

# Effect of Foot Reflexology on the Relief of Premenstrual Syndrome and Dysmenorrhea

Prema .S<sup>1</sup>, Dr. Pushpamala Ramaiah<sup>2</sup>, Dr. Lamiaa Ahmed Elsayed<sup>3</sup>, Dr. Ibtesam Nomani<sup>4</sup>

<sup>1</sup>Dhanvanthri College of Nursing, Namakkal Dt.Tamilnadu, India

<sup>2</sup>Professor, Faculty of Nursing Umm-Al Qura University, Makkah, KSA

<sup>3</sup>Associate professor at Faculty of Nursing Umm-Al Qura University, Makkah, KSA. & Professor of Pediatric nursing, Faculty of Nursing, Ain Shams University, Cairo, Egypt

<sup>4</sup>Obstetric& Gynecological medicine, Umm-Al Qura University, Makkah, K.S.A

**Abstract:** *Primary dysmenorrhea is one of the most prevalent debilitating problems in reproductive ages. A general lack of understanding about the particular needs of Indian adolescents, specifically adolescent girls, persists in India and the wider global community. Adolescence group is viewed as an opportune time to practice healthy living habits and prevent future health complication. Aim of the study: This study was aimed to identify the effect of reflexology on the relief of dysmenorrhea with premenstrual syndrome. Research design: True experimental research design was adopted and the study sample was chosen by simple random sampling technique. Study population was the students studying in P.D.B. Government Higher Secondary School, Krishnagiri District and P.B.A.Government Girls High School, Tamilnadu. Dysmenorrhea symptoms scale was used to assess the symptoms among adolescent girls. The data was collected after obtaining the permission from concerned administrative personnel of the School. Results: The main outcome of this study was severity of dysmenorrhea, which was measured using a visual analog scale and pain rating index. Using these evaluation tools, the participants rated the severity of their dysmenorrhea before the start of intervention and again after each of three consecutive menstrual cycles. Comparing the two groups the results showed that reflexology was more effective in reducing pain intensity and duration.*

**Keywords:** Dysmenorrhea, Foot Reflexology, Premenstrual syndrome, Pain rating Index, Visual Analog scale.

## 1. Introduction

Primary dysmenorrhea is one of the most prevalent debilitating problems in reproductive ages. (AourelIM, et al., 2005 & Sara Azima, 2015). Adolescence group is viewed as an opportune time to practice healthy living habits and prevent future health complication. Pain is the unpleasant sensory and emotional experience associated with actual or potential tissue damage. (Pushpamala.R.2017). The most common symptoms in both dysmenorrhea and non-dysmenorrhea girls during the menstrual periods were tiredness and second most prevalent symptom was back pain. The prevalence of dysmenorrhea was 70.2%. (Shabnam Omidvar et al 2016). Dysmenorrhea is still an important public health problem which may have a negative impact on female health, social relationships, school or work activities and psychological status. (Arampour E., et al, 2012 & Vincenzo De Sanctis et al 2016)

Adolescents who missed school due to dysmenorrhea ranged from 7.7% to 57.8% and 21.5% miss social activities. About 50% of students (53.7%-47.4%) reported a family history of dysmenorrhea. Dysmenorrhea adversely affects the personal life of adolescents and limits their social and academic performance. From 21% to 96% practiced self-medication either by pharmacological or non-pharmacological interventions. (Apay SE, et al, 2010) & (Vincenzo De Sanctis, 2016). User focused educational sessions are recommended as an effective educational strategy to promoting awareness and also suggested that there is an increased need for

awareness programme by health personnel for women. (Latthe PM, et al, 2011 & R. Pushpamala. 2017).

