Xi'an Shiyou Daxue Xuebao (Ziran Kexue Ban)/
Journal of Xi'an Shiyou University, Natural Sciences Edition
ISSN: 1673-064X
E-Publication: Online Open Access
Vol: 66 Issue 05 | 2023
DOI 10.17605/OSF.IO/EF6UW

EFFECT OF FOOT REFLEXOTHERAPY ON LOW BACK PAIN AND LEVEL OF FUNCTIONAL DISABILITY AMONG ELDERLY IN NURSING HOMES

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Abstract

Background: Low back pain is a worldwide phenomenon among elderly especially who are residing in nursing homes for elderly. Reflexotherapy is adjunctive treatment that involves using gentle pressure to reflex points on feet. This study aimed to evaluate the effect of foot reflexotherapy on low back pain and level of functional disability among elderly in nursing homes. **Design:** A Quasi experimental/Non- equivalent control group (Irregular interrupted time series) design was utilized. **Sample:** A purposive sample of 60 elders. **Setting**: the study was conducted at eight governmental free of charge geriatric homes from each district of Cairo governorate, Egypt. **Tools:** 1- Elderly personal and medical history, 2- Pain assessment scales (The visual analogue pain scale (VAS), Wong Backer Face pain Rating scale (WBS) and Numeric Rating Scale (NRS)), 3- standardized Katz scale to assess elderly Functional status and standardized Arabic version Roland &Morris disability questionnaire. **Results:** The mean age of elderly was 73.2±7.7 years in the study and 69.9 ±6.06 in the control groups. All elderly in the current study have chronic low back pain. Moreover, a highly statistically significant difference was found between low back pain as measured by visual analogue scale, Wong backer scale and Numeric Rating scale mean scores and the total mean scores of disability among elderly in the study group between pre and post implementation of foot reflexotherapy (P= 0.000**). **Conclusion:** It can be concluded that, foot reflexotherapy was an effective method to decrease low back pain and minimize functional disability among elderly in nursing homes. **Recommendation:** Endorse reflex therapy as a routine nursing care of low back pain management among elderly in nursing homes.

Keywords: Nursing home for elderly, low back pain, reflex therapy

INTRODUCTION

Low back pain (LBP) has been identified as one of the top health problems that contribute to the global burden of disease. Low back pain has a detrimental impact on elderly, since it is linked to decreased mobility, decreased social engagement, increased isolation, and trouble with everyday activities. Elderly with low back pain more frequently experience a variety of comorbidities, and over €400 billion is thought to be spent annually on medical expenses related to low back pain worldwide (Jenks et al., 2020). In addition, low back pain has large societal and economic implications, with indirect costs typically outpacing direct medical costs (Vlaeyen et al., 2018). Furthermore, low back pain affects 36 to 70% of people over the age of 65, also up to 80% of elderly resident's experience musculoskeletal pain in long-term care facilities. While one-third of cases that accounting

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with lower back pain goes unreported. Elderly with low back pain may have sleep issues, withdraw from social and involvement in recreational activities and also complaints of psychological anguish, cognitive impairment, malnourished, lose function, and may experience falls if their pain is not managed (Wong et al., 2017).

The prevalence of pain among residents of long-term care facilities is underestimated and frequently not effectively treated as a result of problems with pain identification and assessment. Elderly in nursing homes may have chronic pain as a result of inadequate pain assessment and management. Additionally, Polypharmacy is typical, with each resident receiving between 6 and 10 prescriptions, therefore, utilizing extra drugs to treat pain may not always be the best course of action and this confirms the requirement to incorporate non-pharmacological methods into care facility practice (Knopp-Sihota et al., 2022).

Based on the unpleasant pharmacological side effects, scientists stated to shed the light on the alternative therapies that have the potential significantly to enhance several domains as functional activities on wide scale, in addition to its reliable safety that suits elderly. In truth, complementary therapy is becoming more widely recognized as a secure and efficient method of minimizing the causes and effects of pain and disease (El-Fadl, 2021). Complementary therapy is now used more frequently in traditional healthcare settings and elderly are increasingly turning to complementary therapy, possibly out of fear of the adverse effects of their medications and a desire to relieve their symptoms (Adly et al., 2017).

Reflexotherapy is a form of integrative therapies that involves applying a specific touch technique to certain reflex sites on the feet to relieve pain (Wang et al., 2020), by exerting pressure on certain reflex zones, it is believed to correlate to a map of the entire body by encouraging the regular operations of glands, organs, and body parts, and ultimately will promote the body's natural healing process and maintain homeostasis. Reflexotherapy is another sort of pressure that frequently involves the feet. The greatest location for applying reflexology is said to be the feet because they are the most sensitive regions of the body. Regular reflexotherapy on the body can reduce stress, promote relaxation, and maintain health (Marican et al., 2018).

Reflexotherapy must therefore be included into nursing practice as alternative modality to increase patient access and improve quality of life (Ali et al., 2017). According to hemodynamic theory, reflexotherapy stimulation boosts the body's capacity to heal by increasing blood flow to the affected organ and body part (Huang et al., 2021).

Clinically the complementary therapy could be feasible practiced by nurses, so gerontological nurses are the first clinicians to see elderly in pain. The benefit of assessing pain in elderly patients is that it may be detected, acknowledged as something concrete and measurable, explained, and used to gauge treatment (Foster et al., 2018). Lately, specialized nurses practice the application of different types of alternative therapies such as reflexotherapy is a form of integrative therapy that involves applying a specific touch technique to certain reflex sites on the feet to relieve pain (Wang et al., 2020)

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Significance of the study

One of the most common musculoskeletal problem in poor, middle-, and high-income countries is low back pain (LBP) among elderly and it is also continuing to be a common health issue. It is one of the top 10 illnesses that lead to impairment globally and is frequently accompanied by symptoms or conditions that prompt patients to seek out medical attention on a regular basis, LBP is still one of the major global public health issues (Ogunajo et al., 2021).

