then, looked for the factors associated with this delay.

Multivariate analysis identified three parameters that were statistically significantly associated with delayed consultation: marital status, reason for consultation, and care-seeking pathway. Single women and women who followed alternative pathways had a higher risk of delayed consultation, whereas reasons for consultation other than a breast mass were associated with shorter delays. The results of factors associated with patient delay are presented in Table 3.

Factors associated with delayed diagnosis

In the absence of a consensus among authors on the reference value for this delay, we used the median of 26 days observed in our series as the threshold to dichotomize the diagnostic delay variable and identify associated factors. Multivariate analysis showed that single women and patients who followed alternative pathways rather than consulting a medical professional had a higher risk of delayed diagnosis, whereas presenting with symptoms other than a breast mass was a protective factor against diagnostic delayed. factors associated with delayed diagnosis are presented in Table 4.

Table 3: Factors associated with delayed consultation.

Variable	Crude OR (95% CI)	P value	Adjusted OR (95% CI)	P value
Age (in years)				
<40	1 (Ref)	-	1 (Ref)	-
40-55	1.98 (0.64-6.10)	0.235	5.13 (0.83-31.72)	0.07
>55	0.43 (0.12-1.57)	0.204	1.45 (0.10-20.77)	0.78
Marital status				
Married	1 (Ref)	-	1 (Ref)	-
Single	2.17 (1.98-5.04)	0.01	2.48 (1.53-13.0)	0.02
Other	1.77 (0.91-3.48)	0.093	5.44 (0.16-1.21)	0.38
Family history of cancer				
Yes	1 (Ref)	-	1 (Ref)	-
No	0.45 (0.12-1.67)	0.23	1.36 (0.24-8.05)	0.72
Parity				
No child	1 (Ref)	-	1 (Ref)	-
1 child	0.12 (0.034-0.39)	0.01	0.32 (0.02-2.88)	0.32
2-3 children	0.40 (0.118-1.32)	0.137	0.24 (0.01-2.89)	0.27
≥4 children	0.43 (0.156-1.10)	0.092	0.40 (0.06-2.19)	0.30
Reason for consultation				
Breast mass	1 (Ref)	-	1 (Ref)	-
Other symptoms	0.75 (0.37-0.99)	0.01	0.37 (0.14-0.98)	0.04

Continued.

Variable	Crude OR (95% CI)	P value	Adjusted OR (95% CI)	P value
Care pathway				
Medical consultation	1 (Ref)	-	1 (Ref)	-
Alternative pathways	5 (1.4-23.58)	0.02	9 (3.38-33)	0.01
Clinical stage				
Early	1 (Ref)	-	1 (Ref)	-
Late	1.85 (1.64-2.11)	0.01	5.93 (0.21-1.11)	0.31

Notes: Ref: Reference; OR: odds ratio; CI: confidence interval

Table 4: Factors associated with delayed diagnosis.

Variable	Crude OR (95% CI)	P value	Adjusted OR (95% CI)	P value
Age (in years)				
Age <40	1. Reference	-	-	-
40-55	2.55 (0.91-7.13)	0.07	3.42 (0.59-19.91)	0.17
>55	2.43 (0.65-9.07)	0.19	2.92 (0.23-37.70)	0.41
Marital status				
Married	1. Reference	-	-	-
Single	1.01 (0.42-2.45)	0.98	3.67 (1.08-12.40)	0.04
Other	1.62 (0.78-3.40)	0.19	2.00 (0.80-5.16)	0.14
Family history of cancer				
Yes	1. Reference	-	-	-
Non	2.41 (0.93-6.22)	0.07	2.58 (0.82-8.15)	0.10
Number of children				
None	1. Reference	-	-	-
1 child	0.46 (0.13-1.57)	0.23	1.76 (0.50-5.90)	0.36
2–3 children	0.56 (0.20-1.42)	0.32	0.56 (0.19-1.54)	0.26
≥4 children	2.56 (0.85-7.66)	0.09	2.98 (0.78-11.41)	0.11
Type of symptom				
Breast mass	1. Reference	-	-	-
Other symptoms	0.86 (0.40-1.84)	0.04	0.69 (0.27-1.75)	0.02
Care pathway				
Medical consultation	1. Reference	-	-	-
Other pathways	2.04 (1.15-3.98)	0.04	3.27 (1.27-8.43)	0.01
Disease stage				
Early stage	1. Reference	-	-	-
Late stage	2.55 (0.75-8.64)	0.13	2.81 (0.69-11.40)	0.14

Notes: Ref: Reference; OR: odds ratio; CI: confidence interval

Table 5: Factors associated with delayed treatment.