Mahboubeh Vailani et al 2010, results of their research showed that both ibuprofen and reflexology resulted in a significant reduction in pain intensity among female students of Isfahan medical university for three menstrual cycles. However, when comparing the reflexology group to the ibuprofen group, the reflexology group showed a greater reduction of pain intensity and duration, even though reflexology was not administered during the third menstrual cycle. (Lakey H, et al., 2010 & Chen MN, et al., 2013)

## 2. Significance of the Study

The investigator's experience with her colleagues with dysmenorrhea had shown that quality of work both academic and clinical seems to be affected; peer and social interaction were also markedly affected during their menstrual days. This motivated the investigator to perform research into various methods that can reduce the severity of dysmenorrhea in a natural way so as to permit normal activities even during their menstruation. Considering the prevalence of Primary dysmenorrhea, the investigator wanted to develop the complementary therapy like progressive muscle relaxation by foot reflexology to reduce the dysmenorrhea. This further promotes early recovery of the girls suffered from dysmenorrhea and enhances their comfort and promotes early participation in normal life. It is important that health education on puberty and menstruation is regarded as inadequate for many girls in India. (Cho SH, Kim J. 2010 & Shabnam Omidvar et al 2016).

### 3. Research Methodology

In this study the effectiveness of reflexology on dysmenorrhea among adolescent girls was evaluated. The design used for the present study was True experimental design, where Pretest & Posttest with control Group design was selected to assess the effectiveness of Reflexology on dysmenorrhea among selected adolescent girls. The settings of the study are:

- 1) P.D.B. Government Higher Secondary School, Krishnaagiri District Totally 241 students are studying from 9<sup>th</sup> standard to 12<sup>th</sup> standard.
- 2) P.B.A. Government Girls High School, Krishnagiri District. Totally 201 students are studying from 9<sup>th</sup> standard to 12<sup>th</sup> standard.

**Statement of the Problem:** A study to assess the effectiveness of reflexology on dysmenorrhea among adolescent girls in selected schools at Krishnagiri District, Tamilnadu. The objectives of the study were A. to assess the level of dysmenorrhea among adolescent girls in control group and experimental group before and after reflexology. B. To determine the effectiveness of reflexology on dysmenorrhea among adolescent girls in control group and experimental group. C. To find out the association between post test scores of dysmenorrhea among control group and experimental group of adolescent girls with their demographic variables. Hypothesis of this study is stated as follows:

- 1) There is a significant difference in level of dysmenorrhea among adolescent girls in control group and experimental group before and after reflexology.
- 2) There is a significant difference between reflexology on dysmenorrhea among adolescent girls in control and experimental group.
- 3) There is a significant association between post test scores of dysmenorrhea among control and experimental group of adolescent girls with their demographic variables.

#### Sample Size

The sample size comprised of 30 adolescent girls with dysmenorrhea symptoms, out of which 15 were control group and 15 were experimental group. The investigator selected the control and experimental group by simple random sampling technique. The control group and experimental group adolescent girls were selected in two different schools from 05/03/2107 to 09/05/2017. It is to avoid the contamination of the control group with the experimental group. The adolescent girls from 9<sup>th</sup> to 12<sup>th</sup> standard were totally 241 students. Dysmenorrhea symptoms scale was administered to adolescent girls, in that scale, adolescent girls scored more than 50 were 82 subjects, out of which the investigator selected 15 samples by using Simple Random Sampling technique (Lottery Method) in third stage random sampling. The adolescent girls from 9<sup>th</sup> to 12<sup>th</sup> standard were totally 201 students. Dysmenorrhea symptoms of adolescent girls score was measured as: more than 50 were 74 subjects, out of which the investigator selected 15 samples by using Simple Random Sampling technique (Lottery Method) in third stage random sampling.

#### Tool of Data Collection

Structured Questionnaire consists of demographic characteristics of adolescent girls, i.e. age, class (standard), education of the parents, occupation of the parents, religion, age at menarche, duration of menstrual cycle, days of menstrual flow, family history of dysmenorrhea symptoms and practice of home remedies. Visual analogue scale: It consists of Dysmenorrhea symptoms assessment scale, used to assess the dysmenorrhea symptoms among adolescent girls. The symptoms are; Physical symptoms, Gastrointestinal symptoms, Psychological symptoms & Elimination symptoms. Prior to collection of data, permission was obtained from Head Master and adolescent girls studying in P.D.B. Government Higher Secondary School, Krishnagiri District and P.B.A. Government Girls High School, Krishnaagiri to collect data from 05/03/2107 to 09/05/2017.

