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Succesfulness of Controlling and Prevention of Leprosy in Aceh Tenggara Regency, Indonesia

Syafriadi[1], Khairunnisa[2], Azizah nasution[3]*

[1, 2, 3]Department of Pharmacology, Faculty of PharmacyUniversitas Sumatera Utara, Medan, 20155, Indonesia

Abstract. Leprosy remains as a health problem in Indonesia. This retrospective descriptive study analyzed the succesfulness of controlling and prevention of leprosy by Deparment of Health Aceh Tenggara Regency (DHATR), Indonesia period 2010 to 2019. The required data (n=125) were extracted from the DHATR databases using a self-designed questionnaire. The new cases, grade 2 disability rate, recovery rate with multi-drug therapy (MDT), isolation measures for leprosy patients, bacille calmette-guerin (BCG) vaccination for the patients' families, and tertiary prevention were analyzed using a cohort analysis. Succesfulness of the program was analyzed by referring the study results with the National Guidelines for Eradicating Leprosy (NGEL). Of the 125 patients, 62.4% were male. The new cases found for period: 2010 to 2016, $> 5/100,000$ population; 2017 to 2019, $< 5/100,000$ population. The incidence of level 2 disability period 2010 to 2019 was less than 25 cases/10 years and recovery in paucibacillary leprosy (PBL) and multibacillary leprosy (MBL) from 2010 to 2019 reached 100%. The incidence of MBL was higher than that of PBL at the age range of 1 to 70 years.There was no patients isolated and vaccinated during that period. The controlling and prevention of leprosy in DHATR was in accordance with the NGEL.

Keywords: *Controlling, prevention, leprosy*

Abstrak. *Kusta masih merupakan masalah kesehatan di Indonesia. Penelitian deskriptif retrospektif ini menganalisis keberhasilan pengendalian dan pencegahan penyakit kusta oleh Dinas Kesehatan Kabupaten Aceh Tenggara (DKKAT) tahun 2010 hingga 2019. Data yang diperlukan (n=125) diakses dari database DKKAT menggunakan formular pengumpulan data yang dirancang sendiri. Kasus baru, angka cacat tingkat 2, angka kesembuhan penggunaan multi-drug therapy (MDT), tingkat isolasi pasien, vaksinasi bacille calmette-guerin (BCG) bagi keluarga pasien, dan pencegahan tersier dianalisis secara kohort. Kesesuaian program dianalisis dengan membandingkan hasil dengan Standar Nasional Pemberantasan Penyakit Kusta (SNPPK). Diantara 125 pasien, sebanyak 62.4% adalah laki-laki. Kasus baru ditemukan untuk periode: 2010 sampai 2016, $> 5/100,000$ penduduk; 2017 sampai 2019, $< 5/100,000$ penduduk. Insidens angka cacat tingkat 2 periode 2010 to 2019 adalah kurang dari 25 kasus/10 tahun dan angka kesembuhan dari pauci-bacillary (PB) dan multi-bacillary (MB) dari 2010 sampai 2019 mencapai 100%. Insidens MB lebih tinggi dibanding dengan PB pada rentang usia 1 to 70 tahun. Tidak ada pasien yang diisolasi dan divaksinasi selama periode tersebut. Pengendalian dan pencegahan kusta di DKKAT sudah sesuai dengan SNPPK.*

Kata kunci: *Pengendalian, pencegahan, penyakit kusta*

*Corresponding author at: Universitas Sumatera Utara, Medan, Indonesia

E-mail address: azizah@usu.ac.id

1. Introduction

Leprosy also called as Hansen's disease remains as a global health problem especially in developing countries. It is mainly caused by Mycobacterium leprae and Mycobacterium lepromatosis. World Health Organization 2012 showed that the global prevalence of leprosy with a case finding rate or New Case Detection Rate (NCDR) was 4.06/100,000 population, while the prevalence of leprosy in early 2012 was 0.34%. Globally, South-East Asia was ranked as the highest prevalence with leprosy with a total of 160,135 people infected with an NCDR of 8.75/100,000 population, while the prevalence of leprosy in early 2012 was only 0.64% [1]. Indonesia as one country located in the regions of South-East Asia, was ranked as the third largest patients with leprosy in the world following India and Brazil. Epidemiological reports indicated that as many as 20,023 people were infected with leprosy in Indonesia. Endemic areas of leprosy in Indonesia were Aceh, Java, Sulawesi Utara, Maluku Utara, and Papua [2]. Thus, this fact indicated that leprosy is an important issue that need to be responded in this country due to its complex negative impacts.