The majority of researches examining the use of CAM therapies in senior citizens have been conducted on seniors who live in their communities, as CAM therapies are not often accepted in the nursing home setting because of rigorous regulations, despite the fact that people there suffer from chronic diseases. Regarding the use of CAM in nursing homes or other long-term care facilities, there were little information and data available. Last but not least, some of the researches discussed omitted data on how frequently CAM modality use occurs (Gerber, 2021).

Low back pain is a common, difficult-to-manage illness that places a significant health cost on elders, careers, and society. Low back pain is currently regarded as one of the most incapacitating chronic illnesses in the world. Elders with low back pain suffer considerable productivity losses as a result of their condition and are frequent users of healthcare services, including rehabilitation services. Consequently, healthcare systems and society are burdened (Hurwitzet al., 2018).

As populations age, there will be an increase in the number of elderly persons who have chronic musculoskeletal pain that cannot be treated alone with medication. Additionally, there is a critical need for evidence-based non-pharmacological interventions that can be delivered by a variety of nurses in various settings to increase access to pain management services, particularly in settings like nursing homes where there is a severe shortage of specialized manpower. In order to properly manage lower back pain in elderly, thorough assessments and interventions are required because elderly typically face both age-related physical and mental difficulties. Finding non-pharmacological therapies is crucial for enhancing health status outcomes. Healthcare providers can develop prompt and effective treatment methods when they comprehend the numerous elements that contribute to severe and persistent lower back pain in elderly (Wong et al., 2017).

From the researchers' clinical observation, pain management among institutionalized elderly in nursing homes continues to be a challenge to gerontological nursing, with also the advancement of pain medication and the various modalities of therapy, elderly patients are still suffering from underreported & neglected low back pain. The dissatisfaction with medical treatment methods, invasive procedures and the necessity of using daily analgesics as well as the toxic and harmful effects of drugs push elderly patients to different quests for low back pain management. Non-pharmacological methods such as reflexotherapy have been used for low back pain control and functional improvement in elderly patients.

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Finally, researches that support effect of reflexotherapy on low back pain among Egyptian elders are scare. Improved functional status, which is a major concern for the elderly and their families requires effective pain treatment. A nurse who cares for elderly should provide full attention about low back pain. Therefore, the present study aims to evaluate the effect of foot reflexotherapy on low back pain and level of functional disability among elderly in nursing homes.

Operational definition of foot reflexotherapy: It is a technique where pressure is applied to certain points on the feet that correspond with other zones in the body for releasing any blocked energy for 30 minutes for 3 weeks (9 sessions) to decrease low back pain.

Aim of the study

The current study aim to evaluate the effect of foot reflexotherapy on low back pain and level of functional disability among elderly in nursing homes. This aim covered through three main objectives:

1. Assess low back pain and functional disability level among elderly.
2. Implement foot reflexotherapy technique among the elderly.
3. Evaluate the effect of foot reflexotherapy on low back pain and functional disability among the elderly.

Research hypotheses

H1: Elderly exposed to foot reflexotherapy (study group) exhibited lower intensity of low back pain total mean score than those who were not exposed (control group).

H2: Elderly exposed to foot reflexotherapy (study group) exhibits higher of functional Katz scale total mean scores than those who were not exposed (control group).

H3: Elderly exposed to foot reflexotherapy (study group) exhibits lower level of functional disability (Roland & Morris Disability questionnaire) total mean scores than those who were not exposed (control group).

The study subjects and Method

Research design

Quasi-experimental/Non- equivalent control group (Irregular interrupted Time series) design was used to achieve the aim of the current study.

Setting: The current study was conducted at eight free of charge geriatric homes chosen from districts of Cairo governorate that aimed to serve elderly by providing food, housing, medication services and personal care; Dar Botros Ghaly, Muasasat Awlad almatrawi, Muasasat Janih almuahadin, El Gamiya Elsharia letaion elamelen ketab el-sona, Gameyat alqulub al raqiqah, Gameyat elsafa, Gameyat yanboia Elhanan ElQebtia and Gamiat set elhabib .

Sample: A purposive sample of 60 out of 75 elderlies was selected over a period of one year

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Tools for data collection: Five tools were used for data collection:

First Tool

Elderly personal and medical history was developed by the researchers and it included five parts; 1st. part: Elderly personal data such as: age, sex, marital status and education, 2nd. part: Health data about past& present history such as chronic disease, medication and self- rated health status scale, 3rd. part: Foot examination Observational checklist, it included assessment of skin conditions and peripheral circulation such as foot sore, open skin wound, 4th. Part: Assessment the characteristics of low back pain and 5th. Part: Hemodynamic vital signs as blood pressure, respiration.

Second Tool

Pain Assessment tool using three scales:

1st scale; visual analogue scale (VAS) was used to assess pain subjective states. **Scoring system:** zero indicates no pain, 1-3 indicates mild pain, 4-6 indicates moderate pain, 7-9 indicates severe pain, and 10 indicate the most intense pain imaginable.

2nd scale; Wong Backer Face pain Rating scale (WBS) consists of six facial expressions (0, 2, 4, 6, 8 or 10) to illustrate a spectrum of pain intensity and it was scored 0 (no pain) to 10 (worst pain possible).

3rd scale; Numeric Rating Scale (NRS) which the elderly verbally rates the intensity of pain on a scale from (0) no pain to (10) worst pain possible, scoring system mild (from 1to 3 point), moderate (from4 to 7point) and severe (from 8 to10 point) to 10 (worst pain possible).

Third tool

Standardized Katz scale: To assess the functional status and measuring the ability of elderly to perform basic activities of daily living such as feeding, bathing. The total scores ranged from (0) Dependent, (1 to 5.5) partially dependent and (6) meaning completely independent. The scale consists of 6 questions.

Fourth Tool

Standardized Arabic version Roland & Morris Disability questionnaire (RMDQ); to assess the level of functional disability among elderly, the questionnaire consists of 24 statements about the functioning and limits low back discomfort can bring about in daily life. **Scoring system;** scores ranging from zero to one (yes or no) and a range of zero (no disability), grades from 0 to 8 meaning (Mild disability), grades from 9 to 16 meaning (Moderate disability), grades from 17to 24 meaning (Severe disability). The scoring system was adopted from Abd Allah et al., (2021).

