Results of foot reflexotherapy in acute lower back pain of the nursing team: controlled randomized clinical test

Resultados da reflexoterapia na dor lombar aguda da equipe de enfermagem: ensaio clínico randomizado controlado

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ABSTRACT

BACKGROUND AND OBJECTIVES: Musculoskeletal disorder is characterized by changes in neuromuscular, tendinous and joint functions that impact the functionality of the affected areas, especially with pain. The intervention with reflexotherapy is a non-invasive alternative and allows instant control of acute occupational low back pain. The objective of this study was to describe the results of foot reflexology in the relief of acute low back pain related to the nursing staff job.

METHODS: Double-blind controlled clinical trial. Thirty-six effective participants were randomly assigned to one experimental andone control group. Reflexotherapy was applied for low back pain in the sample groups in two sessions with a 72-hour interval. Data collection was performed with the visual analog scale to assess pain before and after the interventions, and a questionnaire for low back pain at the beginning and end of the study. The data were analyzed with the following tests: Shapiro Wilk, for sample normality; Chi-square or Fisher's Exact, for the associationbetween categorical variables and t-test.

RESULTS: There was statistical significance with the foot reflexology in the relief of acute low back pain, with p=0.000 for the visual analog scale and the data of the questionnaire for low back pain p=0.0002.

CONCLUSION: Reflexotherapy showed to be effective in reducing the intensity of acute pain among nursing professionals in this study. The Brazilian Registry of Clinical Trials is RBR-5ndq22.

Keywords: Acute pain, Cumulative trauma disorders, Low back pain, Nursing team, Occupational risks, Reflexotherapy.

RESUMO

JUSTIFICATIVA E OBJETIVOS: O distúrbio osteomuscular é caracterizado por alterações nas funções neuromusculares, tendinosas e articulares, que provocam impacto na funcionalidade da área afetada e, principalmente, dor. A intervenção com a reflexoterapia é uma alternativa não invasiva que possibilita controle imediato da dor lombar aguda ocupacional. O objetivo deste estudo foi descrever os resultados da reflexoterapia podal no alívio da dor lombar aguda relacionada ao trabalho da equipe de enfermagem.

MÉTODOS: Ensaio clínico controlado, duplamente encoberto. Trinta e seis participantes efetivos foram randomicamente alocados em grupo experimental e controle. Aplicou-se a reflexoterapia para dor lombar nos grupos amostrais em duas sessões, com intervalo de 72 horas. A coleta de dados foi realizada com a escala analógica visual de intensidade na avaliação da dor, antes e depois das intervenções e questionário para lombalgia, no início e fim da pesquisa. Os dados foram analisados com os testes Shapiro Wilk, para normalidade da amostra; Qui-quadrado ou Exato de Fisher, para associação das variáveis categóricas e teste t.

RESULTADOS: Houve significância estatística com a reflexoterapia podal no alívio da dor lombar aguda, obtendo-se p=0,000, para a escala analógica visual, e nos dados do questionário para lombalgia p=0,0002.

CONCLUSÃO: A reflexoterapia mostrou-se eficaz na redução da intensidade dador lombar aguda dos profissionais de enfermagem, neste estudo. O Registro Brasileiro de Ensaios Clínicos é RBR-5ndq22.

Descritores: Dor aguda, Dor lombar, Equipe de enfermagem, Reflexoterapia, Riscos ocupacionais, Transtornos traumáticos cumulativos.

INTRODUCTION

Among the alterations in the health of the professional people who work in a hospital environment, one must highlight the work-related musculoskeletal disorders (WMSD), also known as cumulative trauma disorders. These disorders are changes in the functions of tendinous, muscle and bone structures within the body, whether or not associated to degenerative lesions promoted by inappropriate efforts, high demands placed on the body in functions performed, and repetitive movements during labor activities[1,2].

