

# The Effectiveness of Cognitive-behavioral Therapy on Reducing the Depression as a Dysmenorrhea Symptom in Iranian Girls based on Randomized Control Trial (RCT)

Azizreza. Ghasemzadeh<sup>1</sup>, Maryam. Saadat<sup>2\*</sup>

<sup>1</sup> Armada Medical Centre, Dubai, UAE

<sup>2</sup> Lifeworks Holistic Counselling Centre, Dubai, UAE

\* Corresponding author email address: maryamsaadat@lifeworks.ae

## Article Info

### Article type:

Original Research

### How to cite this article:

Ghasemzadeh, A., & Saadat, M. (2023). The Effectiveness of Cognitive-behavioral Therapy on Reducing the Depression as a Dysmenorrhea Symptom in Iranian Girls based on Randomized Control Trial (RCT). *Journal of Assessment and Research in Applied Counseling*, 5(5), 23-28.  
<http://dx.doi.org/10.61838/kman.jarac.5.5.3>



© 2023 the authors. Published by KMAN Publication Inc. (KMANPUB), Ontario, Canada. This is an open access article under the terms of the Creative Commons Attribution-NonCommercial 4.0 International (CC BY-NC 4.0) License.

## ABSTRACT

**Objective:** Depression is one of the most prevalent disorders among the girls with dysmenorrhea. The present research aimed to examine the effectiveness of cognitive-behavioral therapy on reducing the depression severity in primary dysmenorrhea among a selected group of Iranian girls in Tehran.

**Methods and Materials:** The study was conducted in a Randomized controlled Trial (RCT) framework with pre- and posttest. The population included all 20 to 30 year old girls who were studying in Tehran University of Medical Sciences in 2015, among whom a total number of 73 applicants were conveniently selected. A primary interview through Beck Depression Inventory (BDI) was conducted to identify the Depression and dysmenorrhea in the sample. Finally, the sample decreased into 41 persons, among whom 34 applicants were randomly selected and divided into two groups of experimental and control, each of which with 17 people. The experimental group received the cognitive-behavioral therapy for nine sessions, each lasting for two hours while the control group received no treatment. The data were analyzed through inferential statistics such as Analysis of Covariance (ANCOVA) in SPSS, version 20.

**Findings:** The mean scores for the experimental group dropped in posttest compared to the pretest while the mean score for the control group was not significant. Therefore, the cognitive-behavioral therapy could significantly differentiate between experimental and control groups ( $p < 0.01$ ).

**Conclusion:** It can be concluded that cognitive-behavioral therapy could considerably impact on the reduction of depression severity in adolescent girls.

**Keywords:** Depressive disorder, dysmenorrhea, behavior therapy, female.

## 1. Introduction

Dysmenorrhea is gynecological disorder which is common among 50% of women with regular menstruation cycles (Ryan et al., 2005; Ryan, 1999),

among whom more than 10% suffer severe symptoms like incapability in performing daily activities (Dysmenorrhea; Rapkin, 2004). Some of women were reported to fail doing their normal activities due to the painful menstrual cramps

which last for at most three days. Dysmenorrhea is the most prevalent gynecological disorder in adolescents and the young girl (*Dysmenorrhea*). Primary dysmenorrhea is defined as cramping pain in the lower abdomen with increased production of endometrial prostaglandin which occurs just before or during menstruation, in the absence of identifiable pelvic disease and may last till 40 years old. Prevalence rates are as high as 90% (Berek, 2007; Berek & Novak, 2007; Modarres et al., 2011) which is the nearly similar for Iranian women (Modarres et al., 2011; Nazarpour & Khazai, 2012). Dysmenorrhea and the symptoms such as nausea, vomiting, diarrhea, fatigue, fever, and headache threat the life quality of young women (Burnett et al., 2005). The sufferers may be absent from school or work as they are required to take rest for a while (Calis, 2009). Menstruation cycles can negatively impact on women's daily life, academic activities and professional responsibilities. Similarly, the disorder affects the adolescents' personal and social life (French, 2005; Lentz, 2007).

