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# Intervention with a Pilates program in the primary health care of leprosy patients: an experimental study

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## SUMMARY

**OBJECTIVE:** The aim of this study was to evaluate the influence of a Pilates program on the perception of quality of life of leprosy patients suffering from physical disabilities and who are undergoing treatment or who have been discharged.

**METHODS:** This is an experimental study in which 48 participants were included; however, the final sample consisted of 5 participants. We performed a standardized and systematic dermatological–neurological examination to define the Eye-Hand-Foot score. Comparisons between preintervention and postintervention were performed using the paired t and Wilcoxon tests with a significance level of 0.05.

**RESULTS:** We did not find significant values for the quality-of-life outcome in the domains and skills observed. We identified a significant value for the level of physical activity after the intervention.

**CONCLUSIONS:** Quality of life between preintervention and postintervention with the Pilates program did not show significant improvement through self-report.

KEYWORDS: Leprosy. Public health. Primary health care. Exercise.

## INTRODUCTION

Leprosy affects peripheral nerves and skin and can generate important deformities and physical disabilities. Physical disabilities that may arise before, during, and after treatment are more common in multibacillary individuals in cases of large neural impairment. These disabilities become stigmatizing factors of society and cause exclusion, prejudice, fear, and low quality of life[1].

Follow-up is based on routine assessments, such as muscle strength testing and sensitivity in the eyes, hands, and feet. Thus, it is possible to measure the degree of impairment on a scale ranging from 0 to 2, in which 0=absence of alteration; 1=decrease in muscle strength in the eyes, hands, and feet; and 2=notable deficiencies. Diagnosis, treatment, and monitoring are performed by primary health care services with multiprotection care, guidance on the disease, and regular physical exercises[2].

In this context, Pilates program emerges as a way to complement the stages of treatment up to the postdischarge moment, by structuring itself in movements and strategies, guided by professionals, capable of improving the loss of sensitivity, providing group interaction, social reintegration, and improvement of self-esteem and quality of life. Since Pilates practice is used in interventions of numerous pathological conditions and has a large scientific contingent of recommendation sat in the world[3].

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However, it is still unclear in the scientific literature whether the physiological effects of Pilates contribute to the increase in the quality of life of patients affected by disabilities due to leprosy. Thus, the present study aims to evaluate the influence of a Pilates program on the perception of quality of life of leprosy patients affected by physical disabilities and who are undergoing treatment or who have been discharged.

The hypothesis of this study is that a Pilates program, in patients with different degrees of disability caused by leprosy, generates benefits that can be observed through the self-report of these patients.

## METHODS

This is an experimental study conducted in two Centros de Saúde da Comunidade (CSC) of Território Xerente 1 (Palmas, Tocantins, Brazil). All procedures were previously approved by the ethics committee on research with human Beings (code: 3251050).

The sample calculation was performed using the Software Ene, version 3.0, based on the detection of the minimum clinically important difference of 12.9 points for the Physical Health of the WHOQOL-Bref between preintervention and postintervention[4], assuming a standard deviation of 3.1 points. We consider a statistical power of 80% and alpha of 5% and estimate the minimum number of three participants.

Inclusion criteria were patients with disability due to leprosy, over 18 years of age, under treatment or discharged between 2018 and 2019, and who had as reference the CSC of Território Xerente 1 (Laurides Milhomen e Liberdade). Recruitment occurred after the identification of participants through the Notifica-SUS disease notification system.

We performed simplified neurological assessments, as recommended by the manuals of the Ministry of Health, such as muscle strength test, thermal, tactile, and painful evaluation, with the achievement of the Eye-Hand-Foot (EHF) score[5].

Evaluation of quality of life by the abbreviated versions of the WHO Quality of Life Instrument (WHOQOL-100) scale is adapted for Brazilians aged 18 to 59 years and the WHOQOL-Old for the elderly from 60. The scores were calculated using the syntaxes provided by WHO by converting them into scales from 0 to 100. Higher scores indicate a better perception of quality of life[6].

Socioeconomic and demographic data were classified according to the Brazilian Association of Research Companies[7]. We did a standardized and systematized dermato-neurological physical examination to define the EHF score of 8. The EHF score scales the severity of physical disability impairment in grade 1 or 2 for the eyes, hands, and feet segments and generates a score that can range from 0 to 2 on the left and right sides of each of these segments; and the final score ranges from 0 to 12. The higher the score, the greater the commitment in each of these segments[8]. The level of physical activity was measured using the International Physical Activity Questionnaire (IPAQ), a short version, validated for the Brazilian population by Matsudo et al.[9].

