



Positive Parents and Prevention of Disability in Children Living with Leprosy: A Case Report

Rizky Kusuma Wardhani¹, Melinda Harini¹, Luh Karunia Wahyuni¹, Alvin Lakmudin¹

1Physical Medicine and Rehabilitation Department, University of Indonesia, Jakarta, Indonesia

Received on: December 16, 2019, Accepted on: June 7, 2020

ABSTRACT

Modes of transmission of leprosy have been debated for a very long time, but long-term contact is needed for the disease to be transmitted. Children have high risk of contracting leprosy if their parents, especially mothers, are positive and untreated, increasing the risk up to 14 times. 6.6% of children with leprosy are diagnosed with Grade 2 Disability (G2D) at the point of diagnosis. This is a case report showing how early detection, family screening and education effectively prevent disability in children living with leprosy-positive parents. A woman who gave birth to her fourth child was diagnosed with leprosy in Alverno Leprosy Hospital early 2018. The doctor immediately conducted leprosy screening and found that her husband and her three older children were positive. WHO-recommended drug therapy was then started till completion. Neither delayed growth nor deformities were found in all of the children. The mother passed away late 2018 due to leprosy reaction. The youngest child remained negative but constant monitoring should be done due to possible transmission risk. In conclusion, early detection, family screening and education are crucial in order to prevent the spread of leprosy as well as preventing the development of complications such as deformities and amputations.

Keywords: leprosy; disability; children; prevention; screening

INTRODUCTION

Leprosy, also known as Hansen's disease is a chronic infectious disease caused by a rod-shaped, Gram-positive obligate intracellular bacterium, *Mycobacterium Leprae*. It is most common in places of poverty with overcrowding and poor nutrition (Sanford et al., 2016). Leprosy is a major public health problem especially in Indonesia, which has the third highest number of new leprosy cases each year in the world, after India and Brazil, with more than 15,000 new cases every year (The Leprosy Mission, 2019).

M. Leprae primarily affects the skin and peripheral nerve fibres that can result in sensoric and motoric impairment leading to deformities and disabilities. It is known that 20% of patients with leprosy present with physical disabilities as well as social and psychological restriction (Sarno et al., 2013). Some common examples of deformities include madarosis, Buddha ear, sunken nose, banana fingers and ulnar claw hand. World Health Organization (WHO) disability grading system has been widely used to determine the extent of disabilities for people living with leprosy (WHO, 2019).

Modes of transmission of leprosy have been a controversy even until this day, but it is widely known that long-term contact is required for the disease to be transmitted. Children

have extremely high risk of contracting leprosy if their parents, especially mothers, are leprosy-positive and left untreated, increasing the risk up to 14 times. Moreover, 6.6% of children with leprosy are diagnosed with Grade 2 Disability (G2D) at the point of diagnosis due to late diagnosis and treatment (Lana et al., 2013).

In this case report, we present a family of four children living with leprosy positive parents in Singkawang, Indonesia. The mother who gave birth to her fourth child was diagnosed with leprosy early 2018. The doctor immediately conducted leprosy screening and found that her husband and her three older children were positive. With early detection and prompt treatment, the three leprosy positive children did not develop disability and the youngest child did not contract leprosy.

CASE PRESENTATION

A 27-year-old female was diagnosed with multibacillary type (MB type) leprosy in Alverno Hospital, Singkawang, Indonesia in January 2018. She complained of hypo-pigmented lesions with anaesthesia on her skin that appeared since 2 years before consultation and had since grew in numbers and became more prominent. She denied any sensation of itch and burning on the lesions. No complaints of fever, enlarged lymph nodes, changes in structures of facial features, hands and foot were made. She denied any usage of creams and lotions, insect bites, consumption of medicines or drugs.

From initial physical examination, her BMI was 16.5 kg/m² (height: 1.50 cm, weight: 37.1 kg). 8 hypo-pigmented macules with clear edges were found of her skin surface, spread on upper arm, chest and thigh bilaterally. There was no madarosis, la gofthalmus, buddha ear, sunken nose and disabilities on eyes,

*Corresponding Author

Email: rizkykusumawardhani@yahoo.co.id

Cite as: Wardhani, R.K., Harini, M., Wahyuni, L.K., & Lakmudin, A. (2020). Positive Parents and Prevention of Disability in Children Living with Leprosy: A Case Report. *Journal of Disability Studies*. 6(1), 33-35..

