

Effect of Using Warm Shower and Warm Water Footbath with and Without Adding Epsom Salt on Fatigue Level in Systemic Lupus Patients

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Abstract

Systemic lupus erythematosus is a chronic inflammatory autoimmune disease characterized by fatigue, with meaningful effects on patients' life. The aim of this study was to examine the effect of using warm shower and warm water footbath with and without adding Epsom Salt on fatigue level in systemic lupus patients. The study was conducted at Kasr Al Ainy teaching hospital, Cairo University. Ninety consecutive patients (30 in each experimental group). Quasi- experimental design was used. Data was collected using demographic sheet, Fatigue severity scale and thermometer. The study results revealed that in the warm shower group, there was a significant reduction in fatigue level from baseline assessment to day 7 by 2.9 points (54.13 ± 5.21 and 51.23 ± 5.36). Warm shower is effective in reducing fatigue level. Further investigation into using warm water footbath with adding Epsom salt and its effect on fatigue, may lead to an improvement in the complementary therapy and management modality of this chronic inflammatory disease.

Keywords: Fatigue, warm water footbath, Epsom salt and Systemic Lupus.

Introduction

Systemic lupus erythematosus (SLE) is a worldwide complex health problem, afflicting young people at a crucial time in their lives¹. Being a multisystem autoimmune disease with innumerable clinical and laboratory manifestations, SLE imposes negative effect on health and overall quality of life². So precise assessment and proper intervention for SLE patients' subjective parameters such as fatigue is very important as it occurs in most patients.

In SLE patients, fatigue disrupts normal daily functioning and affects quality of life³. Despite its high

prevalence and impact on quality of life, fatigue has not been extensively studied in patients with SLE. At the same time, more than 80% of patients with SLE have reported that fatigue is not adequately addressed in their health care management plan⁴. One of the major responsibilities of nursing is to promote comfort among patients including SLE patients. Furthermore footbath therapy is a non-pharmacological, safe, side effect free, cost effective and easy technique to perform in all settings.

Epsom salt is also known as magnesium sulfate. It's a chemical compound made up of magnesium, sulfur, and oxygen. Epsom has an appearance similar to table salt, but its taste is distinctly different. As Epsom salt dissolves in warm water baths, it releases magnesium and sulfate ions⁵. Epsom salt plays various pharmaceutical effects in medical field. It plays an important role in relief of pain due to its effect on nerve and its characters' as anti-inflammatory and treatment of muscle cramps. Also, Epsom salt has beauty influence on body care due

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to its effect on skin and feet⁶. To our knowledge the effect of adding Epsom salt on warm water in relieving fatigue level was not yet investigated in previous studies. Therefore the aim of the current study is to examine the effect of using warm shower and warm water footbath with and without adding Epsom Salt on fatigue level in SLE patients.

Hypotheses:

All hypothesis are tested at 0.05 level of significance

H1: There will be significant differences in fatigue level between systemic lupus patients receiving warm water footbath with Epsom salt and those who receive warm shower.

H2: There will be significant differences in fatigue level between systemic lupus patients receiving warm water footbath and those who receive warm shower.

H3: There will be significant differences in fatigue level between systemic lupus patients receiving warm water footbath with Epsom salt and those who receive warm water footbath only.

The conceptual framework of the current study is based on general system’s theory given by Karl Ludwig von Bertalanffy in 1968. According to this theory, human beings are constantly changing due to their interaction with environment⁷.

The main component of system theory includes

Input: Fatigue level before the intervention

Process: Intervention

Output: Fatigue level after the intervention

Material and Method

Research Design: Quasi-experimental design will be used to demonstrate the causal impact of warm water foot bath with and without adding Epsom salt and warm shower on level of fatigue. This design uses some criterion other than random assignment⁸.

Setting: The study was conducted at inpatient ward of the Rheumatology and Rehabilitation Unit, Kasr Al Ainy teaching hospital, Cairo University in Egypt from February 2019 to January 2020.

Sample: The sample consisted of ninety consecutive patients (30 in each experimental group) admitted in

the inpatient ward. The study sample was calculated using of Power analysis of 95 ($\beta = 1-.95 = .5$) at $\alpha .05$ (one-sided) with large effect size (0.5) was used as the significance level⁹.

The following inclusion criteria were considered:

Patients with significant level of fatigue according to objective validated Fatigue scale (Arabic version)¹⁰. Patients with SLE diagnosed with a minimum duration of one year and their age from 18-60 years.

Exclusion criteria: Patients with disturbed conscious level, peripheral vascular disease, sensory deficit, any foot ulcer and concomitant Diabetes Mellitus were excluded.

