Original Research Article

Evidence-Based Interventions: Effect on Dysmenorrheic Severity and Related Self-Care Practices

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Abstract

The aim of the current study was to determine the effect of evidence-based interventions on dysmenorrheic severity and related self-care practices. The Design of this study was quasi-experimental. The participants comprised all eligible students according to the inclusion criteria amounting to 193 students. Tools of this study included a dysmenorrheic screening questionnaire and a dysmenorrheic self-care practices questionnaire. The findings revealed that there was a statistically significant difference between dysmenorrheic severity and self-care practices at the pre and follow-up tests. It is concluded that the evidence-based interventions was effective in decreasing dysmenorrheic severity and improve related self-care practices. It is recommended that findings from this study could serve as a baseline for further interventional studies regarding dysmenorrhea management.

Keywords: dysmenorrhea, evidence based intervention and related self-care practices.

INTRODUCTION

According to [1], from menarche to menopause, most women pass through half a lifetime with a monthly menstruation which is a natural process that occurs in healthy adult female. They also added that girls begin to menstruate usually between the age of 9 and 12 years. During her lifetime, a woman will experience an average of 400 menstrual cycles prior to menopause and the average menstrual cycle lasts about 5 days, which accounts to approximately 67 months or 3000 days of menstrual bleeding over a lifetime [2].

Kao, Y. H. & Ko, H. L. [3] hypothesized that some reproductive age women experience significant pain with menstruation, a phenomenon called dysmenorrhea and that primary dysmenorrhea is the most prevalent menstrual health problem in childbearing age women. According to [4], adolescents have the highest prevalence of dysmenorrhea with approximately 90 percent experiencing the problem. Furthermore, dysmenorrhea is also a common health problem in the female population in Egypt, with estimates ranging from 73.3 to 89.4 percent in Egyptian girls.

Dysmenorrhea has been shown to be associated with age, mother's occupation, the duration of menstrual flow, age at menarche, irregular menses, skipping breakfast, BMI, exercise frequency, cigarette smoking, attitude toward menstruation, depression, anxiety, social support, and health education [5].

However, there are inconsistencies regarding factors such as BMI, exercise frequency, and length of menstrual cycle. Moreover, additional research is needed to determine the relationship between these factors and dysmenorrhea [6]. In addition [7] recommended that multiple regression studies should be conducted to explore the interrelationship among these factors in addition to their independent influence on the dysmenorrhea experience.

However, dysmenorrhea is so common that many women do not report it to health providers even when their daily activities are restricted [8, 9] found that only 4.1% of symptomatic students report their dysmenorrhea to either physicians or school nurses. Most symptomatic girls endure dysmenorrhea and its impact on their lives because they believe dysmenorrhea is a normal phenomenon [10]. Consequently, most girls with dysmenorrhea used self-care strategies to manage their discomfort instead of seeking interventions prescribed by health care professionals [11].

A growing body of research in the social and behavioral sciences has demonstrated that certain approaches and strategies for working with youth and their families can positively impact important social problems such as delinquency, teen pregnancy,

substance abuse and family violence [12]. Many of these effective approaches and strategies have been packaged into programs targeting outcomes specific to individuals, schools, families, and communities [13]. Those programs that have been found to be effective based on the results of rigorous evaluations are often called "evidence-based" [14]. An important element of EB is that they have been evaluated rigorously in experimental or quasi-experimental studies [15].

According to [13], few evidence-based interventions have been directed at improving attitudes and self-care behaviors among dysmenorrheic girls. Furthermore, health professionals are generally enthusiastic about the value of the EBP on offer. However, care should be taken to ensure that the quality of EBP provided in the education program is based on the best evidence available [14].

Significance of the Study
The results of recent studies showed that nearly 10 percent of college age females with dysmenorrhea experienced an absence rate of 1 to 3 days per month from college and were unable to do their regular/daily tasks due to their severe pain and other dysmenorrheic experienced symptoms [16]. Although young females due to cultural reasons, lack knowledge, have some wrong perceptions, beliefs, attitudes and self-care practices about dysmenorrhea and menstruation in our country, only a few studies have been focused on this issue so far [17]. Therefore, the researcher tries to promote nursing students' knowledge and self-care practices of dysmenorrhea and develop positive menstrual attitudes within an evidence-based program context, thereby promoting students' reproductive health and wellbeing.

Purpose of the Study
This study was conducted with the purpose of identifying the effect of evidence-based interventions on dysmenorrheic severity and related self-care practices.

Research Hypothesis
The evidence-based interventions will decrease dysmenorrheic severity. The evidence-based interventions will disseminate correct dysmenorrheic self-care practices.

Meta-Analysis of Available Studies
Meta-analyses offer a systematic and quantitative approach to synthesizing evidence to answer important therapeutic questions [18]. Meta-analysis is a statistical technique for combining the findings from independent studies [19]. It is most often used to assess the clinical effectiveness of healthcare interventions. This can be done by combining data from two or more randomized control trials [20]. Meta-analysis of trials provides a precise estimate of treatment effect, giving due weight to the size of the different studies included [21]. The validity of the meta-analysis depends on the quality of the systematic review on which it is based [22]. Good meta-analyses aim for complete coverage of all relevant studies, look for the presence of heterogeneity, and explore the robustness of the main findings [23].