©IS Publications ISSN: 2454-6623 <http://pubs.iscience.in/jds>



hand and foot. No neuritis was observed in N. ulnaris, N. Medianus, N. Radialis, N. Poplitea Lateralis, N. Tibialis Posterior, N. Fasialis and N. Trigeminus.

At the point of diagnosis, she had 4 children: 1 day old, 4 years old, 6 years old and 8 years old. A team from Alverno Hospital then conducted family screening one month post-childbirth and found that her husband and 3 older children were also positive for MB type leprosy. Skin scraping was done on 6 sites during the first visit and result was found to be AFB (+) with bacterial index 4+ (11-100 AFB/1 field), however morphological index calculation was not done.

Table 1. Examination of father and 4 children one month post child birth

	Father	1 st child	2 nd child	3 rd child	4 th child
Age	30 yo	8 yo	6 yo	4 yo	1 month
BMI	Underweight	Wasted	Wasted	Wasted	Wasted
Physical Examination	Hypopigmented Macula No Deformities	Hypopigmented Macula No Deformities	Hypopigmented Macula No Deformities	Hypopigmented Macula No Deformities	-
Diagnosis	MB Type Leprosy	MB Type Leprosy	MB Type Leprosy	MB Type Leprosy	-
Treatment	MB MDT	MB child MDT	MB child MDT	MB child MDT	-

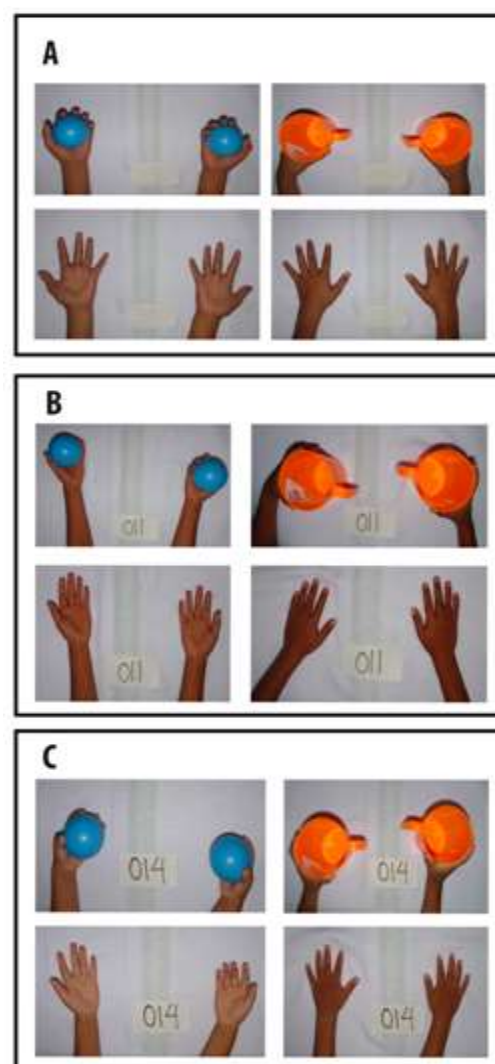
Multi Drug Therapy (MDT) for MB Leprosy was started on the parents (rifampicin 600 mg and clofazimine 300 mg once monthly; dapsone 100 mg and clofazimine 50 mg daily for 12 months) and three older children (rifampicin 10 mg/kg and clofazimine 6 mg/kg once monthly; dapsone 2 mg/kg and clofazimine 1 mg/kg daily for 12 months) (Table 1). 2 months after the initiation of MDT, the mother complained of new painful lumps forming on her arms and legs, accompanied with fever. She was then admitted to Alverno Hospital and was diagnosed with Erythema Nodosum Leprosum (ENL). Treatment included prednisone 40 mg/day with tapering off. However, she did not manage to survive and passed away due to heavy anaemia and ENL 1 month after admission.

