Demographics and Overall Survival Pattern of Chronic Myeloid Leukemia in a Tertiary Hospital in South-South Nigeria: The Calabar Experience

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Original Research Article

ABSTRACT

Background: Chronic myeloid leukemia (CML) is a bi- or triphasic disease comprising of the chronic phase (present at diagnosis in approximately 85% of patients) which can easily be controlled with conventional chemotherapy, followed by unstable accelerated phase and terminating in a blastic phase. The treatment of CML has evolved over the years The availability of the tyrosine kinase inhibitors has distinctly changed the disease course for patients with Ph+ and/or BCR-ABL1+ (CML). This study aims to determine the demographics and overall survival patterns of CML patients in the University of Calabar Teaching Hospital (UCTH)I.

Methods: The study is a retrospective study of twenty-two (22) CML patients seen and managed at the UCTH from June 2014 to August 2021. Male/female distribution was 9/13, with a median age of 42 years. Overall survival (OS) and progression free survival (PFS) were determined using the Kaplan-Meier techniques. The data were analyzed using Microsoft Excel 2016 and IBM SPSS version 21.

Results: Total of 22 CML patients were seen over the 8-year-period of review. The mean age was 42.63, median age 42, and modal age was 37 years respectively. There were 9 males and 13 females. 20 of the patients were in the chronic phase while 2 were in the terminating blastic phase.

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The presence of mutation was seen in two patients while the remaining 20 showed no mutation. Of the patients, 6 were dead and 16 are alive at the time of review. The overall survival period ranges from 12 to 84 months. The survival distributions for mutation and state of the disease (chronic or blastic) were not statistically significantly different, $X^2 = 3.204$, $p = 0.073$.
Conclusion: There is inconsistency in the demographic and overall survival pattern of chronic myeloid leukaemia in our environment. Further study is needed to identify the factors which can help to improve the overall survival pattern in our environment.

1. INTRODUCTION

Chronic myeloid leukaemia (CML) is a clonal myeloproliferative disorder characterized by the presence of a complete spectrum of myeloid development in the peripheral blood. This is caused by the BCR-ABLI, a chimeric protein which is the result of the reciprocal translocation [t (9, 22) (q34: q11)] which is cytogenetically represented as Philadelphia chromosome (ph) [1,2]. Chronic myeloid leukaemia is a rare disease condition, with an incidence of one to two cases per 100,000 people per year and accounts for 15% of adult leukaemia and 15.97% of leukaemia globally [3]. In a previous study [4], the prevalence of CML was reported as 19.57%. A similar study on the pattern and prevalence of haematological cancers in South-Eastern Nigeria also reported a prevalence of 12.6% [5]. The chronic myeloid leukaemia is said to affect any age group but is rare in children [2,3]. The median ages vary from one location to another. In the western world, it is 53 years while in African countries, it is 38years [5,6,7]. Chronic myeloid leukaemia is a bi- or tri-phasic disease condition. However, these disease phases are associated with increased mortality, not until the discovery of tyrosine kinase inhibitors which has improved the management and overall survival of CML patients [8]. There is variation in the demographic and overall survival pattern of CML, Smith et al. [9] reported that in the United Kingdom, a 5-year relative survival estimates for men and women diagnosed in 2004–2011 and treated with TKIs over the period 2004–2013 were 89.1% (79.9% to 95.4%) and 90.1% (71.9% to 96.1%), respectively. Druker et al also reported a similar value of 5years of survival in the UK [10]. However, another study conducted in Nigeria by Oyekunle et al reported a lower value of 63% overall survival of CML in the chronic phase at 5 years [11]. Thus, this is lower when compared to most studies in western countries [12]. Furthermore, Hochhaus et al. [13] reported a 6-year OS of 76% among a cohort of 532 late chronic phase CML patients, managed on imatinib after interferon. Similarly, Kantarjian et al. [14] reported 8-year survival of 87%, among those patients managed during the imatinib era. This study aims to determine the demographics and overall survival patterns of CML patients in the University of Calabar Teaching Hospital.

2. MATERIALS AND METHODS

2.1 Study Design

This study was a retrospective study of chronic myeloid leukaemia patients seen at the University of Calabar Teaching Hospital seen from June 2014 to August 2021.

2.2 Study Area

The hospital is a 600-bed tertiary health institution that renders specialist care to its host and neighbouring communities.