Fifth Tool

Elderly's opinion that denotes the effect of foot reflexotherapy on low back pain and the level of functional disability.

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Content validity and reliability

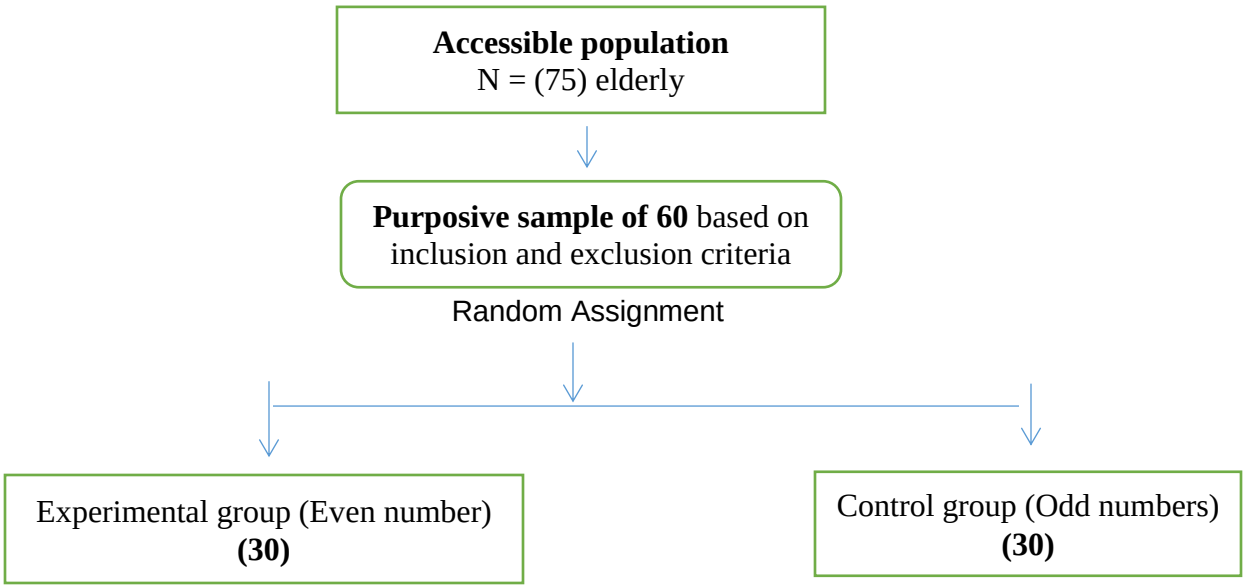
The study tools were constructed by researchers based on a scientifically relevant review of the existing English-related literature and using the available text books, articles, journals, and evidence-based scientific researches. A panel of five competent professors in the fields of Critical care and Medical Surgical nursing, Gerontological nursing and Community Health Nursing evaluated the content validity of the produced instruments.

Tool Reliability

Several scales are commonly used for assessing pain intensity. The test-retest reliability of the (VAS) and (NRS) were 0.97, 0.95 respectively. The Katz index scale is the most common instrument used to measure functional status in older adults and internal consistency (α = 0.72) test-retest reliability (0.82 – 0.93). The test-retest reliability of Roland & Morris Disability Questionnaire (RMDQ) were between (0.83 and 0.93).

Ethical and human rights

The Committee of Scientific Research Ethics of Cairo-Faculty University of Nursing approval number is RHDIRB2019041701. The researchers explained purpose and nature of the study and emphasis was made that participation in this study is voluntary; each elderly has the right to withdraw from the study at any time. Written informed consent was obtained from the participants. Anonymity and confidentiality were assured through coding the data. Elderly assured that this data would not be reused in another research without their permission, and data collected was used for the current research only.



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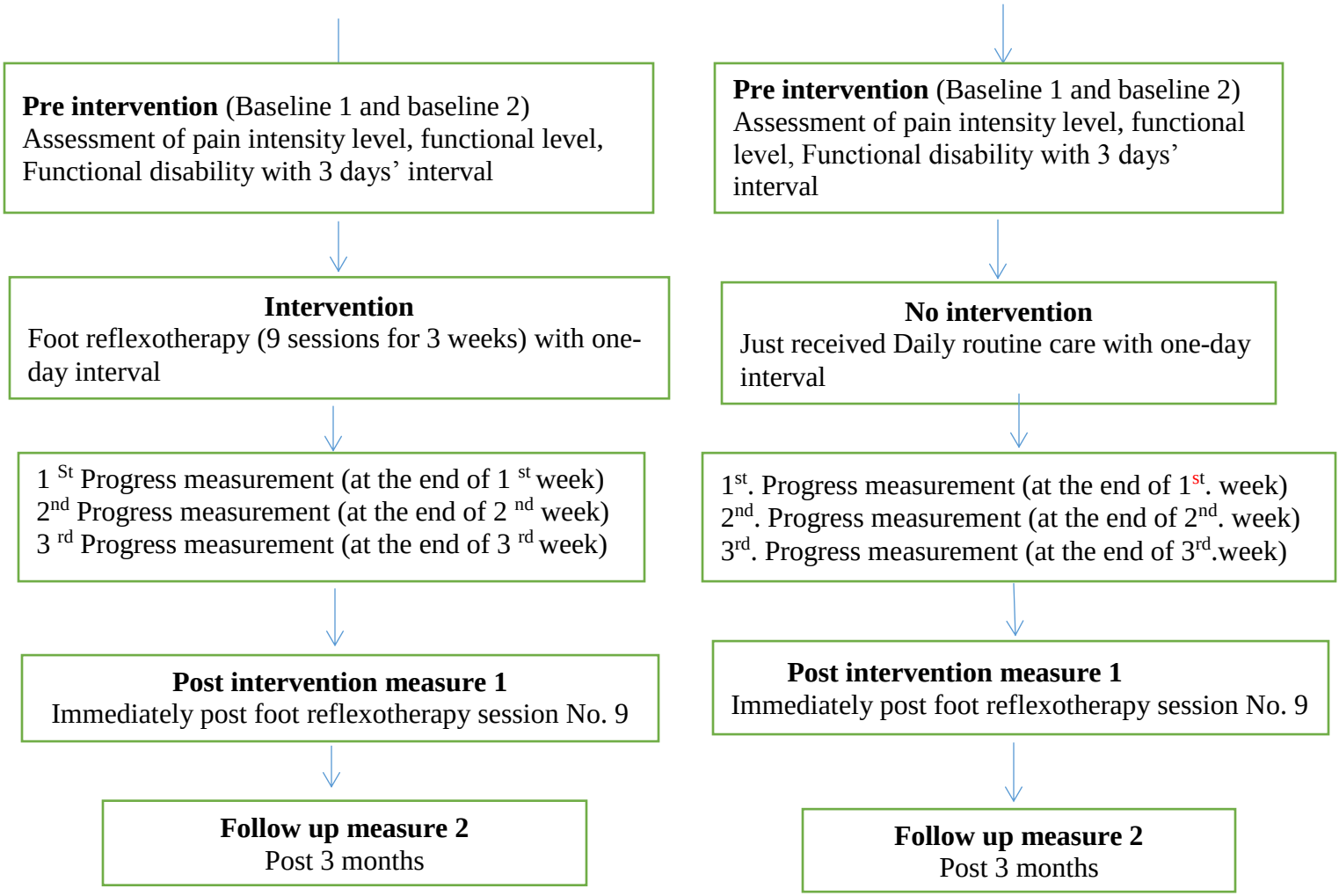

