Effect of Self-feet Reflexology on Relieving Premenstrual Syndrome.

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Abstract: Premenstrual syndrome is considered as one of the most common gynecological diseases and is also one of the most common disorders at fertility ages. PURPOSE of this study was to evaluate effect of self-feet reflexology on relieving premenstrual syndrome. DESIGN: A quasi-experimental study (pre-test and post-test). SETTING: The study was conducted at faculty of nursing at Benha University. SAMPLE, systematic random sample of female students in first year who have premenstrual syndrome and fulfill the inclusion criteria will be included in the study. INSTRUMENTS: self-administrated questionnaire and Menstrual Distress Questionnaire. RESULTS: The present study showed that, illustrates that there was a highly statistical significant difference among (pain, concentration, behavioral and negative affect) related symptoms at different phases of intervention. Increasingly, there was more decrease in mean score regarding pain related symptoms at Follow up phase than Post-test phase. CONCLUSION: there was a highly statistical significant difference among studied students regarding PMS related symptoms (pain, GIT, autonomic reactions, general manifestations, concentration, behavioral change and negative affect) at different phases of intervention (pre-test, immediately post-test and follow up). RECOMMENDEDATIONS: Encourage academic students to practice reflexology to reduce premenstrual syndrome.

Key words: Foot Reflexology, Premenstrual Syndrome

Introduction

Premenstrual syndrome (PMS) is a common disorder that affects approximately 90% of women during the reproductive period at various degrees. The disease is diagnosed via the presence of physical, behavioral, and mood symptoms that arise in the luteal phase of the menstrual cycle and disappear after menstruation Hatice et al, (2016).

The exact cause of PMS is still unknown. Many theories have been suggested, including increased aldosterone activity, elevated adrenal function, hyperprolactinemia, hypoglycemia, decreased levels of central dopamine and serotonin, and decreased vitamin B6 and essential fatty acids. Decreased central dopamine and serotonin have been the most accepted causes Bussell, (2017).

These symptoms may negatively affect woman's life due to causing distress and disturbing everyday functions and interpersonal relationships and are associated with significant social and professional impairment Maleki et al, (2014). In

young adolescents symptoms might particularly affect school functions, and social interactions in a negative way Previous studies have also shown that women with premenstrual disorders have a poor health-related quality of life Heinemann et al, (2010).

Reflexology is a non-pharmacological method for treatment of different health problems as PMS. Moreover, it is a form of massage that is associated with applying pressure on reflexive points of the feet. It is believed that these points are connected with all parts of the body. The pressure on reflexive Points can affect the body's physiological responses Nasiri et al, (2016). Increasingly, Reflexology is a cheap, reliable, noninvasive treatment method that is performed by triggering the natural healing and energy points of the body Tuba Koc and Gozen, (2015).

In other words, reflexology is a special type of foot and hand massage. It is believed that there are some areas in hands and feet which are related to glands, organs, and other body parts. The most important theory about the effect of this method is connection between hands and feet, and other body parts through energy lines or channels. Some studies have shown that regular reflexology could reduce anxiety, increase relaxation, and improve health Azima et al, (2015).

The nurse is important health care personnel who can help the woman and girls in management of PMS. The nurse play pivotal role in providing The most effective current management of PMS which is a conservative one including accurate diagnosis, stress control, sensible levels of diet and exercise, but severe cases should be managed by a multidisciplinary team including a gynecologist, psychiatrist or psychologist, dietitian and counselor Zaka and Mahmood,(2012). For this reason,the study will be conducted to evaluate the effect of self-feet reflexology on relieving premenstrual syndrome.

Research Hypothesis:

- Students who have premenstrual syndrome and apply feet reflexology will experience less premenstrual syndrome than pre-intervention.

Materials and Method

The aim of the study was to evaluate the effect of self-feet reflexology on relieving premenstrual syndrome.

1) Research Design:

A quasi-experimental (pre-test and post-test) study was utilized to fulfill the aim of this study.

2) Research Setting:

The study was conducted at faculty of nursing at Benha University.

3) Sampling:

Sample type: systematic random sample.

Size and technique:

- The total number of female students in first year was 287 female students.

