Effect of Reflexology on Pain and Quality of Life in a Patient with Rheumatoid Arthritis

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Abstract: Patients with rheumatoid arthritis (RA) face considerable physical, social and emotional disabilities. In this chronic disease, for which a cure is not yet available, improving patients' health, quality of life and reduce pain is of the utmost concern. The purpose of this work was to measure the effect reflexology has on pain and quality of life (QOL) in a patient with rheumatoid arthritis. Using an 8-week course of reflexology treatments were given to a patient who has RA. A quasi experimental research design was used with 2- month follow-up. The study was conducted in the outpatient clinic of the RA Departments at Zagazig University Hospitals. On 39 female adult patients diagnosed as having RA without deformity of bones or destruction of joints. The exclusion criterion was the presence of any other chronic illness that may affect patient's QOL as diabetes, ischemic heart disease, chronic obstructive pulmonary disease, and stroke. Perceived pain and QOL were assessed using three validated outcome measures: Bio-socio-demographic and disease (RA) characteristics, the Rheumatoid Arthritis Quality of Life (RAQOL) questionnaire, the Pain Assessment Questionnaire (Numerical Rating Scale) and Health assessment questionnaire (HAQ). The study results revealed that, improvements in patients' QOL, pain and health status at the post-intervention phase and at the follow-up phase. Satisfaction QOL scores had moderate statistically significant negative correlations with the duration of illness throughout the study phases, while the scores of the importance of QOL had weak to moderate statistically significant negative correlations with age and duration of illness. On the other hand, the poor health status scores had moderate statistically significant positive correlations with age and duration of illness throughout the study phases, while pain had no correlation with either of them. The study concludes that hands and feet reflexology applied to rheumatoid arthritis patients is effective in reducing their pain, improving their QOL and their total health status, and these positive impacts are not affected by patient's age and duration of illness. Therefore, reflexology must be considered as a complementary treatment modality in rheumatoid arthritis. It should be introduced to nursing and medical students, and in postgraduate staff development programs. Further research is recommended for the long-term effects of this treatment modality in terms of pain and disablement. Research may also extend to assess the effectiveness of as a useful modality in geriatric care and for patients with other chronic conditions.

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1. Introduction

Rheumatoid Arthritis (RA) is an ongoing, progressive auto-immune disease that affects about 1% of the general population (Palferman, 2003; Helmick et al., 2008; Rheumatoid Arthritis Fact Sheet, 2010). It affects women three times more than men (American Medical Women's Association, 2011). It is mainly a disease of the joints of the body with episodes of painful inflammation, but may also affect other organs of the body and can result in the destruction of joints, disability, and in severe cases, life threatening complications (Chorus et al., 2003). The onset of RA can occur at any age and affects women three time more than men. In general, the younger a person is when he or she develops rheumatoid arthritis, the more rapidly that disease progresses. About 10% of people with the disease become severely disabled. In addition, life expectancy may be shortened by about 3 to 7 years, and those with severe forms of RA may die 10-15 years earlier than expected due to possible life threatening complications (National Institutes of Health, 2006; Helmick et al., 2008).

There is no cure for RA, but with early recognition and treatment, it is possible to minimize joint damage and complications of the disease. The main symptoms, disability and pain, the variability of disease-activity, alternating between improvement and exacerbation, and the chronic nature of the disease cause numerous problems which affect the quality of life. Active participation by the patient in their therapy can help to improve the disease process and its impact in terms of health results (Holman and Lorig, 2004). Because of the progressive chronic nature of the disease, treatment usually needs to be continuous, even lifelong in some cases (Jakobsson

and Hallberg, 2002). The most successful treatment plans usually use a multipronged approach, including; pain relief, buffered aspirin, salicylate medications, hydrotherapy, meditation, and mind-body exercise (British Medical Association, 2000; Gharate, 2007).

