Psikiyatride Güncel Yaklaşımlar-Current Approaches in Psychiatry 2019; 11(Suppl 1):37-50
doi: 10.18863/pgy.521549

RESEARCH

The Relationship Between Premenstrual Syndrome and Mental Health Variables in Adolescents

Ergenlerde Premenstrüel Sendrom ile Ruh Sağlığı Değişkenleri Arasındaki İlişki

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Abstract

Premenstrual syndrome is a frequently encountered psychological and physiological disorder in adoles-cents between 15 and 18 years of age. The aim of this study is to analyze the relationship of premenstrual syndrome with quality of life, level of anger and depression. One hundred fifty six female high school students were recruited for the study. All completed sociodemographic form, Premenstrual Syndrome Scale, Beck Depression Inventory, Quality of Life Scale for Children (Adolescent Form) and The State-Trait Anger Expression Inventory. Results indicated that whilst the severity of premenstrual syndrome in-creases, depression and level of anger significantly increase, however, quality of life decreases. The partial mediation effect of depression and anger on the relationship between quality of life and premen-strual syndrome were found to be significant when examined separately. Moreover, anger had a signifi-cant partial mediation effect on the relationship between depression and premenstrual syndrome. In conclusion, in the treatment of individuals with premenstrual syndrome, the dimensions of depression, anger and quality of life should be controlled first and the relationships between these variables should not be ignored.

Keywords*:* Premenstrual syndrome, depression, quality of life, anger.

Öz

Premenstrüel sendrom, 15-18 yaşlar arasındaki genç kızların sıklıkla karşılaştığı psikolojik ve fizyolojik bir rahatsızlıktır. Bu çalışmanın amacı premenstrüel sendromun yaşam kalitesi, öfke ve depresyon düzeyi ile ilişkisinin araştırılmasıdır. 156 kız lise öğrencisinin katılımı ile mevcut okul ortamında yapılan araştırmada, Sosyodemografik Form, Premenstrüel Sendromu Ölçeği, Beck Depresyon Envanteri, Çocuklar İçin Yaşam Kalitesi Ölçeği ve Sürekli Öfke ve Öfke İfade Tarzı Ölçeği kullanılmıştır. Bu çalışmanın bulgularına göre premenstrüel sendromu düzeyi arttıkça, depresyon ve öfke düzeyi anlamlı olarak artmakta ancak yaşam kalitesi düşmektedir. Ayrıca yaşam kalitesi ve premenstrüel sendromu arasındaki ilişki depresyonun ve öfkenin kısmi aracı etkisi ayrı ayrı değerlendirildiğinde anlamlı bulunmuştur. Depresyon ile premenstrüel sendromu bağıntısında öfkenin bağıntı üzerinde anlamlı bir kısmi aracı etkisi olduğu görülmüştür. Sonuç olarak premenstrüel sendromu olan bireylerin tedavisinde, öncelikle depresyon, öfke ve yaşam kalitesi boyutlarının kontrol edilmesi ve söz konusu değişkenler arası ilişkiler gözardı edilmemelidir.

Anahtar sözcükler: Premenstrüel sendromu, depresyon, yaşam kalitesi, öfke.

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Geliş tarihi/Submission date: 03.02.2019 | Kabul tarihi/Accepted: 05.04.2019 | Çevrimiçi yayın/Online published: 21.05.2019

OVER the past decades, a considerable amount of research has focused on the differences between men and women from various aspects (Ridgeway and Smith-Lovin 1999, Sloan 2012, Tuğlu 2013, Arenliu et al. 2016). Men and women differ from each other in terms of physiological, psychological and behavioral aspect, and women's fertility is the most distinctive feature between them (West and Zimmerman 1987). Fertility period, which begins with menstruating, followed by the pregnancy and post-pregnancy periods, and completed with the period of menopause. Transitions between each stage indicate the periods in which both the bodies and the emotional situations of women are negatively affected. In the case of not being able to cope with puberty which is a Romanesque word indicating to grow up to become hairy (Hamburg and Takanishi 1989, Derman et al. 2004), a person undergoes a rapid change in terms of social, biological and psychological aspects, and young ladies' mental health may be negatively affected due to the changes puberty has brought.