While conducting the Meta-analysis for the current study; the following steps were taken:

Step I: Searching for Studies
The most reliable scientific websites as Medline, Science Direct, Springer, Wiley Blackwell, OVID Medline, EMBASE, CINAHL, pubmed and Cochrane Library were carefully searched. Search was limited to the publication years as follows: Systematic Reviews: From 2010 to 2018 and Randomized Controlled Trials: From 2010 to 2018. The inclusion criteria for searched studies included present original data or reviews of original data, focus on females with dysmenorrhea, applicable to dysmenorrhea care, conducted in humans and published in the English language. The exclusion criteria included: studies of inappropriate population, studies that are not clinically applicable as self-care methods of dysmenorrhea management, reviews and articles which present the author's opinion rather than evidence.

Step II: Adopting a Continuum to Appraise the Available Research Evidence
Due to the large volume of studies addressing the current study issues and as supposed that the greater the evidence, the more confidence in a program's impact; the following continuum was used to demonstrate various levels of evidence then to choose the most powerful level.

Table-1: Continuum for Appraising Evidence-Based Research

NOT Evidence-Based Models	Evidence-Based Models			
Anecdotal, popular/ recognized by the public, featured in newspapers, articles, etc	Single pre-/post-evaluation	Controlled study in peer-reviewed journal	Expert consensus in peer-reviewed journal	Multiple replicated studies in peer-reviewed journals
Level one	Level two	Level three	Level four	Level five

Source: McEvvoy *et al*. [52]

Step III: Setting Criteria for Detecting the Quality of Intervention Recommendation According to Selected Evidence Level

The criteria for detecting the quality of intervention recommendation according to selected evidence level are illustrated in Table 2.

Step IV: Systematic Reviewing of Available Studies

All available studies (from 25 to 51) were reviewed and the most powerful systematic reviews used as evidence.

Table-2: Criteria for Detecting the Quality of Intervention Recommendation

Level of evidence	Classification of recommendations
I: Evidence obtained from at least one properly designed randomized controlled trial.	A. There is good evidence to support the recommendation for use of a diagnostic test, treatment, or intervention.
II-1: Evidence from well-designed controlled trials without randomization.	B. There is fair evidence to support the recommendation for use of a diagnostic test, treatment, or intervention.
II-2: Evidence from well-designed cohort (prospective or retrospective) or case-control studies, preferably from more than one centre or research group.	C. There is insufficient evidence to support the recommendation for use of a diagnostic test, treatment, or intervention.
II-3: Evidence from comparisons between times or places with or without the intervention. Dramatic results from uncontrolled experiments (such as the results of treatment with penicillin in the 1940s) could also be included in this category.	D. There is fair evidence not to support the recommendation for a diagnostic test, treatment, or intervention.
III: Opinions of respected authorities, based on clinical experience, descriptive studies, or reports of expert committees.	E. There is good evidence not to support the recommendation for use of a diagnostic test, treatment, or intervention.

Source: [24].

Step V: Identifying Knowledge Gaps in the Reviewed Studies

Various factors that may be associated with dysmenorrhea have been examined in female populations around the world [52]. In Egypt, factors found to be associated with dysmenorrhea include age, mother's employment status, negative menstrual attitude, and menstrual regularity [17]. Factors identified in other populations that have not been examined in Egyptian female include the duration of menstrual flow, age at menarche, BMI, exercise frequency, cigarette smoking, depression, and anxiety [4].

Additional studies with sound methodology are needed to explore the interrelationship between multiple factors associated with dysmenorrhea and to clarify the conflicting results noted regarding factors such as BMI, exercise frequency, and length of menstrual cycle [6]. Existing evidence indicates that there are significant cultural differences between the self-care strategies of Taiwanese females and those of American or Canadian adolescents [53].

However, there is a knowledge gap regarding the effectiveness of these culture-based self-care strategies for dysmenorrhea [3]. The literature does not provide evidence to indicate which self-care strategies are efficacious and, therefore, should be a part of teaching for symptomatic females [54]. More studies are needed to determine the relationship between self-care strategies and their effectiveness [7]. Some studies have found that mothers are the most important information resource for dysmenorrhea self-care strategies that girls consult; however, the significance of the mother's influence on the females' self-care strategies for dysmenorrhea has not been adequately delineated [55].

Step VI: Identifying the Limitations of Reviewed Studies

Predictive research is strengthened when a strong theoretical framework is used. However, only one study in this review mentioned its theoretical basis [3]. A strong theoretical foundation is important to direct analyses in a predictive study and lead to strong research findings [53]. Another limitation is using the retrospective method to measure dysmenorrhea [56, 57]. Stated that actually the pain memory might be not as accurate as that measured when symptomatic female was in menstrual pain.

Norvell, K.T., Gaston-Johansson F., & Fridh, G [58] conducted a prospective study to validate birth pain recall differences between primiparas and multiparas. They used a visual analogue scale (VAS) to evaluate labor pain during the three stages of labor; and also utilized VAS to evaluate the memory of labor pain two days after delivery. The findings revealed that there were significant differences between the quantity of pain perceived and the quantity of pain recalled by both primiparas and multiparas. During the postpartum period, the participants tended to downplay their perception of pain during labor. This research indicated that retrospective methods of evaluating pain may not be reliable.

Further studies are needed to assess dysmenorrhea by using a prospective method [59]. A major weakness of the studies reviewed in this analysis was their small sample sizes [60]. Since most of the studies were descriptive in nature, few reported sample size calculation methods, or power analysis, to aid interpretation of the significance of the findings [6]. Another limitation of the studies reviewed was that some studies lacked discussion of the reliability and validity of the investigative instruments limiting interpretation of the findings [61]. The most significant limitation, however, was over-interpretation of findings [3]. Many of the studies were cross-sectional or correlational in design and inappropriately attempted to draw conclusions about the predictive relationships of selected variables [53].

