Hansen's Disease Relapse: A 5-year Multi-center, Retrospective Study on Epidemiological and Clinical Patterns in Selected Tertiary Government Hospitals in the Philippines from November 2016 to October 2021

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Abstract

Background: Efforts to control Hansen's disease have progressed through multidrug therapy implementation. However, documented cases of relapse present challenges to its effective management and eradication. Understanding the contributing factors to relapse is crucial for optimizing treatment strategies and achieving better outcomes against Hansen's Disease.

Objective: To determine the epidemiological profile and clinical patterns of patients diagnosed with Hansen's Disease Relapse in selected Tertiary Government Hospitals in the Philippines from November 2016 to October 2021.

Methodology: This was a multi-center, retrospective study involving a five-year chart review method. Charts of all Hansen's Disease Relapse patients were obtained from participating institutions with necessary approvals. Data collection followed approved forms, and patient profiles were analyzed using descriptive statistics. Pre- and post-relapse profiles were compared using T-tests, Wilcoxon tests, and Fisher's Exact Test. Relapse time across subgroups were assessed using Kruskal-Wallis and Mann-Whitney U tests.

Results: A total of 60 relapse cases were included in the study. Majority were single, unemployed males aged 26-35, with low household screening. The Bacillary Index significantly decreased post-relapse. Documented comorbidities included G6PD deficiency before treatment and lepra reactions during MDT. Patients on 12-month MDT regimens had higher relapse time than those on 24-month regimens.

Conclusion: This study underscores the influence of socioeconomic, gender, and age-related factors on relapse. It emphasizes the imperative for enhanced public health measures in accordance with the WHO Global Leprosy Strategy and the importance of considering clinical factors while advocating for continuous improvements in leprosy management protocols.

Keywords: Hansen's Disease Relapse, Epidemiological Profiles, Clinical Patterns

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INTRODUCTION

Hansen's Disease relapse casts a shadow on the progress made in treating this historically and culturally significant condition. Despite patients having initially completed the standard therapeutic regimen and being declared cured, the re-emergence of new clinical signs and symptoms of active disease challenges the effectiveness of the treatment. This occurrence points towards potential treatment failures, be they partial or complete, and highlights the intricate variability in the duration of incubation periods. Relapse rate is an important indicator to assess the efficacy of therapeutic regimens that is incorporated to reduce the disease transmission in the community.[1]

The World Health Organization has seen a drastic improvement in all parameters after recommending the use of Multi Drug Therapy as the standard treatment regimen in the 1980s. The regimen consists of medicines: dapsone, rifampicin and clofazimine. This treatment regimen lasts six months for pauci-bacillary and 12 months for multi-bacillary cases. However, many countries have started reporting of relapse cases even after treatment completion. This is a matter of concern in the current scenario and that continuous monitoring of relapse cases with relation to treatment completion and drug resistance would be useful to plan the next strategy to contain the disease. [2]

The Philippines achieved the goal of eliminating Hansen's Disease at the national level in 1998; however, concerns persist at the subnational level, with low case numbers still reported in various regions. In response, the National Leprosy Control Program (NLCP) of the Philippines has set a vision for the nation to be leprosy-free by 2022, aiming to sustain significant progress in eliminating the disease and achieving zero transmission and disability.[2]

To ensure heterogeneity and representativeness, we initiated a collaborative endeavor involving three tertiary government hospitals in the Philippines renowned for their strong data management. These hospitals were strategically selected to encompass a wide geographic area across the country, spanning the northern and central regions of Quezon City, as well as the southern territories. This approach is pivotal as it enables our research to offer a comprehensive understanding of healthcare dynamics throughout the Philippines.

In the light of the World Health Organization's worldwide strategy for controlling Hansen's Disease and the adoption of relapses as an indicator for the effectiveness of the program, this study will aim to characterize patients who had been diagnosed to have Hansen's Disease relapse at selected Tertiary Government Hospitals in the Philippines.

