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Epidemiology and Clinical Features of New Leprosy Cases at the Raoul Follereau Institute of Côte D'Ivoire (Adzopé) from 2013 to 2023

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Abstract

Objective: *To describe the epidemiological aspects of new leprosy cases observed at the IRFCI from 2013 to 2023.*

Material and Method: *This is a retrospective study of new leprosy cases confirmed by biopsy and/or bacteriological examination from January 2013 to December 2023. Analysis of data such as sex, age and degree of disability as well as bacteriological index was carried out at the IRFCI.*

Results: *425 new cases of leprosy were diagnosed at the Institut Raoul Follereau de Côte d'Ivoire (IRFCI). The mean detection rate was 0.84 during the study period. The sex ratio was 1.1, with 46.5% female and 53.4% male. The rate of new paediatric leprosy cases was 14.8%, compared with 85.1% for those over 15 years of age. Paucibacillary (PB) forms accounted for 29.8% compared with 70.1% of multibacillary (MB) forms. Out of the 425 new cases of leprosy, 43.2% had a disability, of which 04.9% were grade 1 (ID1) and 38.3% grade 2 (ID2). PB forms affected 53.5% of women, 81.8% of subjects aged over 15 and 37% of ID2. MB forms affected 56% of men, 86.5% of subjects aged over 15 and 39.2% had ID2.*

Conclusion: *The significant presence of multibacillary forms and the detection of paediatric leprosy cases indicate a continuing spread of the disease. These findings call for intensified leprosy control in Côte d'Ivoire, with the establishment of a surveillance, monitoring and alert system.*

Key words: *Leprosy, Multibacillary, Paucibacillary, IRFCI*

1. INTRODUCTION

Leprosy, or Hansen's disease, is a chronic, non-immunizing infectious disease caused by the Mycobacterium leprae. It is transmitted via airborne droplets (Pflüger's droplets) or through nasal secretions during close and frequent contact with an untreated infected individual. This disease primarily affects the skin and peripheral nervous system. According to the World Health Organization (WHO), leprosy is one of the 17 neglected tropical diseases (NTDs) [1]. Despite the existence of effective treatment, thousands of new cases are reported each year. The leprosy bacillus was discovered in 1873 by the Norwegian Gerhard Armauer Hansen. With improvements in hygiene and living conditions, the disease was eradicated in some industrialized countries. However, it remains a public health issue in many countries in Africa, Asia, and Latin America, despite efforts by the international community. Indeed, the introduction of multidrug therapy (MDT) in 1981 by the WHO

led to a considerable reduction in the disease. This promising progress motivated the WHO in 1991 to set a goal (from 1991 to 2000) to remove leprosy from the list of public health problems by reducing the prevalence rate of patients treated with MDT to less than one case per 10,000 inhabitants [2]. This ambitious goal was achieved in most countries globally. However, as of 2008, certain countries, including Brazil (2.39/10,000), Liberia (1.78/10,000), Nepal (1.18/10,000), Timor-Leste (1.13/10,000), and the Democratic Republic of Congo (approximately 1/10,000), have not yet met this target [3]. It is also noteworthy that Africa remains an endemic continent, with nine of the 17 countries worldwide where the disease persists accounting for over 95% of new leprosy cases in 2010 [4].

In Côte d'Ivoire, the prevalence rate in 2017 was 0.34/10,000 inhabitants. The Raoul Follereau Institute of Côte d'Ivoire (IRFCI) serves as the national referral centre for managing leprosy complications. It also receives and treats new cases. For decades, it has been treating numerous patients at various stages of the disease. This study aims to assess the state of leprosy at the IRFCI from 2013 to 2023, as no published study has been conducted in this regard.

2. Materials And Methods

This is a retrospective study focusing on new confirmed cases of leprosy diagnosed through biopsy and/or bacteriological examination from 2013 to 2023. Data collection, including information such as gender, age, and degree of disability, was recorded during patient consultations. The bacteriological index was performed at the IRFCI laboratory using a smear test to determine the bacteriological status of the patients, categorizing them as either paucibacillary (absence of bacilli on the smear) or multibacillary (presence of bacilli on the smear).

3. Results

From January 2013 to December 2023, a total of 425 new cases of leprosy were diagnosed exclusively at the Raoul Follereau Institute of Côte d'Ivoire (IRFCI). The highest detection of new cases (57 cases) occurred in 2017, while the lowest (16 cases) was observed in 2018 (Fig. 1).

Out of the 425 cases, 198 (46.5%) were female and 227 (53.4%) were male, yielding a sex ratio (Male/Female) of 1.1 (Table 1). The proportion of patients under 15 years old was 14.8%, while those aged 15 and older constituted 85.1% (Table 1). Among the total cases, 29.8% were paucibacillary forms, while 70.1% were multibacillary forms. For paucibacillary forms, 60 cases (47.2%) were male, and 67 cases (52.7%) were female. Conversely, for multibacillary forms, 56% were male, and 43.9% were female. The distribution of bacillary forms by year showed a peak in multibacillary cases in 2023 and a decline in 2018. For paucibacillary cases, a peak occurred in 2017, followed by a decrease from 2020 to 2024 (Fig. 2).