Tools:

Data was collected using the following tools:

- (a) Structured Questionnaire: It includes patients’ characteristics such as age, gender, level of education, occupation,...etc
- (b) Fatigue severity scale (FSS): developed by Lauren B. Krupps and colleagues in¹⁰ the late 1980s as a tool to assess fatigue symptoms. FSS is a questionnaire containing nine statements that explore the severity of fatigue symptoms. The subject is asked to read each statement and circle a number from 1 to 7, A score of 36 and above (out of a maximum of 63) indicates the presence of significant fatigue. Internal consistency of the FSS is excellent (Cronbach’s $\alpha=0.89$).

Procedure: Once official permission was obtained to conduct with the proposed study, the potential patients were interviewed individually to explain the nature and purpose of current study. After obtaining verbal and written consent from patients, the investigators assessed patient’s fatigue level through the Fatigue severity scale (FSS). Patients who meet the inclusion criteria were consecutively assigned to three groups. Along with standardized treatment, the first group received warm shower. In the second group two medicine cups of Epsom salt were added to the 5 L warm water footbath whereas the third group received warm water footbath only. All interventions were administered for 30 minutes during hospitalization for seven consecutive days. A plastic basin is used for immersion of feet to a depth of 10 cm above the ankles. The temperature of water was measured by thermometer (40-42°C) for both groups. The post interventional assessment for fatigue was

conducted on 3rd, 5th, 7th day 30 minutes following the intervention for all groups using the same scale.

Data Analysis: Statistical package for the social science (SPSS) program, version 20 was used for data analysis. The demographic variables analyzed using (frequency and percentage). Level of fatigue was analyzed using (mean, standard deviation). Effectiveness of warm water foot bath was analyzed using (repeated measures ANOVA test). The independent *t*-test was used for the comparison of the difference between FSS overtime. For variance analysis for repeated measurements, the Pillai trace test was utilized to compare FSS over time after the

intervention of warm water.

Pilot Study: A pilot study will be conducted on 10% of the sample; to ensure objectivity and clarity, feasibility, and reliability of the study tool and determine the time required to fill the different data collection tools.

Ethical Consideration: Written approval from the head of the rheumatology and rehabilitation department .The purpose, nature and importance of the study were explained to patients who met the inclusion criteria. Anonymity and confidentiality were assured through coding the data.

Results

Table 1. Characteristics of patients

Variables	Categories	Warm shower		Footbath using Epsom salt		Footbath using warm water only		Test	
		Mean ± SD		Mean ± SD		Mean ± SD		<i>F</i>	<i>P</i>
Age		37.36±14.34		35.23±11.21		34.96±10.12		.359	.69
		No.	%	No.	%	No.	%	χ^2	<i>P</i>
Gender	Female	23	76.7	20	66.7	24	80	1.52	0.47
	Male	7	23.3	10	33.3	6	20		
Marital status	Married	12	40	16	53.3	10	33.3	4.48	0.61
	Widowed	6	20	3	10	4	13.3		
	Divorced	4	13.3	3	10	3	10		
	Single	8	26.7	8	26.7	13	43.3		
Education	Cannot read & write	7	23.3	5	16.7	9	30	5.83	0.67
	Can read & write	3	10	7	23.3	4	13.3		
	Basic education	3	10	2	6.7	3	10		
	Secondary education	13	43.3	9	30	11	36.7		
	University	4	13.3	7	23.3	3	10		
Job	Employee	4	13.3	9	30	2	6.7	11.64	0.07
	House wife	7	23.3	11	36.7	12	40		
	Unemployed	16	53.3	6	20	11	36.7		
	Retired	3	10	4	13.3	5	16.7		
Residence place	Urban	12	40	20	66.7	18	60	4.68	0.09
	Rural	18	60	10	33.3	12	40		
	No	11	36.7	3	10	9	30		

* $P \leq 0.05$; *F* = Variance analysis of repeated measurements; χ^2 = Chi-square test

As demonstrated in table 1 no statistically significant difference between the groups as regards demographic characteristics ($P > 0.05$).

Table 2. Comparison of fatigue level over time, Mean ± SD of patients in the three experimental groups

Follow up Time	Warm shower	Footbath using Epsom salt	Footbath using warm water only	One way ANOVA	
	Mean ± SD	Mean ± SD	Mean ± SD	F	P
FSS Baseline	54.13±5.21	56.97 ± 3.18	52.56 ± 4.71	7.53	.001
FSS day 3	52.23±5.49	56.30 ± 2.25	51.80 ± 4.68	9.72	.000
FSS day 5	51.79± 4.76	55.97 ± 2.36	52.46 ± 4.45	9.42	.000
FSS day 7	51.23±5.36	55.73 ± 3.91	51.13 ± 4.05	10.26	.000
Within the same group	F value 1.751	0.968	0.662		
	P 0.161	0.411	0.577		

Note: When patients complained about fatigue, baseline means immediately before receiving the intervention and again on day 3, day 5 and day 7 of starting the intervention.