Review of Related Literature

Several studies were done to identify the factors contributing to relapse and to profile patients who were identified to have Hansen's Disease relapse. The possibility of therapeutic failure or insufficiency needs to be ruled out and the lack of uniformity of these concepts, the use of different indicators for assessing relapses, and the absence of up-to-date clinical and laboratory criteria for diagnosing relapses makes it difficult to compare different studies and impedes standardization of control programs.

In a comprehensive retrospective study of 126 leprosy relapse cases in Brazil from 2013 to 2018, researchers found that patients receiving 24 doses of Multi-Drug Therapy (MDT) had significantly better outcomes than those receiving six or twelve doses.[3] Most cases (96.03%) were multibacillary, with a median relapse interval of 10 years. Interestingly, many multibacillary patients had

negative bacillary indices, indicating that this measure may not reliably predict relapse risk.

Similarly, a cohort study from January 1994 to December 2004 analyzed 117 relapse cases and identified three key factors: an initial Bacillary Index (BI) over 20, a history of anti-reactional treatment, and the polar lepromatous clinical type.[4] Patients with polar lepromatous leprosy were four times more likely to relapse. The study also noted a higher incidence of relapse among males and a rural-to-urban case ratio of 1.29, suggesting higher rates in rural areas due to factors like limited access to MDT and poor treatment adherence.

Relapse in leprosy can vary based on leprosy type (multibacillary vs. paucibacillary), treatment adherence, and geographical factors. In a 2020 study conducted in the Philippines, researchers reviewed the records of 391 leprosy patients and found that relapse rates among smear-positive patients receiving 12 blister packs were significantly higher than those receiving 24 blister packs, which coincides with findings from international studies.[5] Key predictors of relapse included the clinical spectrum, a bacteriologic index greater than 3.5, and the number of blister packs administered.

While existing studies on leprosy relapse offer valuable insights into general patterns and predictors, our research is crucial for addressing specific gaps, particularly within tertiary government hospitals in the Philippines, where such studies are limited.

Significance of the Study

The implementation of multidrug therapy (MDT) for Hansen's disease control stands as a pivotal measure in reducing the global disease burden. Despite this progress, the emergence of relapse cases within endemic countries remains a significant concern. Understanding why relapses are occurring can lead to the development of strategies to prevent their recurrence, thus safeguarding the advancements made in controlling the disease. By identifying patterns and risk factors associated with relapse, treatment protocols and patient monitoring procedures can be improved, ensuring better outcomes for patients affected by Hansen's Disease. Furthermore, the knowledge gained from this study carries implications beyond the borders of the Philippines. Hansen's Disease is endemic in various parts of the world, and insights gained from this research can contribute to a broader understanding of relapse patterns.

Research Question

What is the epidemiological profile and clinical patterns of patients diagnosed with Hansen's Disease Relapse in selected Tertiary Government Hospitals in the Philippines?

Objectives of the Study

General Objective

To determine the epidemiological profile and clinical patterns of patients diagnosed with Hansen's Disease Relapse in selected Tertiary Government Hospitals in the Philippines.

Specific Objective

1. To describe the demographic and clinical profiles of patients diagnosed with Hansen's Disease Relapse before and after the relapse occurs.
2. To assess the difference in the bacillary index in slit skin smear of patients diagnosed with Hansen's Disease Relapse before and after relapse
3. To compare the relapse time among Hansen's Disease Relapse patients receiving 12 blister packs of multibacillary drug therapy and 24 blister packs of multibacillary drug therapy
4. To describe the precipitating/ aggravating factors (co-morbidities) which may have contributed to Hansen's Disease Relapse

METHODOLOGY

Study Design

This was a multi-center, retrospective study that involved a five-year chart review method. The charts of patients who had been diagnosed with Hansen's Disease Relapse were obtained from the participating institutions following the necessary approval process. The chart review focused on gathering data related to the epidemiological profile, including demographic and clinical profiles, as well as the difference in bacillary index in slit skin smear before and after relapse. Additionally, the study aimed to compare the relapse time between patients who received 12 blister packs and 24 blister packs of multibacillary drug therapy. Furthermore, the study investigated the precipitating and aggravating factors, such as co-morbidities, associated with Hansen's Disease Relapse. The data collection and evaluation took place at three selected tertiary government hospitals in the Philippines with a dermatology residency training program.