- Students who had premenstrual syndrome and fulfill the inclusion criteria were included in the study.

- The sample was selected by systematic random sample (every other one) according to the list obtained from MIS unit in the faculty. So, the total number of study subjects according to this technique was 100 students (after exclusion of the students included in the pilot study).

- All study subjects was assessed for premenstrual syndrome before and after receiving foot reflexology (pre-post test).

Inclusion criteria: the subjects were selected according the following criteria:

- Regular menstruation.
- Not married.
- No history of mental and physical illnesses.
- Not using sedatives, herbal drugs.

Exclusion criteria:

- Surgery during the last 6 months and during the study.
- Gynecological disorders as polycystic ovarian syndrome, sub mucous fibroid.
- Student who has less than 5 symptoms.

Instruments:

Four instruments were utilized for collecting data:

Instruments(I): Self-administered questionnaire sheet: it was constructed by researcher after reviewing related literature & under guidance of supervisors and translated into Arabic language. It included the following:

1-Personal characteristics:

Was consisted of (6) questions as (age, level of mother education,

income, weight, height and body mass index …etc).

$$BMI = weight (kg)/height2 (m)$$

✓ **BMI Categories:**

Underweight	= <18.5
Normal weight	= 18.5–24.9
Overweight	= 25–29.9
Obesity	= BMI of 30 or greater

2- Menstrual history: Was consisted of (8) questions as (age of menarche, duration, amount of blood loss, rhythm, cycle frequency, liquidity of blood…etc). Instruments (II): Knowledge assessment sheet: Self-administered questionnaire, it was developed by the researcher and included questions related to premenstrual syndrome and reflexology. It was consisted of two parts:

- **Part one: Was consisted of (6) questions** and concerned with knowledge related to premenstrual syndrome. This part includes: definition, symptoms of PMS, duration of these symptoms, causes, how to diagnose PMS, alternative methods to relieve symptoms and the effect of PMS on daily activity, academic

achievement and the presence to faculty.

- **Part two: Was consisted of (5) questions** and concerned with knowledge related to reflexology. This part includes: definition, effect of reflexology on PMS, preparation before application of reflexology, side effect and points of reflexology on the foot related to PMS.

Scoring system of Knowledge:-

Scoring system	
Complete Knowledge	2
Incomplete Knowledge	1
Don't know (wrong)	0

The score of total knowledge was classified as the following:

Good	(≥75% correct answers)
Average	(50 - **<** 75% correct answers)
Poor	(< 50% correct answers).

Instruments (III): Menstrual Distress Questionnaire (Moos, 2010): it was used to record premenstrual syndrome (5-7 days before menstruation) to assess intensity of physical psychological and behavioral symptoms of premenstrual syndrome, it was consisted of 7 items which were Pain, GIT& elimination symptoms, autonomic reactions, general manifestations , concentration,

behavioral change and negative affect. The students were asked to place a mark on the score that best indicates the pain being experienced.

Scoring system:-

No symptoms	0
Mild symptoms	1
Moderate sympt	2
Severe symptom	3
Worst symptoms	4

Ethical consideration:

An official permission from the selected study settings was obtained for the fulfillment of the study. The aim of the study was explained to each student before applying the tools to gain their confidence and trust. Oral consent was obtained from students to participate in the study and confidentialities were assured. The data was collected and treated confidentially.

Pilot Study:

A pilot study was conducted to test the clarity and applicability of study tools as well as estimation of the time needed to fill the questionnaire. 10% of the total sample (10) students were chosen. Accordingly, the necessary modifications were done in the form of reformulation of some questions and omitting of others due to unavailability to be answered accurately by students (such as water retention). The sample of the pilot study was excluded from the study.

Procedure:

1- An official agreement signed from the dean of Faculty of Nursing, Benha University, contains the title and aim of the study to conduct this study.

2- The instruments of data collection was developed after reviewing of current and past national and international relevant literature related to PMS reflexology and its effect on PMS, by using local and international books, journals, periodicals and computer search.

3- For validity assurance, the instruments were submitted to a jury of five nursing experts (two professors of obstetrics and gynecology, two professors of maternal and woman's health nursing, one professor of physiotherapy).