The disease results in many serious complex health problems, including broken skin, numbness due to nerve demyelination and loss of axonal conductance causing irreversible neuropathy. Furthermore, its negative impacts is not merely on medical problems, but also associated with quality of life including disability in the eyes, hands, and feet, social, economic, cultural, security and national security issues. The disease creates a bad image, leading to discrimination and social stigma toward affected people. Leprosy generally infects people in developing countries as a result of the country's limited ability to provide adequate health services, education and socio-economic welfare to the community [3; 4].

Due to the complexity of the problems caused by leprosy, it is necessary to control and prevent leprosy as a milestone in achieving the elimination of leprosy in accordance with the national guidelines for controlling leprosy [5]. The successfulness level of the leprosy controlling and prevention program is the main point to be evaluated since this activity can provide valuable information as the basis for further implementation to achieve the goal as established by NGEL. Efforts should always be done to eradicate leprosy. The present study aimed to evaluate the succesfulness of controlling and prevention of leprosy in Deparment of Health Aceh Tenggara Regency (DHATR), Indonesia.

2. Methods

This descriptive retrospective study was conducted by extracting the required data from the databases of DHATR period 2010 to 2019 using a self-designed data collection form. The study population was all documents of patients with leprosy year 2010 to 2019 and used as the study sample. The new cases, grade 2 disability rate, recovery rate after provision of multi-drug therapy

(MDT) (that consists of rifampicin, lamprene, and dapsone tablets), isolation measures for leprosy patients, bacille calmette-guerin (BCG) vaccination for the patients' families, and tertiary prevention were analyzed using a cohort analysis. Succesfulness and appropriateness of the program was analyzed by referring the study results to the NGEL. Success leprosy treatment should meet the indicators establish by NGEL. New case detection rate (CDR) must be $\leq$ 5/100.000 population, cumulative grade 2 disability rate must be $\leq$ 25 cases during the last 5 years, and recovery in PBL and MBL reaches 100%. Analysis of the parameters were conducted as follows:

2.1. New case detection rate

New case detection rate (CDR) is the number of newly discovered cases in a one-year period per 100,000 population. This indicator is most useful to determine the magnitude of the problem and ongoing transmission. Case detection rate is also useful to calculate the number of drug required and to show program activities [5]. Formula used to calculate CDR is as follows:

$$CDR = \frac{\textit{number of newly discovered cases in one year}}{\textit{population in the same year}} \times 100{,}000$$

2.2. Grade 2 dissability rate

Grade 2 disability rate is calculated per 100,000 population. This rate may reflect changes in the detection of new cases with an emphasis on early case finding [5].

$$\textit{Grade 2 disabiity rate} = \frac{\textit{number of new cases with grade 2 defects found within one year}}{\textit{Total of population}} \times 100{,}000$$

2.3. Recovery Rate or release from treatment (RFT)

Recovery rate is important to analyze the succesfulness of patient management and compliance with the prescribed medication. To analyze the treatment, cohort analysis was used, which was an analytical technique used in studying morbidity that changed according to the date/time when MDT treatment was started and monitored during treatment, i.e. for 6-9 months for PB patients and 12 months for MB patients [6].