The use of complementary and alternative medicines (CAM) has increased in conventional healthcare settings (Ernst and Fugh-Berman, 2002; Pagan and Pauly, 2005). The fear of medication side-effects and desire for symptom relief are possible reasons for the increasing use of CAM by patients (Vincent and Furnham, 1999; Ross et al., 2002). With consumer interest in CAM, nurses have increasingly incorporated these modalities into their practice. For example, reflexology has been widely used in fields such as midwifery, orthopedics, neuroscience and palliative care (Stephenson et al. 2003). However, many CAM modalities lack scientific evidence to support their efficacy and safety.

The supposed theoretical support for reflexology has been developed since ancient Chinese and Egyptian times (Wang et al., 2008). It is performed using the thumb and forefinger to apply pressure to specific areas on the feet that have been claimed to correspond to the internal organs, glands and body parts (Wang et al., 2008). It is different from foot massage in that it involves more superficial contact, deeper pressure on certain parts of the foot, and resembles a caterpillar-like movement (Rose, 2006). It has been claimed that by pressing the 'reflex zones', energy blocks disturbances such that calcium, lactate or uric acid crystals are reabsorbed and later eliminated – a process referred to as 'detoxification.' It has also been suggested that reflexology may help relieve stress and tension, improve blood flow, and promote homeostasis (Wang et al., 2008).

Anecdotal evidence has shown that reflexology is beneficial in many conditions such as pre- and postnatal discomfort, pain, migraine and chronic obstructive pulmonary disease (Stephenson et al. 2003, Wilkinson et al. 2006). Other therapeutic effects, such as strengthening the immune system, improving sleep quality, and wound healing have also been claimed (Xavier, 2007). Reflexology has also been offered to cancer patients to improve the adverse physical and psychological symptoms associated with the illness or its treatments (Hodgson, 2000; Stephenson et al, 2000; Ross et al., 2002; Wright et al., 2002; Quattrin et al., 2006). In addition, the human touch accompanied by reflexology offers care and attention for patients, and this psychological comforting has been reported as one of its primary benefits (Gambles et al, 2002). However, patients' reports of benefits from reflexology may be influenced by bias in the lay literature or limited information about the use and effectiveness of the intervention (Montbriand, 1994). As reflexology has become popular in nursing practice, its effects on pain and quality of life in a patient with rheumatoid arthritis need to be evaluated.

Significance of the study

The prevalence rate of RA in Egypt is not well documented. However, by extrapolation using the worldwide reported prevalence of 1%, about 800000 Egyptians may be affected. Moreover, about 10% of people with the disease become severely disabled. In addition, their life expectancy may be shortened due to possible life threatening complications. Therefore, the magnitude and severity of the disease are high. Since there is no cure for RA, early recognition and treatment are important to minimize joint damage and complications of the disease. The use of non-pharmacological treatment modalities as reflexology may help in reduce pain and improve the quality of life of these patients.

Aim of the Study

The aim of this work was to measure the effect reflexology has on pain and quality of life (QOL) in a patient with rheumatoid arthritis. The research hypotheses were that the QOL of patients with RA, their health status, and pain sensation will demonstrate statistically significant improvements after application of the reflexology intervention.

2. Subjects and Methods

Research design:

A quasi experimental research design was used with 2- month follow-up.

Research setting:

The study was conducted in the outpatient clinic of the RA Departments at Zagazig University Hospitals.

Subjects:

The subjects of this study consisted of 50 patients. The inclusion criteria were being female adult patient diagnosed as having RA without deformity of bones or destruction of joints. The exclusion criterion was the presence of any other chronic illness that may affect patient's QOL as diabetes, ischemic heart disease, chronic obstructive pulmonary disease, and stroke.

Tools for data collection:

Four different tools were used to collect data about QOL, health assessment, and pain. These were included in a structured interview questionnaire form that included the following sections.

Section I:
Bio-socio-demographic and disease (RA) characteristics as age, marital status, level of education, occupation, residence, monthly income, as well as the duration of the disease and management.