4- A pilot study was conducted to test the clarity and applicability of study tools as well as estimation of the time needed to fill the questionnaire, and carried out on 10% of the total sample (10) students were chosen after instruments were developed and before data collection..

5- Developing and translating tools into Arabic language (appendix I).

6- The study was implemented for 12 months, from the beginning of February 2016 to the end of January 2017. Implementation of study was conducted at faculty of nursing at Benha University (students in first year), after the students had been fully informed and consented for participation in the study.

The researcher introduced herself and explained the purpose of the study to the students.

All students were given tool (I) to fulfill it, which include (name, premenstrual syndrome and inclusion criteria).

The selected students who had premenstrual syndrome and fulfilled the inclusion criteria were included in the study.

The students was divided into 5 groups (each group about 20 students) to receive the session of training. The aim of this division is to provide the appropriate time for each group to conduct the training in accordance with the schedule of their both theoretical and practical lectures. Each session took about 35 minutes to be completed.

The students who were included in the study followed the following steps:

First session:

- The students were given tool (II) which includes Socio-demographic data, menstrual history and tool (III) which include knowledge assessment sheet to be completed by them.

- Tools (II) & (III) took about 20 minutes to be filled.

- The previously mentioned tools were gathered by the researcher in the same day.

- The students were given tool (IV) which was (Menstrual Distress Questionnaire) to assess the severity of premenstrual syndrome before the next menstruation and before application of reflexology (pre-test).

Second session:

- At the beginning of this session, tool (IV) was gathered by the researcher before application of reflexology (pre-test).

- Then, the researcher provided knowledge to the students regarding reflexology and premenstrual syndrome through demonstration, and session of discussion and brochure.

- After that, the studied sample was trained by the researcher how to prepare themselves by massage of the whole leg from knee to ankle using both hands and mildly massage whole of the sole before starting the reflexology massage for about 5 minutes.

- Then, the students were trained to exert pressure on the related and specified zones with special concentration for about 20 seconds. These areas consists of: pituitary gland, kidney and adrenal glands, spleen, liver, genital zone

(uterus and ovary) and breasts(Fard et al, 2012).

- The duration of massage was once a day for about 15 minutes totally and from the onset of symptoms of the premenstrual syndrome and continued until period time (totally 5 – 7 days).

- At the end of second session, re-demonstration was done to confirm the students' knowledge and training session.

- Then, the students was given the same daily record form of premenstrual syndrome (tool IV) to be completed again by the sample to determine the severity of premenstrual syndrome for two successive cycles after implementation of self-foot reflexology (post-test).

- The post-test assessment sheet gathered by the researcher. The students were followed-up by the researcher through telephone or other means of social media.

7- Tool (III) and (IV) was gathered by the researcher after application of reflexology (post-test). The knowledge assessment sheet regarding reflexology & premenstrual syndrome (tool III) was given to the students to be completed in this session. Then knowledge assessment sheet was gathered by the researcher at the same time.

8- Finally, the same daily record form of premenstrual syndrome (tool IV)

was completed again by the sample to determine the post-test severity of premenstrual syndrome after implementation of self-foot reflexology (follow up).

Statistical analysis:

Data was verified prior to computerized entry. The Statistical Package for Social Sciences (SPSS version 20.0)

was used for that purpose, followed by data tabulation and analysis. Descriptive statistics were applied (e.g., mean, standard deviation, frequency and percentages). Test of significance, (Paired t test) and (Chi - square test) were used. A significant level value was considered when $p \leq 0.05$. And A highly significant level value was considered when

$P < 0.01$.

RESULTS

Table (1): Personal characteristics of the studied female students (N = 100).

Personal characteristics		
Item	No	%
Age:		
16-	2	2.0
18-	82	82.0
≥20	16	16.0
Mean ± SD = 19.05±.84		
Residence:		
Urban	31	31.0
Rural	69	69.0
Mother's educational:		
Illiterate	4	4.0
Primary	10	10.0
Middle	69	69.0
High	17	17.0
BMI:		
Normal	44	44.0
Overweight	39	39.0
Obese	17	17.0
Mean ± SD = 25.67±3.68		

Table (1) clarifies that; the mean age of the studied female students was 19.05±.84 years. And about two thirds (69%) of students lived in rural areas. Regarding educational level of their mothers, 69% of them had middle education. Moreover; the mean BMI of them was 25.67±3.68.