On the other hand, young girls who start to have menstruation together with puberty may experience physical or emotional difficulties before and during the menstrual period. While the difficulties they encounter during menstruation can be seen as a irregular and painful menstruation, if physical, behavioral and mental difficulties become notable and persistent before menstrual period, premenstrual syndrome is observed (PMS) (Derman et al. 2004). For young women, premenstrual syndrome, observed before each menstruating period without any indication in the first week of menstrual bleeding, become a challenging experience when PMS symptoms come together with mental health variables affected by puberty (Choate 2014). Therefore, it is important to examine the relationship between PMS and mental health variables, which are depression, anger and quality of life, in order to be able to control the negative effect of PMS that may cause permanent problems on both mental and physical health of girls in their adulthoods.

There are considerable amount of studies that focus on the relationship between PMS and mental health variables (Ugarrizza et al. 1998, Franckiewicz et al. 2001, Bosarge 2003, Öncel and Pınar 2006, Tanrıverdi et al. 2010, Kırcan et al. 2012, American Psychiatric Association 2013, Schmelzer et al. 2015, Arslantaş et al. 2018). On the other hand, these studies examining the relationship between PMS and mental health only focused on the possible relationships between PMS and mental health one by one and ignored the interactions between mental health variables. In other words, it is seen that there are limited number of studies focusing on the relationship between PMS and mental health variables within an integrative perspective. Therefore, the current study will examine the relationship between PMS and term of mental health variables which are quality of life, anger and depression and summarize the relationships of these in literature.

In the life of a healthy woman, menstruation is one of the stages that extends from puberty to menopause, and initiates fertility in women. Painful menstruation, menstrual irregularities and bleeding disorders are some of the incidents of menstruation period causing psychological and physical changes in women. PMS is defined as the most common problem in premenstrual period (Evliyaoğlu et al. 2010). PMS is a psychneuroendocrinal disorder characterized by physical, behavioral changes or mood swings prior to menstrual bleeding and loses its efficacy with the onset of menstrual bleeding (Logue and Moos 1986, Doğan et al. 2012). It was first described by Frank as "pre-

menstrual tension" and characterized by intense tension, weight gain, headache and edema during 7 to 10 days prior to the menstruation (1931). The level of premenstrual syndrome is determined by scales and clinical examinations. Although most women show PMS indications, the number of women diagnosed through indications is very low. It has been observed that approximately 40% of women have experienced moderate to severe PMS and that 2-10% have experienced severe PMS (Logue and Moos 1986).

Many behavioral and psychological changes in premenstrual syndrome may lead to several problems on human mental health depending on their severity and individual tolerance. These are feelings of loneliness, forgetfulness, loss of concentration, confusion, restlessness and anxiety, unexpected crying, increased desire to eat and appetite especially for certain foods, change in sexual desire, decrease in self-esteem followed by sense of worthlessness, tiredness and excessive desire to sleep or insomnia. The most important and frequently reported problems are to display depressive thoughts and mood and to be angry or short-tempered (Ugarrizza et al. 1998, Franckiewicz et al. 2001, Bosarge 2003, Oncel and Pınar 2006, Tanrıverdi et al. 2010, Kırcan et al. 2012, American Psychiatric Association 2013, Schmelzer et al. 2015, Arslantaş et al. 2018)..

According to literature, it is clear that depression, quality of life and anger control problems are the most common mental health problems accompanying with premenstrual syndrome. In their previous studies examining women aged 18 to 33 years, Lutsky et al. (2004) focused on the relationship between PMS indicators and mental health problems (stress and quality of life). According to the findings, the general quality of life of people with low PMS was found to be significantly higher than people with high PMS. Additionally, many studies investigating the relationship between premenstrual syndrome and depression conducted and it was found that there is a positive and significant relationship between depression and PMS levels (Gözüm et al. 1996, Erci et al. 1999, Danacı et al. 2001, Akdeniz et al. 2002, Korkmaz et al. 2005, Yücel et al. 2009). Another data gathered from the literature is that the patients with premenstrual syndrome have a tendency to have anger and nervousness with PMS (Ugarrizza et al. 1998, Franckiewicz et al. 2001, Bosarge 2003, Öncel and Pinar 2006, Tanriverdi et al. 2010, Schmelzer et al. 2015).