WMSD can affect several parts of the body, such as the regions of the upper limbs, the spine, lower limbs, and the lumbar region

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(common among workers in the nursing profession). This disorder can also trigger the expression of medical signs and symptoms such as fatigue, a heavy feeling, and, most importantly, pain[2]. The activities carried out by nursing professionals, within a hospital environment, can also cause fatigue and injury to the dorsal region, due to the routine tasks that require transport and mobilization of patients, characterized by repetition and uncomfortable mobility, often demanding effort on the lumbar region[1,3].

The low back pain caused by WMSD has been the object of study of many researchers. Pain is, in fact, a mechanism of defense, a warning of lesions or damage to tissues, making it easier to recognize and perceive any imbalances or diseases of the body[4]. The identification of this symptom in studies, usually collected with the application of questionnaires, puts into context the need for prophylactic intervention or even strategies for controlling health hazards from disorders arising from labor activities[3].

In this perspective, we decided to apply foot reflexotherapy, a non-invasive therapy used for health care and recommended for dysfunctions, acute and chronic disorders, and imbalance of body functions, as it improves the supply of oxygen, as well as the circulation of blood and nutrition of body tissues[5].

Reflexotherapy can be characterized by the stimulation of well-defined and localized points on the feet, hands, and ears, corresponding to organs, viscera, and systems, known as reflex points. This technique uses the theories of Reflexology (the suffix Logia, from the Greek Logos, means knowledge, an explanation of something, a study of something, while the prefix reflexo- means reflexes) and, when this knowledge is applied to health care, it requires the manipulation (clinical intervention) at the reflex points. This means that it is the therapeutic technique in itself, and for this reason, the term Reflexotherapy was coined[4].

In the light of this context, the objective of this study was to describe the results of foot reflexotherapy for the relief of work-related acute low back pain in the nursing team.

METHODS

This is a controlled, randomized, double-blind clinical trial, of the before/after type and quantitative in nature. This study is a result of the stage 1 of a research that, organized in two stages, is for inclusion in a master's dissertation.

The participants were professional nurses working in a hospital environment. The researchers and the collaborator in the study were qualified in the field of reflexotherapy and, prior to recruitment and intervention, received instructions regarding the application of the research protocol, bearing in mind the assurance of technical accuracy.

The publicity was made through notices scattered on notice boards throughout the Hospital, in the different sectors, in nursing departments, and the social media. The posters had images and text. The information was also available through Quick Response (QR Code), so that smartphone users did not need to write down the information.

The sampling was of the probabilistic type. The size of the sample was calculated using the software Open Source Epidemiological Statistics for Public Health (OpenEpi), version 3.03a, of the Rollins School of Public Health, at Emory University, Atlanta, USA. The sample calculations were based on the data obtained in a study conducted by Eghbali et al.[6] that evaluated the effects of reflexology on the intensity of chronic pain in nursing professionals from hospital units and observed an average pain score of 3.8800±0.9713 in the control group and 2.7200±0.8907 in the experimental group. Considering a confidence interval of 95%, power of 80%, this would mean a need for 11 patients in each group. With the addition of approximately 20% of cases in losses and refusals, the total sample size would be 27 patients.

The subjects were recruited in the hospital, by the researchers and the research collaborator, totaling 45 participants. All were randomized and then allocated either to the control group (CG) or the experimental group (EG). The study started with 28 participants in the CG and 17 in the EG. After the first session, 9 participants were excluded (5 dropped out, and 4 did not show up for the sessions after the first visit); all these were part of the CG. Thus, the study was completed with 36 participants, of whom 19 were in the CG and 17 in the EG.

This study was conducted between May and July 2016 and followed the diagram shown in figure 1.

The eligibility criteria were: a) being an active nursing professional; b) showing acute low back pain; c) absence of lesions, inflammatory processes, or infection on the feet. The exclusion criteria were: a) be on specific treatment for the relief of low back pain, with another complementary practice or participation in another study; b) presence of vascular disorders in the lower limbs, such as varicose ulcers and/or thrombosis.

