

Telma Leonel Ferreira^IRosicler Rocha Aiza Alvarez^{II}Marcos da Cunha Lopes
Virmond^{III}

Validation of the questionnaire on hand function assessment in leprosy

ABSTRACT

OBJECTIVE: To validate the psychometric properties of the questionnaire on hand function assessment in leprosy.

METHODS: Study conducted with a convenience sample of 101 consecutive patients in Brasília (Central-Western Brazil), from June 2008 to July 2009. The individuals were adults affected by leprosy, with impairment of the ulnar, median and radial nerves. Interobservers and intraobserver reproducibility was analyzed through successive interviews, and construct validity was analyzed through association between age, clinical form of leprosy, duration of nerve injury, grip and pinch strength measured with a dynamometer, sensibility test performed with Semmes-Weinstein monofilaments and manual ability assessment using the Jepsen test of hand function. Pondered kappa coefficient was calculated and a Bland-Altman plot was constructed to assess the reproducibility of the instrument. For internal consistency, Cronbach's alpha coefficient was utilized. Pearson's correlation coefficient was calculated and a multiple regression model was used.

RESULTS: The pondered kappa values for interobservers and intraobserver assessments ranged from 0.86 to 0.97 and from 0.85 to 0.97, respectively. The value of Cronbach's alpha coefficient was 0.967. Pearson's correlation coefficient showed an association ($p < 0.001$) among duration of nerve injury, grip and pinch strength, cutaneous sensibility and mean score in the Jepsen Test. The mean score of the questionnaire on hand functional assessment in leprosy was associated with operational classification of leprosy, duration of nerve injury, grip strength, cutaneous sensibility and manual ability ($p < 0.0001$ for the model as a whole).

CONCLUSIONS: The questionnaire on hand functional assessment in leprosy presents almost perfect interobservers and intraobserver reproducibility, high internal consistency and correlation with operational classification of leprosy, duration of nerve injury, grip strength, cutaneous sensibility in the hands and manual ability.

DESCRIPTORS: Questionnaires, utilization. Leprosy, complications. Reproducibility of Results.

^I Rede SARAH de Hospitais de Reabilitação. Brasília, DF, Brasil

^{II} Universidade de Brasília. Brasília, DF, Brasil

^{III} Instituto Lauro de Sousa Lima. Bauru, SP, Brasil

Correspondence:

Telma Leonel Ferreira
SQS 103, Bloco E
70342-050 Brasília, DF, Brasil
E-mail: telleonel@pop.com.br

Received: 8/4/2011
Approved: 12/1/2011

Article available from: www.scielo.br/rsp

INTRODUCTION

Leprosy is endemic in Brazil. In 2009, 37,610 new cases were diagnosed, which configures it as a public health problem.^{a,b}

^a Ministério da Saúde (BR), Departamento de Atenção Básica. Manual de prevenção de incapacidades. 3.ed. Brasília (DF); 2008. Introdução; p.9-10.

^b Ministério da Saúde (BR). Coeficiente de detecção geral de casos novos de hanseníase Brasil e estados, 2009. Brasília (DF): Portal Saúde; 2010.

Leprosy-related neuropathy results in muscular weakness or paralysis, deformities, decrease in manual ability with consequent functional reduction, limitation in the performance of activities, decrease in work ability and social isolation.^{6,15}

Data on these restrictions are scarce, which hinders the planning of actions that prevent limitations in the performance of daily activities and promote rehabilitation.^{20,c}

Hand function assessment in the performance of daily activities may reflect the person's degree of independence and direct the healthcare team's instructions and interventions. The *Questionário de avaliação funcional das mãos em hanseníase* (AFMH – Questionnaire on hand function assessment in leprosy) was designed taking into account the influences and repercussions that limitations and disabilities produce on the daily life of the affected person, as well as the scarcity of specific instruments to analyze their hand function (Annex).⁷ This instrument can aid the functional assessment of the hands of adults with diagnosis of leprosy and isolated or associated lesion of the ulnar, median and radial nerves to investigate the difficulties encountered in the performance of daily activities. The questionnaire is compact, low-cost, easy and quick to answer and can be used in the different centers that assist people affected by leprosy.

This study aimed to validate the psychometric properties of the AFMH questionnaire.

METHODS

Validation study with a convenience sample of 101 consecutive patients carried out in Brasília (Central-Western Brazil), from June 2008 to July 2009. In the study, 57% of men and 43% of women were interviewed, with mean age of 47.7 years (SD = 13.3, min = 18, max = 74 years), 97% right-handed and 3% left-handed. They had been diagnosed with leprosy (19% paucibacillary and 81% multibacillary) and isolated or associated lesion of the ulnar, median and radial nerves, and were followed up at a specialized outpatient clinic.

