



Original Article

Characteristics of tuberculosis in older patients

Marie-Josiane Ntsama Essomba¹, Virginie Poka Mayap², Alain Kuaban¹, Arnaud Ntyo'o Nkoumou¹, Elisabeth Nghah Komo¹, Eric Walter Pefura Yone¹

¹Department of Internal Medicine and Specialties, Faculty of Medicine and Biomedical Sciences, University of Yaounde I, ²Department of Pulmonology, Jamot Yaounde Hospital, Yaounde, Cameroon.

***Corresponding author:**

Marie-Josiane Ntsama Essomba,
Department of Internal Medicine and Specialties, Faculty of Medicine and Biomedical Sciences, University of Yaounde I, Yaounde, Cameroon.

ebomaj2012@yahoo.fr

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ABSTRACT

Objectives: Older have increased susceptibility to tuberculosis (TB). The aim of our study was to determine the characteristics of TB in the older as compared to the non-older population.

Materials and Methods: We conducted a retrospective cross-sectional study of all patients treated for TB between 2010 and 2015 in the North and West regions of Cameroon. Sociodemographic, clinical, and paraclinical data of older patients (aged ≥ 65) with TB were compared to those of non-older patients (15–64 years).

Results: Overall, 19,681 patients were treated for TB during the study period, of whom 1131 (5.7%) were older. In the older group, the median age was 70 years [interquartile range 63–77] and 723 (64%) were male. The older group was more likely to have sputum-negative pulmonary TB (SNPTB) (12.7% vs. 10.4, $P = 0.034$), extrapulmonary TB (EPTB) (14.9% vs. 11.3%, $P < 0.001$), less TB lymphadenitis (5.4 vs. 21.6%, $P = 0.004$), and less human immunodeficiency virus coinfection (9.3% vs. 30.3%, $P < 0.001$) than the non-older group.

Conclusion: Older patients with TB in the North and West regions of Cameroon have a higher tendency to SNPTB and EPTB presentations. Healthcare providers should maintain a high index of suspicion to reduce diagnostic delays in older patients with TB.

Keywords: Older patients, Sub-Saharan Africa, Tuberculosis

INTRODUCTION

Tuberculosis (TB) remains a leading threat worldwide, with an estimated global total of 10.6 million cases reported in 2020 resulting in approximately 1.3 million deaths the same year. Low- and middle-income countries carry about 95% of the global TB disease burden.^[1,2] TB incidence rate is estimated to have increased by 3.6% between 2020 and 2021 worldwide.^[2] In 2019, more than 29,000 cases of TB were reported in Cameroon.^[1,3] The TB incidence rate in Cameroon usually peaked among the younger population, especially in people living with human immunodeficiency virus (HIV) whose incidence rate varies between 31 and 69 cases/100,000 people.^[3-5] Despite increased awareness in vulnerable groups such as people living with HIV and the widespread use of antiretroviral therapy (ART), TB in older adults is emerging as a global health issue, and TB control in this group is a major challenge for TB programs.

TB notification rates are higher among those aged 65 and above with those over 80 years having the highest incidence.^[6] It is argued that older people may have increased susceptibility to active TB and to the reactivation of latent TB infection.^[7] This increased susceptibility is being

driven by changes in immune functions, malnutrition, and comorbidities such as diabetes mellitus but also socioeconomic vulnerability and reduced access to health services.^[8] Many studies have demonstrated that TB in the older is likely to follow a non-classical course.^[9] Pulmonary TB (PTB) in the older has a low positive rate of sputum smear making diagnosis difficult and more likely to have delayed diagnosis.^[8-11] Nearly, 40% of TB cases among people over 65 years experienced a diagnosis delay of more than 4 months.^[12] Furthermore, they are more prone to treatment-related adverse effects leading to treatment default, higher rates of retreatment, drug resistance, and mortality.^[8,13]

The older population is expected to double in the majority of African countries during the current decade.^[14,15] The ongoing epidemiological transition and increasing life expectancy are bringing about new challenges for the success of TB programs as these older patients are reservoirs for the continuous spread of the disease. A better understanding of the pattern of TB in older adults in Cameroon can provide substantial information on the course of TB and also improve care for elders in our setting where patients are managed with important financial restraints. Thus, we aimed to determine how TB characteristics differ between older and non-older people in the North and West regions of Cameroon.