Study Setting

This study was conducted in selected tertiary government hospitals in the Philippines. The study spanned from November 2016 to October 2021. All Hansen's disease patients classified as relapse cases, who had undergone face-to-face or teledermatology consultations within this timeframe, were included in the study. The study involved a series of medical chart reviews which were conducted following the approval of the Department of Health-Single Joint Research Ethics Board and the Institutional Review Board (IRB) of each participating institution.

Population and Sampling Method

The study included all Hansen's Disease Relapse patients in selected tertiary government hospitals in the Philippines from November 2016 to October 2021. The researcher included everyone who met the inclusion criteria. Hence, no sampling was done since the study sample was too small for sampling.

Inclusion Criteria

All patients 15 years old and above who had been treated for Hansen's Disease by the standard regimen, released from treatment, and exhibited laboratory and clinical signs and symptoms indicating relapse in selected tertiary government hospitals in the Philippines from November 2016 to October 2021.

Exclusion Criteria

All Hansen's Disease Relapse who had insufficient record information.

Withdrawal Criteria

This study only utilized medical chart records of patients diagnosed with Hansen's Disease Relapse. Hence, there were no withdrawal criteria.

Sample Size

This study assumed that approximately 900 Hansen's Disease patients were eligible for the study. This number was based on the five-year count of one institution, multiplied by three institutions. The study by Nascimento (2021) reported a relapse rate of 11.9%, and this was also used in the sample size computation. The study proposed three sample sizes depending on the precision desired by the study. These values were computed using a 95% confidence interval and a design effect of 1.25, considering the multi-center study.

Precision	Minimum Sample
5%	171
7%	95
10%	49

With the table above, the study aimed to collect a minimum of 49 up to 171 patients to have an estimate of relapse time with a precision of 5% to 10%. This sample size estimation was computed using OpenEpi

Data Collection Tool and Method

Patient data from selected tertiary government hospitals was collected using data collection forms and chart reviews. The gathered information was methodically encoded and safeguarded within a password-protected Microsoft Excel file to ensure confidentiality. Strict security measures were enforced to guarantee that the data remained exclusively designated for the purposes of this study. All data will be deleted after a period of ten years.

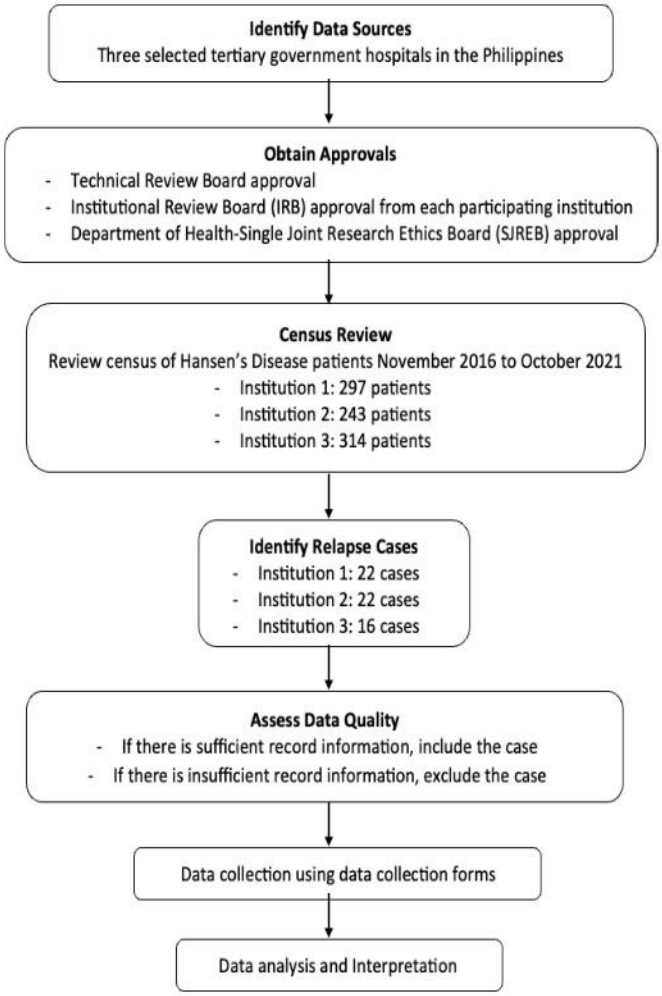
Statistical Analysis

Descriptive statistics were used to describe the demographic and clinical profiles of patients diagnosed with Hansen's Disease Relapse. This included using means and standard deviations or medians and interquartile ranges to present continuous information, and counts and percentages for categorical information.