People who lived outside Brasília were excluded from the study, as well as those who presented some psychiatric, cognitive or behavioral disorder defined in the medical record or informed by the medical team, patients with upper-limb amputation, pain in the upper limbs that affected the performance of the tests and any associated diseases that affected the hands and did not derive from the lesion of the ulnar, median and radial nerves.

In the interviews, the AFMH questionnaire was read to the interviewee. The instrument's objectives (to survey difficulties related to the hands' movements in the performance of daily activities in the 30 previous days) were clarified, as well as the code used in the answers. The code 0 to 3 was used according to the level of difficulty to perform the questioned activity. Value 4 represented the missing values.

Time spent to answer the questionnaire was recorded in a chronograph and written down on a form (Annex).

The individuals affected by leprosy were interviewed on the same day by two observers who had been previously trained to administer the questionnaire, with an interval of at least three hours between the interviews, to verify the interobservers reproducibility of the AFMH questionnaire. Intraobserver reproducibility was analyzed through the questionnaire's answer to the researcher, with a minimum interval of seven days after the first interview.

The construct validity of the AFMH questionnaire was verified based on tests of grip^{2,12} and pinch^{1,12} strength measured with a dynamometer, sensibility test performed with Semmes-Weinstein monofilaments^{d,e} and the test of hand function proposed by Jebsen et al.¹⁰ This complementary assessment was carried out by the researcher in charge in the first moment of the interview.

The stimulated areas in the cutaneous sensibility test were the thenar region, the palmar aspect of the proximal phalanx of the index finger, the distal phalanges of the thumb and index finger for the median nerve; the hypothenar region, the palmar aspect of the distal and proximal phalanges of the little finger for the ulnar nerve. The radial nerve was stimulated in the dorsal region of the hand, corresponding to the area of the first dorsal interosseous muscle. The choice of these parts was based on the innervation areas specific to the dermatome of the corresponding nerve.⁴

The finer filament perceived in each specific territory was recorded on a form. The territory with the worst sensibility was considered and recorded to each specific nerve for the statistical correlation. The arbitrary value of 400 was attributed to the cutaneous territories with anesthesia and the mean of the values of each territory corresponding to the ulnar, median and radial nerves was calculated to each hand in the calculation of Pearson's correlation coefficient.

The mean of the values of the seven subtests for each hand was estimated in order to calculate Pearson's correlation coefficient in the hand function test of Jebsen et al.¹⁰

^c Ministério da Saúde (BR), Secretaria de Vigilância em Saúde, Departamento de Vigilância Epidemiológica. Manual de prevenção de incapacidades. Brasília (DF); 2008. Como identificar dificuldades nas atividades da vida diária e na inserção social; p.95.

^d Camargo LHS, Baccarelli R. Avaliação sensitiva na neuropatia hanseníase. In: Duerksen F, Virmond M, editors. Cirurgia reparadora e reabilitação em hanseníase. Bauru: Centro de Estudos Dr. Reynaldo Quagliato; 1997. p.75-83.

^e SCORRI. Estesiômetro: kit para testes de sensibilidade (Semmes-Weinstein monofilamentos). Bauru; s.d.

The 5% significance level was considered. The reproducibility of the AFMH questionnaire was analyzed through the construction of the Bland-Altman plot and through the calculation of the pondered kappa coefficient to each question in the verification of the agreement between the interobservers and intraobserver assessments. Cronbach's alpha coefficient was calculated to evaluate the instrument's internal consistency. Pearson's correlation coefficient was calculated to analyze the construct's validity and the criteria adjusted R^2 , Mallow's C_p , Akaike Information Criterion (AIC_p), Schwarz Bayesian criterion (SBC_p) and the Mean Square Error (MSE) were utilized in the selection of the independent variables to compose the multiple linear regression model. Multicollinearity was observed and residual analysis was conducted with the construction of the normal probability plot (*QQ plot*) and of the residual plot according to the values estimated by the model. It was verified that they present Gaussian distribution and constant variance.

The database was constructed with the use of the software Microsoft Office Excel 2003. The statistical program that was employed in all the analyses was SAS 9.2 for Windows.

The project was approved by the Research Ethics Committee of the School of Health Sciences of Universidade de Brasília (process no. 061/2008).

RESULTS

Among the interviewees, 11% were unemployed, 22% were retired, 22% were on sick leave, 23% performed housework and 22% developed diverse activities (general cleaning services, agriculturalist, gardener, shop assistant, electrician, artisan, cabinet maker, cart porter, hairdresser, clerk, salesman, bricklayer, watchman, road technician, tradesman, tire repairer and student).

None of the individuals used orthosis to perform the daily activities.