MATERIALS AND METHODS

Study setting, design, and participants

This was a retrospective cross-sectional study that included all consecutive patients with TB aged ≥ 15 years who were diagnosed between January 2010 and December 2015 in the TB diagnosis and treatment centers (DTCs) of the West and North Regions of Cameroon. Data were accessed for research purposes from February to July 2018. Cameroon is a West African region country with an estimated population of 25 million inhabitants in 2016 and older people represent about 5% of this population.^[16] During the study period, there were 20 operational DTC in the Western region and 17 operational DTC in the Northern Region. The study was conducted in all the TB DTC of the two regions. All consecutive TB patients aged 15 years and above who were put on anti-TB treatment. The cutoff age to define older patients was 65 years and above. The non-older group included patients between 15 and 64 years. Patients with missing data on age, sex, and outcome were excluded from the study.

Data collection

Data were extracted from TB treatment registers and treatment forms. They were registered in an electronic questionnaire previously developed in EpiData version 3.1 (Lauritzen, Denmark). The accuracy of data was ensured by two data entry operators during records selection and the

report in EpiData. The sociodemographic data collected were as follows: age in years, sex, place of residence, and place of treatment. Clinical data were as follows: weight in kilograms (kg), height in meters (m), type of TB (new case, retreatment including relapse, failure, and return after loss to follow-up), and form of TB including PTB or extrapulmonary TB (EPTB) and the specific location for EPTB. The biological data were sputum test results at baseline and the end of the treatment (positive or negative) for PTB, and HIV status (positive or negative). “New cases” were defined as patients who have never been treated with anti-TB drugs previously or those who have been treated for less than 1 month. “Retreatment cases” include “relapse,” “failure,” and “defaulters.” “Relapses” were patients previously treated for active TB and declared “cured” or “treatment completed” but who had a positive sputum smear after complete TB treatment. “Failures” were defined as patients with a positive sputum smear control at the 5th month or later during the TB treatment. “Defaulters” were patients who have discontinued their TB treatment for at least 2 consecutive months and thereafter exhibit PTB symptoms or a positive sputum smear.

Data analysis

Data were analyzed with the Statistical Package for the Social Sciences (SPSS 23.0) for Windows (SPSS, Chicago, Illinois, USA). Quantitative variables were presented as mean and standard deviation (SD) or median and interquartile range (IQR). Categorical variables were presented as frequencies and proportions. Quantitative variables were compared by the Student’s T test or the U-Mann-Whitney test. Categorical variables were compared using the Chi-square test or Fisher exact T test as needed. $P < 0.05$ was used to define statistical significance.

RESULTS

General characteristics of the participants

From 2010 to 2015, 19,681 patients were treated for TB in the North and West regions of Cameroon. The total number of older people was 1131 (5.7%), with a median age of 70 years [IQR 65–75], ranging from 65 to 120 years. The median age in the non-older group was 33 [IQR 26–43] ranging from 15 to 64 years. Compared with the non-older, the mean weight (56.7 vs. 54.4 kg, $P < 0.001$) and the mean body mass index (20.3 vs. 19.8 kg/m², $P < 0.001$) in the older patients were lower. HIV coinfection was more frequent in the non-older group than in the older (30.3% vs. 9.3% $P < 0.001$) [Tables 1 and 2].

TB forms and type of regimen

PTB was the most common form, present in 962 older (85.1%) and 16,458 non-older patients (88.6%). Sputum-positive PTB

was the main form of PTB in both groups with 840 cases (87.3%) in older patients and 14,735 cases (89.5%) in non-older patients. However, the older group was more likely to present with sputum-negative PTB (SNPTB) than the non-older group (12.7% vs. 10.4%, $P = 0.034$). EPTB was present in 2261 (11.5%) cases. In comparison with their non-older counterparts, older patients tend to have more cases of EPTB (14.9% vs. 11.3%, $P < 0.001$). However, the older were less likely to have lymph nodes TB in comparison to the non-older (1.8% vs. 6.6%, $P = 0.004$). The majority of patients in both groups (95.4 vs. 95.5%) were under the “new case” treatment regimen. Other clinical characteristics of patients are presented in Table 2.

DISCUSSION

The present study has highlighted the characteristics of TB in older adults in Cameroon. In contrast to previous studies on older TB patients conducted in Cameroon, this study included a large cohort of TB patients from two regions of the country and is more likely to be representative. In our cohort, older patients with TB accounted for a low proportion of all TB patients. However, they were more likely to have SNPTB and EPTB. They had lower rates of lymph node TB and HIV coinfection compared to the non-older. The majority of older patients were under the “new case” treatment regimen.