2.4. Release from treatment rate for MB (RFTMB)

Number of new MB cases from the same 1-year cohort period who completed treatment on time (12 doses in 12-18 months) revealed in the presentation.

$$RFTMB = \frac{\text{number of MB cases who completed 12 doses in } 12-18 \text{ months}}{\text{total number of new MB cases who started MDT in same year cohort period}} \times 100\%$$

2.5. Release from treatment rate for PB (RFTPB)

Release from treatment rate for PB (RFTPB) is the number of new PB cases from the same 1-year cohort period who completed timely treatment (6 doses in 6-9 months) is expressed as a percentage [5] using the following formula:

$$RFTPB = \frac{\text{the total number of new cases of PB who completed } 6 \text{ doses within } 6-9 \text{ months}}{\text{total number of new PB cases who started MDT in the same year cohort period}} \times 100\%$$

3. Results

Characteristics of the patients with leprosy in ATR year 2010 to 2019 are listed in Table 1. As shown in Table 1, number of patients with leprosy varies from year to year during the study period. Overall, number of the leprosy patients during the study period was 125 with age ranging from 1 to 70 years old.

Table 1. Characteristics of the patients with leprosy period 2010 – 2019 (n=125)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total (%)
Gender											
Male	7	21	9	12	15	7	6	1	0	0	78 (62.4)
Female	2	9	6	15	8	3	3	0	1	0	47 (37.6)
Total	9	30	15	27	23	10	9	1	1	0	125
Age (years)											
1-20	3	4	5	3	4	3	1	0	0	0	23(18.4)
21-30	0	8	5	6	9	2	1	0	1	0	32(25.6)
31-50	5	9	4	11	4	1	4	1	0	0	39(31.2)
51-70	1	9	1	7	6	4	3	0	0	0	31(24.8)
Type of Leprosy											
PB	1	6	1	2	1	0	1	0	0	0	12(9.6)
MB	8	24	14	25	22	10	8	1	1	0	113(90.4)
MDT	9	30	15	27	23	10	9	1	1	0	115
Isolation	0	0	0	0	0	0	0	0	0	0	0
Vaccination	0	0	0	0	0	0	0	0	0	0	0

During the study period, most (62.4%) of the leprosy patients were male, while only 37.6% of them were female. Thirty nine or more than one third (31.2%) of them was at the age range of 31 to 50 years old. By type of leprosy, incidence of MB was much higher than that of PB during the study period that reached 90.4%, the highest one was observed in 2013. One-month MDT that consists of rifampin, lampren, and dapsone were provided to MB patients. The first day of treatment, each leprosy patients took 2 capsules of rifampicin 300 mg, 3 tablets of lamprene 300 mg, and 1 tablet of dapsone 100 mg in front of the healthcare provideres. Each of the patients took only 1 tablet of lamprene 50 mg dan 1 tablet of dapsone 100 mg for the scond through the 28th days of the treatment. Only rifampicin and dapsone were given to PB patients. The BCG vaccination was only provided to children and isolated leprosy patients.

Controlling and management of patients with leprosy period 2010-2019 is listed in Table 2.

Table 2. Controlling and management of patients with leprosy period 2010-2019 (n=125)

Data	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
CDR	9	30	15	27	23	10	9	1	1	0
Recovery										
PB	1	6	1	2	1	0	1	0	0	0
MB	8	24	14	25	22	10	8	1	1	0

As shown in Table 2, the highest new CDR, recovery of PB type of leprosy, and recovery of MB type occurred in 2013, 2011, and 2013, respectively.

Disability level of of patients with leprosy year 2010-2019 is listed in Table 3. As shown in Table 3, grade 0 disability reached 101 people with leprosy, grade 1 disability was only experienced by 4 people with leprosy, and grade 2 disability reached 20 people with leprosy.As indicated in Table 3, disability level grade zero (0) of the leprosy patients was the highest in 2013. Grade 1 disability level was the highest in 2011, and the highest number of grade of 2 disability also occurred in 2011.