The Pilates program was conducted in a group, two times per week with 45-min sessions, supervised by a physical education professional experienced in the Pilates method, according to international guidelines[10]. The intervention took place for 12 weeks at the reference center of social assistance (May to November 2019). Each Pilates session was composed of stretching and muscle strengthening exercises in open and closed kinetic chains in the powerhouse system, which includes the abdominals, glutes, and paravertebral and lumbar[11].

### Statistical analysis

Statistical analysis was performed using STATA statistical package version 14.2. The normal age of the variables was verified by the Shapiro-Wilk test. The parametric variables were presented in mean and standard deviation and others in frequency and percentiles. For the comparative analysis of the preintervention and postintervention, the paired t-test and Wilcoxon test were used, both using $p<0.05$ as reference.

## RESULTS

Forty-eight participants who met the eligibility criteria were included. After four attempts, only 16 people attended the first week of the intervention with the Pilates program. Eleven participants were excluded for the following reasons: 1 due to worsening of the clinical picture and 10 for not attending the intervention. The final sample consisted of five participants affected by leprosy who had grade 1 or 2 disability. Socioeconomic, demographic, and clinical characteristics are presented in Table 1.

We did not find significant values, through the paired *t*-test, for the outcome of quality of life in the physical, psychological, social relations, and environment domains, nor for the observations such as sensory skills; autonomy; past, present, and future activities; social participation; death and dying; and intimacy (Table 2). In the evaluation of the level of physical activity, using the Wilcoxon test, we observed a significant value ($p=0.0522$) before and after the intervention.

Table 1. Socioeconomic, demographics, and clinical characteristics of the participants of the Centro de Saúde e Comunidade of Laurides Milhomen e Liberdade, Palmas (TO), 2019 (n=5).

| Variables | n (%) |
|---|---|
| Sex | |
| Male | 1 (20) |
| Female | 4 (80) |
| Racial classification | |
| White | 1 (20) |
| Black | 1 (20) |
| Brown | 3 (60) |
| Age (years) | |
| 41–60 | 2 (40) |
| 60 or above | 3 (60) |
| Average size of households | |
| 1 person | 1 (20) |
| 2 persons | 2 (40) |
| 3 persons | 1 (20) |
| 4 persons | 1 (20) |
| Employment relationship | |
| Autonomous | 1 (20) |
| Unemployed | 2 (40) |
| Retired | 2 (40) |
| Economic classification | |
| D-E | 4 (80) |
| B2 | 1 (20) |
| Clinical characteristics | |
| Dimorfa | 5 (100) |
| Disability | |
| Degree 1 | 4 (80) |
| Degree 2 | 1 (20) |
| Number of lesions | |
| <5 | 4 (80) |
| ≥5 | 1 (20) |
| EHF | |
| <6 | 2 (40) |
| ≥6 | 3 (60) |
| Affected nerves | |
| >1 | 5 (100) |

D-E: average income R$ 768,00; B2: average income R$ 4.852,00; EHF: Eye-Hand-Foot.

## DISCUSSION

We did not observe an improvement with statistical significance in the perception of quality of life in the comparison between preintervention and postintervention. However, there was an improvement in the physical domain and a worsening in the domain of the social relation according to the WHOQOL-Bref. There was an improvement in the facet social participation and worsening in facets sensory abilities and death and dying, as evaluated by the WHOQOL-Old. The physical activity level (NAF) of the participants obtained a statistically significant improvement.

The practice of physical exercises is initiated for various reasons, such as disease prevention, aesthetics, and physical, mental, and social well-being, but not everyone can combine this practice with their daily lives, leaving it aside in various phases of life. In the present study, only 33.3% began to participate in the Pilates program, a number that decreased to 10.4% at the end of the study[12].

The literature still has a scarcity of studies on this subject, and this makes it difficult to conduct a deeper discussion. However, certain barriers are presented to practice exercises in the face of pathological conditions, such as lack of time and energy, demotivation, and especially priority. This fact worsens even more due to issues such as economic class, confirmed in the present study, in which 80% of the participants belong to the economically disadvantaged class, due to the work routine to provide family maintenance[13].

Pilates practice brings important benefits over age and acts as an artifice capable of slowing physiological declines caused by aging, preventing chronic degenerative diseases, and promoting the readaptation of disabilities arising from other diseases, such as leprosy, helping the quality of life and social participation[3].