The mean duration of nerve injury was 66.7 months ($SD = 90.8$, $min = 1$, $max = 480$) for the right hand and 82.5 months ($SD = 106.3$, $min = 1$, $max = 480$) for the left hand up to the date of the interview.

Approximately 4% of the individuals underwent surgery in the right upper limb, 5% in the left upper limb, 10% in the right and left upper limbs and 81% were not submitted to surgical procedures in the upper limb. Performed surgeries were ulnar nerve decompression, associated decompression of the ulnar and median nerve, and sequestrectomy of finger bones. The mean period of time elapsed between the date of the interview and right upper limb surgery was 43.6 months ($SD = 23.3$, $min = 3$, $max = 96$), and between the interview and left upper limb surgery, 50.3 months ($SD = 37.3$, $min = 6$, $max = 132$).

The sensibility test showed that the right ulnar nerve was injured in 8% of the people, the left one in 11% and both of them in 81%. The right median nerve was injured in 11% of the interviewees, the left one in 10%, both of them in 66% and 13% did not present injuries. The right radial nerve was injured in 12% of the individuals, the left one in 16%, both of them in 46% and 26% did not present injuries.

The mean time spent to answer the AFMH questionnaire was four minutes ($SD = 65$ sec, $min = 2$ min, $max = 9$ min).

Among the tasks that presented difficulties and were not present in the questionnaire, the following were mentioned: dressing ($n = 3$), threading a needle ($n = 3$) and carrying a load ($n = 4$).

Table 1 presents means, medians, standard-deviation, minimum and maximum values of the independent

Table 1. Measures of central tendency and of dispersion of the 101 performed tests. Brasília, Central-West Brazil, 2008-2009.

| Variable | Mean | Median | SD | Minimum | Maximum |
|---|-------|--------|-------|---------|---------|
| Right-hand grip (Kgf) | 21.32 | 20 | 14.71 | 0 | 60 |
| Left-hand grip (Kgf) | 18.54 | 19.50 | 13.08 | 1 | 53.50 |
| Right lateral pinch (Kgf) | 4.50 | 4 | 2.65 | 0 | 11 |
| Left lateral pinch (Kgf) | 4.26 | 3.50 | 2.78 | 0 | 12 |
| Right pulp-to-pulp pinch (Kgf) | 3.60 | 3 | 2.25 | 0 | 9.50 |
| Left pulp-to-pulp pinch (Kgf) | 3.52 | 3 | 2.26 | 0 | 9.50 |
| Right tripod pinch (Kgf) | 4.10 | 3.50 | 2.63 | 0 | 12.50 |
| Left tripod pinch (Kgf) | 3.97 | 3.75 | 2.49 | 0 | 12 |
| Mean score right hand Jebsen test (min) | 17.55 | 13.66 | 14.35 | 5.41 | 107.64 |
| Mean score left hand Jebsen test (min) | 21.79 | 18.80 | 11.94 | 6.42 | 66.44 |
| Mean score AFMH questionnaire | 1.11 | 1.22 | 0.71 | 0 | 2.58 |

AFMH: *Avaliação funcional das mãos em hanseníase*

variables grip strength, pinch strength (lateral, pulp-to-pulp and tripod), mean score of the Jepsen test and mean score of the AFMH questionnaire.

The measures of the pondered Kappa coefficient for the interobservers assessments showed values of 0.86 to 0.97 and for intraobserver assessments, 0.85 to 0.97 (lower limit of 95%CI: 0.77;0.94 and upper limit of 95%CI: 0.95;1.00 for the interobservers assessments). For the intraobserver assessments, the lower limit of 95%CI varied from 0.76 to 0.94 and the upper limit of 95%CI varied from 0.93 to 1.00.

The Bland-Altman plot presents the agreement of the result between the interviews conducted by the two evaluators (Figure 1) and by the researcher at different moments (Figure 2) using the mean score. Few points were outside the limit of the 95% confidence interval in the two plots and randomness of the points in the plots was observed.

The value of Cronbach's alpha coefficient showed that the AFMH questionnaire presents high internal consistency (0.969) and that no item of the instrument needed to be excluded from the model.

Table 2 shows the values of Pearson's correlation coefficients among the variables and the corresponding p-values.

Laterality did not interfere in the association among the hands variables. The measures obtained for the right

hand and for the left hand were strongly correlated; therefore, it was not necessary to employ the two measures separately. The measures of pinch strength and the measurements of cutaneous sensibility of the right hand and of the left hand were strongly correlated. The mean of the measurements of pinch strength was calculated for each hand, and of cutaneous sensibility, for each hand and the mean between the two.

Right dominance (97% of right-handed individuals) was chosen to be part of the multiple regression model, thus we used the means of the measures between the right hand and the left hand, as the majority of the injuries was bilateral.