Step VII: Designing the Evidence-Based Program
The evidence-based program was then designed. Available supported interventions were included in the program context after evaluating the available studies.

METHODS
Research Design
Quasi-experimental design was used in carrying out the present study [62].

Setting
The present study was conducted at Faculty of Nursing, Menoufia University. Faculty of Nursing (FON): is an academic unit of Menoufia University offering academic degrees of bachelor (BNSc), master (MNSc) and doctorate (DNSc) in different nursing specialties.

Participants and Sample
The target population of this study was Faculty of Nursing students experiencing dysmenorrhea. The accessible population of interest was volunteer students from the Faculty willing to participate in this study and fulfilling the inclusion criteria. The inclusion criteria were as follows: (1) not married (2) had experienced dysmenorrheic cramps two or more times during the last 6 months prior to the study.

The researcher screened all Faculty students to determine the target population and then the sample size. The target population was 193 students; the researcher used a convenient sample and recruited the whole population as a study sample (193 participants). The data collection started in May till October.

May: screening phase (1 month)
June: interventional teaching sessions, pre-test and post-test (1 month).
October: Follow-up test (1 month).

Data Collection Tools
Throughout the course of the present study data were collected using tools developed by the researcher and revised by a jury of qualified experts, then tested for validity and reliability.

Dysmenorrheic Screening Questionnaire: This tool was devoted to select the eligible students who fulfill the proposed inclusion criteria and to measure dysmenorrheic severity.

Dysmenorrheic Self-Care Practice: This tool was developed with the aim of assessing the students' self-care practices during dysmenorrhea

Each part of the tool was scored separately according to the number of correct answers. The total score was calculated using the summation of all parts. It was 53 points.

Validity of the Data Collection Tools
The validity of the tools was ascertained by a group of subject area experts (medical and nursing staff) who reviewed the tools for content and internal validity. They were also asked to judge the items for completeness and clarity. Suggestions were incorporated into the tools.

Reliability of the Data Collection Tools
Test – retest reliability was applied by the researcher for testing the internal consistency of the tool. It was done through the administration of the same tools to the same participants under similar conditions on two or more occasions. Scores from repeated testing were compared.

Operational design
Pilot Study
Piloting was conducted to test the applicability of the tools, the feasibility of the study and to estimate the time needed for data collection. It was conducted on 10% of the total sample (20 students). On the basis of the pilot study results; the researcher rephrased some questions and sentences then set the final fieldwork schedule.

Procedure and Maneuver of Intervention
The current study was carried out in four consecutive phases, namely preparatory, program development, and program implementation and evaluation phases.

The Preparatory Phase
An extensive review related to the study area was done including electronic dissertations, available books, articles and periodicals. A review of literature to formulate knowledge base relevant to the study area was also done. An official permission was granted from the faculty authorities.

The Program Development Phase
The program aimed at improving students' knowledge, attitude and self-care practices toward

dysmenorrhea. It was designed by the researcher and validated by a jury. It covered knowledge about dysmenorrhea, diet, exercises, massage, personal hygiene, herbs and warm drinks.

Meta-analysis of available studies was done to detect which one represents powerful evidence. The following steps were taken:

Searching for studies
Adopting a continuum to appraise the available research evidence.
Setting criteria for detecting the quality of intervention to be included in the program according to selected evidence level.

Systematic reviewing of available studies.
Identifying Knowledge gaps in the reviewed studies.
Identifying the limitations of reviewed studies.
Designing the evidence-based program.

A guide booklet was prepared by the researcher, reviewed by a jury and then handed to participants for providing them with basic knowledge about dysmenorrhea.

The Implementation Phase
The researcher applied the implementation phase in the following steps.

The 1st step: At the beginning and to select the study sample, the researcher screened all students to identify the eligible participants according to the inclusion criteria. After determining the sample of the study, the researcher introduced herself to the participants and provided verbal explanation of the study, answered all related questions, and provided a study packet to each potential participant. The study packet included a written overview of the study and information detailing how to contact with the researcher for questions or additional information. Participants' telephone number and e-mails were taken to facilitate communication and follow up.

The 2nd step: The researchers met the participants in the class period of the following day to ensure their participation after reading the study overview.

The 3th step: The researcher used the self-care practices questionnaire to pre-test participants' practices of self-care during dysmenorrhea then the researcher post-tested the participants.

Self-care sessions: Two sessions which focused on addressing correct practices during dysmenorrhea. It took about 20 -30 minutes each time.

Students filled the questionnaire forms within 5 to 7 minutes. Completed questionnaires were reviewed by the researcher with the participants to minimize missing data. At the last session; each participant was thanked and provided a gift card in recognition for her time.

The Evaluation Phase
The evaluation of effectiveness was ensured three months later. The researcher started the follow-up phase using the same questionnaires of the pre and posttests (severity and self-care practices questionnaires) to examine participants' symptoms severity and retention of given information.

Administrative design
Permission from Menoufia University Faculty of Nursing Dean and vice dean for students' affairs was obtained before starting data collection.

Human Rights and Ethical Considerations
Approaches to ensure ethics were considered in the study regarding confidentiality and the informed consent. Confidentiality was achieved by the use of locked sheets with the names of the participating students replaced by numbers. All students were informed that the information they provided during the study would be kept confidential and used only for statistical purpose and after finishing the study, the findings would be presented as a group data with no personal participant's information remained.

After explanations prior to enrollment in the study, informed consent was obtained verbally from all students. Each student was informed that participation in the study was voluntary, and that she could withdraw from the study whenever she decided to and each one was given the opportunity to freely refuse participation. They were free to ask any question about the study details.