#### Intervention Procedure

After giving complete explanations about the research, written informed consents were obtained from the participants. Investigator applied the pressure on the reflex point with thumb. The adolescent girls were made to lie down on table comfortably in supine position to perform the procedure as follows: Relaxation exercises were performed, by massaging the foot all over slowly and gently twist the spine area on the foot. (2 minutes for each foot). Thumb walking up and down on the spine (2 minutes for each foot). Stimulate the meridian points such as Ovary and Uterus. (2 minutes for each point, 6 minutes/foot). Duration of treatment was 10 minutes/foot (total 20 minutes). Treatment duration 20 minutes (10 minutes in each leg) once in a day for 5 days (starts from 3 days before menstruation and ends with 2<sup>nd</sup> day of menstrual cycle) in two consecutive menstrual cycles.

Dysmenorrhea pain was measured by Visual Analogue Scale and Dysmenorrhea symptoms which were measured by Dysmenorrhea symptoms assessment rating scale. Reflexology intervention was given after pre-test among the adolescent girls from 3 days before menstruation cycle and continued for 2<sup>nd</sup> day of menstrual cycle for the duration of 20 minutes daily for 5 days in 2 consecutive menstrual cycles followed by the Post-test after 2 consecutive menstrual cycles (during 3<sup>rd</sup> menstrual cycle) by using visual analogue scale.

### 4. Results

Table (1) Comparison between Control Group and Experimental Group: shows that there was a significant effectiveness between pre and post test scores of level of dysmenorrhea pain and symptoms among both control and experimental group. It seems that reflexology was effective in reducing the dysmenorrhea pain among adolescent girls.

**Table 1**

Areas	't' Value		Table value
	Control group	Experimental group	
Dysmenorrhea pain	6.83	10.34	2.15
Physical symptoms	6.51	8.27	2.15
Gastro intestinal symptoms	6.53	8.68	2.15
Psychological symptoms	5.67	9.96	2.15
Elimination symptoms	6.38	8.23	2.15
Total	7.65	14.91	2.15

Table (2) Comparison of mean, SD, and mean percentage of control group pre and post test scores: It reveals that, in dysmenorrhea pain, the pre-test mean score was  $(9.71 \pm 1.48)$ , which is 97%, whereas in post-test the mean score was  $(8.85 \pm 1.65)$ , which is 88%, showing a difference of 9% on the level of dysmenorrhea pain. In dysmenorrhea symptoms the pre-test mean score was  $(19.98 \pm 1.63)$ , which is 95%, whereas in post-test the mean score was  $(17.48 \pm 1.82)$ , which is 83%, showing a difference of 12% on level of dysmenorrhea symptoms. It seems that without intervention there is no improvement among adolescent girls with dysmenorrhea.

**Table 2: Comparison of Pretest and posttest scores control group**

Areas	Max. scores	Pre-test score			Post-test score			Difference in Mean (%)
		Mean	SD	Mean (%)	Mean	SD	Mean (%)	
Dysmenorrhea pain	10	9.71	1.48	97	8.85	1.65	88	9
Physical symptoms	7	6.34	1.10	91	5.82	1.57	83	8
Gastrointestinal symptoms	5	4.32	0.75	86	3.98	0.43	80	6
Psychological symptoms	5	4.71	0.92	94	3.54	0.62	89	5
Elimination symptoms	4	3.86	1.49	96	3.40	1.38	85	11
Total	21	19.98	1.63	95	17.48	1.82	83	12

Table (3) Comparison of mean, SD, and mean percentage of experimental group pre and post test scores reveals that, dysmenorrhea pain the pre-test mean score was  $(9.73 \pm 1.81)$ , which is 97%, whereas in post-test the mean score was  $(7.85 \pm 1.65)$ , which is 78%, showing a difference of 19% on the level of dysmenorrhea pain. In dysmenorrhea

symptoms the pre-test mean score was  $(19.98 \pm 1.53)$ , which is 95%, whereas in post-test the mean score was  $(13.48 \pm 1.62)$ , which is 64%, showing a difference of 31% on level of dysmenorrhea symptoms. It seems that reflexology was effective in reducing the dysmenorrhea pain and symptoms among adolescent girls.