Table 3. Disability level of of patients with leprosy year 2010-2019 (n=125)

Disability level	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
0	5	18	9	26	23	10	8	1	1	0	101
1	1	2	0	0	0	0	1	0	0	0	4
2	3	10	6	1	0	0	0	0	0	0	20

4. Discussions

Succesfulness of leprosy control and prevention was evaluated by assessment of finding new cases, recovery rates and disability rates. The results were compared with NGEL. The discovery of new cases in ATR was high during period of 2010 to 2016 which reached greater than 5/100,000 population. This high incidence may be due to person with leprosy did not understand the early signs of the disease, and did not report to health workers so that officers carried out active examinations in villages. Many factors are associated pure managenent of leprosy. Asystematic review indicated that increased age, poor sanitary and socioeconomic conditions, lower level of education, and food-insecurity are risk markers for leprosy. Additionally, suffering from food shortage in the past, contact with a leprosy patient, and living in a crowded house and associated with leprocy. This study also found that leprosy is more prevalent in male compared to female [7]. The present study also confirmed that leprosy was more prevalent in male compared to female. There was a decrease in the leprosy cases in 2017 to 2018 and there were no new cases of leprosy in ATR in 2019.

The discovery of the level 2 disability rate in ATR was relatively low because health workers conducted socialization about prevention of leprosy disability, such as carrying out several treatments, namely skin care by giving moisturizers so that the skin did not crack and dry, eye care wears an eye patch to prevent dust from entering the eyes, hand care using gloves to avoid injury, and foot care using soft footwear. So then, the last 10 years, the discovery of cases of disability level 2 20 cases/last 10 years. The administration of MDT regularly every month showed high recovery rate (100%) for MB leprosy in ATR in 2019. Regular administration of MDT also demonstrated a significant recovery rate (100%) for PB leprosy in 2017 to 2019.

Control and prevention of leprosy includes administration of MDT to leprosy patients once a month during the treatment period. According to Moh. Ryman et al 2016, provision of MDT or treatment for leprosy patients is always routinely undertaken by health workers, all of whom carry out MDT for MB and PB patients and undergo treatment for 6 months to 2 years, leprosy patients are not charged at all to obtain drugs from the Public health center [8].

Isolation is one part of leprosy control and prevention in this activity not carried out by the ATR Public Health Office but they only localizing families and leprosy patients in areas that have been determined by the government to make it easier to monitor leprosy patients and BCG vaccination is only given to children for leprosy.

According to Moch Irfan Hadi (2017), BCG vaccination is a vaccine useful for increasing immunity against BCG disease, but it also shows protection against leprosy [9]. BCG vaccination can be one way to break the chain of leprosy transmission. In the Republic of Malawi, a study has been conducted on BCG vaccination and the results showed that one dose could provide 50%

protection and two doses provided 80% protection [10]. However, the results of this study have not been implemented as a policy program in Indonesia since further studies are still required to obtain evidence-based data. BCG vaccination can provide optimal protection if it is given before the age of 14 years.

Controlling and prevention succesfulness of leprosy was evaluated by collecting data on new case findings such as passive patient finding, namely people who looked for treatment at the public health center of their own accord and active patient discovery by conducting surveys to villages. Furthermore, the recovery for leprosy patients is carried out by giving MDT to leprosy patients which aims to kill leprosy germs so that they are powerless to damage body tissues and signs of disease become less active until they finally disappear [11]. If people with leprosy do not take medication regularly, the leprosy germs can become active again, as the result, new symptoms emerge on the skin and nerves that can worsen the patients. Thus, early treatment of the disease are crucial to avoid defects caused by leprosy germs.

According to Arif Mulyadi (2017), people with leprosy must be able to carry out self-care regularly so that the occurred disability does not get worse. People with leprosy must understand that MDT treatment can kill leprosy germs, but it defects in the eyes, hands or feet that have already occurred will remain for life. Therefore, they must carry out self-care diligently so that their disabilities do not get worse and get education provided by health workers on procedures of self-care to prevent disability due to leprosy when people with leprosy are first diagnosed with leprosy [12]. The Global Leprosy Strategy 2021–2030 "Towards zero leprosy" has been developed and structured with four principles. First strategy is the implementation of integrated, country-owned zero leprosy roadmaps in all endemic countries. Scondly, scaling up leprosy prevention alongside integrated active case detection. The third approach is the management of leprosy and its complications and prevent new disability. Last effort is to combat the stigma caused by leprosy and ensure human rights [13].

Conclusion

Controlling and prevention of the leprosy in ATR have been effectively implemented and in accordance with the national standards for eradicating leprosy.

Acknowledge

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