Table (2): Menstrual history of the studied female students (N = 100).

Menstrual history		
Item	**No**	**%**
Age of menarche:		
10-	6	6.0
12-	50	50.0
≥14	44	44.0
Mean ± SD = 13.28±1.30		
Feeling at menarche :		
Crying	11	11.0
Embracement	67	67.0
Happiness	4	4.0
Nothing	18	18.0
Action at menarche :		
Inform my mother	89	89.0
Inform my school nurse	3	3.0
Inform my grand sister	8	8.0
Menstrual cycle:		
22- days	10	10.0
26- days	59	59.0
≥30 days	31	31.0
Mean ± SD =28.32±2.25		
Duration of menstruation:		
1-3 days	31	31.0
4-5 days	63	63.0
6-7 days	6	6.0
Mean ± SD = 4.77±1.14		
Amount of blood:		
Mild	31	31.0
Moderate	65	65.0
Severe	4	4.0
Liquidity of blood:		
liquid	94	94.0
clots	6	6.0
Color of blood:		
Bright red	20	20.0
Dark red	80	80.0

Table (2) indicates that the mean age of menarche was 13.28±1.30 years. And about two thirds (67%) of students were embraced at menarche. The majority of them (89%) inform their mothers about menses. In addition; the mean menstrual cycle

of them was 28.32±2.25 days. Moreover; the mean duration of menstruation was 4.77±1.14 days. Regarding the amount of blood (65%) of students had moderate amount, and the majority of them had liquid menstruation. Increasingly, (80%) of them had dark red color of blood.

Table (3): Mean score of pain related symptoms at Pre-test, Post-test and Follow up phases.

Symptoms	Pre-test Mean ± SD	Post-test Mean ± SD	Paired t test(1)	P value	Pre-test Mean ± SD	Follow up Mean ± SD	Paired t test(2)	P value
Headache	1.43±1.05	.66±.80	51.53	<0.001**	1.43±1.05	.46±.71	42.20	<0.001**
Cramps	1.07±1.11	.47±.76	33.84	<0.001**	1.07±1.11	.36±.64	30.43	<0.001**
Backache	1.85±1.22	1.02±.97	58.65	<0.001**	1.85±1.22	.77±.88	46.22	<0.001**
Muscle stiffness	.56±.86	.18±.53	21.83	<0.001**	.56±.86	.11±.39	20.12	<0.001**
Breast tenderness	1.35±1.15	.65±.86	43.82	<0.001**	1.35±1.15	.46±.79	36.87	<0.001**
Pain in lower thigh	1.12±1.10	.47±.80	37.99	<0.001**	1.12±1.10	.32±.66	32.87	<0.001**
Fatigue	1.75±1.23	.91±1.01	59.87	<0.001**	1.75±1.23	.66±.90	46.35	<0.001**
General Ach & pains	1.74±1.21	.94±.96	56.31	<0.001**	1.74±1.21	.67±.86	44.22	<0.001**
Total score	10.90±6.98	5.34±5.13	57.82	<0.001**	10.90±6.98	3.84±4.51	47.59	<0.001**

*A Statistical significant p ≤ 0.05
**A Highly Statistical significant p ≤ 0.001

Table (3) illustrates that there was a highly statistical significant difference among pain related symptoms at different phases of intervention. Increasingly, there was more reduction in mean score regarding pain related symptoms at Follow up phase than Post-test phase.

Table (4): Mean score of concentration related symptoms at Pre-test, Post-test and Follow up phases.