With the utilization of the criteria adjusted R^2 , Mallow's C_p , AIC_p , SBC_p and the MSE, a model was developed with the independent variables age, operational classification of leprosy, duration of nerve injury, palmar grip strength, sensibility and manual ability.

Multicollinearity among the independent variables was not a problem; the value of the variance inflation factor to each variable was below 1.5. The independent variables associated items with different focuses.

The independent variables (age, operational classification of leprosy, duration of nerve injury, palmar grip strength, cutaneous sensibility and manual ability) were associated with the result of the mean score of the AFMH Questionnaire (Table 3).

Table 2. Correlation between variables according to the value of Pearson's coefficient and the corresponding p value. Brasília, Central-West Brazil, 2008-2009.

| Correlation between variables ^a | r |
|--|-------|
| Duration of injury in the right and left hand | 0.642 |
| Palmar grip strength in the right and left hand | 0.779 |
| Lateral and pulp-to-pulp pinch strength in the right hand | 0.917 |
| Lateral and tripod pinch strength in the right hand | 0.873 |
| Pulp-to-pulp and tripod pinch strength in the right hand | 0.917 |
| Lateral and pulp-to-pulp pinch strength in the left hand | 0.903 |
| Lateral and tripod pinch strength in the left hand | 0.881 |
| Pulp-to-pulp and tripod pinch strength in the right hand | 0.936 |
| Means among lateral, pulp-to-pulp and tripod pinch strength performed with the right and left hand | 0.728 |
| Sensibility assessment of the ulnar and median nerves for the left hand | 0.738 |
| Sensibility assessment of the ulnar and radial nerves for the left hand | 0.649 |
| Sensibility assessment of the median and radial nerves for the left hand | 0.842 |
| Sensibility assessment of the ulnar and median nerves for the right hand | 0.756 |
| Sensibility assessment of the ulnar and radial nerves for the right hand | 0.662 |
| Sensibility assessment of the median and radial nerves for the right hand | 0.721 |
| Sensibility assessment of the ulnar, median and radial nerves for both hands (mean score) | 0.678 |
| Mean score of the test of Jepsen et al in both hands | 0.648 |

r: Pearson's correlation coefficient

^a p < 0.001

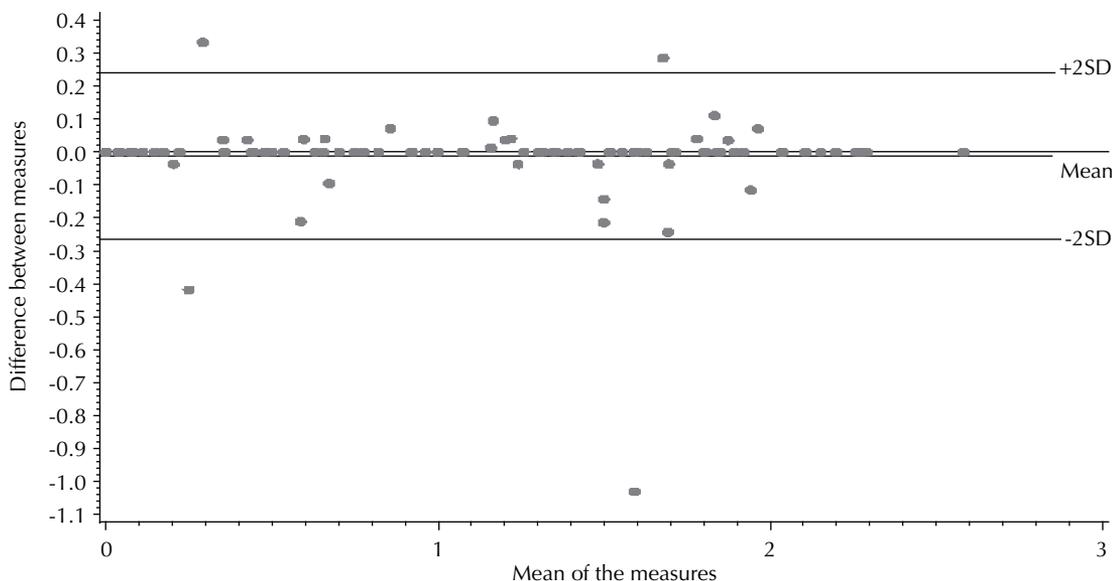


Figure 1. Mean score of the interobservers assessments (Bland-Altman plot). Brasília, Central-West Brazil, 2008-2009.

DISCUSSION

The AFMH questionnaire presents high internal consistency (0.969) and no item of the instrument needs to be excluded from the model.

There was practically no systematic difference between the interobservers and intraobserver assessments in the Bland-Altman plot and the two assessments tended to produce similar results. No systematic bias was found in the agreement. The interobservers reproducibility showed values slightly higher than the

intraobserver one, probably due to the fact that the interviews were performed on the same day. Some people could not wait for hours or return to perform the second interview.