**Table 3**

Areas	Max. scores	Pre-test score			Post-test score			Difference in Mean (%)
		Mean	SD	Mean (%)	Mean	SD	Mean (%)	
Dysmenorrhea pain	10	9.73	1.81	97	7.85	1.65	78	19
Dysmenorrhea symptoms								
Physical symptoms	7	6.74	1.09	96	4.82	1.74	69	27
Gastro intestinal symptoms	5	4.22	0.84	84	3.88	0.36	78	6
Psychological symptoms	5	4.73	0.94	95	3.23	0.24	65	30
Elimination symptoms	4	3.86	0.49	96	2.92	1.08	73	23
Total	21	19.98	1.53	95	13.48	1.62	64	31

Effectiveness between control and experimental groups post test scores on level of dysmenorrhea: The unpaired 't' test value was 6.34 and 9.56, when compared to table value (2.05,  $p < 0.05$ ), it is high. It shows that there was a significant effectiveness of reflexology on dysmenorrhea among adolescent girls.

scores reveal that, in control group mean score was  $(9.71 \pm 1.48)$ , which is 97%, whereas in experimental group the mean score was  $(7.85 \pm 1.65)$ , which is 78%, showing a difference of 19% on the level of dysmenorrhea pain. In control group mean score was  $(19.98 \pm 1.63)$ , which is 95%, whereas in experimental group the mean score was  $(13.48 \pm 1.62)$ , which is 64%, showing a difference of 31% on level of dysmenorrhea symptoms. It seems that reflexology was effective in reducing the dysmenorrhea pain and symptoms among adolescent girls.

Table (4) Area wise comparison of mean, SD, and mean percentage of control and experimental group post-test dysmenorrhea scores: Comparison of mean, SD, and mean percentage of control group and experimental group post test

**Table 4**

Areas	Max. scores	Post test score						Difference in Mean (%)
		Control group			Experimental group			
		Mean	SD	Mean (%)	Mean	SD	Mean (%)	
Dysmenorrhea pain	10	9.71	1.48	97	7.85	1.65	78	19
Dysmenorrhea symptoms								
Physical symptoms	7	6.34	1.10	91	4.82	1.74	69	22
Gastro intestinal symptoms	5	4.32	0.75	86	3.88	0.36	78	8
Psychological symptoms	5	4.71	0.92	94	3.23	0.24	65	29
Elimination symptoms	4	3.86	1.49	96	2.92	1.08	73	23
Total	21	19.98	1.63	95	13.48	1.62	64	31

Table (5) Association between post test score and demographic variables of adolescent girls reveals that there is no significant association between dysmenorrhea symptoms scores when compared to the age, class, education of parents, occupation of parents, religion, age at menarche, duration of menstrual cycle, days of menstrual flow, family history of dysmenorrhea, practice of home remedies, frequency of observation of dysmenorrhea problem and source of information. So accept the null hypothesis in these variables. Whereas there is a significant association with education of parents and frequency of observation of dysmenorrhea problems, so reject the null hypothesis in these aspects of demographic variables. Hence it can be concluded that there is significant association between the post test score with the demographic variables of education of parents and frequency of observation of dysmenorrhea symptoms.