Symptoms	Pre-test Mean ± SD	Post-test Mean ± SD	Paired t test(1)	P value	Pre-test Mean ± SD	Follow up Mean ± SD	Paired t test(2)	P value
Difficulty concentrating	1.56±1.18	.76±.96	55.66	<0.001**	1.56±1.18	.5387±.79327	43.96	<0.001**
Accidents	.37±.69	.10±.35	17.08	<0.001**	.37±.69	.0800±.30613	16.31	<0.001**
Insomnia	1.46±1.23	.70±.99	50.30	<0.001**	1.46±1.23	.5312±.87606	41.22	<0.001**
Forgetfulness	.73±.95	.28±.58	25.51	<0.001**	.73±.95	.1937±.48114	23.43	<0.001**
Confusion	1.25±1.16	.57±.89	41.92	<0.001**	1.25±1.16	.4325±.72877	35.99	<0.001**
Lowered judgment	.99±1.15	.45±.81	30.47	<0.001**	.99±1.15	.3387±.68160	27.29	<0.001**
Distractible	1.07±1.20	.52±.86	31.48	<0.001**	1.07±1.20	.3812±.69029	27.93	<0.001**
Lower motor coordination	.76±1.10	.33±.76	24.55	<0.001**	.76±1.10	.2200±.58697	22.27	<0.001**
Total score	8.23±6.27	3.74±4.68	50.07	<0.001**	8.23±6.27	2.71±3.91	43.84	<0.001**

*A Statistical significant $p \leq 0.05$
**A Highly Statistical significant $p \leq 0.001$

Table (4) reveals that there was a highly statistical significant difference among concentration symptoms related symptoms at different phases of intervention. Increasingly, there was more decrease in mean score regarding concentration related symptoms at Follow up phase than Post-test phase.

Table (5): Mean score of behavioral change related symptoms at Pre-test, Post-test and Follow up phases.

Symptoms	Pre-test Mean ± SD	Post-test Mean ± SD	Paired t test(1)	P value	Pre-test Mean ± SD	Follow up Mean ± SD	Paired t test(2)	P value
Lowered school or work performance	1.63±1.21	.84±.98	54.82	<0.001**	1.63±1.21	.61±.83	43.26	<0.001**
Take naps; Stay in bed	1.52±1.19	.73±.98	55.66	<0.001**	1.52±1.19	.55±.86	44.49	<0.001**
Stay at home	1.63±1.32	.87±1.07	49.62	<0.001**	1.63±1.32	.68±.93	40.57	<0.001**
Avoid social activities	1.63±1.32	.91±1.04	46.18	<0.001**	1.63±1.32	.69±.95	38.48	<0.001**

			<0.001**				<0.001**
Decreased efficiency	1.74±1.27	.96±1.01	53.61		1.74±1.27	.71±.90	42.51	
Total score	8.17±5.67	4.32±4.41	55.05	<0.001**	8.17±5.67	3.26±3.92	45.90	<0.001**

*A Statistical significant p ≤ 0.05
**A Highly Statistical significant p ≤ 0.001

Table (5) clarifies that there was a highly statistical significant difference among behavioral change symptoms related symptoms at different phases of intervention. Increasingly, there was more decrease in mean score regarding behavioral change related symptoms at Follow up phase than Post-test phase.

Table (6): Mean score of negative affect related symptoms at Pre-test, Post-test and Follow up phases.

Symptoms	**Pre-test**	**Post-test**	**Paired t test(1)**	**P value**	**Pre-test**	**Follow up**	**Paired t test(2)**	**P value**
	Mean ± SD	**Mean ± SD**			**Mean ± SD**	**Mean ± SD**		
Anxiety	1.49±1.29	.77±1.03	46.18	<0.001**	1.49±1.29	.60±.89	38.65	<0.001**
Irritability	1.10±1.12	.50±.79	33.24	<0.001**	1.10±1.12	.36±.70	30.15	<0.001**
Mood swings	1.70±1.27	.91±1.04	52.88	<0.001**	1.70±1.27	.67±.88	42.28	<0.001**
Depression	1.95±1.30	1.16±1.03	55.66	<0.001**	1.95±1.30	.86±.91	43.31	<0.001**
Crying	.96±1.23	.40±.77455	20.52	<0.001**	.96±1.23	.29±.64	21.45	<0.001**
Tension	1.42±1.24	.70±.98	45.61	<0.001**	1.42±1.24	.50±.83	37.38	<0.001**
Loneliness	1.13±1.43	.64±1.07	27.43	<0.001**	1.13±1.43	.50±.90	24.27	<0.001**
Restlessness	1.84±1.36	1.05±1.10	52.85	<0.001**	1.84±1.36	.78±.97	42.09	<0.001**
Total score	11.62±8.53	6.16±6.56	51.52	<0.001**	11.62±8.53	4.58±5.72	43.74	<0.001**

*A Statistical significant p ≤ 0.05
**A Highly Statistical significant p ≤ 0.001

Table (6) illustrates that there was a highly statistical significant difference among negative affect symptoms related symptoms at different phases of intervention. Increasingly, there was more decrease in mean score regarding negative affect related symptoms at Follow up phase than Post-test phase.