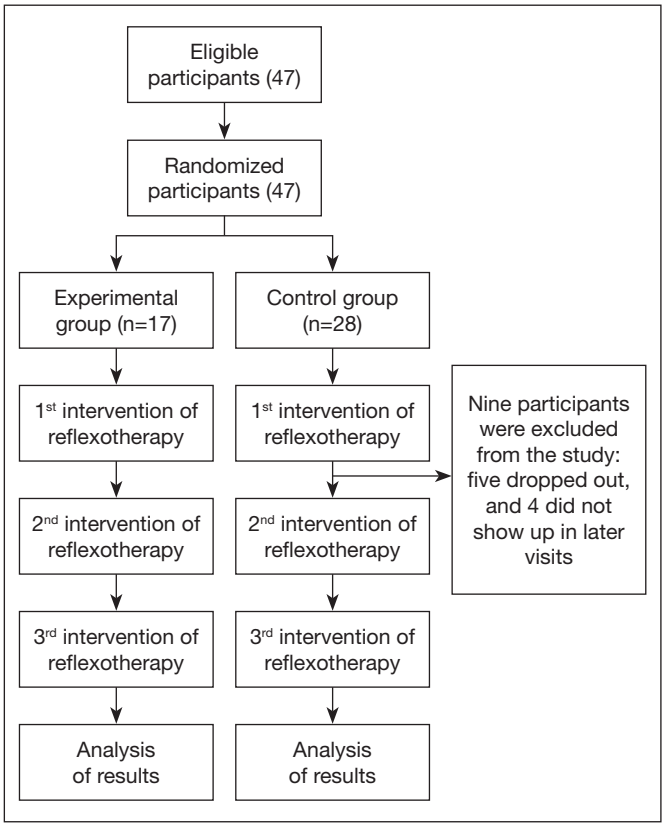

Figure 1. Diagram showing the flow of participants at each stage of the study
Source: Prepared by the authors.

This study follows the terms of the Declaration of Helsinki, of the World Medical Association (WMA), and is also compliant with Ruling No. 466/12 of the Brazilian National Health Council[7] which sets out the Guidelines and Regulatory Standards for Research with human subjects, and in compliance with the requirements set by the Free and Informed Consent Form (FICT) After the completion of the FICT, the randomization process started. A fellow, trained to help with the study, organized the randomized distribution of the participants into the groups. The procedure was as follows: papers with numbers from 1 to 100 were placed each in a sealed buff envelope. The participant would choose one of the envelopes containing a number, which was noted down on the researcher's organization roster so that the treatment could begin (this roster was filled in by the study collaborators).

The participants who chose the envelopes containing odd numbers received treatment A (specific reflexotherapy – EG), and the participants who chose envelopes with even numbers received treatment B (non-specific reflexotherapy – CG) for the treatment of acute low back pain. Participants and researchers were not aware of the group that they would be allocated to, also assuring secrecy between them. Only at the application of the procedure that the treatment was provided to the participant, by checking the number that he/she had been given (a necessary procedure to apply the protocol suitable for the EG or the CG).

The study was carried in three sessions: the first two sessions were for the application of the protocol, while the third was just for filling in the instruments for data collection. At the first meeting, before the intervention, the participant filled in the instruments for data collection: the sociodemographic questionnaire, and a specific questionnaire on low back pain[8]. Then, according to the protocol, the participant should be taken to the stretcher to receive the treatment. Also, at this stage, the participant would then identify the level of pain by marking on a visual analog scale (VAS) and right after received the reflexotherapy for low back pain. After the protocol, the participant was asked again to identify the level of pain by marking on the VAS, totaling 30 minutes per person. For each marking of pain level on the EAV, a new scale was used, with colored printing, so as not to influence the responses given at each application, and to ensure that the data was covered.