Furthermore, dysmenorrhea influences the image that girls have about becoming pregnant and mother, which causes some problems for them and the family (Amodei et al., 1987). Menstrual pains are under direct effect of social status, type of pregnancy, diet, smoking, alcohol consumption, physical activity, mental status, bleeding periods, and marital status (Fritz & Speroff, 2011). Most of common existing therapy methods have side effects. Medical therapy such as nonsteroidal anti-inflammatories (NSAIDs) are common treatment for dysmenorrhea, however, the efficacy of treatments such as nonsteroidals is considered to be a failure since the rate is still often 20-25% (Shahrjerdi & Shaych Hosaini, 2010).

Therefore, it would be necessary to present a therapy method which can provide the patients with a treatment method free of any side effect (Reyhani et al., 2013). The dysmenorrhea degree of severity has been reported to be attributed to the psychological and behavioral factors (Calis, 2009). Although these factors have not been proved to directly influence on the disorder, the role they can play in deterioration of dysmenorrhea is considerable. The menstrual pain, like other forms of pains, may accompany anxiety, tension, or impatience (Golomb et al., 1998). Therefore, it seems that psychology has broadened the horizon for reaching a new therapy in primary dysmenorrhea (Nazarpour & Khazai, 2012). Identifying the factors which are influential in affecting dysmenorrhea can

be a great step in treating the disorder and facilitating the treatment for patients.

The individual mindset, beliefs and expectations, attitudes and emotions has a big proportion in facing with psychological challenges, facing with which can be simplified through cognitive-behavioral therapy (Rajabpour & Nejat, 2019; Scheer et al., 2023). Cognitive-Behavioral Therapy (CBT) includes methods to face against negative thoughts, learning behaviors and social skills in new situations, reducing anxiety and fear, tackling problematic behavioral patterns, challenging with negative mindset, and finally understanding the link between stimuli, thoughts and feelings (Ghasemi et al., 2022; Moura et al., 2020). Taking into account the relationship between psychological factors and physical disorders, which has been the subject of many studies, the present research aims at examining the effectiveness of using cognitive-behavioral therapy in reducing the depression in dysmenorrhea for a sample of Iranian girls. The research is based on the hypothesis that cognitive-behavioral therapy can reduce the depression in dysmenorrhea Iranian girls.

## 2. Methods and Materials

### 2.1. Study Design and Participants

The present research was conducted in a Randomized controlled Trial (RCT) framework, in which two groups of experimental and control took part in pre- and posttest. The population included all 20 to 30 year old girls who were studying in Tehran University of Medical Sciences from April to June 2015, among whom a total number of 73 applicants were conveniently selected through public call. Having received the consent form applicants, they filled out the primary interview form, which contained clinical questions to differentiate the primary and secondary dysmenorrhea (pain caused by a problem of the womb or pelvis), and Beck Depression Inventory (BDI). The items related to the primary dysmenorrhea were selected through sources, which were employed in clinical centers. It is worth mentioning that applicants' consent was received before taking part in the study. With regard to the data extracted from interviews and the inventory, the sample size decreased to 41 people, among whom 34 applicants were randomly selected and divided into two groups of experimental and control, each of which with 17 people. The groups completed the Beck Depression Inventory.

The criteria to be included into the treatment were being single, having regular menstrual periods, having primary

dysmenorrhea for three consecutive periods, not having physical problems for hiking, and getting the score higher than 14 in BDI. Factors such as pelvic or lower abdominal surgeries, coagulopathy, experiencing abnormal abdominal or pelvic sonography, taking alcoholic drinks, drugs, contraceptives, abnormal vaginal bleeding, and stress were considered as the exclusion criteria. It is worth mentioning that all participants were taking antidepressant drugs.

It is worth mentioning that the research was conducted for one session in a week, totally with nine months. An expert psychologist along with a MA graduate in the same field was managing the sessions, which were held in Bozorgmehr Centre in Tehran, Iran.

## 2.2. Measures

### 2.2.1. Depression

To gather the data, Beck's Depression Inventory- second edition (BDI-II) was employed. The inventory is a 21-item scale considered a multiple-choice self-report inventory intended to assess the existence and severity of symptoms of depression. Also, there is a four-point scale for each item ranging from 0 to 3. The Cronbach's alpha for outpatients and college students was reported as 0.92 and 0.93 respectively which show that the scale is considered acceptable for Iranian samples (Dadfarnia et al., 2020).