The variables dominance and pinch strength (lateral, pulp-to-pulp and tripod) were not included in the multiple regression analysis model by the criteria adjusted R^2 , Mallows's C_p , AIC_p , SBC_p and MSE because they did not present statistical relevance when included with the other variables.

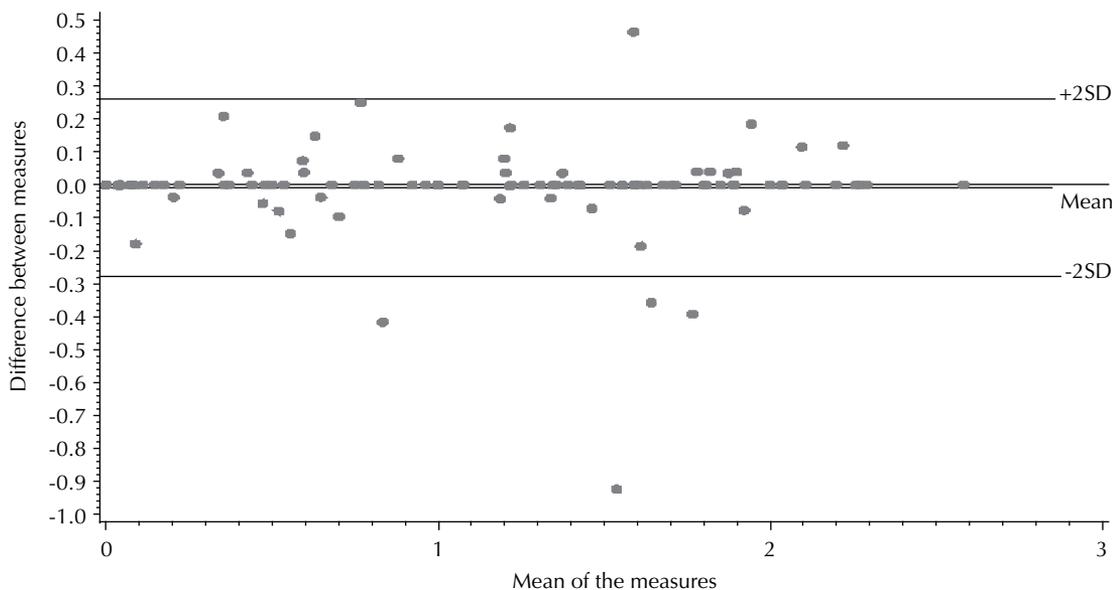


Figure 2. Mean score of the intraobserver assessments (Bland-Altman plot). Brasília, Central-West Brazil, 2008-2009.

Table 3. Result of the multiple regression analysis between the independent variables and the mean score obtained in the AFMH questionnaire. Brasília, Central-West Brazil, 2008-2009.

| Variable | df | Estimation of the parameter | | | |
|----------------------------|----|-----------------------------|----------------|---------|---------|
| | | Estimated parameter | Standard error | t value | p |
| Intercept | 1 | 0.88097 | 0.21268 | 4.14 | <0.0001 |
| Age | 1 | 0.00716 | 0.00397 | 1.80 | 0.0748 |
| Operational classification | 1 | - 0.28349 | 0.12425 | - 2.28 | 0.0248 |
| Duration of injury | 1 | - 0.00126 | 0.00058324 | - 2.16 | 0.0334 |
| Palmar grip strength | 1 | - 0.02081 | 0.00409 | - 5.09 | <0.0001 |
| Sensibility | 1 | 0.00133 | 0.00036782 | 3.63 | 0.0005 |
| Manual ability | 1 | 0.01545 | 0.00475 | 3.25 | 0.0016 |

For the entire represented model $p < 0.0001$, $R^2 = 0.5654$

Increasing age by one year corresponded to adding 0.00716 to the result of the mean score of the AFMH questionnaire in the multiple regression analysis. Age is an important confounding variable in the assessment of the associations and it was maintained in the model to prevent interference in the results.

Shiffman¹⁸ reports functional decline of the hands from the age of 65 onwards. To Hackel et al,⁸ the manual function analyzed by the test of Jebsen et al¹⁰ decreases to men and women aged 60 to 89 years. These data differ from the present study, in which the relation between the increase in the mean score of the AFMH questionnaire and the increase in age was not statistically significant. This may have occurred because the individuals' mean age was lower than in the two cited studies.