To assess the profiles before and after relapse among patients, descriptive statistics were employed to portray subgroup characteristics. Paired T-tests or Wilcoxon signed-rank tests were used for non-parametric data or continuous characteristics. Alternatively, Fisher's Exact Test was employed for categorical characteristics.

Relapse time was calculated by evaluating the occurrence of relapse throughout the aggregated person-time of the patients. It was also disaggregated depending on therapy received. Descriptive statistics were used to present the distribution of relapse time (days before relapse after treatment) per subgroup. To assess differences across multiple groups, the Kruskal-Wallis test was utilized, while the Mann-Whitney test was employed for comparisons between two groups. Additionally, comparative boxplots were employed to provide visual representations. Moreover, descriptive statistics, comprising counts and percentages, were employed to illustrate the distribution of factors potentially contributing to the occurrence of Hansen's Disease Relapse.

Figure 1. Flowchart of Methodology



Results

Table 1.1 Profile of Hansen's Disease Relapse Patients

Characteristics	Valid N	Mean (SD)	Median (IQR
Number of Household Members	39	4 (2)	4 (3-5)
Relapse Time (days)	60	3330 (4530)	693 (254 - 5129)
Bacillary index in SSS (Initial Diagnosis)	60	2 (2)	4 (2-6)
Bacillary index in SSS (After relapse)	60	2 (1)	1 (1 - 3)
	Categories	**Count**	**%**
Age	15-25	8	13.30
	26-35	16	26.70
	36-45	12	20.00
	46-55	5	8.30
	56-65	15	25.00
	66-75	4	6.70
Sex	Male	47	78.30
	Female	13	21.70

Occupation	Unemployed	27	45.00
	Self-Employed	16	26.70
	Employed	11	18.30
	Student	6	10.00
Civil Status	Single	38	63.30
	Married	21	35.00
	Widow	1	1.70
Household members screened for Hansen's Disease	Yes	7	11.70
	No	53	88.30
Initial MB Type	Borderline Tuberculoid (BT)	3	5.00
	Borderline Borderline (BB)	4	6.70
	Borderline Lepromatous (BL)	10	16.70
	Lepromatous Leprosy (LL)	43	71.70
Diagnosis_Before	Clinical	0	0.00
	Laboratory	0	0.00
	Clinical and Laboratory	60	100.00
Previous Treatment	MDT 12 months	40	66.70
	MDT 24 months	20	33.30
Clinical Form of Relapse	Borderline Tuberculoid (BT)	1	1.70
	Borderline Borderline (BB)	7	11.70
	Borderline Lepromatous (BL)	14	23.30
	Lepromatous Leprosy (LL)	38	63.30
Diagnosis After	Clinical	11	18.30
	Laboratory	4	6.70
	Clinical and Laboratory	45	75.00
Time Until Relapse	180 below	9	15.00
	181-364 days	18	30.00
	365-545 days	2	3.30
	546 -729 days	1	1.70
	730 days	30	50.00
Bacillary index in SSS (Initial Diagnosis)	0	0	0
	1	9	15.00
	2	9	15.00
	3	7	11.70
	4	9	15.00
	5	4	6.70
	6	22	36.70
Bacillary index in SSS (After relapse)	0	6	10.00
	1	25	41.70
	2	10	16.70
	3	10	16.70
	4	5	8.30
	5	2	3.30
	6	2	3.30

Table 1.1 presents the profile of Hansen's Disease relapse patients, revealing that the most common age group was 26-35 years old (26.70%). The majority of the participants were male (78.3%), unemployed (45%), single (63.3%), and resided in households with an average size of four. Only one in every ten patients' household members were screened for Hansen's Disease. Most patients had LL (71.7%) as the initial MB Type, diagnosed through both clinical and laboratory methods (100%). Majority of the patients experienced relapse with a median time of 693 days (IQR: 254-5129). Around half of the 20 relapses occurred at the two-year post-treatment mark. 40 patients received MDT at 12 months (66.7%) and 20 patients at 24 months (33.3%). Following relapse, the majority of patients still displayed the LL clinical form (63.3%). BI in SSS had a median of four (36.7%) before relapse and one (41.7%) after relapse.