The proportion of older people with TB in our study was lower than the 12.8% and 12.7% reported in Senegal and Nigeria, respectively.^[10,17] It is also far from the 16.6% reported in India.^[11] The proportion of TB cases in older adults varies widely across various settings. Although the reasons for these discrepancies are not clear, diagnosis of TB is a challenge in the older population. Indeed, TB in the older can easily be paucisymptomatic or atypical due to age-related immune changes and comorbidities, thus making diagnosis difficult.

Low reports of TB in older people in our setting are probably hindered by a low suspicion index as other conditions like cancer are usually called to mind in the presence of clinical features like weight loss that can also be described in patients with TB. Furthermore, the cut-off used to define the older population, in other studies conducted in Africa is 60 years and over while we used the cutoff of 65 years and above in our study.

Our study has shown that older people were more likely to present with SNPTB. This is consistent with other findings in Mexico, Nigeria, Tanzania, and India.^[8,10,11,18] This high rate of SNPTB can be explained by age-related changes in lung functions especially decreased mucous production. This can impede their capacity to produce adequate sputum. Sputum analysis is a cornerstone in the early diagnosis of patients with suspected TB but access to TB diagnosis by sputum is a major issue in Cameroon even in non-older patients.^[19] Indeed, despite the implementation of molecular testing, about 10–25% of suspected PTB in Cameroon are treated as SNPTB.^[19,20] Furthermore, the lack of routine culture confirmation in our country does not allow the detection of acid-fast bacilli in sputum.^[21] This higher sputum smear negativity at baseline reported in older patients is a matter of concern as it may delay the diagnosis of TB. Flexible bronchoscopy has significantly improved the diagnosis of TB in older patients who cannot provide adequate sputum.^[22] However, its use remains limited in our setting, due to geographical and financial constraints.

We reported a higher rate of EPTB among the older group in comparison to the non-older. Our prevalence was less than the 20% reported among patients aged ≥ 51 years with bacteriologically proven EPTB in the Littoral region of Cameroon.^[23] However, our findings are in line with those of Nagu *et al.* in Tanzania and Niu *et al.* in China who reported 10.5%^[18] and 11.5%^[24] of EPTB cases among older

Table 1: Demographic and anthropometric characteristics of participants.

	Older <i>n</i> =1131 (%)	Non-older <i>n</i> =18550 (%)	All <i>n</i> =19681 (%)	uOR	95%CI	<i>P</i> -value
Male	723 (63.9)	11818 (63.7)	12541 (63.7)	-	-	0.883
Female	408 (36.1)	6732 (36.3)	7140 (36.3)			
Median age (IQR)	70 (68-75)	33 (26-43)	34 (26-45)	-	-	<0.001
Mean weight in kg (SD)	54.4 (10.5)	56.7 (11)	56.6 (11.01)	-	-	<0.001
Mean BMI in kg/m ² (SD)	19.8 (3.9)	20.3 (3.9)	20.5 (4.01)	-	-	<0.001
Region						
North	622 (55)	11131 (60)	11753 (59.7)	0.81	0.72–0.92	<0.001
West	509 (45)	7419 (40)	7928 (40.3)	-	-	
Year of registration						
≤ 2012	534 (47.2)	9366 (50.5)	9900 (50.3)	1.14	1.01–1.3	0.032
> 2012	597 (52.8)	9184 (49.5)	9781 (49.7)			

BMI: Body mass index, CI: Confidence interval, uOR: Unadjusted odds ratio, IQR: Interquartile range, SD: Standard deviation

Table 2: Characteristics of older patients and form of TB.