Section II:
This consisted of the Arthritis Quality of Life Questionnaire sheet version IV *(Ferrans & Powers, 1998).* It is the most recent version composed of 70 questions, for assessing health-related QOL. The tool assesses four subscales of QOL: health and functioning, social and economic, psychological/spiritual, and family. Each subscale has six items on a 6-point scale which are assessed twice: once for satisfaction with the item, and once for the importance of the item. The scale for satisfaction is: very dissatisfied, moderately dissatisfied, slightly dissatisfied, slightly satisfied, moderately satisfied, and very satisfied, which are scored from 1 to 6 respectively. The scale for importance is: very unimportant, moderately unimportant, slightly unimportant, slightly important, moderately important, and very important, also scored from 1 to 6 respectively. A higher score means more QOL satisfaction and higher perception of importance.

Section III:
This section included the Health Assessment Questionnaire (HAQ-DI), which assesses upper extremity fine movements, lower extremity locomotors activities, and other activities of both upper and lower extremities. Scoring takes into account the use of aids and devices or assistance from another person. The tool has 20 items in eight categories of functional activities during the past week: dressing, rising, eating, walking, hygiene, reach, grip, and usual activities. Each category contains at least two specific sub-category questions. For example, under the category "walking," patients are asked about their ability to walk outdoors on flat ground and to climb up five steps. Scoring of the HAQ-DI is modeled after the American Rheumatism Association/ American College of Rheumatology functional classes *(Hoch Bergm et al., 1992; Bruce and Fries, 2005).* For each item, there is a four-level response set scored from 0 to 3, with higher scores indicating more disability (0 = without any difficulty; 1 = with some difficulty; 2 = with much difficulty; and 3 = unable to do). The highest sub-category score determines the value for each category, unless aids or devices are used. The category scores are then averaged into an overall HAQ-DI from zero to three. A higher score points to more disability.

Section IV:
This consisted of a Numerical Rating Scale where the user has the option to verbally rate pain severity on scale from 0 to 10; zero indicates absence of pain, while 10 represents the most intense pain possible *(Ware et al., 1988; Kagee, 2001; McGill, 2009).*

The reflexology intervention:
Reflexology therapy is not massage, and it is not a substitute for medical treatment. Source: The reflexology manipulations in this intervention have been adapted from the techniques taught in David Vennells' book entitled Healing Hands: Simple and practical reflexology techniques for developing good health and inner peace (*David Vennell 2007).* A reflexology session involves pressure treatment that is most commonly administered in foot therapy sessions of approximately 20 minutes in duration. The foot therapy may be followed by a brief 15-minute hand therapy session and 5 minute for video film on reflexology treatment. No artificial devices or special equipment are associated with this therapy. If the part of the body corresponding to the reflex area is out of balance then a degree of tenderness will be felt in the foot when pressure is applied. Treatment to all of the reflex areas in both feet takes about 40 minutes and during this time the patient is sitting in a comfortable, reclining position with the feet raised. Treatment is not applied to inflamed or painful joints. After receiving a massage treatment, the patient is instructed to drink water to eliminate toxin and lactic acids developed during the massage process.

Content validity and reliability:
It was established by a panel of two expertises who reviewed the instruments translation from English version to Arabic and back to English the differences between expertises were calculated and proved high inter reliability (r=89).

Pilot Study:
A pilot study was conducted on five RA patients from the study setting to check and ensure the clarity, applicability, relevance, and feasibility of the tools, to identify the difficulties that may be faced during the application, and to estimate the time needed for data collection. Then modifications of the tools were done to reach to the finalized form. Subjects who shared in the pilot study were not included in the main study sample.