Statistical design
Upon completion of data collection, each answer sheet was coded and scored. The researcher coded the data into a coding sheet so that data could be prepared for computer use. Data was statistically analyzed using statistical package for social science (SPSS. IBM, USA, 2012) version 20 on IBM compatible computer. Test of significance was used to evaluate the program effectiveness in improving knowledge, attitude and practices. Level of significance was at $p < 0.05$ [63].

Data were summarized using the following:
Number and percentage distribution: was done to sociodemographic data of participants and physical characteristics.

Arithmetic Mean was used as an average describing central tendency of observations. Standard Deviation (SD) was used as a measure of dispersion of results around the mean.

The Chi-square test (χ^2) was used for comparing frequencies or proportions. The test is also referred to as a test of a measure of fit or "goodness of fit" between data.

$$(\chi^2) = \frac{(O-E)^2}{}$$

Where:
O= observed frequency
E= Expected frequency

Spearman Correlation (r) was used to detect association between two quantitative variables.

Mc nemar test: test of paired proportion was used to analyze change difference from pre-intervention to post- intervention (follow-up).

Significance of Results

For all the statistical tests done, the threshold of significance is fixed at the 5% level (P value), as follows:

Non – significant difference if $P > 0.05$
Significant difference if $P < 0.05$
Highly significant difference if $P < 0.001$

RESULTS

Table-1: Distribution of the Study Participants Regarding Their Socio-Demographic Characteristics

Variable	Categories	193 =No	Percent (%)
Age	20.09 ± 1.56		
Religious	Muslim	193	100
	Others	0	0
Residence	Urban	98	50.8
	Rural	95	49.2
Accommodation	With family	110	57
	In campus	83	43
Family Monthly Income	Enough	99	51.3
	Not enough	94	48.7
Mother Level of Education	Illiterate	32	16.6
	Basic	58	30
	Secondary	59	30.6
	University	44	22.8

The socio-demographic characteristics of the sample are summarized in Table (1). The mean age of the sample was 20.09 (SD= 1.56). Exactly; half of the sample was urban residents and the other half was rural ones. Fifty seven percent of the study participants were living with their family. Meanwhile; 43% were living in the university campus. Regarding the monthly income; enough indicated the highest class, not enough indicated the lowest class. The participants' mother's education levels varied: most of mothers completed their basic education, 59 mothers (30.6%) completed secondary school, and 44 (22.8%) graduated from college.

Table-2: Distribution of the Study Participants Regarding Their Self-Care Strategies for Dysmenorrhea

Variable	Category	No	%
Seeking Medical Advice Regarding Dysmenorrhea	Sometimes	14	7.3
	Never	59	30.6
	Once before	120	62.2
Medication Usage	Pain relieving pills	62	45.9
	Injectable medications	18	13.3
	Local analgesics	5	3.7
	More than one method	50	37.0
Non-Pharmacological Methods Used	Bed rest	43	24.8
	Warm drink	94	54.3
	Hot compress	10	5.7
	Warm bath	20	11.5
	More than one method	6	3.4

The self-care strategies for dysmenorrhea are displayed in Table (2). As evident from the table, 62.2% of the sample asked for medical advice once before. Regarding medication use, 37% used more than one medication for relieving pain. Nearly half of the participants (54.3%) used warm drinks as a natural pain relieving measure.

Table-3: Distribution of the Study Participants Regarding Their Dysmenorrheic Characteristics

Variable	Category	No	%
Age of First Dysmenorrheic Experience	With menarche	63	32.6
	6-11 months after menarche	61	31.6
	One year after menarche	45	23.3
	One year ago	13	6.7
	Three years ago	11	5.8
		0	0
Times of Dysmenorrhea in The Last Six Months	1-3 times	18	9.3
	4-6 times	175	90.7
The Start of Dysmenorrhea	Before the period	59	30.6
	With the beginning of period	134	69.4
Duration of Dysmenorrhea	First 24 hours	121	62.7
	2 days	72	37.3
Degree.of.Dysmenorrheic.Severity	Mild	7	3.6
	Moderate	11	5.7
	Sever	175	90.7
Effect of Dysmenorrhea on Daily Activities during The Last 6 Months	Little	7	3.6
	Moderate	11	5.7
	Sever	175	90.7
Faculty Absenteeism Because of Dysmenorrhea during The Last 6 Months	Every menstruation	14	7.3
	Occasionally	31	16.1
	Never	148	76.8
Mother.or.Sisters.Dysmenorrhea	Mother	34	17.6
	Sister	49	25.4
	Both	8	4.2
	No	102	52.8

Dysmenorrheic characteristics, including the age of first dysmenorrhea experience, days of dysmenorrhea lasting, dysmenorrhea experience in the last 6 months, the influence of the period on daily activity and Faculty absenteeism because of dysmenorrhea are shown in Table (25). As shown in the table, 32.6% of participants experienced dysmenorrhea with menarche. The results showed that most of participants (90.7%) had dysmenorrhea experience 4-6 times in the last six months. For 62.7% of participants; dysmenorrhea lasted for the first 24 hours of menstrual bleeding.