All other family members completed the MDT regimen (12 months post-diagnosis). Disability of the three older children was examined 6 months after the completion of MDT. It was found that there were no deformities nor disabilities present in the father and all of the children (Figure 1). The youngest child remained leprosy free.

DISCUSSION

In this case report, we describe a family of four children with MB-type leprosy parents. Three of the older children were leprosy positive. It was found that the risk of children developing leprosy in a person is four times higher if neighbourhood contact with a leprosy patient is present. This risk increases to nine times when the contact is intra-familial, with a prevalence of familial contact in childhood leprosy ranging from 10-36%. Further, the risk increases to fourteen times if the contact is maternal, MB form leprosy (lepromatous type) and if the number of patients is more than one (Dogra et al., 2014). Even though the exact mechanism of leprosy transmission is unknown, the close contact with two positive adults in a household posed an extremely high risk of leprosy.

Figure 1. Hand examination of the 3 older children showing no deformities and disabilities. A: 1st child (9 years old at the time of examination), B: 2nd child (7 years old at the time of examination), C: 1st child (5 years old at the time of examination).



transmission and therefore, it is not surprising that the three children were also leprosy positive.

The main route of transmission of leprosy is believed to be through inhalation of nasal droplets and direct skin contact. However, epidemiological evidence of transplacental transmission of leprosy is present. Dogra et al. (2014) showed an infant developing leprosy at the age of three weeks. The youngest child in the family did not have leprosy at the age of eighteen months old, so transplacental transmission is unlikely to occur in this case.

The youngest child was breastfed for one full month while the mother is on MDT. Shale et al proved that acid fast bacilli are found under light microscopy in breast milk of lepromatous women who were not treated with MDT, however, the viability is not known. Even though M. Leprae is known to be present in breast milk, the risk of acquiring leprosy infection in breastfed infant through gastrointestinal tract remains uncertain. No evidence of orally-ingested leprosy was found. It is believed that nasal droplets and skin-to-skin contact are more likely to transmit leprosy than breast milk ingestion (Shale, 2000).

It was also found that air borne risk is negligibly low if the mother is on or has completed MDT (Shale, 2000). In this case report, the mother started MDT when the newborn was 1 day old and should therefore reduce the risk of transmission

drastically. However, there is no exact guideline stating the required duration of MDT treatment before the risk of transmission becomes negligible. MDT has been shown to be safe during breastfeeding.

There are two types of leprosy according to WHO classification, paucibacillary (PB) and multibacillary (MB). 61% of all leprosy belong to MB-type. Lastoria and Abreu showed that the types of leprosy are dependent on two factors which are genetic factor and immune status (2014). Different sets of HLA and non-HLA determines clinical presentation of leprosy. MRC1 gene markers located in 10p13 region is associated with PB leprosy while polymorphisms in promoter genes for TNF- α and in macrophage protein 1 are associated with the development of MB leprosy. Immune status also plays a role in determining the type of leprosy since it controls integrity of epithelia, surface IgA and NK (Pinheiro et al., 2011). All of the family members in this case report have MB-type leprosy. This could be due to both genetic factors and weakened immune status resulting from poor nutritional status of the patients described in this case report.

5% of children diagnosed under the age of 15 have grade 1 deformity, while 10% have grade 2 deformities at the time of diagnosis. There are several risk factors leading to deformities which are type of leprosy, number of nerve trunk involved, attack of reaction, neuritis and duration of active disease. Lana et al stated that children with MB type leprosy have higher rates of disability at 11% as compared to children with PB type leprosy at 2% (2013). All the family members in the family has MB type leprosy and are therefore more prone to deformities as compared to PB type patients.

Although MDT is known to be able to reduce the duration of active disease, thus preventing deformities, Sales et al demonstrated that disability can still occur in leprosy patients who have completed MDT (2013). The overall incidence of worsening of disability was 6.5/100 PY. The incidence rate of deterioration was 4.5/100 PY if treatment was started without disability and much higher at 10.5/100 PY if treatment was started at grade 1 or 2 disability. The father and three children in this case study started MDT without disability. There were no deformities nor disabilities seen in all three children 6 months post-MDT completion, however, taking MDT does not guarantee that there will not be disability progression and therefore constant monitoring is required.