Administrative design and ethical considerations:
To carry out the study, the necessary approvals were obtained from the Head of outpatient Department, and from the General Director of the

Zagazig University Hospitals. Letters were issued to them from the Faculty of Nursing, Zagazig University explaining the aim of the study in order to obtain permission and help. The study protocol was approved by the pertinent official authorities at the Faculties of Nursing and Medicine, Zagazig University. Oral informed consents were secured from each subject to participate after explaining the nature, purpose, and benefits of the study. Participants were informed that participation is voluntary, with no obligation to continue against will. Confidentiality and anonymity were ensured. The study maneuvers would improve participant's health, with no potentials of harmful effects.

Study maneuver:

The researchers met with participants who gave their consent and were willing to comply with the entire study protocol and interviewed them individually in the outpatient clinic. The researchers started to apply the intervention and educate the subjects on how to perform reflexology treatment. Teaching included giving a good therapeutic foot and hand massage, massaging own feet and hands for self healing, and stress management. Also, they were advised to comply with the medications prescribed by their physicians. The researchers scheduled times for attending to the clinic on Saturday, Monday, and Wednesday of each week (days for females in outpatient clinic) for physiotherapy, exercises, and reflexology treatment. They encouraged participants to attend regularly three times per week for two weeks these 40-minute sessions. They also ask the patients to perform these exercises and reflexology regularly at home. Follow-up assessment was done after 8 weeks. Data collection extended over a period of one year from June 2009 to June 2010. Available patients (39 patients) who fulfilled the inclusion and exclusion criteria were assigned to implemented nursing intervention three times per week. While patients can not received nursing intervention three times per week excluded from the study.

Statistical analysis:

Data entry and statistical analysis were done using SPSS 14.0 statistical software package. The non-parametric Kruskal-Wallis was used for multiple group comparisons of quantitative data as normal distribution of the data could not be assumed. Pearson correlation analysis was used for assessment of the inter-relationships among quantitative variables. Statistical significance was considered at p-value <0.05.

Limitations of the study:

The researchers were faced with many logistic problems and spent much effort to convince and promote the objectives of the study. Drop out cases: the total subjects number at the pre, intervention and post phases were 50 participants. While during the follow up phase 11 participants were dropout from the study for personal reasons and did not complete the study. The small number of the study sample of patients doesn't allow generalization of the result. Patients who suddenly get complications were excluded.

3. Results:

The study included 39 female patients in the age range from 19 to 70 years (mean±SD 45.9±11.8 years). As Table 1 shows, the majority were illiterate (79.5%), married (82.1%), and from rural areas (74.4%). The duration of their illness ranged between less than one to 16 years with mean±SD 4.4±4.0 years. About two thirds of them had regular follow-up (66.7%).

Table 1. Socio-demographic and diseases characteristics of patients in the study sample

	Frequency	Percent
Age (years):		
<50	24	61.5
50+	15	38.5
Range	19-70	
Mean±SD	45.9±11.8	
Marital status:		
Single	7	17.9
Married	32	82.1
Education:		
Illiterate	31	79.5
Educated	8	20.5
Job:		
Unemployed	35	89.7
Working	4	10.3
Living:		
Alone	2	5.1
With family	31	79.5
With children	6	15.4
Residence:		
Rural	29	74.4
Urban	10	25.6
Income:		
Sufficient	20	51.3
Insufficient	19	48.7
Duration of illness (years):		
<5	25	64.1
5+	14	35.9
Range	<1-16	
Mean±SD	4.4±4.0	
Regular follow-up:		
No	13	33.3
Yes	26	66.7

Table 2 show statistically significant improvements in patients' QOL at the post-intervention phase. The improvements were also sustained at the follow-up phase. The only domain that did not improve was that related to family, both for satisfaction and importance. As for the poor health status, the areas of statistically significant improvements were those related to walking ($p<0.001$), self-care ($p=0.01$), reaching ($p<0.001$), and pinching ($p=0.003$). The improvements also persisted during the follow-up phase in these areas. Also, the pain scale scores demonstrated a statistically significant decline at the post-intervention phase, with a slight increase at the follow-up phase ($p<0.001$).

