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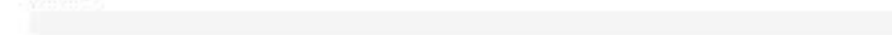
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Factors that are correlated with the incidence of peripheral neuropathy in patients with Morbus Hansen at Sanglah Hospital Denpasar in 2018

M. Sofyan Faridi, I Putu Eka Widyadharma, Ni Made Susilawathi.

ABSTRACT

Abstract

Morbus Hansen (MH) also known as leprosy is a granulomatous infection of the skin and peripheral nerves caused by *Mycobacterium leprae*. Even though the MH prevalence has decreased from 5.4 million to 1 million, new cases of 685 thousand are still found and approximately 20% of these cases are at risk of neurological dysfunction with various factors. Peripheral neuropathy is a peripheral nervous system disorder including sensory, motoric and autonomic nervous disorders. MH is one of the causes. Semmes Weinstein Monofilament (SWM) is a tool for examining sensory nerve in the upper and lower

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FACTORS THAT ARE CORRELATED WITH THE INCIDENCE OF PERIPHERAL NEUROPATHY IN PATIENTS WITH MORBUS HANSEN AT SANGLAH HOSPITAL DENPASAR IN 2018

M. Sofyan Faridi*, I Putu Eka Widyadharma* and Ni Made Susilawathi*

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ABSTRACT Morbus Hansen (MH), also known as leprosy, is a granulomatous infection of the skin and peripheral nerves caused by *Mycobacterium leprae*. Even though the MH prevalence has decreased from 5.4 million to 1 million, new cases of 685 thousand are still found and approximately 20% of these cases are at risk of neurological dysfunction with various factors. Peripheral neuropathy is a peripheral nervous system disorder including sensory, motoric and autonomic nervous disorders. MH is one of the causes. Semmes Weinstein Monofilament (SWM) is a tool for examining sensory nerves in the upper and lower extremities.

This study aimed to determine the factors that correlate with the incidence of peripheral neuropathy in patients with MH. This research used a descriptive observational method with a cross-sectional design. 30 MH sufferers were examined with Semmes Weinstein Monofilament. Subjects were said to have neuropathy if Monofilament > 0.07gram in upper limb and > 0.4gram in the lower limb and were analysed with the expected factors. The results recorded in the table are calculated in percentage. The results were obtained from 30 subjects, 15 men (50%) and 15 women (50%). From the examination of upper limb monofilament in MH patients, mostly aged 36-45 years were 10 people (33.3%) ($r = 0.365$) ($p = 0.047$), with 20 married people (80%) and 10 single or unmarried people (20%) with a value ($r = 0.535$) ($p = 0.001$). Besides, from the examination of the lower limb monofilament in MH patients with illness > 2 years was 44% while those <2 years was 56% with a value ($r = 0.475$) ($p = 0.008$). It can be concluded that peripheral neuropathy of the upper limb in MH correlates with age and marital status whereas in the lower extremity it correlates with the duration of illness.

KEYWORDS Peripheral Neuropathy, Morbus Hansen, Semmes Weinstein Monofilament

Introduction

Morbus Hansen (MH) or also called leprosy is a granulomatous infection of the skin and peripheral nerves caused by *Mycobacterium leprae* (M. leprae).

This bacteria is unique because it attacks the peripheral nerves which can cause impaired sensory, motor and autonomic nerve function, damage to the nerves can cause disabilities that affect the quality of life of patients and result in poor stigmata in the community.[1]

MH disease is still a problem faced by most of the world community, especially in developing countries, and Indonesia is a contributor to MH after India and Brazil. This disease is thought to originate from Africa or Central Asia which then spread throughout the world through population movements, caused by war, colonization, trade between continents and islands. Based on the examination of human skeletons in Scandi-

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navia, it is known that MH sufferers are treated in Leprosaria in strict isolation. This disease was estimated to entered Indonesia in the IV-V century which was allegedly brought by Indians who came to Indonesia to spread their religion and trade.[2]

Peripheral nerve involvement is sometimes not detected, because nerve damage has occurred before clinical symptoms are seen, in this study, we examined the sensation disturbance in MH patients with Seminarian Weinstein Monofilament (SWM) examinations in the upper and lower extremities, where sensory nerve damage occurs earlier rather than damage to motor and autonomic nerve fibres. Sensory nerve damage causes disturbance of sensation, temperature and pain. Initial disturbance of temperature sensation, pain and touch occur together, but complete loss of tactile sensation occurs most recently compared to complete pain or temperature sensation.[3-6]

This research aims to find out factors which are related to the incidence of peripheral neuropathy in MH sufferers such as gender, age, education, occupation, marital status, MH's type, duration of illness with an examination of Seminarian Weinstein Monofilament upper and lower extremities. It is expected that the results of this study can be useful for doctors, paramedics, and Morbus Hansen's sufferers to find out the factors associated with the incidence of peripheral neuropathy in MH and as a basis for further research.