The total time between answering the questionnaire and receiving the reflexotherapy was about 40 to 50 minutes. The second session took place three days (72 hours) after the first application, following the same procedure. The time allocated for this session was 30 minutes. The third meeting was three days after

Reflexotherapy Protocol – Experimental Group	Reflexotherapy Protocol – Control Group
Cleansing the feet with ethyl alcohol and cotton wool	Cleansing the feet with ethyl alcohol and cotton wool
1. Spinal Area: The technique started with a firm movement (pressing and releasing with the thumb) throughout the reflex area of the spine. This maneuver started with the right foot. The movements were repeated eight times, in three repeated series.	1. Spinal Area: The technique started with a firm movement (pressing and releasing with the thumb) throughout the reflex area of the spine. This maneuver started with the right foot. The movements were repeated eight times, in three repeated series.
2. Hips and pelvic area: Handling with simultaneous pressure being exerted on the internal and the external part of the pelvic reflex region, with deep circular movements. At the same time, the thumbs massaged the plantar region around the heel bone. These movements were performed eight times, in three repeated series.	2. Hips and pelvic area: Handling with simultaneous pressure being exerted on the internal and the external part of the pelvic reflex region, with superficial circular movements. At the same time, the thumbs massaged the plantar region around the heel bone. These movements were performed eight times, in three repeated series.
3. Lumbar spine area: The whole lumbar reflex region was massaged (including the final part of the navicular – above the joint with the ankle bone, traveling all along the side of the body from the ankle bone through to the internal region of the heel bone). This was performed with deep circular movement and pressure on the whole reflex lumbar area (on the whole path of the lumbar spine), with firm top-down touches. These movements were repeated eight times, during three repeated series.	3. Lumbar spine area: The whole lumbar reflex region was massaged (including the final part of the navicular – above the joint with the ankle bone, traveling all along the side of the body from the ankle bone through to the internal region of the heel bone). This was performed with light circular movement and pressure on the whole reflex lumbar area (on the whole path of the lumbar spine), with soft top-down touches. These movements were repeated eight times, during three repeated series.
4. Back muscles area: A strong crushing movement was applied, but without generating any discomfort, using the palms of the hands, pressing the reflex region of the back muscles. In this movement, the participant's toes were positioned against the therapist's thumb (which was positioned in the midline of the sole of the foot). The movements were repeated eight times, in three repeated series.	4. Back muscles area: A light crushing movement was applied, with a superficial touch, using the palms of the hands, pressing the reflex region of the back muscles. In this movement, the participant's toes were positioned against the therapist's thumb (which was positioned in the midline of the sole of the foot). The movements were repeated eight times, in three repeated series.
5. Lumbar spine and sciatic nerve: firm pressure on the plantar region of the calcaneus (including the posterior region of the ankle bone and extending to the distal part of the tibia). These movements were performed eight times, in three repeated series.	5. Lumbar spine and sciatic nerve: light pressure on the plantar region of the calcaneum (including the posterior region of the ankle bone and extending to the distal part of the tibia). These movements were performed eight times, in three repeated series.
6. Finalizing the technique: a strong crushing movement with both hands, from the reflex region of the thorax down to the reflex region of the lumbar spine and pelvis, including the whole region around the calcaneus. These movements were performed eight times, during three repeated series. All the procedures were performed on both feet. First, on the right foot, and then on the left.	6. Finalizing the technique: a light crushing movement with both hands, from the reflex region of the thorax down to the reflex region of the lumbar spine and pelvis, including the whole region around the calcaneus. These movements were performed eight times, during three repeated series. All the procedures were performed on both feet. First, on the right foot, and then on the left.

Figure 2. Study protocol
Source: Prepared by the authors.

the second session when the patients were asked just to fill in the questionnaire for low back pain and the VAS. There was no intervention with the protocol in this case. The time allocated for this session was 5 minutes. The times for the intervention were scheduled in advance with the nursing professionals.

The materials used for the application of the protocol were cotton wool, ethyl alcohol at 70% (for cleaning the feet), and a disposable paper sheet to cover the stretcher for the participants to lie on and to place the instruments for data collection (VAS, questionnaires for low back pain, and sociodemographic questionnaire).