Figure 1 summarizes the total scores of various parameters throughout the intervention phase. It demonstrates significant increase in the scores of QOL (satisfaction and importance) at the post-intervention phase, which was sustained at the follow-up phase. Also, the pain and poor health status scores showed decline at the post-intervention phase, which was maintained at the follow-up phase.

Concerning the correlations with patients' age and duration of illness, Table 3 indicates that scores of satisfaction with QOL had moderate statistically significant negative correlations with the duration of illness throughout the study phases, while the scores of the importance of QOL had weak to moderate statistically significant negative correlations with age and duration of illness. On the other hand, the poor health status scores had moderate statistically significant positive correlations with age and duration of illness throughout the study phases, while pain had no correlation with either of them.

Table 2. Changes in patients' QOL, health status, and pain scores throughout intervention phases

	Time						Kruskal Wallis Test	p-value
	Pre (n=39)		Post (n=39)		FU (n=39)			
	Mean±SD	Median	Mean±SD	Median	Mean±SD	Median		
QOL satisfaction:								
Health/functioning	2.9±0.9	2.50	4.2±0.4	4.10	4.2±0.4	4.10	55.69	<0.001*
Social/economic	2.7±0.8	2.60	3.4±0.6	3.30	3.4±0.6	3.30	36.16	<0.001*
Psychic./spiritual	3.4±0.7	3.30	4.7±0.3	4.60	4.7±0.3	4.60	56.82	<0.001*
Family	4.9±0.5	5.00	5.0±0.5	5.00	5.0±0.5	5.00	0.10	0.95
QOL importance:								
Health/functioning	4.2±0.9	4.40	4.9±0.5	4.90	4.9±0.5	4.85	14.50	0.001*
Social/economic	3.0±1.0	2.90	3.9±0.6	3.70	3.9±0.6	3.70	26.67	<0.001*
Psychic./spiritual	4.2±0.9	4.00	5.0±0.4	4.90	5.0±0.4	4.90	23.21	<0.001*
Family	5.0±0.9	5.20	5.3±0.5	5.40	5.3±0.5	5.40	3.41	0.18
Poor health status:								
Clothing/hygiene	1.7±0.8	2.00	1.6±0.8	2.00	1.7±0.7	2.00	0.29	0.87
Lifting	1.2±0.9	1.00	1.1±0.9	1.00	1.3±0.8	1.00	0.65	0.72
Eating	2.2±0.7	2.00	2.1±0.6	2.00	2.1±0.6	2.00	1.05	0.59
Walking	2.1±0.9	2.00	1.3±0.7	1.00	1.4±0.6	1.00	20.43	<0.001*
Self-care	1.9±1.0	2.00	1.4±0.6	1.00	1.4±0.6	1.00	8.70	0.01*
Reaching	2.2±0.7	2.00	1.6±0.5	2.00	1.6±0.5	2.00	22.57	<0.001*
Pinching	1.9±0.9	2.00	1.3±0.6	1.00	1.3±0.6	1.00	11.44	0.003*
Outdoor activities	2.7±0.5	3.00	2.6±0.5	3.00	2.6±0.5	3.00	1.77	0.41
Pain scale	6.7±1.0	7.00	5.3±0.8	5.00	5.5±0.6	5.00	44.75	<0.001*

(*) Statistically significant at $p<0.05$

Table 3. Correlations of patients' scores of QOL, pain, and health status and their age and duration of illness throughout intervention phases

	Pearson correlation coefficient					
	Pre		Post		FU	
	Age	Duration of Illness	Age	Duration of Illness	Age	Duration of Illness
QOL satisfaction	-.253	-.442**	-.166	-.418**	-.192	-.419**
QOL importance	-.638**	-.380*	-.561**	-.331*	-.592**	-.455**
Pain	-.094	.202	.017	.192	.055	.140
Poor health status	.581**	.510**	.631**	.486**	.609**	.480**

(*) Statistically significant at p<0.05; (**) Statistically significant at p<0.01