Leprosy classified as paucibacillary reduces the mean score of the AFMH questionnaire by 0.28349. Ramadan et al¹⁴ found higher frequency of physical deformities in people suffering from Virchowian leprosy (multibacillary) possibly due to the long duration of the disease and frequent reactions. To Croft et al,⁵ people with paucibacillary leprosy have less tendency to present impairment of the nerve function in relation to people with multibacillary leprosy. Saunderson et al¹⁷ followed up leprosy patients without physical deformities at the moment of the diagnosis and observed lower occurrence of neuropathy in people with paucibacillary leprosy in the first year, compared to those with multibacillary leprosy. In the present study, people with paucibacillary leprosy presented a reduction in the mean score of the AFMH questionnaire compared to people with multibacillary leprosy, which suggests less difficulty in the performance of the activities listed in the instrument.

Each month's increase in the duration of nerve injury implies a 0.00126 reduction in the mean score of the AFMH questionnaire. To Chen et al,³ functional impairment occurs as a consequence of the interaction among the deformity (alteration of the anatomical structure), contextual factors like the person's attitude towards the difficulties, and the capacity to adapt to the new

reality. As the duration of the nerve injury increases, the individual tends to adapt to the sequels and develop compensatory mechanisms to perform the activities, even if in a different way from the one used before the neural injury.

The questionnaires evaluate whether the person has difficulty in performing some activities, but they do not analyze how the tasks are executed.

People with longer duration of peripheral nerve injury reported greater facility to perform the activities listed in the AFMH questionnaire.

The addition of one kilogram-force to the assessment of palmar grip strength corresponds to a 0.02081 reduction in the result of the mean score of the AFMH questionnaire. Rajkumar et al¹³ report that palmar grip strength has an impact on the performance of daily activities of people suffering from leprosy. To Van Brakel et al,²¹ the use of a dynamometer can be added to the assessment to quantify muscular strength. The present study showed greater facility in the performance of the activities listed in the AFMH questionnaire for people with greater palmar grip strength.

To each increase in filaments' weight in the sensibility test performed with Semmes-Weinstein monofilaments, the mean score of the AFMH questionnaire increased by 0.00133. A study¹⁴ showed that the sensory system was more affected than the motor system of people suffering from leprosy. Authors state that the sensibility test performed with monofilaments can be used to detect physical disabilities and is capable of evaluating nerve function impairment in leprosy patients.^{11,22} The sensibility test carried out with monofilaments can reflect the severity of the neuropathy. The abnormalities in the parameters of sensitive conduction of the nerve are a predictor factor for the occurrence of physical disabilities.²¹ The present study found a relation between decrease in cutaneous sensibility and high values in the score of the AFMH questionnaire.

The increase of each second in the result of the hand function test of Jebsen et al¹⁰ corresponds to a 0.01545 increase in the result of the mean score of the AFMH questionnaire. Jarus & Poremba⁹ state that the hand function test of Jebsen et al¹⁰ can be used in hand function assessment, although it does not describe how the activity is performed. People who took more time to perform the tasks of the Jebsen test reported greater difficulty in performing the activities listed in the AFMH questionnaire in the present research.

The mean score of the AFMH questionnaire showed association with the tests of palmar grip strength performed with a dynamometer, sensibility test performed with Semmes-Weinstein monofilaments and with the hand function test of Jebsen et al¹⁰ used in the routine assessment of people with lesion in the ulnar, median and radial nerves. There is no specific questionnaire to assess hand function with isolated or associated injury of the ulnar, median and radial nerves in adults suffering from leprosy that has kept up with the technological advances.

The scales Green Pastures Activity Scale,¹⁹ Karigiri Activities of Daily Living Rating Scale (KADLRS)¹³ and Screening Activity Limitation and Safety Awareness⁶ have been elaborated to analyze the influence that the sequels produced by leprosy can have in the performance of daily activities. The instrument KADLRS contains activities that are not part of the habitual practice of the majority of the Brazilian adult population. The scales Green Pastures Activity Scale, Screening Activity Limitation and Safety Awareness and also the Activities of Daily Living Questionnaire (ADL Questionnaire)¹⁶ are not specific instruments to analyze hand function impairment, which is the aim of this study.

The AFMH questionnaire is a standardized instrument that enables the longitudinal follow-up and the successive comparison of the scores of the activities contained in the instrument. It is compact, easy to

answer and includes daily activities of different natures. Its administration is rapid (average of four minutes). The maximum time spent was nine minutes because some people explained the way in which they executed the activities and associated stories to the performed activities, although the interviewer tried to return to the focus of the interview. It is a low-cost instrument, it can be printed in one single page (front and back) and can be self-administered or read to the person affected by leprosy by any literate professional of the health-care unit; it does not need a specialized professional to administer it. Due to its low complexity and low operational cost, it can be used in primary care units.