Table-4: Distribution of Participants Regarding Mean and Standard Deviation of Their Self-Care Practices at the Pre, Post and Follow-Up Tests

Variable	Pre test (X ± SD) N= 193	Post test (X ± SD) N= 193	Follow-up (X ± SD) N= 193	Repeated Measures ANOVA	P value
Personal Hygiene	9.01 ± 2.43	18.45 ± 1.19	16.23 ± 1.44	376.03	<0.001*
Sanitary Pads	3.38 ± 1.07	9.85 ± 0.46	8.36 ± 1.20	374.75	<0.001*
Clothes	4.13 ± 1.99	10.81 ± 0.49	8.64 ± 1.11	380.59	<0.001*
Others	3.44 ± 2.41	13.00 ± 0.0	10.94 ± 1.28	377.50	<0.001*
Total.Self-Care Practices Score	19.96 ± 4.70	52.11 ± 1.46	44.17 ± 3.16	386.00	<0.001*

(*) Statistically significant at p<0.001

Descriptive statistics including mean and standard deviation was used to test the third research hypothesis.

The self-care practices used by the study participants were measured using self-care practices questionnaire. The self-care behaviors relevant to dysmenorrhea were defined as actions taken to enhance comfort and to prevent or respond to the condition. Responses were provided on a 2-point dichotomy scale. Items scores were totaled to yield a scale score ranging from 0 to 53 points. Higher scores indicated more correct self-care practices used by participants.

A statistically significant improvement (p<0.001) regarding all variables of the questionnaire was clearly noticed during the post and follow-up tests compared to the pre test. Table (10) shows that at the post test. The mean scores were as follows: personal hygiene (18.45 ± 1.19), pads (9.85 ± 0.46), clothes (10.81 ± 0.49), other practices (13.00 ± 0.0), respectively. As expected, the follow-up test mean

results of each variable slightly decreased as follows: personal hygiene (16.23 ± 1.44), pads (8.36 ± 1.20), clothes (8.64 ± 1.11), other practices (10.94 ± 1.28), respectively.

It could be concluded that there was a highly statistically significant difference (p<0.001) between the mean score of each part and also the total self-care practices score at the three measurements times

Table-5: Correlation between the Degree of Dysmenorrheic Severity and Total Self-Care Practices Score

Variable	Degree of Dysmenorrheic Severity	
	r	P-value
Self-Care Practices Score (pre-test)	0.842	< 0.001*
Self-Care Practices Score (follow-up)	0.854	< 0.001*

(*) Statistically significant at p<0.001

The correlation between dysmenorrheic severity and the total self-care practices score is displayed in Table [11]. The scores show that there was strong negative correlation (r = 0.854) between the increase in self-care practices score and the decrease in dysmenorrheic severity at the follow-up phase of the study.

DISCUSSION

In the current study, dysmenorrhea was reported by one fourth of faculty students which reflects the fact that dysmenorrhea is a common health issue. This result is in harmony with recent worldwide surveys which reported that dysmenorrhea is a universal health issue highly affecting females of the same age group [3].

The participants' mean age was twenty years. All were students with self-reported dysmenorrhea volunteered to participate. The researcher selected this age group in reference to [64] who support the facts that dysmenorrheic severity among college age students leads to poor mental performance, high absenteeism rate and decreased interest in the academic activities with a decline in academic performance. Later on, these facts were additionally supported by a study conducted at Iran by [31], who mentioned that dysmenorrhea is a main factor affecting students' academic performance.

About one third of the participants have first experienced dysmenorrhea since their menarche, another third experienced dysmenorrhea for the first time 6-8 months after menarche. Dysmenorrhea usually started with or one year after menarche age, with no effect on severity or frequency. This finding was agreed upon by [47] who studied an age group similar to that of the current study and found that the first dysmenorrheic experience of their studied groups was at menarche age or one year later, with no difference between those who first experienced with menarche and those after menarche regarding severity. [65] who tested knowledge, attitudes and beliefs about menarche of adolescent girls in Anand district, Gujarat, India also supported the current finding as they found that the occurrence of first dysmenorrheic experience generally occurred 9- 12 months after menarche.

About two thirds of participants started dysmenorrheic suffering with the first day of menstruation while another third experienced dysmenorrhea just before the start of period. [66]. Who studied dysmenorrhea among college-age girls, reported similar findings. They found that half of their study sample experienced dysmenorrhea with the start of menstruation.

Dysmenorrhea lasted for the first 24 hours of menstrual period for nearly two thirds of participants [67]. Tested knowledge and practices related to menstruation among Tribal adolescent girls and reported the same finding. Nearly all participants had dysmenorrhea only during the first day of their menstruation. This finding is contradicted by [68] who examined the prevalence of primary dysmenorrhea in young adult female university students and reported that dysmenorrhea was experienced during the first two to three days of menstruation, but they were unable to rationalize their findings.

All participants had dysmenorrhea with varying degrees during the six months prior to the study. The majority had severe degree. All participants were asked for experienced symptoms that lasted for more than one month, to be sure that all experienced symptoms were due to dysmenorrhea and were not caused by any medical condition. This is consistent with many other studies necessitating dysmenorrheic experience as a main study variable, like some studies conducted by [17] in Egypt, [47] at Peshawar University, Pakistan and [35] at Ontario, Canda. Researchers of such studies reported that retrospective questions about the six months prior to their studies was a paramount axis in ensuring that participants really had dysmenorrhea and that the experienced symptoms were not a result of any medical condition.

The impact of dysmenorrhea on the participants' daily life activities was tested in this study. Most of participants reported that their daily activities had been affected by dysmenorrhea. These results are consistent with previous studies [46]. Researcher of such studies reported similar effect on daily activities in the form of school or work absenteeism, exercise reduction and affection of usual family activities.

As for faculty absenteeism because of dysmenorrhea, only one-fourth of participants reported that they had been absent from faculty due to dysmenorrhea during the six months prior to the study. This finding was expected because of the practical nature of studying at the faculty which necessitates everyday presence. [66] who studied dysmenorrhea among college-age girls reported similar findings. They reported severe suffering from dysmenorrheic pain with the inability of participants to be absent from their school. The current finding does not support that of [69] who studied dysmenorrhea and its effects on school activities among adolescent girls in Selangor, Malaysia and found a high absenteeism rate among girls during their menstrual period due to experienced pain and cramps. The studied group of [69] was selected from faculty of homeopathy, music and economics students.