Age group analysis revealed that paucibacillary forms were observed in 18.1% (23 cases) of pediatric patients compared to 81.8% (104 cases) in patients aged 15 and older. For multibacillary forms, 13.4% (40 cases) were pediatric patients, while 86.5% (258 cases) were aged 15 and older.

The proportion of disabilities among new cases was 43.2%, varying by year. Level 1 disability accounted for 4.9% (21 cases), while Level 2 disability was 38.3% (163 cases), with significant rates of 50% in 2014 and 48.7% in 2022. Level 0 disability was observed in 56.7% (241 cases) (Table 1). Analysis of disability levels by bacillary forms showed that for paucibacillary cases, Level 0 disability was 55.1%, Level 2 disability was 37%, and Level 1 disability was 7.8%. For multibacillary cases, Level 0 disability was 57%, Level 2 disability was 39.2%, and Level 1 disability was 3.6%.

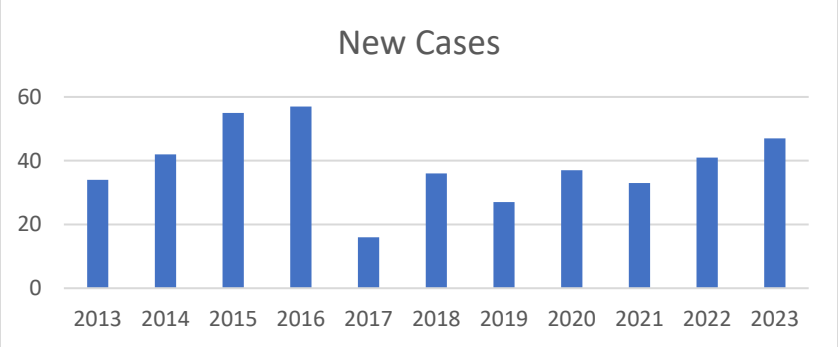

Figure 1. *New cases of leprosy detected at IRFCI, Annual detection rate from 2013 to 2023.*

Table 1. *Main characteristics of new leprosy cases from 2013 to 2023.*

	2013		2014		2015		2016		2017		2018	
	N	%	N	%	N	%	N	%	N	%	N	%
Sex												
Male	22	64.7 %	20	47,6 %	24	43,6 %	32	56,1 %	11	68,7 %	16	44,4 %
Female	12	35.2 %	22	52,3 %	31	56,3 %	25	43,3 %	05	31,2 %	20	55,5 %
Age range												
<15 years	15	44.1 %	05	11,9 %	19	34,5 %	04	07,0 %	08	50,0 %	01	02,7 %
≥15 years	19	55.8 %	37	88.0 %	36	65,4 %	53	92,9 %	08	50,0 %	35	97,2%
Disability Level												
0	14	41.1 %	19	45,2 %	27	49,0 %	31	54,3 %	11	68,7 %	25	69,4 %
1	03	08.8 %	8	19,0 %	02	03,6 %	01	01,7 %	00	00,0 %	02	05,5 %
2	17	50.0 %	15	35,7 %	26	47,2 %	25	43,8 %	05	31,2 %	09	25,0 %
Bacillary forms												
PB	11	32.3 %	21	50,0 %	18	32,7 %	24	42,1 %	11	68,7 %	10	27,7 %
MB	23	67.6 %	21	50,0 %	37	67,2 %	33	57,8 %	05	31,2 %	26	72,2 %
	2019		**2020**		**2021**		**2022**		**2023**		**Total**	
	N	%	N	%	N	%	N	%	N	%	N	%
Sex												
Male	16	59,2 %	18	48,6 %	14	42,4 %	25	60,9 %	29	61,7 %	**227**	**53,4 %**
Female	11	40,7 %	19	51,3 %	19	57,5 %	16	39,0 %	18	38,2 %	**198**	**46,5 %**
Age Range												
<15 years	01	03,7 %	01	02,7 %	02	06,0 %	05	12,1 %	02	04,2 %	**63**	**14,8 %**
≥15 years	26	96,2 %	36	97,2 %	31	93,9 %	36	87,8%	45	95,7 %	**362**	**85,1 %**
Disability Level												
0	17	62,9 %	27	72,9 %	23	69,6 %	21	51,2 %	26	55,3 %	**241**	**56,7 %**
1	01	03,7 %	00	00,0 %	03	09.0 %	00	00,0 %	01	02,1 %	**21**	**04,9 %**
2	09	33,3 %	10	27,0 %	07	21,2 %	20	48,7 %	20	42,5 %	**163**	**38,3 %**
Bacillary forms												
PB	07	25,9 %	09	24,3 %	08	24,2 %	04	09,7 %	04	08,5 %	**127**	**29,8 %**
MB	20	74,0 %	28	75,6 %	25	75,7 %	37	90,2 %	43	91,4 %	**298**	**70,1 %**