Another important aspect of deformity and disability prevention includes treatment of leprosy reaction and neuritis. There are two major types of leprosy reactions: type 1 reaction – Reversal Reaction (RR) and type 2 reaction – Erythema Nodosum Leprosum (ENL). Both have been known to be a major cause of nerve damage and morbidity that can occur even after successful completion of MDT. The treatment for both types of leprosy reaction is steroids. There are however no conclusive mediator or diagnostic test to identify patients with higher risk of reaction. As such, family education should be done in the family to ensure early detection and prompt treatment if leprosy reaction is to occur.

CONCLUSION

In summary, leprosy remains as one of the main contributors of disability in the world. Intra-familial, untreated, MB-type maternal contact poses an extremely high risk for children to

contract leprosy. Breastfeeding, droplet inhalation and skin-to-skin contact become negligibly low if mother is on or has completed MDT. To prevent disability, we firstly need to conduct health promotion, early detection and prompt treatment with MDT. In addition, leprosy reaction treatment with steroids should also be immediately given once diagnosed. Finally, follow-ups are required to be conducted even after the completion of MDT to detect disability progression.

ACKNOWLEDGMENTS

We thank Alverno Leprosy Hospital, Singkawang, Indonesia for allowing us to conduct a study on leprosy, especially Ms. Yozepha being a hospitable host during our stay in Singkawang; we also would like to thank the family in this case report for the chance to conduct home visits and giving us the permission to publish this paper.

REFERENCES

- Dogra, S., Narang, T., Khullar, G., Kumar, R., & Saikia, U. N. (2014). Childhood leprosy through the post-leprosy-elimination era: a retrospective analysis of epidemiological and clinical characteristics of disease over eleven years from a tertiary care hospital in North India. *Leprosy review*, 85(4), 296-311.
- Lana, F.C.F., Fabri, A.D.C.O.C., Lopes, F.N., Carvalho, A.P.M. and Lanza, F.M. (2013). Deformities due to leprosy in children under fifteen years old as an indicator of quality of the leprosy control programme in Brazilian municipalities. *Journal of tropical medicine*. <http://dx.doi.org/10.1155/2013/812793>
- Lastória, J.C. & Abreu, M.A.M.M.D. (2014). Leprosy: review of the epidemiological, clinical, and etiopathogenic aspects-part 1. *Anais brasileiros de dermatologia*. 89(2), 205-218.
- Leprosymission.org. (2019). Indonesia | Our Work | The Leprosy Mission. [online] Available at: <https://www.leprosymission.org/tlm-in-your-country/indonesia> [Accessed 26 Nov. 2019].
- Pinheiro, R.O., de Souza Salles, J., Sarno, E.N. & Sampaio, E.P. (2011). Mycobacterium leprae-host-cell interactions and genetic determinants in leprosy: an overview. *Future microbiology*, 6(2), 217-230.
- Sales, A.M., Campos, D.P., Hacker, M.A., da Costa Nery, J.A., Düppre, N.C., Rangel, E., Sarno, E.N. & Penna, M.L.F., (2013). Progression of leprosy disability after discharge: is multidrug therapy enough?. *Tropical Medicine & International Health*, 18(9), 1145-1153.
- Sales, A.M., Campos, D.P., Hacker, M.A., da Costa Nery, J.A., Düppre, N.C., Rangel, E., Sarno, E.N. & Penna, M.L.F. (2013). Progression of leprosy disability after discharge: is multidrug therapy enough? *Tropical Medicine & International Health*, 18(9), 1145-1153.
- Sanford, C.A., Jong, E.C. & Pottinger, P.S. (2016). *The Travel and Tropical Medicine Manual E-Book*. Elsevier Health Sciences.
- Shale, M.J.H. (2000). Women with leprosy: a woman with leprosy is in double jeopardy. *Leprosy review*, 71(1), 5-17.
- World Health Organization. (2019). Leprosy: improved reporting, active case-finding and enhanced data collection reveal hidden cases. [online] Available at: https://www.who.int/neglected_diseases/news/Leprosy_improve_d_reporting/en/ [Accessed 26 Nov. 2019].

Source of Funding: None

Conflict of Interest: None