Although we did not find statistically significant improvements in the analyses of the perception of quality of life before and after the practice of Pilates, a fact that can be explained by the reduced number of the sample, according to the descriptions of Loureiro et al.[14], we can observe improvements in the physical domains and facet social participation, as well as the worsening of the observations for sensory abilities and death and dying.

Pain, physical disability, and physical inactivity are intrinsically related to a low assessment of the perception of quality of life of those affected by leprosy[15]. Thus, after the practice of physical exercises, it was possible to observe an improvement in the physical domain, maintaining a good evaluation, with mean values between 41 and 60.

Social participation, which refers to personal relationships, sexual activity, and social support of friends or groups of people, can generate different behaviors and emotions[16]. In this study, the social participation domain had a slight worsening

but remained with average values (41–60). On the other hand, the social participation facet evaluated in the elderly, despite the nonsignificant, obtained a small improvement.

Physical exercises performed in groups are more effective than compliments and advice, provide encouragement for the continuity of their practice, and promote a positive relationship among their practitioners. This strategy is seen as fundamental for individuals who are in the aging process because it provides more independence in performing cotidiana activities and autonomy, skills that are shaken by leprosy[16]. With aging, there is a decrease in the sensitivity of the body and the reduction of the physical capacity of individuals, a fact that is enhanced in leprosy patients since the disease decreased the sensitivity of the body and can cause pain and discomfort. This factor may explain the reduction of the sensory abilities facet, which nevertheless remained well evaluated. Multibacillary leprosy has a treatment proposed by the Ministry of Health of 12 months, and in its course, there may be type 1 and 2 reactions that may aggravate the clinical picture of the affected[8].

Analyzing the death and dying facets, we observed that it was the only one with an evaluation considered bad and that it also did not improve. This may be related to the aging process, due to decreased physiological capacity and the emergence of degenerative conical diseases, which decrease the quality and life expectancy of individuals[17].

The advent of technology has brought facilities to move through various means of transport; thus, currently less physical effort is made, increasing the number of physically inactive people. Physical inactivity, in addition to favoring the onset of diseases, can cause injuries to those associated with the fragility of the immune system and prognosis of leprosy[8]. In the present study, 80% of the individuals were insufficiently active at the beginning of the exercise program, which went to 40% physically active and 60% very physically active, an important fact that should be highlighted since the group was composed of people with grade 1 and 2 disabilities caused by leprosy.

This study has limitations that should be highlighted, such as small sample size and difficulty in adhering to recruits. Thus, new research is suggested to better understand the physiological adaptations of physical exercise in this population.

## CONCLUSION

The quality of life between preintervention and postintervention with the Pilates program did not show significant improvement through self-report.

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## ETHICS APPROVAL

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Table 2. Perception of quality of life before and after intervention with Pilates program in participants with leprosy of Centro de Saúde e Comunidade of Laurides Milhomen & Liberdade, Palmas (TO), 2019 (n=5).

| Domain | Pre | | Post | | p‡ |
|---|---|---|---|---|---|
| | Mean | SD(±) | Mean | SD(±) | |
| Physical* | 47.86 | 8.96 | 51.43 | 10.29 | 0.5862 |
| Psychological* | 56.00 | 13.87 | 57.00 | 10.37 | 0.7865 |
| Social relations* | 63.34 | 4.57 | 58.43 | 13.17 | 0.3961 |
| Environment* | 58.75 | 12.38 | 57.50 | 16.03 | 0.7865 |
| Sensory skills† | 58.33 | 13.01 | 54.17 | 3.61 | 0.4142 |
| Autonomy† | 56.25 | 6.25 | 54.17 | 3.61 | 0.3173 |
| Activities PPF† | 58.33 | 3.61 | 56.25 | 12.50 | 0.7815 |
| Social participation† | 54.17 | 3.61 | 62.50 | 27.24 | 0.4142 |
| Death and dying† | 37.50 | 6.25 | 35.42 | 3.61 | 0.3173 |
| Intimacy† | 60.42 | 7.22 | 60.42 | 3.61 | 1.0000 |

SD: standard deviation; *WHOQOL-Bref: WHO Quality of Life – scale abbreviated version; †WHOQOL-Old: World Health Organization Quality of Life for Older Persons; PPF: past, present, and future activities; ‡Paired t-test.

## AUTHORS' CONTRIBUTIONS

**AMB:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. **SCG:** Visualization, Writing – original draft, Writing – review & editing. **APS:** Validation, Visualization, Writing – original draft, Writing – review, editing. **FRPQ:** Visualization, Writing – original draft, Writing – review & editing. **ESM:** Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing.

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