The total duration of the study for each participant was nine days. The time and the periodicity were based on a clinical study that evaluated the effects of reflexotherapy on chronic low back pain in hospital settings[6]. The reflexology map[9] applied to identify the reflex points and areas is of Brazilian origin (Figure 2).

This study was conducted in a hospital in Southern Brazil, under the approval of the Research Ethics Committee, in 2016, under number 1,512,978.

Statistical Analysis

For the statistical analysis, a database was prepared using a Microsoft Excel spreadsheet that was later exported to the SPSS software, version 20.0. The results were summarized as absolute (n) and relative (%) frequencies for nominal variables, the mean and standard deviation for numerical variables. The Shapiro-Wilk test was used to test the normality of the sample. The Chi-Square test or Fisher's Exact Test was applied to calculate the degree of association among the variables. As the distribution of data showed to be parametric, the t-test was used to evaluate the differences in the means of the intensity of the acute low back pain before and after the foot reflexotherapy. The level of significance was $p<0.05$ for a confidence interval (CI) of 95%.

RESULTS

Among the participants of the study, 88.9% (32) were female, and 11.1% (4) were male. With regard to weekly workload, 50% of the participants (18) mentioned a working week of 30 hours; 2.8% (1) 36 hours; 22.2 (8) 40 hours; 2.8% (1) 48 hours; 2.8% (1) 50 hours; 16.7% (6) 60 hours, and 2.8% (1) 70 hours per week. Considering the number of working hours per week, distributed in hours per day, we see that 50% (18) worked 6 hours per day; 25% (9) 8 hours per day; 22.2% (8), 12 hours per day, and finally 2.8% (1) worked 14 hours per day. Of the professionals who participated in the study, 38.9% (14) worked in Hospitalization Units; 30.6% (11), in Internal Medicine; 16.7% (6), in the Outpatient Treatment Centre; 8.3% (3) in the Research Centre; and 5.6% (2) in the Emergency Area.

In the analysis of the categorical variables of both groups, the result obtained was p=0.026 for daily hours of work and p=0.062 for the weekly workload. In the analysis regarding the work units of the professionals, we obtained p=0.003.

Regarding the sociodemographic characteristics of the participants in the EG, the mean age was 48.76±9.82 years; the average weekly workload of 38.12±8.67 hours with an average working time of 7.65±1.90 hours per day. The time on the job showed a mean of 23.35±12.30 years, while the time working in the specific sector was 17.67±9.46 years. Commuting time to get to work and to return home showed a mean of 38.53±24.28 minutes.

In the CG, the sociodemographic characteristics showed a mean age of 37.05±8.56 years. The weekly workload an average of 40.84±14.92 hours, with the average working day of 8.42±3.09 hours. The mean of the time on the job was 13±8.55 years in the profession, and in that sector, the mean was 9.37±6.66 years. The CG also showed that the commuting time from home to work and vice-versa was 40 to 53 minutes.

In general, the mean age of the groups was 42.58±10.81 years, assuming a weekly workload of 39.56±12.27 hours and a mean of 8.06±2.59 of daily working activities. The time on the job in the profession showed a mean of 17.89±11.59 years, while the mean of the time working in the specific sector was 13.33±9.04 years. The commuting mean was 39.58±22.72 minutes.

Regarding the immediate results obtained with the VAS after the application of the reflexotherapy, we observed that the CG started with a mean of 4.42±1.77 (p=0.53) for pain intensity, while the EG showed a mean of 4.75±1.48 for pain intensity (p=0.14). After the first intervention with the reflexotherapy, the CG showed a mean of 4.05±1.75 for pain intensity, and the EG a mean of 0.82±1.18. The immediate statistical difference between the data before and after the first intervention was p=0.008; for both groups p=0.000.

In the second session (72 hours after the first), the CG showed a mean of 4.53±1.50 for pain intensity with p=0.07, and immediately after the intervention,, the mean was 4.26±1.44, p=0.180. In the EG, there mean for the intensity of pain was 3.41±1.50 before the intervention. After the intervention, the mean was 0.24±0.43, statistically with p=0.000.