Table 1.2 Co-morbidities of Patients

Comorbidities	Valid N	With		Without	
		Count	%	Count	%
Co-morbidities (with or without)	60	28	46.70	32	53.30
G6PD deficiency (with or without)	58	15	25.90	43	74.10
Hypertension (with or without)	58	7	12.10	41	87.90
Diabetes Mellitus (with or without)	58	0	0.00	58	100.00
Tuberculosis (with or without)	58	2	3.40	56	96.60
Asthma (with or without)	58	1	1.70	57	98.30
Allergies (with or without)	58	2	3.40	56	96.60
Others (with or without)	58	3	3.40	56	96.60
Tuberculosis (N/A = 23)	37	2	8.10	34	91.90

Among the 60 patients studied, less than half (46.7%) had comorbidities, as shown in Table 1.2. The most prevalent comorbidities were G6PD deficiency (25.9%) and hypertension (12.1%). Additionally, a smaller percentage (3.40%) of patients had tuberculosis, allergies, and other infections. Only one patient (1.70%) had asthma, and there were no cases of diabetes mellitus (DM) within the sample.

Table 1.3 Newly Developed Conditions Post-Treatment

Newly developed conditions	Valid N	With		Without	
		Count	%	Count	%
Conditions that developed during MDT treatment	58	37	63.80	21	36.20
Lepra reaction (with or without)	58	30	51.70	28	48.30
Anemia (with or without)	58	23	39.70	35	60.30
Kidney Disease (with or without)	58	2	3.40	56	96.60
Liver Disease (with or without)	58	3	5.20	55	94.80
Infection (with or without)	58	6	10.30	52	89.70
Others (with or without)	58	1	1.70	57	98.30

Table 1.3 shows that 37 patients (63.80%) developed new conditions during treatment. Among these conditions, lepra reaction emerged as the most prevalent, affecting 30 patients (51.70%). Other patients developed anemia (39.70%), infections (10.30%), liver disease (5.20%), and kidney disease (3.40%).

Table 2. Within-Group Comparison of the Bacillary Index (BI) in SSS Before and After Relapse according to the Clinical Form of Relapse

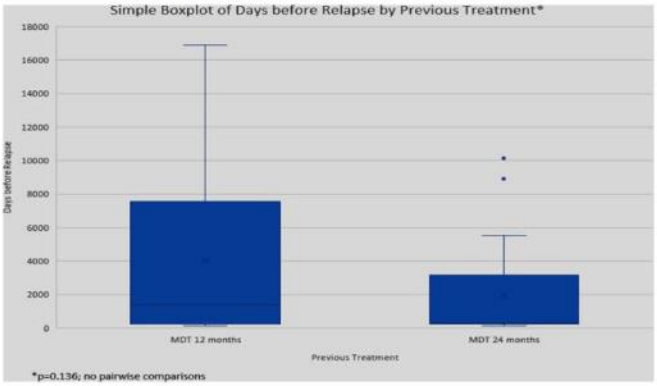
Clinical Form of Relapse	Valid N	Bacillary Index (BI) in SSS				z-value	p-value (Two-Tailed)
		Before Relapse		After Relapse			
		Median (Md)	IQR	Median (Md)	IQR		
Total	60	4	2 – 6	1	1 – 3	5.07†	0.001
Borderline Tuberculoid (BT)	1	2	2 – 2	1	1 – 1	1.00	1.000
Borderline Borderline (BB)	7	3	2 – 5	1	0 – 1	2.40†	0.016
Borderline Lepromatous (BL)	14	3	2 – 5	1	1 – 3	2.91†	0.004
Lepromatous Leprosy (LL)	38	6	2 – 6	2	1 – 3	3.90†	0.001