Figure 1: Diagrammatic representation of research design done by the executive researcher (Salah, 2023)

The Study Procedure

The current study was conducted in the following stages

I: Preparation phase (Administrative procedure): Prior to the current study, the researcher has received approved Certification to practice foot reflexotherapy

1-The researcher received the formal written approval from the Faculty of Nursing Cairo University to conduct the study and an official permission was obtained from the Ministry of Social Solidarity and geriatric directorates then the selected eight geriatrics free of charge geriatric homes. 2- Participant randomization; participant of study group (n=30) were allocated for even numbers, whereas, participants of control group (n=30) were allocated for odd numbers.

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II: Pre intervention (Baseline1 & Baseline2) phase: By using study tools

a-Personal & medical history using interviewing questionnaire, **b-**Assessment the low back pain by using subjective pain assessment as visual analogue pain scale, Wong Backer face rating scale and Numeric Rating scale and objective pain assessment as elderly vital signs and pain assessment characteristics, **c-**Katz scale, **d-**Standardized Arabic version from Roland Morris Disability Questionnaire. Two reading (observations) for assessment with interval three days documented by the researchers.

Additionally, elderly in control group were interviewed at Saturday, Monday and Wednesday whereas the elderly in study group were interviewed at Sunday, Tuesday and Thursday from 9 until 2 pm.

III: Intervention phase

To initiate the intervention, the elderly was positioned in comfortable position in a warm and quiet room, given a little pillow to place beneath his or her knees. 1- Foot relaxation using hand method (Fig. 2), 2- pressing on pressure points to relieve pain (on the sole of your feet) then applied pressure to reflex points according to reflexology mapping (Fig.3).

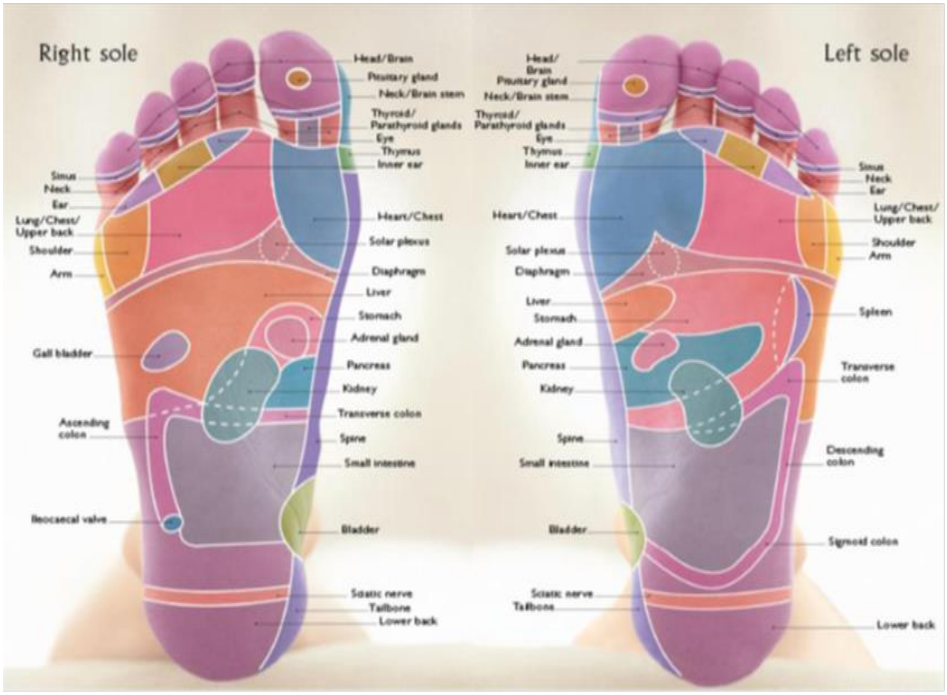

Figure 2: Reflex points on the feet sole, Amer et al., (2022)

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Figure 3: Foot relaxation, Amer et al., (2022)

VI: Evaluation stage

The researchers re-assessed the low back pain intensity, functional status and disability level immediately and 3 months after.