FSS = Fatigue severity scale; *P ≤ 0.05 ; F = Variance analysis of repeated measurements, Pillai trace test.

Table 2 Revealed that there was a statistically significant difference in the baseline fatigue level and on days 3, 5, 7 between the 3 groups .In the warm shower group, there was a reduction in fatigue level from baseline assessment to day 7 by 2.9 (54.13± 5.21 and 51.23 ± 5.36 respectively).

Table 3: Comparison of baseline assessment of fatigue level with day 3, 5, and 7 in the three experimental groups

Fatigue	Pairs	Mean difference	Paired t-test	
			T	P
Warm shower	Baseline - day 3	1.90000	3.843	.001
	Baseline - day 5	2.34333	3.459	.002
	Baseline - day 7	2.90000	3.877	.001
Footbath using warm water only	Baseline - day 3	.76667	1.044	.305
	Baseline - day 5	.10000	.155	.878
	Baseline - day 7	1.43333	2.031	.052
Footbath using Epsom salt	Baseline - day 3	.66667	1.130	.268
	Baseline - day 5	1.00000	1.619	.116
	Baseline - day 7	1.24000	1.651	.110

Significant at *P ≤ 0.05

Table 3 illustrated statistically significant differences between baseline fatigue level and days 3,5 and 7 in the group using warm shower (P= 0.001, 0.002 and 0.001 respectively)

Discussion

Worldwide improvement in fatigue management among hospitalized patients is a high priority goal

especially in patients with SLE. The findings of this study showed that 30 minutes of warm shower and warm water footbath are significantly reduced fatigue levels within the fifth and seventh day of starting the intervention. Accordingly it is argued that the warm water intervention can be safely and effectively incorporated into standard nursing practice in the care of patients with SLE. In the current study the researchers’ added Epsom salt to warm water footbath and to the best of their knowledge, this

is the first study that has examined the effect of adding Epsom salt to warm water footbath on fatigue level in patients with SLE in Egypt.

In the current study the reduction of fatigue level after the intervention was similar to a study conducted in India to evaluate the effectiveness of warm water footbath on level of fatigue among elderly patients and highlighted that fatigue level was reduced in the experimental group when compared with control group. In addition the findings of this current study are congruent with the findings of the study carried out by¹¹ to investigate the effect of footbath therapy on fatigue among chronic renal failure patients highlighted a significant difference between fatigue level in the experimental group before and after administering warm water footbath. Another study conducted in Egypt by¹² also supported the effectiveness of using warm water footbath to reduce level of fatigue among hemodialysis patients.

Regarding the effect of warm shower of the body, the researchers of the present study found a significant reduction in FSS after the intervention. This finding is consistent with study conducted in Japan by¹³ evaluating physical and mental effects of bathing and reported better self-assessment results for fatigue level among the group taking warm shower of the body. This could be due to the effect of warm shower of the body exerts sufficient hyperthermic action to induce vasodilatation and increase blood flow, supplying more oxygen and nutrients to the periphery. Also showering is the most common form of bathing worldwide and provide feelings of warmth, relaxation, relief from fatigue, and refreshment. Another study conducted in Germany by¹⁴ to evaluate the changes in the haemostatic system after hyperthermic water immersion and highlighted that warm water bathing leads to management of fatigue through haemoconcentration and minimal activation of coagulation.

Epsom salt is hypothesized to have an important role in relieve pain due to its effect on nerve and its characters' as anti-inflammatory and treatment of muscle cramps¹⁵. Our study failed to demonstrate a positive effect of adding Epsom salt to warm water footbath. The current study is the first study that has examined the effect of warm water footbath adding Epsom salt on fatigue level in SLE patients in Egypt. So the findings of this study could potentially be useful if repeated in different settings to confirm the effect of the intervention.

Furthermore the American Society of Health-System Pharmacists¹⁶ highlighted that, in warm water Epsom salt dissociated into magnesium ions, and sulfate ions which easy absorbed through the skin, this improve the benefit of Epsom salt .Another study carried out in USA by¹⁷ reported that magnesium plays bio vital roles in the body including reduction of inflammation, relaxation of muscle and helps to prevent artery hardening. In addition, sulfates helps in removing toxins from the body and promoting the production of serotonin, which is responsible for feeling of calm and relaxation, and reduces the effect of adrenaline which may be triggers from increasing level of fatigue⁶.

The authors of the current study **concluded** that using different methods of bathing indicated that warm shower of the body is more effective in reducing level of fatigue than warm water footbath with and without adding Epsom salt. The study cannot be generalized to the whole population as small sample size was recruited.

Ethical Clearance: All procedures were performed in accordance with the ethical standards of the institution

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Conflict of Interest: The authors declare that they have no conflicts of interest

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