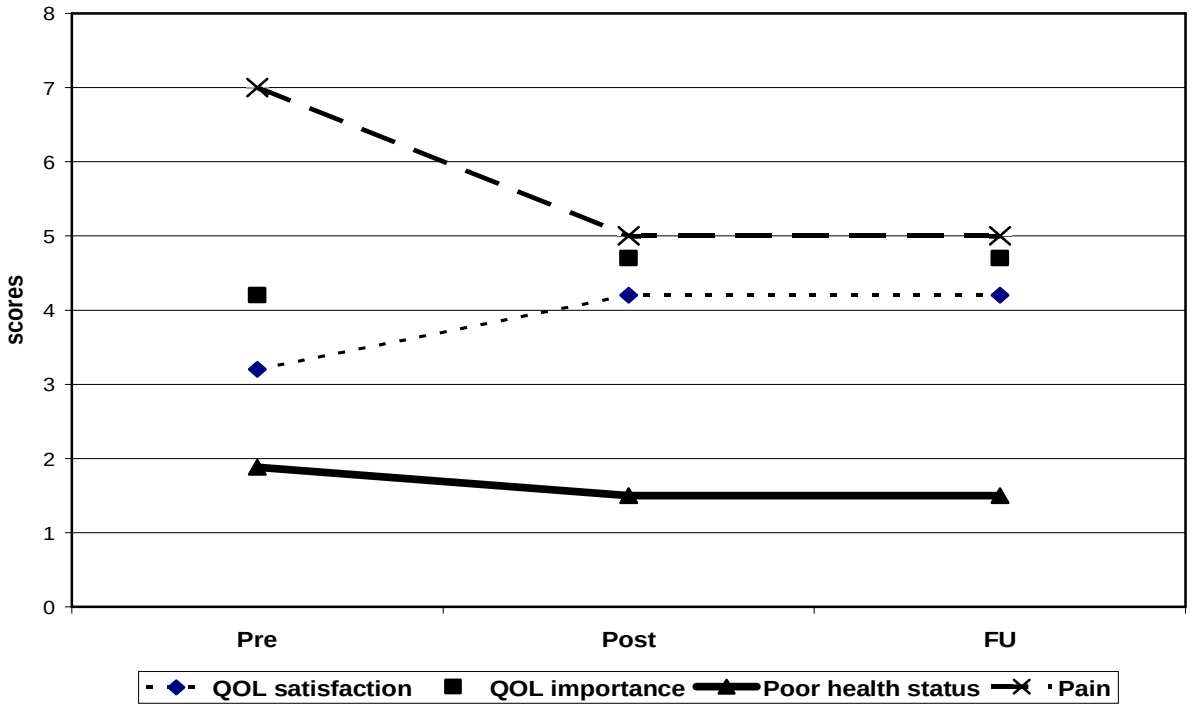

Figure 1. Changes in patients' total QOL, health status, and pain scores throughout intervention phases

4. Discussion:

The present study was carried out to test the research hypothesis that the QOL of patients with RA, their health status, and pain sensation will demonstrate statistically significant improvements after application of the reflexology intervention. The study findings lead to accepting this research hypothesis since they point to statistically significant increases in QOL scores and decreases in poor health status and pain scores after implementation of the reflexology intervention. The improvements were also sustained during the follow-up phase.

In the present study, the researchers used the Short-Form 36 (SF-36), Rheumatoid Arthritis Quality of Life (RAQOL) questionnaire, Health Assessment Questionnaire (HAQ), and visual analog scales for pain, all of them having high degrees of validity and reliability. Additionally, their validity was further confirmed in the study of rheumatoid arthritis in particular Bansback et al, 2008; (Linde et al, 2008). The authors compared the measurement properties of these tools and showed that all of them were able to discriminate between low, moderate, and severe rheumatoid arthritis activity as measured by the Disease Activity Score. These findings add to the validity of these instruments, and consequently support the results of the present study.