The Study Results:

Part I: Description of elderly personal data and medical history

Table 1: Distribution of the elderly according to personal data (n=60)

Personal data	Study group (n=30)		Control group (n=30)		Chi square test	
	N	%	N	%	χ^2	P
Sex						
Male	7	23.3%	6	20%	.098	.754
Female	23	76.7%	24	80%		
Marital status						
Single	5	16.7	5	16.7		
Married	0	0%	0	0%		
Widowed	25	83.3	18	60%	8.140	.017
Divorced	0	0%	7	23.3		
Educational level						
Read & write	25	83.3%	17	56.7%		
primary education	4	13.3%	6	20%		
Preparatory	0	0%	3	10%	6.724	.081
High technical institute	1	3.4%	4	13.3%		

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Table (1) reveals that (80 %) of elderly in the control group are females compared to (76.7 %) in the study group. In terms of marital status, (60%) of the elderly in the control group were widowed whereas (83.3 %) of those in the study group widowed. Regarding to educational level, (56.7 %) of the elderly in the control group and (83.3 %) of them in the study group can read and write.

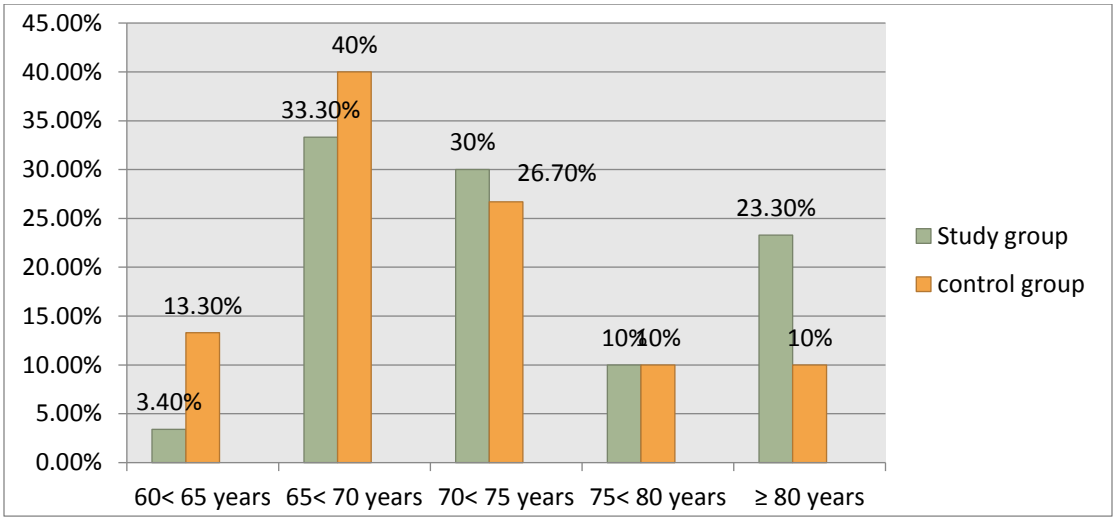

Figure 4: Percentage distribution of the elderly regarding age group (n=60)

Figure (4) illustrates that, (40%) of elderly in the control group aged (65-70 years), furthermore (33.3 %) in the study group aged (65- 70 years) with a mean of 73.2±7.7 years in the study and (69.9 ±6.06) in the control groups.

Table 2: Distribution of the elderly regarding medical history; chronic disease and prescribed medication (n=60)

	Study group (n=30)		Control group (n=30)		Chi square test	
	N	%	N	%	χ^2	P
Chronic Disease					.31	.57
Rheumatoid	3	10%	0	0%		
Osteoporosis	10	33.3%	10	33.3%		
Renal stone	2	6.7%	3	10%		
Muscle relaxant	1	3.4%	0	0%		
Diabetes mellitus	22	73.3%	20	66.7%		
Hypertension	26	86.7%	24	80%		
General weakness	3	10%	3	10%		
Medication						
Anti-Hyperglycemia	22	73.3%	20	66.7%	.11	.73
Anti-Hypertensive	26	86.7%	24	80%		
Osteoporosis drugs	6	20%	8	26.7%		
Anti-Rheumatic	1	3.4%	0	0%		

All responses are mutually exclusive.

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Table (2) revealed that (66.7 %) of the elderly complained of diabetes mellitus, (80 %) complained of hypertension in the control group while (73.3 %, and 86.7 %) respectively in the study group complained of the same health problems. Concerning medication used by the elderly, (66.7 %) of the elderly took diabetes mellitus medication, (80 %) took anti-hypertensive medication in the control group while (73.3 %) of the elderly took diabetes mellitus medication, (86.7 %) took Anti-hypertensive medication in the study group.

Part II: Description of the Elderly pain assessment

Table 3: Distribution of the elderly regarding pain medication (n=60)

	Study group (n=30)		Control group (n=30)		Chi square test	
	N	%	N	%	χ2	P
Pain medications					1.92	.16
Yes	18	60%	23	76.7%		
No	12	40%	7	23.3%		
Name of pain medication (NSAID)						
Diclac 75 mg (NSAIDs)	1	3.4%	1	3.4%	6.67	.24
Pandol 500mg(**(acetaminophen)**	9	30%	10	33.3%		
Ketofan 50 mg (NSAIDs)	5	16.6	5	16.6		
Alcofan 150 mg (NSAIDs)	1	3.4%	0	0%		
Brufen 600 mg (NSAIDs)	2	6.6	4	13.3%		
Dimre 50mg (NSAIDs)	0	0%	2	6.6		
Rapidus 50 mg (NSAIDs)	0	0%	1	3.4%		

Table (3) reveals that, (60 %) of the elderly in the study group and (76.7%) in the control group took medications to control pain. As regard type of medication used for pain relief (30 % and 16.6 %) of the elderly respectively took Panadol 500 mg and ketofan 50 mg in the study group compared to (33.3 %, 16.6 %) of the elderly respectively in the control group .