## 2.3. Intervention

### 2.3.1. CBT

#### Session 1:

The session was aimed at familiarizing the applicants with muscle relaxation, the symptoms of dysmenorrhea; also, some explanations about the cognitive-behavioral therapy, stress and its effects on body, and the relaxation effectiveness were given to the applicants. Moreover, the pretest was performed.

#### Session 2:

The session aimed to give some information about the automatic thoughts and make the applicants aware of the physical tension.

#### Session 3:

The session was aimed at informing the applicants about the relationship between thoughts and feelings, learning the

assessment process, understanding the cycle of thoughts, feelings and physical status.

#### Session 4:

The purpose of session was to identify the negative thoughts in order to have an examination on the effects they can have on the human behaviors

#### Session 5:

The objective of the session was to identify the logical and illogical self-talk, leaning the alternatives for logical thoughts, and practicing how to replace the distorted thoughts with logical thoughts

#### Session 6:

The session was aimed at understanding the meaning of the concept of coping, and various styles of coping.

#### Session 7:

The session was aimed at learning some concepts about anger, the patterns and responds to the anger, and how to manage the anger.

#### Session 8:

The purpose of session was to learning the learning styles, practicing expressive communication, learning the obstacles to expressive behaviors, and using problem-solving skills in order to remove barriers.

#### Session 9:

The session was to summarize the taught materials, getting along with depressed people through effective methods, examining the executive limitations in posttest (Beck Depression Inventory).

## 2.4. Data analysis

Descriptive statistical methods and Analysis of Covariance (ANCOVA) were applied with SPSS version 20 (IBM-SPSS) to analyze the data.

## 3. Findings and Results

Regarding the descriptive statistics in Table 1, it can be seen that the mean scores of depression for control group were reported 16.80 and 16.60 in pre- and posttest respectively whereas the scores for the experimental group were as 17.00 and 14.26 respectively. Therefore, it can be said that the mean scores for the experimental group dropped in posttest compared to the pretest while the mean score for the control group was not significant  $p < 0.01$

**Table 1**

*Descriptive Indices of Research Variables*

Group	Stage	Mean	Median	Mode	SD	Variance	Minimum	Maximum
Control	Pretest	16.80	17.00	16.00	2.24	5.09	12.00	21.00
	Posttest	16.60	16.00	16.00	2.35	5.54	12.00	22.00
Experimental	Pretest	17.00	17.00	16.00	2.00	4.00	13.00	21.00
	Posttest	14.26	15.00	12.00	2.12	4.49	11.00	17.00

Table 2 shows that with regards to the pretest scores as a covariate variable, the cognitive-behavioral therapy could considerably differentiate between the groups of experimental and control ( $p < 0.01$ ). Considering the eta

coefficient as 61.2, it can be concluded that the cognitive-behavioral therapy could reduce the symptoms of depression as 61.2 %.

**Table 2**

*Results of ANCOVA*

Source	SS	Df	MS	F	p	Eta <sup>2</sup>
Pretest	113.882	8	14.235	106.82	0.00	0.810
CBT	42.15	1	42.015	31.529	0.00	0.612
Error	26.652	20	1.333			

#### 4. Discussion and Conclusion

The present study aimed to investigate the effectiveness of cognitive-behavioral therapy on reducing the depression severity in primary dysmenorrhea among a selected group of Iranian girls in Tehran.

Research studies showed that cognitive-behavioural therapy could significantly and positively reduce the level of depression in females suffering from dysmenorrhea. The results can be justified in this manner that most of the applicants were not aware of their disorders, which led to not having any treatment solution. In addition, the negative consequences of the disorder resulted in its deterioration.

Cognitive-behavioural therapy sessions could help the patients understand their illness and encouraged them to have a comprehensive examination on their disorders and found some solutions through traditional medicine and change in their life style. On the other hand, negative attitudes of patients towards treatment through medicine (Shahrjerdi & Shaych Hosaini, 2010) culminated to the fact that they were not inclined to apply such a treatment due to its chemical side effects. Studies also revealed that females were challenging with a vicious deteriorating cycle (Dawood, 2006), which denotes that menstruation could negatively affect their academic and professional functions (French, 2005; Lentz, 2007). This issue could worsen the consequences of dysmenorrhea. Consequently, the increase

in dysmenorrhea can result in weakness in function. Other studies have proved the same consequence for dysmenorrhea, in which the severity of symptoms could debilitate the patients. Cognitive-behavioral therapy reduces the symptoms of dysmenorrhea such as depression and reduces the tensions of the disorder considerably. The research findings are in line with some previous studies (Amodei et al., 1987; Maddineshat et al., 2016; Proctor et al., 2007).