Methods

This study uses an analytic cross-sectional design with consecutive data collection. The study was conducted in November 2018 at the Werkudara Hall of Sanglah Hospital. Inclusion criteria in this study are patients who have been diagnosed with MH from the Dermatology and Venereology Clinic of Sanglah Hospital with a minimum age of 7 years, cooperated, patients are willing to become participants in the study by signing informed consent. Furthermore, subjects who met our inclusion and exclusion criteria performed a Seminarian Weinstein Monofilament (SWM) examination. The subject was said to experience a sensation disturbance if the Monofilament test >0.07 gram on the palm and > 0.4 gram on the sole.

Data analysis using SPSS version 21.0 for Windows consists of descriptive and analytic analysis. Descriptive analysis was carried out to determine the characteristics of the sample. To determine the correlation of numerical variables (a), we use the Spearman correlation test, and for categorical variables (b) we use the coefficient correlation test. The strength of correlation (r) is expressed in terms of values and interpretations as follows: $r = 0,000-0,199$ (very weak), $r = 0,20-0,399$ (weak), $r = 0,40-0,599$ (moderate), $r = 0,60-0,799$ (strong), $r = 0,80-1,000$ (very strong). Significance level (p) is stated that there is a significant correlation between the two variables tested if $p < 0,05$.

Results

Data collection has been carried out on patients with Morbus Hansen found 30 research subjects for descriptive studies. All respondents who met the inclusion criteria in Sanglah Hospital Health Services found male research subjects (50%) compared to female subject groups (50%) (Table 1) Mostly aged 36-45 (33.3%) Characteristics of research subjects based on the level of education and work that has been undertaken, the majority of high school graduates (53.3%) and private workers (53.3%) have been married (66.7%) with the most illnesses 25 months and over (36.7%), and most of them had Multibacillary type (70%).

Discussion

The correlation between age and marital status with the incidence of MH peripheral neuropathy in the upper limb was significant, where age ($r = 0.365$) ($p = 0.047$) and marital status ($r = 0.525$) ($p = 0.001$), the results of the study showed that most age groups experienced peripheral neuropathy disorders through monofilament examination are aged 35-45 years, as many as ten people (33.3%) of the 30 people studied. The results of this study indicate that the least age group is the 7-11 year age group in the examination of upper limb monofilament. These results are not following research conducted by Bakker on the effect of age on peripheral neuropathy, the least group being the age group above 45 years.⁸ Instead, the results of this study resemble the results of several previous studies which mention the risk of neuropathy disorders increases with age. Pimentel MIF reports that age 50 years and above most experience peripheral neuropathy, although in general older age is more at risk of developing neuropathy due to a low cellular immune system, it cannot be concluded that there is a relationship between age and peripheral neuropathy disorders, because the number of study samples between age groups not evenly distributed. The existing data reflected the structure of the population of MH sufferers according to age.^{9]}

The relationship of marital status with the incidence of peripheral neuropathy in MH is still unclear because based on Anna T. Van't Noordende's research, found that 48% of the community members think that people affected by MH disease will face marital problems, but not much is known about the nature of the marriage effect with the severity of MH due to the level of stress that occurs in patients with MH that can suppress the cellular immune system in patients who are already married thereby increasing the risk of peripheral neuropathy in MH.^{10]}

The correlation between duration of illness and the incidence of peripheral neuropathy in the lower extremities was significant ($r = 0.476$) ($p = 0.008$) according to the MIF experimental study. MH patients with peripheral neuropathy at the start of treatment had a 1.75 times risk of experiencing the same disorder after treatment. However, the study concluded that clinical improvement in the severity of MH patients during treatment was higher than before treatment.^{9]} According to Rosenberg, most of the study samples showed disturbance of touch sensation long after treatment, seven years later, presumably due to chronic immune processes in MH patients who did not respond optimally with steroid therapy and experience progressive neurological dysfunction when corticosteroid doses are lowered, and they suggest giving more aggressive, higher doses and more extended periods of corticosteroids or in combination with other immunosuppressive drugs such as cyclosporine, so in this study, the relationship between duration of illness with the incidence of peripheral neuropathy in MH correlates with the success of MDT therapy in MH patients.^{11]}

The correlation between the level of education with the incidence of peripheral neuropathy in the upper and lower extremities is not significant, this is not yet clear, but based on the results of Nursalam research in 2005, it is known that most MH sufferers have sufficient knowledge (48.1%) while only 22 with good knowledge, 2%, based on frequency distribution data, it is known that most respondents have a good level of knowledge with no MH occurring as many as 22 people (84.6%), based on the Chi-Square test results obtained $p = 0.007$ ($p < 0.05$). The results showed that there was a significant relationship between the level of knowledge and the incidence of MH, while the OR

Table 1 Distribution of demographic characteristics of research subjects.