The current finding revealed that the degree of severity decreased at the follow-up phase of the study as a result of improved knowledge, attitude and self-care practices scores. The decreased severity appeared at the follow-up test compared to the pre-test is thought to be due to increased number and frequency of management strategies used. These findings are similar to that of [70] who studied knowledge of menstrual pain and practices of nursing students affiliated to university of Alexandria. They reported a significant difference between the pre, post and follow-up pain severity which is positively correlated to improved knowledge and practices of management strategies. The finding is also supported by [71] who investigated the attitude of rural adolescent schoolgirls toward menstrual pain in India and revealed a decrease in pain severity correlated to increase positive attitudes score.

CONCLUSION
The evidence-based interventions were successful in disseminating correct self-care practices toward dysmenorrhea. The evidence-based interventions were effective in decreasing dysmenorrheic symptoms severity.

Recommendations
There should be effective health education and counseling for college age females about dysmenorrhea and its related self-care strategies.

Findings from this study could serve as a baseline for further interventional studies regarding dysmenorrhea management. Replication studies are needed to support the findings of the current study.

Further research is necessary to clarify the relationship between health and illness factors and perceived effectiveness of self-care strategies.

Further qualitative research studies are needed to explore the females' subjective perception about the effectiveness of self-care strategies. The results would be helpful to design a detailed plan for nursing interventions for dysmenorrhea.

REFERENCES
1. Ladewing, J., Proctor, M.L., & Farquhar, C. (2018). Nonsteroidal anti-inflammatory drugs for primary dysmenorrhea (Cochrane Review). In: The Cochrane Library, Issue 4, 2008. Oxford: Update Software.
2. Beek, S., Faghihzadeh, S., Sohrabvand, F., Lamyian, M., & Emamgholy, T. (2016). A randomized placebo-controlled trial to determine the effect of vitamin E in treatment of primary dysmenorrhea. British Journal of Obstetrics and Gynecology, 98, 1181–3.
3. Kao, Y. H. & Ko, H. L. (2013). Exercise behavior, current situations of dysmenorrhea and their relative factors among female adolescents. National Taipei College of Nursing. Retrieved from: http://140.131.94.3/ETD-db/ETD-search/view_etd?URN=etd-0816111-204111-28
4. Badawi, K., & El-Fedawy, S. (2013): Menstrual hygiene among adolescent schoolgirls in Mansoura, Egypt: Reproductive Health Matters, 13, 147-52.
5. Chen, C. H., Lin, Y. H., Heitkemper, M. M., & Wu, K. M. (2017). The self-care strategies of girls with primary dysmenorrhea: a focus group study in Taiwan. Health Care for Women International J, 23, 418-27.
6. Helms, F. (2017). The relationship among exercise, stress and primary dysmenorrhea. Journal of Behavioral Medicine, 12, 569-86.
7. Zondervan, K.T. (2018). Menstrual pain of females in the United Kingdom: a systematic review. Br J Obstet Gynaecol, 105, 93-9.
8. Coco, A.S. (2016): Primary dysmenorrhea. American Family Physician, 75, 489-96.
9. Chiou, M.H. & Wang, H.H. (2017). Effect of systematic menstrual health education on dysmenorrheic female adolescents' knowledge, attitudes, and self-care behavior. The Kaohsiung Journal of Medical Sciences, 23, 183-90.
10. Yang, N. (2016). The pathophysiology of primary dysmenorrhea. Res Clin Forums, 14, 47–54.
11. Cakir, M., Mungan, I., Karakas, T., Girisken, I. & Okten, A. (2017). Menstrual pattern and common menstrual disorders among university students in Turkey. Pediatr Int. J, 49, 938-42.
12. Kamjo, A. (2016). Evidence based program for primary dysmenorrhea in college students in Bandar Abbas. Retrieved from: http://www.scribd.com/doc/49695206/03-4540life0802-13-18-kabirian
13. Dennehy, J. (2014): A survey of adolescent dysmenorrhea symptom and frequency. A model program for prevention, detection, and treatment. Journal of Adolescent Health, 33, 317-22.
14. Evidence-Based Education (EBE) (2016): Retrieved from:

http://www2.ed.gov/nclb/methods/whatworks/eb/edliteslide3.htmlAccessed: 15 Jan, 2016.

15. Abioye-Kuteyi, (2016). Menstrual cramps knowledge and practices amongst college girls in Ile Ife, Nigeria. The Journal of the Royal Society for the Promotion of Health, 120, 23–6.

16. Pedron, N., Deligeoroglou, E., Zachari, A., Loutradis, D., & Papadimitriou, T. (2017). Incidence of dysmenorrhea and associated symptoms in women aged 15-24 years in Mexico City. Retrieved from: http://www.ncbi.nlm.nih.gov/pubmed/9951177

17. Abu-Hashem & Ammari F.L. (2016). Practices and care of Egyptian girls during menstruation. Eastern Mediterranean Health Journal, 7, 197-203.

18. Antman, E.M., Lau, J., Kupelnick, B., Mosteller, F., & Chalmers, T.C.A. (2016): Comparison of results of meta-analyses of randomized control trials and recommendations of clinical experts. JAMA, 268, 240-8.