Table 2 shows that the median bacillary index before relapse was four (IQR = 2 to 6), while became one (IQR = 1 to 3) after the relapse. Comparative analyses showed that the median bacillary index after relapse was significantly lower than before the relapse (z=5.07, p=0.001). It can also be noted that the bacillary index after relapse for borderline borderline (BB; z=2.40, p=0.016), borderline lepromatous (BL; z=2.91, p=0.004), and lepromatous leprosy (LL; z=3.90, p=0.001) were significantly lower compared to their respective median scores before relapse.

Table 3.1 Comparison of Relapse Time by Treatment

Previous Treatment	Days before Relapse						P-value
	Count	Mean	SD	Median	IQR	Range (Min-Max)	
MDT 12 months	40	4017	4991	1409	263 - 7562	143 - 16882	0.136
MDT 24 months	20	1957	3100	301	251 - 2528	106 - 10145	

Figure 2. Comparative Baseline of Relapse Time by Treatment Group



The data presented in Table 3.1 suggests that there is insufficient evidence to definitively conclude that relapse time significantly varies based on the type of treatment received (p=0.136). However, it is noteworthy that among the 20 patients who received MDT over 24 months, relapse occurred at a median of 301 days (IQR: 251 - 2528). In contrast, among the 40 patients who received MDT over 12 months, relapse was observed at a median of 1,401 days (IQR: 263 – 7562).

Table 3.2 Within Group Comparison of Relapse Time by Treatment

Clinical Form of Relapse	Previous Treatment	Days before Relapse			p-value
		Valid N	Median	IQR	
Borderline Tuberculoid (BT)	MDT 12 months	1	611	611 - 611	.
	MDT 24 months	0	.		
Borderline Borderline (BB)	MDT 12 months	5	476	253 - 774	0.857
	MDT 24 months	2	275	275 - 275	
Borderline Lepromatous (BL)	MDT 12 months	10	321	230 - 901	0.106
	MDT 24 months	4	214	143 - 255	
Lepromatous Leprosy (LL)	MDT 12 months	24	4681	795 - 10507	0.113
	MDT 24 months	14	619	279 - 5344	

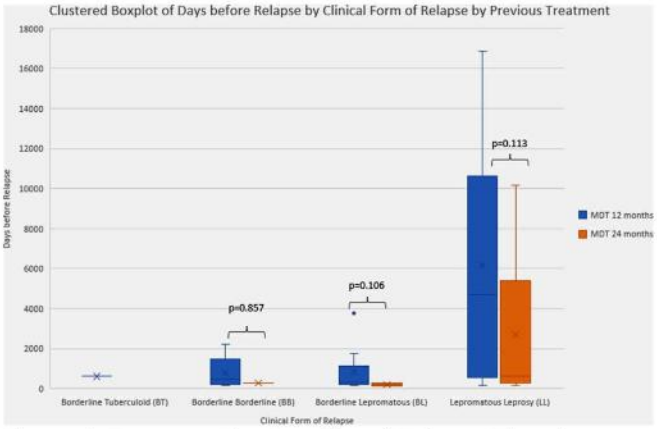


Figure 3. Comparative Baseline of Relapse Time by Treatment Group Grouped by Treatment

The results presented in Table 3.2 showed that within each subgroup, the available evidence does not support the conclusion that relapse time significantly varies based on the treatment administered (p>0.05).

DISCUSSION

Clinical Profile

The profile of 60 Hansen's Disease relapse patients provided valuable insights into demographics and clinical characteristics. Notably, there is a predominance in the 26-35 age group, comprising 26.70% of cases, with a significant majority being males (78.30%). Additionally, a substantial proportion of patients are unemployed (45%), single (63.30%), and experienced relapse with a median time of 693 days (IQR: 254-5129), with around half of the relapses occurring at the two-year post-treatment mark. These percentages suggest that gender, socioeconomic factors, and a prolonged incubation period may play significant roles in relapse risk. These findings align with an international study conducted by Gitte et al. in 2018, where they also identified a higher prevalence of relapse among males in the age group between 20-45, with relapse times ranging from one to 33 years. This parallel finding underscores the consistency of this trend across different studies.