The data obtained from the questionnaire for low back pain[7] were used to describe the immediate effect from the 1st to the 9th day of the study. As a result, we confirmed an increase in the mean of the intensity of the low back pain in the CG (Figure 3), which started with a mean of 38.26±3.533 of pain intensity and ended with 41.84±3.636, giving a final p=0,0101. Regarding the EG, the low back pain started with a mean of 40.00±4.264 and ended at 20.76±3.064, p=0.0002.

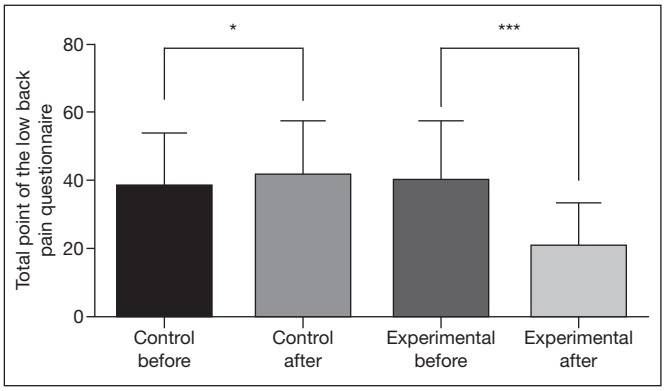

Figure 3. Total score of the low back pain questionnaire according to the sample reflexology groups.
T-test for paired samples. * p=0.0101; *** p=0.0002.
Source: Prepared by the authors.

DISCUSSION

The results showed that the application of foot reflexotherapy has contributed significantly to the relief of the acute low back pain related to the work activities of the nursing team, both immediately and mediately. The result converges towards the theory that the stimuli provoked by the reflexotherapy in nerve endings corresponding to the organs and systems of the body, lead to effects such as alleviation of the pain symptoms, as well as other health conditions such as anxiety, stress, insomnia, promotion of well-being, and relaxation[4,11,12].

Pain has a negative impact on the quality of life and on the performance of some professional activities, having a direct effect on productivity, attention, and the quality of the service rendered[1,13]. Specifically, acute pain has the physiological function of warning and defending the body against lesions, infections, and other symptoms, and for this reason, pain plays an important role in the preservation of life[4]. Thus, the applicability of the reflexotherapy to relieve the intensity of low back pain has allowed us to think about incentives for the applicability of the technique[4,15], in the acute phase, to stop the pain from progressing from acute to chronic stages[14].

The protocol applied in the EG showed a significant difference in the reduction of pain intensity in all interventions. This result may be attributed to the difference in the intensity of the reflexological touch promoted in the points and areas, as all procedures with the CG were carried out with a soft and superficial touch, while in the EG the manipulation was firm and deep. Experts in the area say that gentleness of movements, firmness of pressure, and confidence in the manipulation in the reflexotherapy are essential to obtain good results[4,5,15].

There was also statistical significance considering daily working hours (p=0.026) and the work unit (p=0.003), which led us to think that the exposure to repetitive movements is more likely to have an impact on the daily working time than the actual job time (in years)[2,13]. Work activities that often require an inadequate posture for assistance, including administration of drugs, patient preparation and care with hygiene and comfort, among others[3,13], are factors that cause a predisposition to the development of WMSD.

In the light of the evidence that repetitive movements may, indeed, generate pain and lesions quite quickly, we consider that the foot reflexotherapy could be an alternative for immediate intervention, to help with pain relief, as well as the prevention and control of pain, and the recovery and promotion of health[3,12]. These are preventive actions and procedures that encourage the care of the nursing professionals, providing better working conditions for the nursing profession[1,3]. In addition, making a therapeutic intervention to improve the general health of the professionals also means lower costs incurred by the institution regarding new hires, staff replacement, work overload of the professionals, and, as a result, a reduction in occupational hazards[2,12].