Table 4: Percentage distribution of the elderly regarding assessment the characteristics of low back pain (n=60)

	Study group (n=30)		Control group (n=30)		Chi square test	
Characteristics of low back pain	N	%	N	%	χ2	P
Factors exacerbate pain						
Lifting heavy weights	2	6.7%	11	36.7%	7.95	.005
Sitting incorrectly	22	73.3%	22	73.3%	.000	1.0
Stand up incorrectly	8	26.7%	6	20%	.37	.54
Sudden movement as fall	4	13.3%	11	36.7%	4.35	.03
Stress	14	46.7%	15	50%	.067	.79
Malaise	2	6.7%	12	40%	9.31	.002
Smoking	0	0%	1	3.4%	1.01	.313
Improper posture of body	6	20%	3	10%	1.17	.278
Curvature of the back	17	56.7%	9	30%	4.34	.03
Other (Walking and stairs)	8	26.7%	2	6.7%	4.72	.09

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Table (4) denotes that, factors exacerbate pain among elderly were (sitting incorrectly, stress and curvature of the back respectively in the control group as (73.3%, 46.7%, 46.7%) respectively compared to (73.3%, 50% and 30%) in the study group respectively. Note. All the elderly in the study and control group have chronic pain (more than 12 weeks).

Table 5: Percentage distribution of the elderly regarding category of pain assessment scale (n=60)

Category of pain assessment scales	Study group (n=30)		Control group (n=30)		χ2	P-value
	No.	%	No.	%		
Visual analogue pain scale (VAS)					3.78	.286
Mild	1	3.4%	2	6.7%		
Moderate	7	23.3%	12	40%		
Severe	16	53.3%	14	46.7%		
Worst pain possible	6	20%	2	6.7%		
Numeric Rating scale						
Mild	1	3.4%	2	6.7%	4.28	.118
Moderate	10	33.3%	17	56.7%		
Severe	19	63.3%	11	36.7%		
Wong Backer face pain scale						
No hurt (0)	0	0	0	0	3.99	.406
Hurts little bit(2)	0	0	2	6.7		
Hurts little more(4)	6	20	6	20		
Hurts even more(6)	7	23.3	10	33.3		
Hurts whole lot(8)	12	40	10	33.3		
Hurts worst(10)	5	16.7	2	6.7		

Table (5) shows that (23.3%) had moderate pain and (53.3%) had severe pain in the study group and the elderly had moderate, severe (40%, 46.7%) respectively. Concerning to the category of Numeric Rating scale among elderly, this table shows that (33.3%) had moderate pain and (63.3%) had severe pain in the study group and the elderly had moderate, severe (56.7% and 36.7%) respectively, furthermore, regarding to the category of Wong Backer face pain scale among elderly, this table reveals that (40%) described the pain as hurts whole lot in the study group and the elderly describe the pain as hurts whole lot (33.3%) in control group.

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Part III: Elderly Level of Functional Disability by using standardized Arabic version Roland & Morris Disability questionnaire (RMDQ)

Table 6: Comparison between mean & standard deviation regarding to Functional disability questionnaire among study elderly before & after foot reflexotherapy (n=60)

Standardized Functional disability questionnaire	Study group (n=30)	Control group (n=30)	T- test	p-value
	Mean ± SD	Mean ± SD		
Pre intervention1	2.93±.44	3.03± .61	-.71	.47
Pre intervention 2	2.93±.52	2.96±.64	-.22-	.82
Post program 1	2.66±.60	3.0±.64	-2.06-	.04
Follow up	2.67±.60	3.0±.58	-2.16-	.03

Table (6) reveals that the mean functional disability score decreased from (2.93±.44) in the pre intervention to (2.67 ± .60) in the post in the study group. In addition, there were statistically significance differences after implementation of foot reflexotherapy regarding functional disability as P -value= (.04 and .03) respectively.

Part V: Elderly's opinion about effect of foot reflexotherapy on low back pain and level of functional

Table 7: Elderly opinions about the effect of foot reflexotherapy on lower back pain &ability to carry out daily living activities n (60)

Elderly opinion's	Study group (n=30)		Control group (n=30)		Chi- test	
	No improvement	Improvement	No improvement	Improvement	χ2	P-value
1 st week	27	3	30	0	3.158	.076
2nd. week	5	25	29	1	39.09	.000**
3 rd. week	2	28	26	4	38.57	.000**

Table (7) illustrates that, there was no statistically significant difference found in the 1 st week between the study and control group regarding effect of foot reflexotherapy on lower back pain and ability to carry out daily activities (P= .076). Whereas, there was a highly statistically significant difference was found between the study and control group in 2nd week and 3 rd. week as (P- Value = .000**)

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E-Publication: Online Open Access
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DOI 10.17605/OSF.IO/EF6UW

Table 8: Difference between total study variables before and after foot reflexotherapy sessions in study group (n=30)

Study Variables	Study group (n=30)		Effect size	Paired T-test	
	Pre intervention	Post intervention			
	Mean ± SD	Mean ± SD		T	P
Total pain mean scores of visual analogue scale	6.96±1.92	4.30±1.26	1.63*	10.63	.000**
Total pain mean scores of numeric Rating scale	7.03±1.86	4.50±1.33	1.5*	11.60	.000**
Total pain mean scores of Wong backer scale	6.73±1.85	4.06±1.52	1.57*	13.35	.000**
Total Functional level mean scores	4.58±1.68	4.58±1.68	0	0.0	1.0
Total Disability level mean scores	12.3±4.32	9.90±4.12	0.52	6.99	.000**

*Values larger than 0.8 indicates larger effect size

** Significant at the 0.01 level

Table (8) illustrates that, there was a highly statistically significant difference was found regarding visual analogue scale, Wong backer scale and Numeric Rating scale mean scores of pain scales and total mean scores of disability among elderly in the study group in the pre and post foot reflexotherapy sessions (P= 0.000**), additionally, there was a large effect sizes which means a great difference between pre and post the intervention regarding visual analogue scale, numeric Rating scale and Wong backer scale and weak effect size regarding disability level, whereas there was no difference between pre and post foot reflexotherapy sessions regarding Katz scale as (P- value = 1.0).