	Older	Non-older	All	uOR	95%CI	P-value
Form of TB (n=19681)						
PTB	962 (85.1)	16458 (88.7)	17420 (88.5)			
EPTB	169 (14.9)	2092 (11.3)	2261 (11.5)	1.38	1.17–1.64	<0.001
Form of PTB (n=17420)						
SPPTB	840 (87.3)	14735 (89.6)	15575 (79.1)			
SNPTB	122 (12.7)	1723 (10.4)	1845 (9.4)	1.24	1.02–1.51	0.034
Localization of EPTB (n=2261)						
Pleural	18 (10.7)	179 (8.6)	197 (1)	-	-	0.488
Lymph nodes	3 (1.8)	139 (6.6)	142 (0.7)	0.21	0.063–0.67	0.004
Pott's disease	8 (4.7)	70 (3.4)	78 (0.4)	-	-	0.436
Other*	140 (82.8)	1704 (81.5)	1844 (9.4)	-	-	0.207
HIV status (n=17,691)						
Positive	89 (9.3)	5078 (30.3)	5167 (29.3)	4.24	3.4–5.29	<0.001
Negative	866 (90.7)	11658 (69.7)	12524 (70.7)			
Bacillary load at baseline in SPPTB (n=15528)						
<2	387 (46.2)	6475 (44.1)	6862 (44.2)	-	-	0.224
≥2	450 (53.8)	8216 (55.6)	8666 (55.8)			
Sputum conversion at 2 months in SPPTB (n=12611)						
Yes	614 (94.6)	11379 (95.1)	11993 (95.1)	-	-	0.521
No	35 (5.4)	583 (4.9)	618 (4.9)			
Treatment regimen (n=19499)						
New case	17535 (95.5)	1069 (94.5)	18604 (95.4)	-	-	0.841
Retreatment	845 (4.5)	50 (4.6)	895 (4.6)			

*Other include all other the sites except lymph nodes, pleural, and Pott's disease. CI: Confidence interval, EPTB: Extrapulmonary tuberculosis, HIV: Human immunodeficiency virus, uOR: Unadjusted odds ratio, PTB: Pulmonary tuberculosis, SNPTB: Sputum negative pulmonary tuberculosis, SPPTB: Sputum positive pulmonary tuberculosis, TB: Tuberculosis

patients, respectively. It is not clear if older patients may have increased susceptibility to the hematogenous dissemination of *Mycobacterium tuberculosis*. However, EPTB is characterized by various clinical presentations depending on the involvement. It is possible that extrapulmonary localizations such as lymph nodes or pleural involvement were more suggestive of TB in our study thus maybe the index of suspicion was higher in the older group.

Older patients had lower rates of HIV-co-infection than the non-older group. This is consistent with other studies conducted in Nigeria and Senegal.^[10,17] However, our findings should be interpreted by taking into account the low perceived risk by clinicians and older people themselves.^[25,26] Indeed, HIV is usually perceived as a condition of the non-older but there has been increasing interest in understanding the course of HIV in aging in various settings. Low levels of HIV testing in older people contrast with the changing epidemic in Cameroon. The older population is growing in HIV care units in Cameroon, reaching 15% in some

regions.^[27-29] HIV is a known risk factor for TB disease as well as TB associated-mortality^[3,5,30] despite increasing ART coverage in the country. Further research is needed to determine the profile and burden of TB-HIV coinfection among older patients.

Our study has many implications for the national TB program. Although diagnosis in older is a challenge, it is probable that TB cases among older patients are underreported due to a low index of suspicion among clinicians. These older patients are reservoirs for the continuous spread of the disease despite increased awareness in other vulnerable groups. Another important concern is the lack of recording comorbidities especially in the older group. This might be an opportunity to call for close collaboration with another program like the one in charge of the non-communicable diseases of the Ministry of Public Health, to improve recording in the existing registry. This will also be relevant to assess the impact of non-HIV comorbidities on the course of TB among older patients.

Limitations

Although our study consists of a large sample size of TB older patients, it must be interpreted with some caution due to its retrospective design and potential selection bias related to the choice of the regions. Another major limitation was the lack of clinical and paraclinical data. Indeed, we were not able to obtain specific clinical including specific organ involvement in the majority of EPTB cases but also radiological features for PTB.

CONCLUSION

Older patients with TB in the North and West regions of Cameroon are likely to present with SNPTB and EPTB. They are less likely to have TB-HIV coinfection in comparison to non-older patients. Strategies to maintain a high index of suspicion among clinicians and the community are not only relevant but also necessary to enhance the recording of TB cases among older patients, thus reducing diagnosis delays.

Availability of data and materials

The datasets used and/or analyzed during the present study are available from the corresponding author upon reasonable request.

Authors' contributions

MJNE, VPM, PYEW: Conceived the study design; MJNE: Analyzed the data, wrote the manuscript; VPM, KA, NKA, NKE, PYEW: Made substantial modifications and review on the manuscript. All authors accepted the final version of the manuscript.

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