4. DISCUSSION

The introduction of multidrug therapy (MDT) by the WHO in 1981 has significantly reduced the prevalence of leprosy worldwide. Proper adherence to treatment ensures a cure in over 95% of cases, as relapses and resistance are rare. This has notably contributed to a reduction in the global prevalence of leprosy. In Côte d'Ivoire, progress has been evident with a prevalence rate of 0.34/10,000 inhabitants in 2016, reflecting a significant reduction in the circulation of Mycobacterium leprae, the causative agent of leprosy. However, the disease persists and continues to spread. Between 2013 and 2023, the IRFCI recorded 425 new cases, representing 5.6% of the 7,579 cases reported nationwide during this period, with an average national prevalence of 0.34/10,000 inhabitants. This aligns with the WHO target of less than 1/10,000 inhabitants, aimed at eliminating leprosy. Côte d'Ivoire's prevalence is notably lower than that of Mayotte, which reported 3.7/10,000 inhabitants in 2011.

Our study appears to be similar to the one conducted by the WHO in 2014, where 9% of new leprosy cases were recorded in Africa, 2% in the Eastern Mediterranean, 2% in the Western Pacific, compared to 71% in Southeast Asia and 16% in the Americas [8].

The analysis of new leprosy cases by gender during the study period shows that 46.5% of cases were female compared to 53.4% male cases, giving a sex ratio of 1.1. This indicates good involvement of women in the screening and management of the disease. The proportion of female cases (46.5%) is significantly higher than the national figure of 39.7% recorded in 2015[9]. The participation rate of women in screening is increasingly significant in some countries, such as Burkina Faso (49.2%), Senegal (25.0%), Cuba (48.8%), and Sri Lanka (49.9%) [9]. These rates show good representation of women, suggesting the gradual end and absence of discrimination against women with leprosy. Furthermore, these rates indicate that African countries have understood the need not to exclude women from the 2016-2020 goal of achieving a world without leprosy. At IRFCI, as in all other parts of Côte d'Ivoire, it must be noted that access to healthcare does not depend on the sex of the patients.

The detection rate of new leprosy cases appears significant in individuals over 15 years old compared to those under 15 years old. The proportion of pediatric new cases (14.8%) in this study is notably higher than the national figure of 8.9% and elsewhere, such as in Somalia (8.4%) and globally (8.9%) [9]. However, this proportion is low compared to that in Comoros (38.1%) and Papua New Guinea (30.4%) [9]. Screening for pediatric leprosy cases is very important as it provides insight into the level of ongoing transmission and recent contamination of the disease. According to the results of our study, this indicator of the insidious spread of leprosy illustrates the possibility of infection transmission within the Ivorian population. Since children are an active, naïve, and vulnerable population, it is necessary to raise awareness and educate them from a young age in order to achieve the goal of zero pediatric leprosy.

The proportion of new multibacillary leprosy cases in this study, which was 70.1%, aligns with the 70% figure recorded in 2015 nationally. This proportion remains significant in both situations. Some authors, such as De Carsalade in 2006, revealed that the increase in multibacillary forms could pose a transmission risk for leprosy [10]. Based on this, we can assume that the high rate of multibacillary forms in Côte d'Ivoire reflects significant circulation of leprosy within the Ivorian population. The 70% rate at the national level is quite comparable to that in countries such as Senegal (94.8%), Comoros (47.5%), Egypt (91.1%), Argentina (91%), and Indonesia (84.6%) [9]. Since the multibacillary form is the most contagious, its increase could sustain the infection and lead to major disabilities. In fact, according to some authors, a multibacillary form increases the risk of developing level 2 disability by 5.7 times [11]. Similarly, the significant presence of multibacillary forms in some African countries leads us to believe that certain regions of Africa continue to remain endemic areas and dormant foci of leprosy. Therefore, it is crucial for Côte d'Ivoire to achieve early detection of leprosy in order to reduce multibacillary forms and ultimately eliminate level 2 disabilities permanently.

The analysis of new leprosy cases related to disability revealed that 56.7% of cases had no sequelae, while 38.3% had level 2 disability (ID2). This proportion of ID2 is still high and quite close to the national figure of 20.8% in 2015 [9]. It is also important to note that this rate is similar to that of Burkina Faso (31.2%) and Somalia (42.1%). The level of disability of degree 2 appears to be increasing in certain regions of the world, such as Southeast Asia, where the number of new ID2 cases rose from 5,791 in 2005 to 8,572 in 2015. The appearance of a level 2 disability (ID2) in new leprosy cases reflects late detection of the disease. Thus, the high rate of ID2 indicates that awareness and screening for leprosy in Côte d'Ivoire and other parts of Africa are still delayed. This situation highlights the need to strengthen awareness and early diagnostic methods.

5. CONCLUSION

This study at IRFCI in Adzopé over the past eleven years demonstrates that leprosy remains a public health concern. The high prevalence of multibacillary forms underscores the need to sustain MDT efforts and strengthen national surveillance to achieve definitive elimination of the disease. Enhanced awareness among healthcare workers and the general population is crucial for early diagnosis and the elimination of pediatric leprosy cases. Establishing a robust monitoring, surveillance, and alert system for leprosy is also recommended.

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