Table (7): Total mean score of PMS total symptoms at Pre-test, Post-test and Follow up phases.

Symptoms	Pre-test	Post-test	Paired t test(1)	P value	Pre-test	Follow up	Paired t test(2)	P value
	Mean ± SD	Mean ± SD			Mean ± SD	Mean ± SD		
Pain	10.90±6.98	5.34±5.13	57.82	<0.001**	10.90±6.98	3.84±4.51	47.59	<0.001**
GIT& Elimination Symptoms	7.05±5.17	3.02±3.75	52.06	<0.001**	7.05±5.17	2.10±3.06	44.45	<0.001**
Autonomic Reactions	3.18±2.26	1.52±1.71	52.52	<0.001**	3.18±2.26	1.08±1.51	43.74	<0.001**
General Manifestations	5.97±4.97	2.76±3.47	42.97	<0.001**	5.97±4.97	1.97±2.91	37.96	<0.001**
Concentration	8.23±6.27	3.74±4.68	50.07	<0.001**	8.23±6.27	2.71±3.91	43.84	<0.001**
Behavioral Change	8.17±5.67	4.32±4.41	55.05	<0.001**	8.17±5.67	3.26±3.92	45.90	<0.001**
Negative Affect	11.62±8.53	6.16±6.56	51.52	<0.001**	11.62±8.53	4.58±5.72	43.74	<0.001**

*A Statistical significant $p \leq 0.05$
**A Highly Statistical significant $p \leq 0.001$

Table (7) illustrates that there was a highly statistical significant difference among PMS total symptoms including (pain, GIT& elimination symptoms, autonomic reactions, general manifestations, concentration, behavioral change, and negative affect) at different phases of intervention.

DISCUSSION

The present study hypothesis was supported by the result of the study as follows:

The present study clarified that mean score related to premenstrual Syndrome continued to decrease in post and follow up test than pre-test. Increasingly, there was more decrease in mean score regarding pain related symptoms at Follow up phase than Post-test phase. These findings weren't congruent with **Quinn et al, (2007)** who studied "Reflexology in the management of low back pain: A pilot randomized controlled trial", and **Lee and Mee, (2011)** who conducted "Effects of Aroma-foot-reflexology on Premenstrual Syndrome, Dysmenorrhea and Lower Abdominal Skin Temperature of Nursing Students, revealed that foot reflexology reduced premenstrual syndrome, and raised lower abdominal skin temperature of the students, The decrease in the level of pain may be due to applying reflexology technique that result in increased secretion of endrophins (natural pain killers found in the body) and enkephalins and consequently pain control.

Concerning concentration related symptoms that included (difficulty concentrating, accidents, insomnia, forgetfulness, confusion, lowered judgment, distractible and lower motor coordination), the results of the present study revealed that there was improvement in concentration in post and follow up test than pre-test. These results were similar to *Kim and Cho, (2002)* who studied "The Effect of Foot Reflexology on Premenstrual Syndrome and Dysmenorrhea in Female College Students", reported that the relieved symptoms after foot reflexology were fatigue , insomnia , abdominal pain , lower abdominal pain and constipation . The decrease in concentration related symptoms indicate that stimulating reflex points has positive effect on balancing energy and hormones that lead to alleviating these symptoms.

In relation to behavioral change, there were improvement in school or work performance, take naps; Stay in bed, stay at home, avoid social activities and decreased efficiency, in post and follow up test than pre-test, The improvement of behavioral symptoms might be due to stimulation of the reflex points that result in general relaxation created in the body. Following this relaxation, stress messages stopped and sympathetic nervous system activity improved. Therefore, there is an assumption that after receiving reflexology, due to reduction of their anxiety and stress level, students have more improvement of behavioral change related symptoms than before receiving it.