Table 9: Difference between variables of the study regarding total mean scores in study and control group before and after foot reflexotherapy sessions (n=60)

Total mean Scores	Study group (n=30)						Control group (n=30)					
	Pre1	Pre2	post1	Post 2	ANOVA		Pre1	Pre2	Post1	Post2	ANOVA	
Mean SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	F	P	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	F	P
VAS	7.56±1.86	6.96±1.92	4.33±1.24	4.30±1.26	34.4	.000**	6.56±1.94	6.26±2.03	5.90±1.93	5.93±1.96	.762	.517
Numeric	7.53±1.83	7.03±1.86	5.43±1.77	4.50±1.33	20.1	.000**	6.53±1.97	6.30±2.00	6.23±2.01	6.00±1.91	.370	.775
Wong	7.06±2.01	6.73±1.85	4.40±1.61	4.06±1.52	23.2	.000**	6.26±2.08	6.13±2.16	5.53±2.27	5.53±2.27	.939	.424
Functional	4.58±1.68	4.58±1.68	4.58±1.68	4.58±1.68	.000	1.00	5.08±1.14	5.08±1.14	5.08±1.14	5.08±1.14	.000	1.00
Disability	12.0±4.26	12.3±4.32	9.70±4.0	9.90±4.12	3.24	.024*	13.26±5.0	12.80±5.0	12.73±5.07	12.83±4.9	.070	.976

Table (9) illustrates that, There was a significant difference between the four times in the study group regarding pain scales (VAS scale, Numeric scale& Wong scale) and disability level as (P- value= 000** and .024*), while there was non-significant difference

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between four times regarding functional level regarding daily living activities of elderly in the study group ,moreover, there was non-significant difference between four times in the control group regarding pain scales (VAS scale, Numeric scale& Wong scale), functional level and disability level.

DISCUSSION

Low Back Pain (LBP) is a prevalent, incapacitating and challenging condition that contributed to be a major health burden on elderly, caregivers and society. The prevalence of pain among residents of long-term care facilities is underestimated and frequently not effectively treated as a result of problems with pain identification and assessment. Residents of care homes may have chronic pain as a result of inadequate pain assessment and management (Knopp-Sihota et al., 2022). Thus, managing pain using additional medications may not always be the best option. This reinforces the need to implement non-pharmacological approaches into care home practice such as reflexotherapy.

The results of the current study revealed that more than three quarters of the elderly were females in the study and the control group with no statistically significant difference between the two groups. From the researcher point of view, In Egypt, especially free governmental charge nursing homes which looks for fragile elderly mainly women due to women abuse is common. Furthermore, women are at higher risk of low back pain due to the effect of the physiological changes caused by relatively lower level of hormones after menopause, and the accelerated lumbar disc degeneration. These findings consistent with the findings of randomized controlled trial study done by Bakir et al. (2018) on 60 patient in Turkey to examine the effect of foot reflexology on rheumatoid arthritis patients' pain and found that most of the patients were female (76.6%).

The results of the current study indicated that more than one third of the elderly aged between 65- 70 years in the study and control group with a mean of 69.9 ±6.06 years in the control group and 73.2± 7.7 years in the study group with no statistically significant difference between the two groups. This increase in mean age due to increasing health services and new country health sector reform system and this reflected in increased age and decreased mortality and morbidity. These findings consistent with the findings of a quasi-experimental study done by Abbasi -Fakhravari et al. (2018) on 67 elderly women resident in nursing homes in Iran to examine the effect of foot reflexology massage on the sleep quality of the elderly women with Restless Leg Syndrome and found that the Mean±SD ages of the participants in test and control group were 71.43±6.25 and 72.6±4.67 years respectively.

As regarding to marital status the results of the current study presented that less than two third of the elderly were widowed in the control group compared to more than three quarters in the study group. This finding agrees with a descriptive exploratory cross-sectional study done by Black et al. (2018) on 63 women in Campus, USA to assess the relationship between chronic pain and dependency level in activities of daily living among

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long-lived institutionalized elderly and found that less than one half of the studied elderly were widowed.

Concerning the educational level, the results of the current study revealed that more than one half of the elderly in the control group compared to more than three quarter of them in the study group could read and write. This finding is consistent with the findings of the study done by ŞAHİN et al. (2022) on 70 patients in the cardiovascular surgery clinic of a Turkish hospital; 35 patients were assigned to a study group, and 35 patients were assigned to a control group to analyze the effects of foot reflexology intervention upon patients having undergone an open-heart surgery on their pain, anxiety, and satisfaction level and found that 91.4% of patients were elementary school graduates. From the researcher point of view these findings may be explained by the fact that the elderly had fewer opportunities for education in the past for several reasons as low socioeconomic status especially in the developing countries and this effect on the elderly health literacy and healthy life style.

Regarding chronic disease, the present study showed that, less than two third of the elderly complained from diabetes mellitus, more than three quarters complained from hypertension in the control group while less than three quarters and more than three quarters complained from diabetes mellitus and hypertension respectively. These findings congruent with the findings of a cross-sectional study done by Arunsawas et al. (2017) to determine elderly characteristics, environmental factors, and psychological factor in relation to chronic low back pain among 188 elderly clubs in Thailand and found that majority of elderly (83.5%) have had chronic diseases; the most common three diseases were hypertension, dyslipidemia, and diabetes mellitus respectively. From the researcher of view, as a fact aging goes parallel with chronicity of diseases.

In relation to medications used, the present study indicated that less than three quarters of the elderly take diabetes mellitus medication, more than three quarters take hypertension medication in the control and the study group. These findings to some degree matched with the results of the study done by El Ghany et al.(2018) on120 older adults with chronic low back pain to determine the relationship between chronic low back Pain and risk of fall and depression among community dwelling older adults in the outpatient clinic at Alexandria, Egypt and found that analgesics and anti-inflammatory drugs were consumed by 74.2% of the patients followed by cardiac drugs (65.8%), hypoglycemic agents (44.2%), renal drugs (39.2%), and GIT drugs (30.8%). From the researcher point of view, using more than 3-5 drugs among the studied elderly could be correlated to co-morbidities.