**Table 5:** Association between experimental group post test scores and demographic variables

Sl. No.	Variables	Degrees of freedom	$\chi^2$	Level of Significant
1	Age (in year)	2	0.96	Not Significant
2	Class	1	1.01	Not Significant
3	Education of parents	2	5.33	Significant
4	Occupation of parents	1	0.54	Not Significant
5	Religion	1	0.67	Not Significant
6	Age at menarche	1	0.28	Not Significant
7	Duration of menstrual cycle	1	0.59	Not Significant
8	Days of menstrual flow	2	0.3	Not Significant
9	Family history of dysmenorrhea	1	0.11	Not Significant
10	Practice of home remedies	1	0.50	Not Significant
11	Frequency of observation of dysmenorrhea	2	5.56	Significant
12	Source of information	1	0.68	Not Significant

Table (6) Association between post test score and demographic variables of adolescent girls reveals that there is no significant association dysmenorrhea symptoms scores when compared to the age, class, education of parents, occupation of parents, religion, age at menarche, duration of menstrual cycle, days of menstrual flow, family history of dysmenorrhea, practice of home remedies, frequency of observation of dysmenorrhea problems and source of information. So accept the null hypothesis in these variables. Whereas there is a significant association with education of parents and duration of menstrual cycle, so reject the null hypothesis in these aspects of demographic variables. Hence it can be concluded that there is significant association between the post test score with the demographic variables of education of parents and duration of menstrual cycle.

S.No.	Variables	Degrees of freedom	$\chi^2$	Level of Significant
1	Age (in year)	2	0.81	Not Significant
2	Class	1	1.98	Not Significant
3	Education of parents	2	6.24	Significant
4	Occupation of parents	1	0.81	Not Significant
5	Religion	1	0.19	Not Significant

6	Age at menarche	1	0.32	Not Significant
7	Duration of menstrual cycle	1	4.32	Significant
8	Days of menstrual flow	2	0.36	Not Significant
9	Family history of dysmenorrhea	1	0.21	Not Significant
10	Practice of home remedies	1	0.19	Not Significant
11	Frequency of observation of dysmenorrhea	2	0.19	Significant
12.	Source of information	1	1.94	Not Significant

## 5. Discussion

Frequency and percentage distribution of samples according to their demographic variables: Distribution of control and experimental group of adolescent girls according to their age group shows that highest percentage (47% and 60%) of the adolescent girls were in the age group of 15 to 16 years in both the groups. Distribution of control and experimental group of adolescent girls according to their age at menarche shows that highest percentages (60% and 53%) of the adolescent girls belong to less than 13 years. About 40% and 47% of the adolescent age at menarche were between 13 to 14 years in both the groups.

According to their practice of home remedies in both groups shows that highest percentages (73% and 60%) of the adolescent girls do not practice home remedies. The frequency of observing dysmenorrhea symptoms shows that highest percentages (93% and 87%) of the adolescent girls had observed dysmenorrhea symptoms on every cycle and only 7 % and 13 % of adolescent girls' alternate cycle observing dysmenorrhea symptoms in both the groups. From both group (40% and 47%) of the adolescent girls received information's from their mothers regarding dysmenorrhea, it was quite interesting to note that 47 % and 40 % of the adolescent girl's gained awareness on information regarding dysmenorrhea from their teachers in both the groups. This result was supported by the previous cross sectional study by Nahall habibi (2015).

Frequency and percentage distribution of pre and post test scores of dysmenorrhea pain among adolescent girls: Frequency and percentage distribution of control group pre-test and post test scores on level of dysmenorrhea pain among adolescent girls depicts that, in pretest all (100%) of them had severe pain, whereas in post-test, most of them (87%) had severe pain and 13% of adolescent girls had moderate pain. With regard to the post test scores of dysmenorrhea symptoms among adolescent girls in control and experimental group reported that, the common dysmenorrhea symptoms experienced in control group was feeling of heaviness in the lower abdomen (100%), and similar (87%) percentage of symptoms experienced were lethargy and tiredness, fullness and tenderness of breast, nausea and gaseous distension of abdomen. Similar (80%) percentage of symptoms experienced were pain and swelling in the ankle, swelling of face, loss of appetite, anorexia, constipation and frequency of micturition.