The heightened exposure observed in individuals within this particular gender and age demographic can be attributed to their typical role as primary breadwinners for their families. This role leads to increased community interactions and, consequently, a potentially elevated risk of disease exposure. Additionally, socioeconomic factors, such as elevated unemployment rates in the context of a developing country, may contribute to lower levels of education and awareness about the disease. This educational gap could potentially result in delays in seeking medical treatment or adhering to prescribed treatment regimens.

The findings of our study further reveal important insights into the screening of household contacts of Hansen's Disease patients. Among the patients included in our study, a majority resided in households with an average size of four. However, it is noted that only one in every ten patients' household members (88.3%) underwent screening for Hansen's Disease. This low rate of screening can be attributed to the lack of consent given by family members, which is often rooted in a lack of understanding or education about the risk of contracting the disease. It is imperative to highlight that contacts of multi-bacillary (MB) leprosy patients face a significantly higher risk of developing leprosy, up to five to eight times higher, compared to individuals not living in such households. [6] Furthermore, our study underscores the significance of interventions such as chemoprophylaxis, as outlined in Pillar 2 of the WHO Global Leprosy Strategy 2016–2020, "Accelerating towards a leprosy-free world." In this context, the

feasibility and acceptability of chemoprophylaxis gain added importance, as it has been shown to be not only effective but also socially acceptable for household contacts of leprosy patients.

Majority of relapse patients studied received MDT for 12 months (66.70%), while 33.3% received 24-month MDT regimen. It is also noteworthy that the LL clinical form of the disease predominated at the initial diagnosis among the relapse cases (71.70%). These findings are significant and aligns with the observations from a local study where they concluded that relapse rates among smear-positive leprosy patients receiving 12 blister packs vs. those receiving 24 blister packs were statistically higher. [7]

Following relapse, a substantial proportion of patients continued to display the LL clinical form (63.3%). Before relapse, the majority of patients exhibited a BI in SSS of six (36.7%), while after relapse, the majority had a BI in SSS of one (41.7%). This shift in BI in SSS highlights the potential changes in bacterial load associated with relapse, which is a critical factor in disease management and echoes the significance of BI changes noted in various studies.

Co-morbidities

Among the 60 patients studied, comorbidities were observed in less than half (46.7%), as depicted in Table 2.2. The most prevalent comorbidity was G6PD deficiency (25.9%). Furthermore, a smaller percentage (3.40%) of patients presented with other conditions. It is noteworthy that comorbidities can influence the development of clinical manifestations of Hansen's Disease (HD) or its reactional states. They pose a significant challenge in the treatment of HD, as asymptomatic latent infections can reactivate when immunosuppressive therapy is administered for HD. [8]

In the context of our study, while it is evident that G6PD deficiency may have led to some patients not taking dapsone, it is important to recognize the potential consequences of discontinuing this bactericidal drug. This discontinuation could allow the bacterial load to persist or even increase, potentially contributing to relapse. Moreover, drug resistance may also play a key factor. These findings underscore the complexity of drug resistance patterns in Hansen's Disease and further emphasize the necessity for a comprehensive understanding of drug resistance in the context of this disease.

Conditions that developed during treatment

Many patients developed new conditions during treatment, with lepra reactions being the most frequently observed. Other conditions included anemia, infections, liver disease, and kidney disease. While lepra reactions do not directly contribute to relapse risk, they complicate management, especially when corticosteroids are required. Additionally, other conditions may pose challenges, as treatments for these issues can complicate overall management.

Bacillary Index

A comprehensive analysis of the bacillary index (BI) at initial diagnosis and at relapse revealed that the median BI before relapse was four (IQR: 2 to 6), decreasing to one (IQR: 1 to 3) after relapse, a statistically significant change ($z=5.07$, $p=0.001$). This reduction suggests a decrease in bacterial burden, and even a minor increase in BI should be considered substantial evidence for diagnosing relapse in previously negative patients.