According to the present study findings, the application of reflexology had a positive impact on participants' QOL, health status, and pain scores throughout intervention phases. These improvements may be attributed to the process of reflexology as it

has been claimed that local finger pressure on reflex points on the hands or feet can influence the function of corresponding target organs to promote homeostasis, relaxation, and sense of human touch. Moreover, the reduction of pain intensity by reflexology may improve patients' independent involvement in personal and self-care, as well as social functioning, with further positive impact on self-esteem and QOL. Therefore, it has been recommended as a promising complementary therapy which can improve quality of life in persons with rheumatoid arthritis, and other conditions (Lynn, 2010).

The present study revealed improvements in all QOL domains except that related to family. This might be attributed to that the scores of this domain were the highest at the pre-intervention phase and in all subsequent phases. This implies that the family domain of QOL is the least affected by the disease. The finding is expected given the importance of the family solidarity and values in our community, where chronic disease patients are provided with more care in their families. In agreement with this, El-Mansoury et al. (2008), comparing loneliness among Egyptian and Dutch women with rheumatoid arthritis found that the role of the family in perceived loneliness is greater in Egypt than the Netherlands. The importance of family relations and functioning in rheumatoid arthritis has been addressed in previous studies **(**Cunha-Miranda et al, 2010; Strand and Khanna, 2010). Furthermore, Coty and Wallston (2010) in a study that examined the relationship of problematic social support and family functioning in women with rheumatoid arthritis. The study concluded that subjective well-being in women with rheumatoid arthritis is related to perceptions of family functioning and the amount and type of support received.

As regards health status, the reflexology intervention had significant positive impacts on certain areas but did not affect others. The areas that showed improvements were those of walking, self-care, reaching, and pinching, whereas the areas of clothing, eating, lifting, and outdoor activities were not affected. This might have two different explanations. The first is related to the severity of rheumatoid arthritis and the types of joints affected and their relation to these different activities. The other explanation is related to the proper application of reflexology and compliance with the instructions so that all functions are improved. In line with this explanation, Somchock (2006) mentioned that most of the studies addressing reflexology claimed that reflexology induced general relaxation evidenced by physiological changes has been reported, but whether its therapeutic effects were associated with pressure on specific foot zones remains unanswered because none of the researchers used an objective indicator to verify changes in blood perfusion in the foot zones pressed. Meanwhile, the differential effects of reflexology on functional aspects of rheumatoid arthritis patients of the present study are in congruence with Wang et al. (2008) who reported variations among reviewed studies regarding the efficacy of reflexology.

Patient's age and duration of illness may also be confounding factors affecting the impact of reflexology on QOL, and health status, and pain. The study findings revealed no effect of age or duration of illness on pain throughout the intervention phases. As regards QOL, it had statistically negative significant correlations with the duration of illness in both its aspects, and with patient's age in its importance aspect. This means that patient's QOL declines with increased age and duration of illness. Similarly, the scores of poor health status increase with age and duration of illness. The findings are quite plausible given the added effects of aging, and the progress of the disease severity with increased duration as previously reported (Schneider et al., 2008; Collins et al., 2009). However, all these correlations did not change throughout the study phases, which means that patient's age and duration of illness were not confounding factors, and consequently the observed positive impact of the intervention was true. In other words, the intervention was successful in alleviating pain and improving QOL and health status regardless patient age and duration of illness.

5. Conclusion and recommendations

The study concludes that hands and feet reflexology applied to rheumatoid arthritis patients is effective in reducing their pain, improving their QOL and their total health status, and these positive impacts are not affected by patient's age and duration of illness. Therefore, reflexology must be considered as a complementary treatment modality in rheumatoid arthritis. It should be introduced to nursing and medical students, and in postgraduate staff development programs. Further research is recommended for the long-term effects of this treatment modality in terms of pain and disablement. Research may also extend to assess the effectiveness of as a useful modality in geriatric care and for patients with other chronic conditions.

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