2.3 Subject

This included 22 patients diagnosed with chronic myeloid leukaemia at our facilities who had commenced any form of tyrosine kinase inhibitor and are also compliant with hospital visits at the haematology department, which is staffed by consultants, resident doctors, trained nurses and laboratory scientific officers. The diagnosis was made by the haematologist using peripheral blood and bone marrow. In addition, the further investigation included cytogenetics and karyotyping majorly, BCR-ABRL and Philadelphia (ph) respectively.

2.4 Selection Criteria

Those whose information was retrieved from the cancer registry, hospital records and patients' folders were included in the study, while omissions and discrepancies from any part of the archives were excluded from the study.

These data and results collated were analyzed using Microsoft Excel 2016 and IBM SPSS version 21. The data were analyzed using Simple Inferential Statistics (frequency and percentage) Survival analysis was done using the Kaplan-Meier method. For the survival studies, overall survival (OS) was calculated as the time interval between the time of diagnosis to the date of last follow-up (for living patients) or the date of death from any cause.

3. RESULTS

Total of 22 CML patients were seen over the 8-year-period of review. The demographic characteristics of the patients are presented in Table 1. The mean age was 42.63, median age 42, and modal age was 37 years respectively. There were 9 males and 13 females. 20 of the

patients were in the chronic phase while 2 were in the terminating blastic phase. The presence of mutation was seen in two patients while the remaining 20 showed no mutation. Of the patients, 6 were dead and 16 are alive at the time of review. The overall survival period ranges from 12 to 84 months. Fig. 1 showed the year of diagnosis, the Kaplan Meier curve for the state of disease and presence or absence of disease are presented in Figs. 2 & 3 respectively.

A Breslow (Generalized Wilcoxon) test was run to determine the differences in the survival distribution of the patients diagnosed with chronic myeloid leukaemia. The survival distributions for mutation and state of the disease (chronic or blastic) were not statistically significantly different, X^2= 3.204, p = 0.073.

Table 1. Showing the demographic characteristics of the participants (n=22)

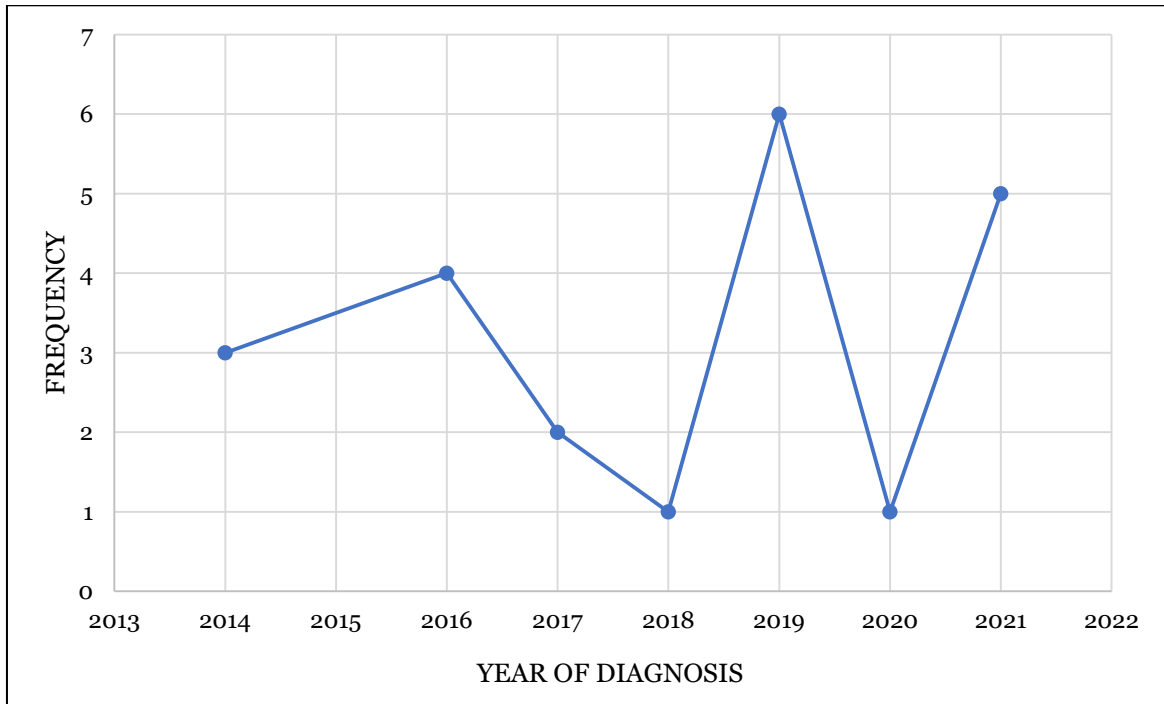| Variable	N (n=22)	%
Age range		
20-29	3	13.64
30-39	6	27.27
40-49	7	31.82
50-59	4	18.18
≥60	2	9.09
Gender		
Male	9	40.91
Female	13	59.09
State of disease		
Chronic	20	90.91
Blastic	2	9.09
Mutation		
Present	2	9.09
Absent	20	90.91
Status		
Dead	6	27.27
Alive	16	72.73
Overall survival (months)		
12	7	31.82
24	5	22.73
36	1	4.55
48	2	9.09
60	4	18.18
84	3	13.64