The questionnaire can be used in centers specialized in providing assistance for people with neural injuries in the hands because it specifically analyzes hand function in people affected by leprosy with isolated or associated lesion of the ulnar, median and radial nerves. The functional assessment of the leprosy patient can be complemented by the utilization of a general questionnaire that includes questions related to the face and lower limbs.

The questionnaire can aid the follow-up of the neural function; the identification and quantification of hand-related physical disabilities, reflecting the person's independence level; the indication of orthoses and adaptive devices used to facilitate or enable the performance of daily activities; the provision of health education information by the healthcare team to the leprosy patient; and results evaluation after conservative interventions (drug therapy or physical therapy) or surgical interventions (neurolysis, neuroorrhaphy and tendon transfer). The AFMH questionnaire presents almost perfect interobservers and intraobserver reproducibility, high internal consistency and association with the parameters: operational classification of leprosy, duration of nerve injury, palmar grip strength, cutaneous sensibility and manual ability, when answered by adults with diagnosis of leprosy and isolated or associated lesion of the ulnar, median and radial nerves.

REFERENCES

1. Araújo MP, Araújo PMP, Caporrino FA, Faloppa F, Albertoni WM. Estudo populacional das forças das pinças polpa-a-polpa, tripode e lateral. *Rev Bras Ortop.* 2002;37(11-12):496-504.
2. Caporrino FA, Faloppa F, Santos JBG, Réssio C, Soares FHC, Nakachima LR, et al. Estudo populacional da força de preensão palmar com dinamômetro Jamar®. *Rev Bras Ortop.* 1998;33(2):150-4.
3. Chen CC, Granger CV, Peimer CA, Moy OJ, Wald S. Manual Ability Measure (MAM-16): a preliminary report on a new patient-centred and task-oriented outcome measure of hand function. *J Hand Surg Br.* 2005;30(2):207-16. DOI:10.1016/j.jhsb.2004.12.005
4. Chusid JG. Os nervos espinhais. In: Chusid JG, editor. *Neuroanatomia correlativa e neurologia funcional.* 18. ed. Rio de Janeiro: Guanabara Koogan; 1985. p.131-7.
5. Croft RP, Nicholls PG, Steyerberg EW, Richardus JH, Cairns W, Smith S. A clinical prediction rule for nerve-function impairment in leprosy patients. *Lancet.* 2000;355(9215):1603-6. DOI:10.1016/S0140-6736(00)02216-9
6. Ebenso J, Fuzikawa P, Melchior H, Wexler R, Piefer A, Min CS, et al. The development of a short questionnaire for screening of activity limitation and safety awareness (SALSA) in clients affected by leprosy or diabetes. *Disabil Rehabil.* 2007;29(9):689-700. DOI:10.1080/09638280600926587
7. Ferreira TL, Alvarez RRA, Virmond MCL, Araujo EA. Questionnaire to evaluate hand function with nerve lesions. *Hansen Int.* 2010;35(2):47-59.
8. Hackel ME, Wolfe GA, Bang SM, Canfield JS. Changes in hand function in the aging adult as determined by the Jebsen Test of Hand Function. *Phys Ther.* 1992;72(5):373-7.
9. Jarus T, Poremba R. Hand function evaluation: a factor analysis study. *Am J Occup Ther.* 1993;47(5):439-43.
10. Jebsen RH, Taylor N, Trieschmann RB, Trotter MJ, Howard LA. An objective and standardized test of hand function. *Arch Phys Med Rehabil.* 1969;50(6):311-9.
11. Khambati FA, Shetty VP, Ghate SD, Capadia GD. Sensitivity and specificity of nerve palpation, monofilament testing and voluntary muscle testing in detecting peripheral nerve abnormality, using nerve conduction studies as gold standard: a study in 357 patients. *Lepr Rev.* 2009;80(1):34-50.
12. Mathiowetz V, Weber K, Volland G, Kashman N. Reliability and validity of grip and pinch strength evaluations. *J Hand Surg Am.* 1984;9(2):222-6.
13. Rajkumar P, Premkumar R, Richard J. Grip and pinch strength in relation to function in denervated hands. *Indian J Lepr.* 2002;74(4):319-28.
14. Ramadan W, Mourad B, Fadel W, Ghoraba E. Clinical, electrophysiological, and immunopathological study of peripheral nerves in Hansen's disease. *Lepr Rev.* 2001;72(1):35-49.
15. Ruijs AC, Jaquet JB, Kalmijn S, Giele H, Hovius SE. Median and ulnar nerve injuries: a meta-analysis of predictors of motor and sensory recovery after modern microsurgical nerve repair. *Plast Reconstr Surg.* 2005;116(2):484-94. DOI:10.1097/01.prs.0000172896.86594.07
16. Rosen B. Recovery of sensory and motor function after nerve repair: a rationale for evaluation. *J Hand Ther.* 1996;9(4):315-27.
17. Saunderson P, Gebre S, Desta K, Byass P, Lockwood DN. The pattern of leprosy-related neuropathy in the AMFES patients in Ethiopia: definitions, incidence, risk factors and outcome. *Lepr Rev.* 2000;71(3):285-308.
18. Shiffman LM. Effects of aging on adult hand function. *Am J Occup Ther.* 1992;46(9):785-92.
19. Van Brakel WH, Anderson AM, Wörpel FC, Saiju R, Bk HB, Sherpa S, et al. A scale to assess activities of daily living in persons affected by leprosy. *Lepr Rev.* 1999;70(3):314-23.
20. Van Brakel WH, Saunderson P, Shetty V, Brandsma JW, Post E, Jellema R, et al. International workshop on neuropathology in leprosy: consensus report. *Lepr Rev.* 2007;78(4):416-33.
21. Van Brakel WH, Officer A. Approaches and tools for measuring disability in low and middle-income countries. *Lepr Rev.* 2008;79(1):50-64.
22. Van Veen NH, Roberts AE, Mahato ME, Velema JP. Evaluation of simplified tests for the diagnosis of nerve function impairment in leprosy: the Sensory Motor Screening (SMS) study. *Lepr Rev.* 2009;80(1):51-64.