Demographic Characteristic	Total	Percentage (%)
Sex		
Male	15	50
Female	15	50
Age		
7 - 11 years	1	3,3
12 - 16 years	0	0
17 - 25 years	3	10
26 - 35 years	9	30
36 - 45 years	10	33,3
46 - 55 years	2	6,7
56 - 65 years	4	13,3
65 years above	1	3,3
Education		
Elementary school	8	26
Secondary school	3	10
High school	16	53,3
University	1	3,3
Uneducated	2	6,7
Occupation		
Housewives	4	13,3
Not working	7	23,3
Private employee	16	53,3
Student	2	6,7
Factory worker	1	3,3
Marital status		
Married	20	66,7
Not married	10	33,3
Duration of sickness		
0-6 months	6	20,0
7-12 months	8	26,7
13-18 months	4	13,3
19-24 months	1	3,3
25 months above	11	36,7
Morbus Hansen Type		
Paucibacillary	9	30
Multibacillary	21	70

Table 2 Correlation between factors that influence the incidence of MH peripheral neuropathy examined by Semmes Weinstein monofilament in upper extremities,

Variable	R	P
Age	0,365	0,047* a
Duration of Sickness	0,310	0,096 a
Sex	0,089	0,624 b
Marital status	0,525	0,001* b
MH type	0,097	0,593 b
Occupation	0,477	0,065 b
Education	0,339	0,420 b
<i>a: Spearman Correlation, b: Coeficient Correlation *p<0,05</i>		

Table 3 Correlation between factors that influence the incidence of MH peripheral neuropathy examined by Semmes Weinstein monofilament in lower extremities.

Variable	R	P
Age	0,253	0,178 a
Duration of sickness	0,476	0,008* a
Sex	0,259	0,142 b
Marital status	0,125	0,488 b
MH type	0,281	0,109 b
Occupation	0,344	0,402 b
Education	0,256	0,717 b
<i>a: Spearman Correlation, b: Coeficient Correlation *p<0,05</i>		

value was 0.182 so that it could be seen that respondents who had low knowledge had a risk of 0.182 times greater exposure to MH than respondents who had high knowledge. OR values <1 and IK 95% do not include the number 1, meaning low knowledge is one risk factor for MH events but not necessarily a risk factor for peripheral neuropathy in MH. This is influenced by the level of education, the majority of which have low education or elementary school, whereas senior high school is well educated, education is the process by which a person develops positive attitude, attitude and forms of behaviour that contain positive values in society, the higher the level of education, the easier it is for someone to receive information so that the more a lot of knowledge possessed. Conversely a lack of education will hamper one's development of new values that are introduced. Patients see the symptoms of MH but assume the symptoms that appear are other skin diseases such as tinea versicolor, so there is less action to check themselves into health services and not a few of them experience delayed treatment, resulting in MH neuropathy complications that result in disability.[12]

The correlation between the type of work and the incidence of neuropathy MH was not significant in this study where the most types of work are private employees and farmers only one person, and this may be directly proportional to the research conducted in Nepal by Ghimire in 1996 dividing respondents into two categories, namely "manual worker" and "non-manual worker" obtained 64% results, the manual workers experience a secondary disability caused by leprosy reaction events allegedly more likely to occur in rough workers who spend much energy, and excessive labour expenditure will have an impact on decreasing stamina so that people with leprosy can experience physical stress and there is a change in the immune response that can trigger ENL and peripheral neuropathy on MH.[12]

Summary

In this study, peripheral neuropathy of the upper limb in MH correlates with age and marital status, whereas in the lower extremity it correlates with the duration of illness.

Disclosure Statement

There were no financial support or relationships between the authors and any organization or professional bodies that could pose any conflict of interests.

Ethics Committee Approval

This study has ethical clearance number: 2386 / UN.14.2 / KEP / 2017 issued by the Research Ethics Commission of FK Udayana University / Sanglah Hospital Denpasar.

Competing Interests

Written informed consent obtained from the patient for publication of this case report and any accompanying images.

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