N = Frequency, % = Percentage

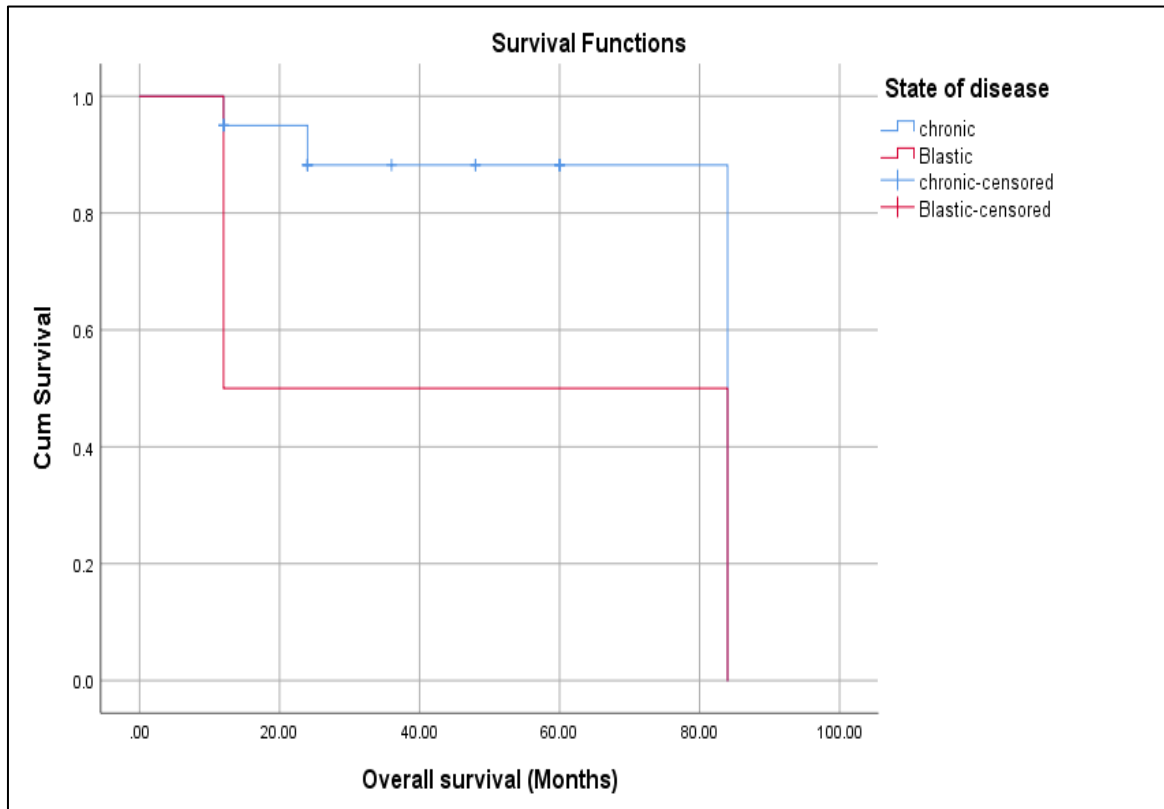**Fig. 1. Showing the year of disease diagnosis**