Variable	Crude OR (95% CI)	P value	Adjusted OR (95% CI)	P value
Age (in years)				
<40	1. Reference	-	-	-
40-55	1.70 (0.64-4.56)	0.29	4.48 (0.85-23.78)	0.07
>55	1.00 (0.22-4.47)	1.00	7.95 (0.46-13.22)	0.15
Marital status				
Married	1. Reference	-	-	-
Single	2.55 (1.02-6.91)	0.04	3.67 (1.08-12.40)	0.04
Other	1.62 (0.78-3.40)	0.19	2.00 (0.80-5.16)	0.14
Family history of cancer				
Yes	1. Reference	-	-	-
No	2.06 (0.83-5.12)	0.12	2.58 (0.82-8.15)	0.10
Number of children				
None	1. Reference	-	-	-
1 child	0.46 (0.13-1.57)	0.23	-	-

Continued.

Variable	Crude OR (95% CI)	P value	Adjusted OR (95% CI)	P value
2-3 children	0.56 (0.20-1.42)	0.32	0.56 (0.19-1.54)	0.26
≥4 children	2.67 (1.02-6.96)	0.04	2.98 (0.78-11.41)	0.11
Type of symptom				
Breast mass	1. Reference	-	-	-
Other symptoms	2.40 (1.00-5.77)	0.05	3.44 (1.22-9.67)	0.02
Care pathway				
Medical consultation	1. Reference	-	-	-
Others pathway	2.32 (1.05-5.14)	0.04	3.27 (1.27-8.43)	0.01
Disease stage				
Early stage	1. Reference	-	-	-
Late stage	1.53 (0.65-3.61)	0.33	1.60 (0.59-4.44)	0.36

Notes: Ref: Reference; OR: odds ratio; CI: confidence interval

Factors associated with delayed treatment

We used a treatment delay of 1 month as a reference as recommended by NHS to dichotomize the variable treatment delay and considered any delay above this threshold as a treatment delay, and investigated the associated factors. In the multivariate analysis, single women, those consulting for symptoms other than a breast mass, and those who used alternative pathways before medical consultation had a higher risk of experiencing treatment delay. The results of factors associated with treatment delay are summarized in Table 5.

DISCUSSION

Population characteristics

The mean age in our series was 48 years. Similar mean ages of 46, 47, 48, and 49 years have been reported in Sudan, Egypt, Tunisia, and Rwanda, respectively.[6] These findings confirm the general trend of breast cancer being diagnosed at a younger age in African regions.[7]

All our patients consulted for symptomatic breast cancer, with 74% presenting with a palpable mass. A predominance of breast mass has been reported in several African studies.[8-10]

The majority of patients (90.8%) had advanced-stage cancer. Comparable results have been found in Côte d'Ivoire (92%), South Africa (95%), Mali (86.3%), and Tanzania (84.4%).[11] Advanced-stage diagnosis is common in other low-income countries, mainly due to the absence of early detection systems and socio-cultural barriers.[12]

More than a quarter of patients (28%) initially took alternative pathways before seeking medical consultation. The use of traditional medicine is cited by numerous authors as a major factor contributing to delayed consultations in sub-Saharan Africa.[13-15]

Regarding management, the high proportion of advanced-stage disease explains the predominance of chemotherapy (67%) as first-line treatment, either as neoadjuvant therapy to reduce tumor size for potential surgery, or as palliative treatment in cases of initially metastatic disease.