Concerning the type of medications used for pain relief, the current study showed that less than one third of the elderly took (NSAID) as Panadol 500 mg, less than fifth take ketone 50 mg in the study and control group. These findings matched with the findings of the study done by Chen et al. (2018) a nationwide population-based study to examine chronic pain with use of analgesics and mortality in the home healthcare elderly between 2002 and 2013 in the Taiwan and found that Acetaminophen was found to be the most

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common analgesics, followed by non-steroidal anti-inflammatory drugs and opioids. Morphine was the most commonly used opioid. From the researcher point of view, the elderlies were aware of the effects of their pain and prefer the regular use of analgesics to relieve the pain because they did not receive complete information on non-pharmacological interventions from the caregivers and the researcher recommended the use of non-pharmacological pain management among elderly.

As regarding the type of pain, the present study indicated that all elderly patients in the study and control group have chronic low back pain. These findings agree with a cross-sectional study done by Li et al. (2021) on 1381 older adults in China to gain insight into chronic pain that affects the community-dwelling elderly and found that (57.3%) had chronic pain. From the researcher point of view, prolonged period of chronic pain (more than 12 weeks) among studied elderly could be contributed to misconception of pain as a normal during aging process and inaccessibility to pain medications.

Concerning factors exacerbate low back pain; the current study showed that less than three quarters in the control and study group reported sitting incorrectly. These findings agree with a cross-sectional study done by Šagát et al. (2020) on 463 adults aged between 18 and 64 years to estimate the low back pain intensity, prevalence, and associated risk factors among adults in Riyadh (Saudi Arabia) and found that non-adherence to ergonomic recommendations, prolonged sitting, the insufficient practice of physical activity were associated with a higher low back pain intensity. From the researcher point of view, incorrect body mechanic will contribute to low back pain and lack of knowledge regarding proper body alignment.

Regarding to the category of Wong Backer face pain scale the present study indicated that less than one half of the elderly described the pain as hurts whole lot in the study group compared to more than one third of the elderly described the pain as hurts whole lot in the control group. The preceding finding is consistent with the study done by Abbady et al. (2019) descriptive study was conducted on 600 elderly patients at orthopedic outpatients' clinics in Assiut General Hospital to assess daily living activities among elderly patient with low back pain and found that only 6.2% of the elderly patients were hurt little bit, while 41.0% of them were hurt even more, and only 5.0% were hurt worst concerning Wong Backer Faces Scale.

The current study was hypothesized that there will be a difference in low back pain total mean score regarding to pain scales; Visual analogue scale, Numeric Rating scale and Wong Backer face pain scale among control and study group before and after foot reflexotherapy sessions. The results of the current study supported the research hypotheses as there were statistical significant differences after implementation reflexotherapy as compared to before.

The current study was based on another hypothesis that there will be a difference in total mean score regarding standardized disability questionnaire among control and study group before and after foot reflexotherapy sessions. The results of the current study supported the research hypotheses as between the study and control group pre and post

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intervention foot reflexotherapy massage session related disability level among the elderly.

The current study revealed that, there was statistically significance differences between the study and control group post program 1&2 foot reflexotherapy massage session in functional disability questionnaire, where P value= (.04, .03) respectively. This result is similar to a study conducted by Kh el al.(2019) on 50 elderly diagnosed knee osteoarthritis and the participants were randomly assigned into two groups to investigate the effect of reflexology on pain intensity, functional disability level and found that there were significant effects of reflexology on pain intensity level, functional disability level.

The result of the current study showed that, there was no statistically significant difference found between elderly in the study and control group regarding the effect of foot reflexotherapy on low back pain and ability to carry out daily activities in the 1 st week (P= .297). Whereas a highly statistically significant difference found between the study and control group in 2nd week (P= .000). Additionally, a statistically significant difference found between the study and control group in 3 rd. week (P= .001). These findings completely matched with the results of a randomized controlled trial done by Davodabady et al. (2021) on 66 patients ;divided into intervention (n = 33) and control (n = 33) ,severity of pain in both groups was measured using visual analog scale twice a day (5−10 min before dressing change and 5−10 min after dressing change) for six days, in Arak, Iran to determine the effect of foot reflexology on pain and anxiety severity in burn patients and found that no significant difference in severity of pain (p = 0.25) between the two groups on the first day, then, the results showed no significant difference between the two groups in the second and third treatments after intervention; the mean pain scores showed a significant difference between the two groups in the fourth (p = 0.005), fifth (p = 0.001), and sixth (p = 0.001) days after intervention.

The current study showed that, there was a highly statistically significant difference was found between total VAS, Numeric Rating, Wong pain scale mean score, total disability level mean scores of elderly in the study group in the pre and post foot reflexotherapy sessions (P= 0.000**). There was a large effect sizes which means a great difference between pre and post the intervention regarding visual analogue scale, numeric Rating scale and Wong backer scale. These results go on the same line with the result of a randomized controlled trial was conducted by (Anderson et al. (2021) on 40 patients that were randomized into either the intervention or control group to evaluate the effects of foot reflexology on pain and nausea among inpatients with cancer and found that foot reflexology significantly decreases pain for inpatients with cancer. From the researcher point of view, reflexology is technique that may reduce pain by interrupting the transmission of pain signals, modifying pain perception, stimulating the release of endorphins and neurochemicals, as well as emotional regulation.

To sum up, Strengths of the current study includes given the complication of pharmacological treatment of pain among elderly, this research strength the importance of testing reflexotherapy as a new cheap feasible modality to relieve chronic low back

ISSN: 1673-064X
E-Publication: Online Open Access
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pain among elderly in low and middle economic countries, whereas the limitations of the study, pain assessment is a subjective in nature, recall bias of chronic low back pain expression, timing and administrative agreement.

CONCLUSION

It can be concluded that, foot reflexotherapy was an effective method to decrease low back pain and minimize functional disability among elderly in nursing homes.

Conflict of Interest: No conflict of interest

Recommendation of the study: Based on study findings, it was recommended to:

1- Implement foot reflexotherapy by gerontological nurses to manage low back pain and minimize functional disability among long term care elderly

2- Conduct further researches that include larger sample size of elderly to generalize the results.

3- Endorse reflexotherapy as a routine nursing care of low back pain management among elderly in nursing homes.

4- Increase awareness of gerontological nurses about foot reflexotherapy.

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ISSN: 1673-064X
E-Publication: Online Open Access
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