19. Mulrow, C.D. (2014). Rationale for systematic reviews. British Medical Journal, 309, 597-9.

20. Moher, D., Cook, D.J., & Eastwood, S. (2016). Improving the quality of reports of meta-analyses of randomized controlled trials: the QUOROM statement. Quality of Reporting of Meta-analyses. Lancet, 354, 1896-900.

21. Cook, D.J., Sackett, D.L., & Spitzer, W.O. (2015). Methodologic guidelines for systematic reviews of randomized control trials in health care from the Potsdam Consultation on Meta-Analysis. J Clin Epidemiol, 48, 167–71.

22. Higgins, J.P.T., & Green, S. (2016): Cochrane Handbook for Systematic Reviews of Interventions 4.2.6. Retrieved from: http://cochrane.org/resources/handbook/Handbook4.2.6Sep

23. Jüni, P., Altman, D.G., & Egger, M. (2015): Assessing the quality of randomised controlled trials. In: Egger, M., Smith, G.D., Altman, D.G. (editors). Systematic Reviews in Health Care: Meta-analysis in context, 2nd ed. London. British Medical Journal Publishing Group.

24. Woolf, S.H., Battista, R.N., Angerson, G.M., Logan, A.G., & Eel, W. (2014). Canadian task force on the periodic health exam. Ottawa: Canada Communication Group. Retrieved from:

25. Akerlund M. (2016). Comparing NSAIDs vs placebo as a treatment for dysmenorrhea (Cochrane Review). In: Cochrane Database of Systematic Reviews. Issue 2, 2016.

26. Proctor, M., Murphy, P.A., Pattison, H.M., Suckling, J.A., & Farquhar, C. (2015). Behavioral interventions for dysmenorrhea in an evidence-based program context. Cochrane Database of Systematic Reviews 2015, Issue 3. Art. No.: CD002248.

27. Brown, D.J. (2015). The use of herbal and botanical therapies for dysmenorrhea. Journal of Women s' Health, 49, 519-31.

28. Proctor, F. (2016). Diagnosis and management of dysmenorrhea. Acta Obstet Gynecol Scand, 80, 649–53.

29. Bakhshani, N., Mousavi, M., & Khodabandeh, G. (2015). Factors decreasing severity of dysmenorrhea among Iranian female university student. Journal of Pak Med Assoc, 61, 205-8.

30. Gotthell, M., Steinberg, R., & Granger, Luc. (2015). An exploration of massage effect on dysmenorrhea. Canadian Journal of Behavior Science, 31, 254-62.

31. Dellorto, A. (2014). Dysmenorrhea; food preferences and pain severity. Journal of Clinical Psychology, 5, 30-9.

32. Rapkin, A.J., Edelmuth, E., & Chang, L.C. (2017). Sleep period and dysmenorrhea. Journal of Obstetric Gynecology, 70, 533-7.

33. Endicott, J., Schacht, S., & Halbreich, U. (2016). Attitudes changes and dysmenorrhea. Journal of Psychosomatic Medicine, 43, 519-29.

34. Haskell, C. F., Kennedy, D., Wesnes. K. A., Milne, A. L., & Scholey, A. B. (2017): A double-blind, placebo-controlled, multi-dose evaluation of systemic analgesics effects on dysmenorrhea. Journal of Psychopharmacology, 21, 65–70.

35. Tobin, M.B., Schmidt, P.J., & Rubinow, D.R. (2017): Dysmenorrhea: believes and attitudes. American Journal of Psychiatrics, 151, 1503-4.

36. Wyatt, K.M., & Dimmock, P.W. (2017). Efficacy of Vitamin B complex in the Treatment of dysmenorrhea: Systematic Review. British Medical Journal, 332, 1375- 1381.

37. Anderson, D.J., Legg, N.J., & Ridout, D.A. (2017). Preliminary Trial of yoga and dysmenorrhea. Journal of Obstetrics and Gynecology, 17, 76-9.

38. Norton, R. (2016). The relationship between fresh vegetables and symptoms of dysmenorrhea in college age females. American Family Physician, 66, 1239-48.

39. Dennehy, C.E., Pharm, D. (2016): The use of herbs and dietary supplements in gynecology: an evidence-based review. Midwifery Women Health J, 51, 402-9.

40. Wyatt, K.M., Dimmock, P.W., & Ismail, K.M.K. (2016). The effectiveness heat modalities with and without 'add-back' therapy in treating dysmenorrhea; a Meta-analysis. British Journal of Obstetrics and Gynecology, 97, 585–93.

41. Havens, W., Coleman, G., & Russell, J. (2016). Self-care practices and dysmenorrhea: A re-evaluation of the planned and un-planned personal hygiene. Journal of Psychosomatic Research, 31, 183-90.

42. Ernster, V.L., Mason, L., & Goodson, W.H. (2015). Effects of certain analgesics on dysmenorrhea: a randomized trial. Journal of Surgery, 92, 263-7.

43. Lucks, B.C. (2015). Relaxation therapy and dysmenorrhea: Controlled, double-blind Study. British Medical Journal, 318, 435-52.

44. Deadman, P. (2015). Yoga in the Treatment of dysmenorrhea. Retrieved from: http://www.ncbi.nlm.nih.gov/pubmed/21514190

45. Pearlstein, T.B., Halbreich, U., & Batzar, E.D. (2015). Fruits and dysmenorrhea. Journal of Clinical Psychiatry, 61, 101–9.

46. Rosenstein, D.L., & Elin, R.J. (2015). Water and fluids effect on dysmenorrhea. Journal of Biological Psychiatry, 35, 557-65.