Delays and associated factors

The median patient delay in our study was 12 months, similar to the 12- and 13-month delays reported in Sudan and Uganda, respectively.20 These delays are long compared with those in other countries in the region, such as Nigeria (3.7 months) or Mali (4.8 months).[6]

Some North African countries, including Morocco and Tunisia, reported shorter patient waiting times of 2 months.[16-17] In Egypt, this delay was 2.3 months in Moussa's study, and less than 1 month according to Stapleton's study.[18,19]

A patient delay exceeding 3 months is considered long in the literature and is often associated with larger tumor size, advanced stage at diagnosis, and poorer survival.[20-22]

The diagnostic delay in our series was 26 days, with intermediate delays of 12 days between consultation and biopsy, and 14 days between biopsy and histopathological confirmation. Similar findings have been reported in Malaysia (26 days), in Mali (27 days) and South Africa (28 days).[23,24,6] Although these delays are acceptable, they remain longer than those reported in other African countries such as Tunisia (13 days), Morocco (20 days), or Algeria (less than two weeks).[25]

Even shorter median diagnostic delays of 6, 8, and 10 days have been reported in the Auvergne, Alsace, and PACA regions, respectively, according to the French National Cancer Institute.[26]

We acknowledge the advances in diagnostic timeliness in high-income countries, as well as the improvement efforts made by certain African countries such as Morocco and Tunisia. However, comparisons of delays with these countries must be made with caution, due to factors that can either shorten or lengthen the observed delays.

The first factor concerns the reference point used to calculate delays. In the studies from Tunisia and France,

the starting point for analysing diagnostic delay was the date of mammography, whereas in our series, it was the date of medical consultation. This suggests that delays may appear shorter when mammography is used as the reference, since there is no additional intermediate step before performing the biopsy, especially if the lesion is already suspected of malignancy on imaging. In contrast, when consultation date is used as the starting point, an imaging examination may be required before biopsy, which lengthens the diagnostic delay.

The second factor is the biopsy method. Compared with these studies, all women in our series underwent surgical biopsy. This invasive procedure, performed under anaesthesia and requiring operating room scheduling, can be subject to postponements, thus extending diagnostic delays. This contrasts with less invasive and less demanding methods such as fine-needle aspiration or image-guided core biopsy, which can be performed at the patient's bedside on the same day.

Although the diagnostic delay in our study is close to international recommendations and remains encouraging, a twelve days interval between consultation and biopsy seems long, particularly in our context, where women often present with clinically obvious cancers.

The median Treatment delay was 39 days. Comparable results have been reported in Mali (39 days), South Africa (37 days), and Malaysia (42 days).[27]

Outside of urgent cases, the oncology service at the University Clinics of Kinshasa is organized with only one consultation day, one day for surgical scheduling and multidisciplinary team meetings, and two operative days. Any absence of a patient on the scheduled day, according to the specific procedure required, results in rescheduling one week later, which consequently delays the corresponding step (consultation, biopsy, or treatment). This organization likely explains much of the healthcare system-related delay observed in our study.

studies have shown that delayed treatment initiation is associated with adverse outcomes in the care pathway of women with breast cancer. The study of Yun al, in 2012 showed a 59% increased risk of death in patients treated between 2001 and 2005 when the delay in accessing treatment exceeded 31 days.[28] Accordingly, several recommendations, including those from the United Kingdom's National Health Service (NHS), emphasize that the interval between diagnosis and the decision for first treatment should not exceed 31 days.[29] Cancer Care Ontario similarly recommends a maximum interval of 28 days between treatment decision and surgical procedure for invasive breast cancers.[30]

As factors associated with delays, single women and patients who initially pursued alternative pathways experienced delays at all stages of care.

Studies have shown that socioeconomic and psychological vulnerability, often linked to single status, limits access to care and reduces the chances of early intervention.[31] According to several authors, pursuing alternative pathways before seeking medical advice, justified by cultural beliefs, fear of surgery, or the perception of greater efficacy of natural remedies, delays access to conventional care.[32]

CONCLUSION

Our study showed that the patient wait time is very long, which manifests as late stages of the disease, justifying the predominance of chemotherapy either as neoadjuvant therapy for operable cancer or as palliative therapy for cancer that is already metastatic. The diagnostic delay is acceptable, but the treatment delay is relatively long.

Efforts must be made to combat other factors associated with late consultations within the population, in addition to marital status and other pathways. It is also necessary to improve the functioning of the healthcare system in the subsequent stages of care.

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