The current study findings illustrated that there was a highly statistical significant difference among negative affect symptoms related symptoms that included at different phases of intervention. Increasingly, there was more decrease in mean score regarding negative affect related symptoms at Follow up phase than Post-test phase. This result was in accordance with *Hernandez-Reif et al, (2000)* who studied "Premenstrual symptoms are relieved by massage therapy", mentioned that the massage group showed decreases in anxiety, depressed mood and pain immediately after the first and last massage sessions. The longer term (5 week) effects of massage therapy included a reduction in pain and water retention and overall menstrual distress. However, no long-term changes were observed in the massaged group's activity level or mood. This improvement is due to touching skin can cause the release of endogenous endorphins of the body and would reduce the stress, anxiety, restlessness and irritability; therefore, with stress reduction, the pain would consequently reduce. The second reason is that, reflexology can remove the fatigue and anxiety. A third cause, explain that applying pressure on hands or feet activate large diameter fibers to close the pain gate, thereby inhibit the transmission of pain. Finally, the depression would consequently reduce (*Hughes, et al., 2011*).

Furthermore, *Fard et al, (2013)* in their study of "Effect of foot reflexology on physical and psychological symptoms of

premenstrual syndrome ", mentioned that the average reduction of general severity of PMS symptoms was 23.39% in foot reflexology group while it was -9.68% in the control group (p<0.0001). There was signification difference between the average of physical and mental symptoms in reflexology group compared to the control group (p<0.0001). So it was Concluded thatfoot reflexology is effective in improvement of physical and metal symptoms of PMS.

Generally, the results of the present study concluded that there was a highly statistical significant difference among PMS total symptoms including (pain, GIT& elimination symptoms, autonomic reactions, general manifestations, concentration, behavioral change, and negative affect) at different phases of intervention. Additionally, it was clarified that there was a significant reduction of total PMS symptoms at follow up as compared with post intervention. This finding was in line with *Kim and Cho, (2002)* who studied "The Effect of Foot Reflexology on Premenstrual Syndrome and Dysmenorrhea in Female College Students", indicated that the mean score of the premenstrual syndromes and dysmenorrhea before foot reflexology was 8.35, it was 4.16 at the first menstruation after foot reflexology and 3.25 at the second menstruation for the experimental group. The significant reductions of total PMS symptoms at follow up as compared with post intervention can explained by repetition of practicing reflexology massage can promote its

efficiency and efficacy on relieving PMS due to enhancing experience of practice.

Increasingly, in consistence with the results of present study *Song et al, (2015)* who studied "Effect of self-administered foot reflexology for symptom management in healthy persons: A systematic review and meta-analysis", illustrated that analysis of three non-randomized trials and three before-and-after studies showed that self-administered foot reflexology resulted in significant improvement in subjective outcomes such as perceived stress, fatigue, and depression.

The foregoing findings are in contrast with findings of studies conducted in Iran by *Ansari et al, (2014)* who studied " The effect of sole reflexology (Reflex Zone Therapy) on the intensity of premenstrual syndrome: A single-blinded randomized controlled trial", they highlighted that the mean intensity of symptoms before intervention in both groups showed that there is not statistically significant difference between two groups before the intervention. Studying the statistical test results showed that there is not statistically significant difference between mean differences of the intensity of behavioral symptoms in the research unit in real and unreal reflex zone therapy. That means, such that the real reflex zone therapy was not effective in decreasing the intensity of behavioral symptoms p<0.05. Studying the results of statistical tests showed that the intensity of behavioral symptoms was decreased to 20% after

receiving the real reflex zone therapy and for 18.30% after receiving the unreal reflex zone therapy which is not considered statistically significant.

CONCLUSION:

In the light of the results of the present study, it could be concluded that; Self-feet reflexology result in remarkable improvement (positive effect) on relieving premenstrual syndrome in studied students in post-test phase and follow up than pre-test phase.

RECOMMENDATIONS:

In the light of the current study findings, the following recommendations are suggested:

1-Develop awareness programs for academic students to enhance their knowledge regarding premenstrual syndrome.

2-Encourage academic students to practice reflexology during PMS.

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