In course of post-test intervention, the symptoms marked was lethargy and tightness of breast, anorexia and frequency

of micturition (40%), fullness and tenderness of breast, nausea, distension of abdomen and diarrhea (47%). It seems the reflexology was effective in reducing the dysmenorrhea pain and symptoms among adolescent girls. Frequency and percentage distribution of control group and experimental group post test scores of level of dysmenorrhea pain among adolescent girls depicts that, in control group majority (87%) of them had severe pain and 13 percent of them had moderate pain, whereas in experimental group most of them (80%) had mild pain and 20% of adolescent girls had moderate pain. It seems that reflexology was effective in reducing the dysmenorrhea pain among adolescent girls.

The first objective of this study was to assess the level of dysmenorrhea among adolescent girls in control group and experimental group before and after reflexology. The study results revealed that there was a significant difference in level of dysmenorrhea among adolescent girls in control group and experimental group before and after reflexology. So the first hypothesis was accepted. The second goal of this current study was a significant difference between reflexology on dysmenorrhea among adolescent girls in control and experimental group, study revealed there is difference. Third objective was to find out the association between post test scores of dysmenorrhea among control and experimental group of adolescent girls with their demographic variables.

Chi square test showed education of parents and frequency of observation of dysmenorrhea problems in control group and duration of menstrual cycle in experimental group have significant association ( $P < 0.05$ ) with their post test scores of level of dysmenorrhea and other demographic variables have no significant association ( $P > 0.05$ ) with the post test score of level of dysmenorrhea in both control and experimental group

Hence the differences observed in the mean scores values were only by chance and not true difference. It seems that reflexology was effective to all the adolescent girls irrespective of their demographic variables. The above results showed that the third hypothesis was rejected.

Most significant menstrual problems in Tamil Nadu are dysmenorrhea, which is increased remarkably due to lack of awareness and knowledge on effects of dysmenorrhea and related diseases. This shows that need for reflexology on awareness regarding dysmenorrhea symptoms and nurses are in the ideal position to provide reflexology therapy on dysmenorrhea symptoms to individual, families and community at large.

## 6. Nursing Implications

Despite its high prevalence and associated negative effects, many adolescents do not seek medical care for dysmenorrhea. Appropriate counseling and management should be instituted among female students to help them cope with the challenges of dysmenorrhea, information, education, and support should also be extended to parents, school peer leaders in order to address the reproductive health needs of the female students. The investigator has devised the following implications: Maternity nurse can

train the local volunteers, community health personnel, family members of adolescent girls in screening for the risk level related to harmful effect of dysmenorrhea. She can provide menstrual problem education, simple home remedies plus alternative therapies (Reflexology), continued monitoring and referral to specialist for evaluation and treatment based on the risk level due to dysmenorrhea, help the mother and teacher to strengthen the need and commitment to reduce dysmenorrhea by addressing the related health and effect, involve in reproductive health information campaigns and menstrual problem free activities and events at school and community level to change family attitude for menstrual problem of dysmenorrhea. She should also be aimed at providing individual intervention to help the adolescent girls to be aware of the potential risk at an early stage and prevent extensive problem.

## 7. Summary & Conclusion

Reflexology is an intervention which helps in reducing the dysmenorrhea pain and improving the dysmenorrhea symptoms, control group mean score was ( $9.71 \pm 1.48$ ), which is 97%, whereas in experimental group the mean score was ( $7.85 \pm 1.65$ ), which is 78%, showing a difference of 19% on the level of dysmenorrhea pain. In control group mean score was ( $19.98 \pm 1.63$ ), which is 95%, whereas in experimental group the mean score was ( $13.48 \pm 1.62$ ), which is 64%, showing a difference of 31% on level of dysmenorrhea symptoms. It seems that reflexology was effective in reducing the dysmenorrhea pain and symptoms among adolescent girls. The calculated unpaired 't' value ( $t = 10.34$  and  $t = 14.91$ ) was higher than the table value ( $t_{14} = 2.15$ ,  $p < 0.05$ ). There was a significant reduction in posttest dysmenorrhea symptoms score of adolescent girls in control group than the posttest dysmenorrhea symptoms score of experimental group. The computed 't' value ( $t = 6.34$  and  $t = 9.56$ ) was greater than the table value ( $t_{28} = 2.05$ ,  $p < 0.05$ ). There is no significant association between post-test dysmenorrhea score with demographic variables of adolescent girls in control group and experimental group. Similar study by Priya Kannan et al 2015 did the research to associate the relation between pain intensity and demographic variables.