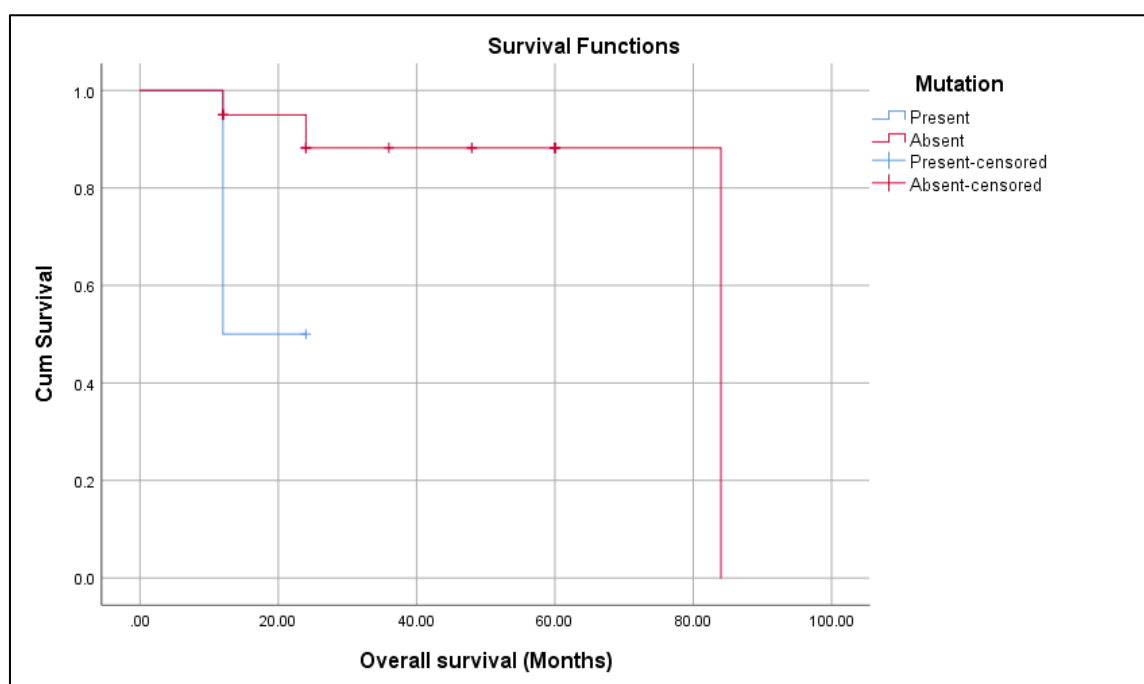**Fig. 2. Kaplan Meier curve for the state of disease**

Fig. 3. Kaplan Meier curve for presence or absence of mutation

4. DISCUSSION

This study shows inconsistency with the available data on chronic myeloid leukaemia concerning age, sex and overall survival. Chronic myeloid leukaemia constitutes 2 percent of all the malignancies seen during the period review. This study also reported female preponderance with an M: F ratio of 1:1.5. this is similar to a previous study by Akaba et al. [4]. This difference can be attributed to the early health-seeking behaviour among women compared to men.

The median age of chronic myeloid leukaemia patients in this study was 45 years, which is similar to the study by Koffi et al on positive chronic–phase myeloid leukaemia in Ivory Coast [14]. Furthermore, this finding is also somewhat similar to the finding of Oyekunle et al. [15] on the overall survival pattern of CML, but at variance with the study conducted by Hoglund et al. [16] that reported a higher value. This difference in age incidence of CML can be attributed to a combination of environment and as yet unknown biological factors that may account for the differential age incidence pattern of CML between the Blacks and the other races [17]. This study also shows that 90.91% and 9.09% were in chronic and blastic phases respectively, this is similar to the study by Durosinmi et al on the use of Imatinib mesylate in Nigeria with CML [17]. This study also reviews that 9.09% had the mutation and six [6] death respectively.

This study also reported a median overall survival of 24 months with 5 patients. Overall survival at 12, 24, 36, 48, 60, 84 months was 31.82%, 22.73%, 4.55%, 9.09%, 18.18% and 13.64% respectively. This study is at variance with a similar study conducted by Oyekunle et al at Obafemi Awolowo University Teaching Hospital (OAUTH), Ile-Ife, South-West Nigeria. This difference in overall survival rate can be attributed to OAUTH as the only centre where tyrosine kinase inhibitors can be accessed in the country. The cost and psychological implication to the patient from other regions of the country are quite unbearable and challenging predisposing to non-adherence and loss to follow up and eventually death [18].

5. CONCLUSION

There is inconsistency in the demographic and overall survival pattern of chronic myeloid leukaemia in our environment. Further study is needed to identify the factors which can help to improve the overall survival pattern in our environment.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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