The concept of "persisters"—dormant microorganisms surviving within the host despite adequate chemotherapy—warrants consideration, as they can be present in about 10% of MB patients, potentially at higher rates in those with elevated BI.[9] This highlights the importance of monitoring changes in BI for relapse diagnosis and the role of persisters in Hansen's Disease recurrence.

Relapse Time

The findings presented in Table 3.1 and Table 3.2 provide valuable insights into the relationship between treatment duration, clinical form at relapse, and relapse times in patients with Hansen's Disease. While the statistical analysis did not yield definitive evidence to suggest that relapse time significantly varies based on the type of treatment or treatment duration, these results offer several significant implications highlighting the potential flexibility in treatment regimens for Hansen's Disease patients. It suggests that the choice of treatment duration may not be the sole determining factor influencing relapse time. Moreover, it also showcased the intricate interplay between clinical form, treatment duration, and relapse times.

According to WHO, the estimated risk of relapse is a mere 0.77% for MB (multibacillary) patients and slightly higher at 1.07% for PB (paucibacillary) patients, nine years after discontinuing Multidrug Therapy (MDT). Moreover, various other studies, which utilize person- years of observation, have reported relapse rates ranging from 0.65% to 3.0% for PB leprosy and from 0.02% to 0.8% for MB leprosy. These global estimates provide essential context for analyzing the findings of this study.

The observed relapse time may be attributed to various underlying factors, including patients' clinical profiles, adherence to treatment regimens, drug resistance or the presence of particularly virulent strains of Mycobacterium leprae. Additionally, the reported variations in relapse rates in this study underscore the ongoing need for improving and refining Hansen's Disease management guidelines on a global scale.

CONCLUSION

The findings of this study provided valuable insights into the intricate dynamics and complexities of Hansen's Disease relapse. The comprehensive analysis of demographic and clinical profiles revealed compelling trends, emphasizing the impact of socioeconomic factors, gender, and age on relapse risk. The low rate of household screening for Hansen's Disease within the study population underscored the necessity for enhanced public health interventions and the importance of comprehensive screening and chemoprophylaxis, in accordance with the WHO Global Leprosy Strategy.

Patients receiving 12-month MDT regimens experienced higher relapse rates than those on 24-month regimens. While a 24-month MDT regimen appeared to be more effective in preventing relapses, it was essential to recognize that the clinical form of leprosy could significantly influence treatment outcomes. Additionally, the prevalence of comorbidities among patients and the development of conditions during treatment, while not direct causes of relapse, could impact disease management.

RECOMMENDATION

Based on the findings of this study, it is recommended that treatment surveillance and screening strategies for Hansen's disease be enhanced to improve post-treatment outcomes. The current National Leprosy Control Program (NLCP) guidelines advocate for follow-ups every three months for the first two years and annually for the subsequent five years. However, given the observed relapse times, a thorough evaluation of this surveillance framework is warranted.

The study also emphasizes the need to address risks among household contacts of Hansen's Disease patients, particularly due to low consent rates for screening. To effectively mitigate these risks, it is suggested to implement improved educational programs and awareness campaigns aimed at dispelling misconceptions and stigma associated with the disease. These initiatives should facilitate the implementation of the contact tracing and chemoprophylaxis guidelines established by the WHO. By adopting this proactive

approach, the potential for identifying latent infections among household contacts increases, which can significantly reduce the risk of re-infection and lower relapse rates. This comprehensive strategy is crucial not only for the well-being of individual patients but also for advancing global efforts to eradicate Hansen's Disease.

Lastly, to explore the complexities of relapse further, it is recommended to employ more sophisticated study designs, such as prospective cohort studies. This approach enables the systematic collection of data over time, allowing for a deeper exploration of causal relationships between treatment types, baseline clinical forms, and the likelihood of relapse. Future studies could also integrate data from a larger number of institutions, encompassing both relapsed and non-relapsed cases, to provide a more accurate representation of overall relapse risk within the population and contribute to a robust understanding of disease dynamics

SCOPE AND LIMITATION OF THE STUDY

The study was limited only to three selected tertiary government hospitals in the Philippines from November 2016 to October 2021

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