## References

- [1] Arampour E, Khoshnam E, The effect of massage training on primary dysmenorrhea. *Advances in Environmental Biology*. 2012; 6: 3040
- [2] Aourel M, Skoog M, Carleson J. Effects of Swedish massage on blood pressure. *Complementary therapies in clinical practice*. 2005; 11[4]: 242-246
- [3] Chen MN, Chien LW, Liu CF. Acupuncture or Acupressure at the Sanyinjiao [SP6] Acupoint for the Treatment of Primary Dysmenorrhea: A Meta-Analysis. *Evid Based Complement Alternative Medicine*. 2013; 493038.
- [4] Cho SH, Kim J. Efficacy of acupuncture in management of premenstrual syndrome: a systematic review. *Complement Therapy Medicine*. 2010 Apr; 18(2):104.
- [5] Lakey H, Chisholm C, Dear F, Harris B, Hartwell R, Daley A, Jolly K. Is exercise associated with primary

- dysmenorrhea in young women? Bjog: An international journal of obstetrics & gynecology. 2010; 117[2]: 222-224.
- [6] Latthe PM, Champaneria R, Khan KS. Dysmenorrhea. *Clinical Evidence*. 2011; 2011: 0813.
- [7] Mahboubeh Valiani, Eleheh Babaei, Reza Heshmat and Zahra Zare, 2010, Iranian journal of Nursing and Midwifery, 15, 371-378.
- [8] Nahall habibi, Mary Soo LeeHuang, YingGan, Sayyed MortezaSafavi, Prevalence of primary dysmenorrhea and factors associated with its intensity among undergraduate students cross-sectional study, *Pain Management Nursing*, 2015, P 855-861.
- [9] Ou MC, Hsu TF, Lai AC, Lin YT, Lin CC. Pain relief assessment by aromatic essential oil massage on outpatients with primary dysmenorrhea: a randomized, double blind clinical trial. *Journal of obstetrics and gynecology research*. 2012; 38[5]: 817-822
- [10] Priya Kannan, Cathy M Chapple, Dawn Miller, Leica S Cladydon, G David Baxter, Menstrual pain and quality of life in women with primary dysmenorrhea, *Contemporary clinical trials*, Elsevier, 2015.
- [11] Pushpamala Ramaiah, Lamia Ahmed Elsayed and Hamdia Khamis, Effectiveness of topical anesthesia cream in reducing the pain associated with IV cannulation, *International journal of science and research (IJSR)*, vol 5, Issue 12, 2016, 1815-17.
- [12] Pushpamala Ramaiah, Ayman Johargy, Hamdia Khamis, Guidelines of awareness on Breast cancer, *International journal of science and research (IJSR)*, vol 6, Issue 3, 2017, 1956-1960.
- [13] Shabnam Omidvar, Fatemah Bakouei, Fatemeh Nasiri Amiri and Khyrunnisa begum, 2016, Primary dysmenorrhea and menstrual symptoms in Indian female students: Prevalence, impact and Management, *Global Journal of Health Science*, 8(8): 135-144.
- [14] Sara Azima, Hajar Rajaei Bakhshayesh, Samaneh Mousavi, Akram Ashrafizaveh, Comparison of the effects of reflexology and massage therapy on primary dysmenorrhea. *Allied academics*, 2015.
- [15] Valiani M, Babaei E, Heshmat R, Zare Z, Comparison the effect of reflexology and Ibuprofen methods on dysmenorrhea in female students of Isfahan University of medical sciences. *Iran Journal of Nursing Midwifery*, 2010, 371-378.
- [16] Vincenzo De Sanctis, Ashraf T Soliman, Heba Elsedfly, Nada A Soliman, Mohamed El Kholy, Dysmenorrhea in Adolescents and Young Adults: A review in Different country, *ACTA BIO MEDICA*, 2016, Vol 87, No 3.