Any reduction in the psychological tension would lead to lowering in dysmenorrhea including depression symptoms. The result will be a significant reduction of tension in patients. Regarding the literature review, there is no study conducted on the effectiveness of cognitive-behavioural therapy in reducing the symptoms of menstruation in females with primary dysmenorrhea.

However, findings of the present research are in line with the one conducted by Keneddy et al. (2014) and Proctor et al. (2007) (Kennedy et al., 2014; Proctor et al., 2007). These studies both have examined the effectiveness of behavioural therapy on reduction of psychological symptoms in primary dysmenorrhea. In addition, the results are consistent with the study of Hunter (2003), who examined the effectiveness of cognitive-behavioural therapy in reducing the syndrome symptoms in pre-menstruation and pre-menopause. Hunter's study has some similarities with the present research in methods for challenging the negative thoughts, changing illogical

beliefs, explaining the relationship between stimulus-thought-emotion and psychological behaviour (Hunter, 2003). This relationship can help females reduce their psychological problems during menstruation.

It can be concluded that the treatment method including facing with negative thoughts (the reason for women's resentment), learning social behaviors and skills (regulating the time off hours with first days of menstruation), negotiating with principals in order to provide employees with some facilities, practicing relaxation in order to control the depression symptoms, etc. can incredibly reduce the symptoms of depression in women with dysmenorrhea. It is suggested that researchers conduct a treatment with different approach and compare the results with those of present study.

## 5. Limitations & Suggestions

The study's limitations include the small sample size and its focus on a specific demographic (Iranian girls aged 20-30 years with primary dysmenorrhea), which may limit the generalizability of the findings. The research also relied solely on self-reported measures for depression and dysmenorrhea symptoms, potentially introducing bias. Additionally, there was a lack of long-term follow-up to assess the sustainability of the treatment effects.

Future research should consider larger and more diverse sample populations to enhance the generalizability of the findings. Longitudinal studies are needed to evaluate the long-term effectiveness of cognitive-behavioral therapy (CBT) in treating depression associated with dysmenorrhea. Further exploration into the mechanisms underlying the observed therapeutic effects would also be beneficial. Investigating the integration of CBT with other therapeutic approaches could provide a more comprehensive treatment model.

In clinical practice, it is recommended to incorporate CBT as part of the treatment regimen for adolescent girls and young women experiencing depression due to dysmenorrhea. Healthcare providers should be trained in delivering CBT effectively and sensitively, considering the cultural and individual nuances of their patients. Additionally, patient education about the connection between mental health and dysmenorrhea is crucial for

promoting self-awareness and self-care strategies. Integrating multidisciplinary approaches, including psychological and medical interventions, might enhance treatment outcomes.

## Acknowledgments

We would like to express our appreciation and gratitude to all those who cooperated in carrying out this study.

## Declaration of Interest

The authors of this article declared no conflict of interest.

## Ethics Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants. The trial is registered at the Thai Clinical Trial Registry ([clinicaltrials.in.th](http://clinicaltrials.in.th)) with the TCR identification number TCTR20170126001.

## Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

## Funding

This research was carried out independently with personal funding and without the financial support of any governmental or private institution or organization.

## Authors' Contributions

Azizreza Ghasemzadeh contributed to the conceptualization of the research, participant recruitment, data collection, and the design and implementation of the cognitive-behavioral therapy intervention. Maryam Saadat played a key role in the statistical analysis, interpretation of the results, and manuscript preparation. Both authors reviewed and approved the final manuscript for publication.