Despite the interest that the professionals have shown in participating in this study, unforeseen work situations were limiting factors for the application and development of the study. Even though the sample size was small, this study showed that the foot reflexotherapy intervention protocol, as a non-pharmacological therapy, showed significant results for the relief of acute low back pain. New controlled clinical trials, with more participants, are necessary for further discoveries and new contextualization of the results.

CONCLUSION

In the scope of this study, the foot reflexotherapy showed statistical significance in reducing the work-related acute low back pain of the nursing team working in a hospital. Both the immediate and mediate results obtained with the use of different instruments, ensure the efficacy of reflexotherapy, right from the first moments of intervention.

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REFERENCES

1. Jellad A, Lajili H, Boudokhane S, Migaou H, Maatallah S, Frih ZB. Musculoskeletal disorders among Tunisian hospital staff: prevalence and risk factors. Egypt Rheumatol.2013;35(2):59-63.
2. Martins EA, Correa CS, Vidal PC. Doenças osteomusculares relacionadas ao trabalho com destaque aos profissionais da área de enfermagem. Rev Perspect Ci. Saúde. 2017;2(2):107-18.
3. Alvim CC, Souza MM, Gama LN, Passos JP. Relação entre processo de trabalho e adoecimento mental da equipe de enfermagem. Rev. Fluminense de Extensão Universitária 2017;7(1):12-6.
4. Avelino CA, Medeiros GM. Aplicação do STIPER em pontos da reflexologia podal em casos de dor lombar. Cad Naturol Terap Complem. 2013;2(3):13-20.
5. Peña LI, Medeiros GM. Os efeitos da reflexoterapia podal na capacidade aeróbica máxima - VO2máx - em atletas de futsal feminino da categoria adulta. Rev Bras Futsal Futebol. 2017;9(34):320-6.
6. Eghbali M, Safari R, Nazari F, Abdoli S. The effects of reflexology on chronic low back pain intensity in nurses employed in the hospitals affiliated with Isfahan University of Medical Sciences**.** Iran J Midwifery Res. 2012;17(3):239-43.
7. Brasil. Ministério da Saúde. Conselho Nacional de Saúde. Resolução n. 466, de 12 de dezembro de 2012. Aprova diretrizes e normas regulamentadoras de pesquisas envolvendo seres humanos. Brasília, Diário Oficial da União, 12 de dezembro de 2012.
8. Monnerat E Pereira SJ. Validação e confiabilidade de um Questionário para dor lombar. Fit Perf J. 2009;8(1):45-8.
9. Medeiros GMS. O poder da argila medicinal: princípios teóricos, procedimentos terapêuticos e relatos de experiências clínicas. Blumenau, SC: Nova Letra; 2013. 185p
10. McCullough JE, Liddle SD, Sinclair M, Close C, Hughes CM. The physiological and biochemical outcomes associated with a reflexology treatment: a systematic review. Evid Based Complement Alternat Med. 2014;2014:502123.
11. Silva NC**,** Chaves Éde C, de Carvalho EC, Carvalho LC, Iunes DH. [Foot reflexology in feet impairment of people with type 2 diabetes mellitus: randomized trial. Rev Lat Am Enfermagem. 2015;23(4):603-10. English, Portuguese, Spanish.
12. Embong NH, Soh YC, Ming LC, Wong TW. Revisiting reflexology: concept, evidence, current practice, and practitioner training. J Tradit Complement Med. 2015;5(4):197-206.
13. Massuda KC, Muzili NA, Lima DF, Taciro C, Oliveira Júnior SA, Martinez PF. Incidence of low back pain according to physical activity level in hospital workers. Rev Dor. 2017;18(1):8-11.
14. Martelli A, Zavarize SF. Nociceptive pathways of pain and its impact on activities of daily living. Uniciências. 2013;17(1):47-51.
15. Silva AI, Neto GA, Freitas IA, Almeida LS, Cruz MC, Santana ME. Reflexoterapia como técnica de relaxamento para profissionais em centro de terapia intensiva. Ciência, Cuidado e Saúde. 2017;16(4):1-5.