Annex – QUESTIONÁRIO DE AVALIAÇÃO FUNCIONAL DAS MÃOS EM HANSENÍASE (Questionário AFMH)

Nome: _____ Registro Nº _____

Data Nasc: ____/____/____ Sexo (M) (F) Dominância (D) (E) (Ambidestro)

Telefone: _____

Profissão Atual: _____

Etiologia da Lesão do Nervo: () MHI () MHT () MHD () MHV

Tempo da Lesão do Nervo: _____

Cirurgia no membro superior após lesão do nervo: _____

| | | |
|-----------------------|--------------|---------------|
| Uso de Órtese () Não | | |
| () Sim | | |
| () Direito | () Esquerdo | () Bilateral |
| Tipo: | | |

| | | |
|---------------|---------------|---------------|
| Nervo Lesado | | |
| Ulnar | Mediano | Radial |
| () Direito | () Direito | () Direito |
| () Esquerdo | () Esquerdo | () Esquerdo |
| () Bilateral | () Bilateral | () Bilateral |

RESPONDA COMO VOCÊ REALIZA CADA
ATIVIDADE LISTADA ABAIXO

USE COMO REFERÊNCIA O ÚLTIMO MÊS

UTILIZE O CÓDIGO:

- 0 – Sem Dificuldade
- 1 – Pouca Dificuldade
- 2 – Muita Dificuldade
- 3 – Impossível (não consegue realizar a atividade)
- 4 – Não se Aplica (não faz parte das suas atividades de vida diária)

| Nº | Atividades | Data _/_/____ Código |
|--------------------------|---|----------------------------|
| Vestuário | | |
| 01 | Abotoar, desabotoar | |
| 02 | Abrir, fechar zíper | |
| 03 | Dar laço, amarrar cadarço | |
| 04 | Abrir, fechar fecho de corrente, pulseira | |
| * | | |
| Alimentação | | |
| 05 | Usar colher, garfo, faca nas refeições | |
| 06 | Descascar fruta, legume | |
| 07 | Segurar copo | |
| 08 | Levantar jarra, garrafa com mais de 1,5 litro | |
| * | | |
| Higiene pessoal | | |
| 09 | Escovar dentes | |
| 10 | Usar fio dental | |
| 11 | Barbear-se, depilar-se | |
| 12 | Cortar unhas | |
| * | | |
| Cuidados com a casa | | |
| 13 | Lavar louça | |
| 14 | Lavar roupa | |
| 15 | Torcer roupa | |
| 16 | Limpar chão com vassoura, rodo | |
| * | | |
| Escrita | | |
| 17 | Escrever com caneta, lápis | |
| * | | |
| Outros | | |
| 18 | Abrir, fechar com chave | |
| 19 | Abrir, fechar maçaneta de porta | |
| 20 | Abrir, fechar torneira | |
| 21 | Manusear nota de dinheiro | |
| 22 | Segurar-se em transporte coletivo | |
| 23 | Usar cartão magnético em caixa eletrônico | |
| 24 | Usar telefone celular | |
| 25 | Cortar com tesoura | |
| 26 | Usar martelo | |
| 27 | Folhear página de livro, caderno, revista | |
| 28 | Pegar objetos pequenos (moeda, grampo, agulha) em superfície plana (mesa, chão) | |
| * | | |
| Resultado final | | |
| Profissional Responsável | | |

* ATIVIDADE SUGERIDA PELO ENTREVISTADO
TEMPO GASTO PARA RESPOSTA: _____ segundos.