## References



- Amodei, N., Nelson, R. O., Jarrett, R. B., & Sigmon, S. (1987). Psychological treatments of dysmenorrhea: Differential effectiveness for spasmodics and congestives. *Journal of Behavior Therapy and Experimental Psychiatry*, 18(2), 95-103. [https://doi.org/10.1016/0005-7916\(87\)90022-X](https://doi.org/10.1016/0005-7916(87)90022-X)
- Berek, J. S. (2007). Berek & Novak's Gynecology. In.
- Berek, J. S., & Novak, E. R. (2007). *Berek & Novak's gynecology*. [https://digital.library.tu.ac.th/tu\\_dc/frontend/Info/item/dc:18207](https://digital.library.tu.ac.th/tu_dc/frontend/Info/item/dc:18207)
- Burnett, M. A., Antao, V., Black, A., Feldman, K., Grenville, A., Lea, R., Lefebvre, G., Pinsonneault, O., & Robert, M. (2005). Prevalence of Primary Dysmenorrhea in Canada. *Journal of Obstetrics and Gynaecology Canada*, 27(8), 765-770. [https://doi.org/10.1016/S1701-2163\(16\)30728-9](https://doi.org/10.1016/S1701-2163(16)30728-9)
- Calis, K. (2009). Dysmenorrhea. <http://emedicine.medscape.com/article/253812-overview>
- Dadfarnia, S., Hadianfard, H., Rahimi, C., & Aflakseir, A. (2020). Predicting Depression Based on Cognitive Emotion Regulation Strategies [Research]. *Tolooebehdasht*, 19(1), 32-47. <https://doi.org/10.18502/tbj.v19i1.2815>
- Dawood, M. Y. (2006). Primary Dysmenorrhea: Advances in Pathogenesis and Management. *Obstetrics & Gynecology*, 108(2), 428-441. <https://doi.org/10.1097/01.AOG.0000230214.26638.0c>
- Dysmenorrhea. (2012). <http://www.clinicalconnection.com/clinicaltrials/condition/dysmenorrheal.aspx>.
- French, L. (2005). Dysmenorrhea. *Am Fam Physician*, 71(2), 285-291. <https://pubmed.ncbi.nlm.nih.gov/15686299/>
- Fritz, M. A., & Speroff, L. (2011). *Clinical gynecologic endocrinology and infertility*. lippincott Williams & wilkins. [https://books.google.com/books?hl=en&lr=&id=L173ZsBKlKwC&oi=fnd&pg=PA428&dq=21\)+Fritz+MA+,+Speroff+L.+Clinical+gynecologic+endocrinology+and+infertility.+8th+ed.+Philadelphia:Lippincott+Williamd+%26+Wilkins%3B2011.&ots=gQjkhktsK&sig=Lf8Amfu\\_1sg8ZoB\\_8Mq6azzfw4E](https://books.google.com/books?hl=en&lr=&id=L173ZsBKlKwC&oi=fnd&pg=PA428&dq=21)+Fritz+MA+,+Speroff+L.+Clinical+gynecologic+endocrinology+and+infertility.+8th+ed.+Philadelphia:Lippincott+Williamd+%26+Wilkins%3B2011.&ots=gQjkhktsK&sig=Lf8Amfu_1sg8ZoB_8Mq6azzfw4E)
- Ghasemi, N., Rezaei, F., & Sadeghi, M. (2022). The Effectiveness of Cognitive-behavioral Therapy on Sexual Function and Quality of Marital Relationships in Women with Sexual Interest/Arousal Disorder [Research]. *Journal of nursing education*, 10(3), 78-87. <https://doi.org/10.22034/IJPN.10.3.78>
- Golomb, L. M., Solidum, A. A., & Warren, M. P. (1998). Primary dysmenorrhea and physical activity. *Medicine & Science in Sports & Exercise*, 30(6), 906-909. [https://journals.lww.com/acsm-msse/fulltext/1998/06000/primary\\_dysmenorrhea\\_and\\_physical\\_activity.20.aspx](https://journals.lww.com/acsm-msse/fulltext/1998/06000/primary_dysmenorrhea_and_physical_activity.20.aspx)
- Hunter, M. (2003). Cognitive behavioural interventions for premenstrual and menopausal symptoms. *Journal of Reproductive and Infant Psychology*, 21(3), 183-193. <https://doi.org/10.1080/0264683031000155006>
- Kennedy, S., O'Higgins, S., Sarma, K., Willig, C., & McGuire, B. E. (2014). Evaluation of a group based cognitive behavioural therapy programme for menstrual pain management in young women with intellectual disabilities: protocol for a mixed methods controlled clinical trial. *BMC Women's Health*, 14(1), 107. <https://doi.org/10.1186/1472-6874-14-107>