47. Tabassum, S., Afridi, B., Aman, Z., Tabassum, W., & Durrani, R. (2015). Dysmenorrhea; Frequency and severity of symptoms after avoiding certain attitudes in young college girls at Peshawar University, Pakistan. Journal of Pak Med Assoc, 55, 546-9.

48. Chapman, E.H., & Angelica, J. (2014): Results of the different heat modalities on menstrual pain. Journal of the American Institute of Homoeopaths, 87, 14-21.

49. Caan, B., Duncan, D., Hiatt, R., Lewis, J., Chapman, J., & Armstrong, M.A. (2015). Association between aerobic exercises and dysmenorrhea. Journal of Reported Medicine, 38, 630-6.

50. Fenster, L., Quale, C., Waller, K., Windham, C., Elkin, P., Benowitz, N., & Swan, H. (2015): The Johns Hopkins University School of Hygiene and Public Hearth, personal hygiene and dysmenorrhea. American Journal of Epidemiology, 149, 550-7.

51. Corney, R.H., & Stanton, R. (2015). Comparison of fruits, vegetables and unplanned dietary intake on dysmenorrhea. Journal of Psychosomatic Obstetrics & Gynecology, 11, 211–20.

52. McEvvoy, O., & Anderson, G.C. (2016). Self-treatment patterns among adolescent girls with dysmenorrhea. Journal of Pediatric &Adolescent Gynecology, 28, 285-9.

53. Chen, H. M., & Chen, C. H. (2010). Related factors and consequences of menstrual distress in adolescent girls with dysmenorrhea in Taiwan. The Kaohsiung Journal of Medical Sciences, 41, 121-7.

54. Banikarim, C., Chacko, MR., & Kelder, SH. (2014). Prevalence and impact of dysmenorrhea on Hispanic female adolescents. Arch Pediatr Adolesc Med, 154, 1226-9.

55. Lee, K.A., & Taylor, D.L. (2016). The health and symptom experience of employed women with dysmenorrhea. The Journal of the North American Menopause Society, 3, 154-64.

56. Alonso, C., & Coe, C.L. (2015). Disruptions of social relationships accentuate the association between emotional distress and menstrual pain in young women. Health Psychology, 20, 411-6.

57. Johansson, T., & Carrieri, V. K. (2017). The sensations dysmenorrhea. J Nursing Research, 12, 154-9.

58. Norvell, K.T., Gaston-Johansson F., & Fridh, G. (2017). Remembrance and pain recall: how valid are retrospective pain measurements? Pain, 31, 77-86.

59. Burnett, M. A., Antao, V., Black, A., Feldman, K., Grenville, A., & Lea, R. (2015). Prevalence of primary dysmenorrhea in Canada. Journal of Obstetrics and Gynaecology Canada, 27, 765-70.

60. Davis, D., & Metheny, W. P. (2013). The impact of dysmenorrhea on daily activities. Behavior Research & Therapy, 25, 123-8.

61. Balbi, C., Musone, R., Menditto, A., Prisco, L., Cassese, E., D'Ajello, M., Ambrosio, D., & Cardone, A. (2014). Influence of menstrual factors and dietary habits on menstrual pain in adolescence age. Eur J Obstet Gynecol Reprod Biol, 91, 143–8.

62. Polit. F.D., (2017). Essential of Nursing Research, Designs of Nursing Research, Lippincott company, New Yourk, P. P(54-60)

63. Fisher, M., & Yates, K. (2018). Guide to data analysis. Upper Saddle River, New Jersey. Prentice Hall International Inc.

64. Janowsky, M.K., & Scholten, A. (2016). Dysmenorrhea: Issues in management. Harvard Medical School. Retrieved from: http://healthgate.partners.org/browsing/browseCont ent.asp?fileName=19962.xml&title=Conditions%2 0InDepth:%Dysmenorrhea%20(Dysmenorrhea). Retrieved on 2016-01-10.

65. Tiwari, H.O.U., & Tiwari, R. (2016): Knowledge, attitudes and beliefs about menarche of adolescent girls in Anand district, Gujarat. Eastern Mediterranean Health Journal, 8, 428-33.

66. George, A. & Bhaduri, A. (2014): Dysmenorrhea among college age girls- symptoms experienced during menstruation. Health Promotion Educ J, 17, 41-7.

67. Rajni, D., Anil, K., & Manpreet, K. (2013): Knowledge and Practices Related to Menstruation among Tribal (Gujjar) Adolescent Girls. Ethno-Med. 3(1), 43-48. Retrieved from: http://www.krepublishers.com/02-Journals/S-EM/EM-03-0-000-09-Web/EM-03-1-000-2009-Abst-PDF/EM-03-1-043-09-058-Dhingra-R/EM-03-1-043-09-058-Dhingra-R-Tt

68. Polat, A., Celik, H., Gurates, B., Kaya, D., Nalbant, M., & Kavak, E. (2015). Prevalence of primary dysmenorrhea in young adult female university students. Arch Gynecol Obstet, 79, 527-32.

69. Liliwati, I., Verna, L.K.M., & Khairani O. (2017). Dysmenorrhea and its effects on school activities among adolescent girls in a rural school in Selangor, Malaysia. Med & Health J, 2, 42-7.

70. El-Shazly, M.K., Hassanein, M.H., Ibrahim, A.G., & Nosseir, S.A. (2016). Knowledge about menstrual pain and practices of nursing students affiliated to University of Alexandria. Egypt Public Health Assoc J, 65, 509-23.

71. Singh, M.M., Devi, R., & Gupta, S.S. (2015). Attitude of rural adolescent schoolgirls toward menstrual pain and some reproductive health problems, India. Indian J Med Sci, 58, 439-43.