- Lentz, G. (2007). Primary and secondary dysmenorrhea, premenstrual syndrome, and premenstrual dysphoric disorder: etiology, diagnosis, management. *Comprehensive Gynecology. Part, 6*, 791-802. <https://www.em-consulte.com/article/520044/primary-and-secondary-dysmenorrhea-premenstrual-sy>
- Maddineshat, M., Keyvanloo, S., Lashkardoost, H., Arki, M., & Tabatabaiechehr, M. (2016). Effectiveness of Group Cognitive-Behavioral Therapy on Symptoms of Premenstrual Syndrome (PMS) . *Iran J Psychiatry*, 11(1), 30-36. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4888138/>
- Modarres, M., Mirmohammad Ali, M., Oshrieh, Z., & Mehran, A. (2011). Comparison of the Effect of Mefenamic Acid and Matricaria Camomilla Capsules on Primary Dysmenorrhea [Research]. *Journal of Babol University of Medical Sciences*, 13(3), 50-58. <http://jbums.org/article-1-3803-en.html>
- Moura, C. V., Tavares, I. M., & Nobre, P. J. (2020). Cognitive-Affective Factors and Female Orgasm: A Comparative Study on Women with and Without Orgasm Difficulties. *The Journal of Sexual Medicine*, 17(11), 2220-2228. <https://doi.org/10.1016/j.jsxm.2020.08.005>
- Nazarpour, S., & Khazai, K. (2012). Correlation between body image and coping styles with severity of primary dysmenorrhea. *Journal of Fundamentals of Mental Health*, 14(56), 55-344. <https://doi.org/10.22038/jfmh.2013.893>
- Proctor, M., Murphy, P. A., Pattison, H. M., Suckling, J. A., & Farquhar, C. (2007). Behavioural interventions for dysmenorrhoea. *Cochrane Database of Systematic Reviews*(3). <https://doi.org/10.1002/14651858.CD002248.pub3>
- Rajabpour, S., & Nejat, H. (2019). Comparison of the Cognitive-Behavioral Therapy and Drug Therapy with Bupropion on Sexual Satisfaction and Marital Disturbance in Women with Sex Anxiety [Original Research Article]. *Middle Eastern Journal of Disability Studies---*, 9(0), 28-28. <http://jdisabilstud.org/article-1-1385-en.html>
- <http://jdisabilstud.org/article-1-1385-en.pdf>
- Rapkin, A. J. (2004). Dysmenorrhea and chronic pelvic pain. *Essential Obstetrics and Gynecology*, 287-295. <https://cir.nii.ac.jp/crid/1574231876116473344>
- Reyhani, T., Jafarnejad, F., Behnam, H., Ajam, M., & Baghaei, M. (2013). The Effect of Brisk Walking on Primary Dysmenorrhea in Girl Students. *The Iranian Journal of Obstetrics, Gynecology and Infertility*, 16(46), 14-19. <https://doi.org/10.22038/ijogi.2013.764>
- Ryan, K., Berkowitz, R., Barbieri, R., & Donaif, A. (2005). *Kistner'Gynecology and women'health 1999. Translated by In: Ghazijahani B, Ghotbi R, editors. 7th ed. Tehran: Golban Publication, 189.* [https://books.google.com/books/about/Kistner\\_s\\_Gynecology\\_and\\_Women\\_s\\_Health.html?id=i8xsAAAAMAAJ](https://books.google.com/books/about/Kistner_s_Gynecology_and_Women_s_Health.html?id=i8xsAAAAMAAJ)
- Ryan, K. J. (1999). *Kistner's gynecology and women's health. (No Title)*. <https://cir.nii.ac.jp/crid/1130000795228902912>
- Scheer, J. R., Clark, K. A., McConocha, E., Wang, K., & Pachankis, J. E. (2023). Toward Cognitive-Behavioral Therapy for Sexual Minority Women: Voices From Stakeholders and Community Members. *Cognitive and Behavioral Practice*, 30(3), 471-494. <https://doi.org/10.1016/j.cbpra.2022.02.019>
- Shahrjerdi, S., & Shaych Hosaini, R. (2010). The effect of 8 weeks stretching exercise on primary dysmenorrhea in 15-17 aged high school student girls in Arak [Research]. *Journal of Shahrekord University of Medical Sciences*, 11(4), 84-91. <http://78.39.35.44/article-1-324-en.html>