The aim of this study was to analyze the relationship between mental health variables -which are quality of life, anger and depression- and PMS. Moreover, it also focuses on intercorrelation between mental health variables and their interaction on PMS.

Method

Sample

Ethical approval of the study was obtained from Işık University Institute of Social Sciences Ethics Committee on 28.11.2017 saying the study is proper and applicable ethically. Moreover, since the sample of the study recruited in high schools, the second approval was obtained from Istanbul Provincial Directorate of National Education on 26.01.2017. After the approvals, participants of the study were determined with the convenience sampling, and two high schools in Istanbul were selected. After the permissions of the high school authorities, the study was started.

Since the sample of the study consisted of participants who had not yet reached the age of 18, at first permissions from the parents of the participants was obtained with

"Informing and Approval Form of Parents" for being able to attend the study. Participants who had the affirmation of the parents were also consented with "Informed Consent Form". Then, the scales of the study were applied to the participants who had consent during February 2017. In order to make the participants feel comfortable while answering the questions of the scales, it was preferred to locate practice in libraries and girls' dormitories where only female students were present (the practice lasted for half an hour). Participants were asked to answer the questions in the scales. The instructions were given in writing and verbally.

The only inclusion criterion for the research -no exclusion criteria set for the study- is that participants should be between 15 years 0 months and 18 years 12 months. 158 female students participated in the study, but two of them were not included in the analysis because their ages were less than the targeted participant age and the research was completed with 156 adolescent girls (n= 156). Average age of participants is 16.28 years, average first menstration age of them is 12.66 years, and duration of their menstrutions is 5.71 years.

Measures

The research scales of current work were Sociodemographic Form, Premenstrual Syndrome Scale, Beck Depression Inventory, Quality of Life Scale for Children (Adolescent Form) and The State-Trait Anger Expression Inventory.

Sociodemographic Form

A data sheet was prepared by the researcher to get information about the sociodemographic characteristics of the participants and their menstruation routine. It is expected from the participant to answer the questions about their age, class, educational status of the mother, educational status of the father, employment status of the mother, employment status of the father, school achievement of the participant, any activity they are interested in, age of first menstruation, length of menstrual period, menstruation routine, any talk about menstruation with mother and any treatment for menstruation. However, since the current study is a part of extensive research, analyses of variables in Sociodemographic Form and variables -PMS and mental health- are aimed to research in the next study in detail.

Premenstrual Syndrome Scale

In the present study the Premenstrual Syndrome Scale, developed by Gençdoğan and made reliable in 2006, was used to measure the level and symptoms of PMS with Likert-type measure consisting of 5 levels (Never, Very Little, Sometimes, Often, Continuous) and 44 items. Participants are asked to answer the questions, directing them to remember their week prior to the menstruation period. When evaluating the scale, "No" response is 1 point, "Very few" response is 2 points, "Sometimes" response is 3 points, "Frequently" response is 4 points and "Continuous" response is 5 points. The lowest score that can be taken from the scale is 44 and the highest score is 220. It can be interpreted that if the score of the scale is higher, PMS symptoms are also higher. In the reliability analysis of Gençdoğan's research, the Cronbach alpha coefficient was found to be 0.75 (2006). According to the reliability analysis in our study, the Cronbach alpha coefficient was 0.95.

Beck Depression Inventory

The scale, which was used to determine the presence and level of depression with 13 years and older participants through making self-assessment, was developed by Beck and his friends in 1961 and revised in 1978 and 1996 (Beck et al. 1988). In our country, the study of Turkish validity and reliability of the scale was conducted by Hisli in 1989 among university students between 17-23 years of age. The scale composed of 21 questions is subjectively examined. The lowest score taken from the scale is 0, and the highest score is 63. As a result of validity reliability studies conducted by Beck, the internal consistency coefficient was found to be 0.86 (1978). According to Turkish reliability research conducted by Hisli (1989), Cronbach alpha coefficient of the scale is 0.80. In current study, the internal consistency coefficient of the scale was reported as 0.81.

Quality of Life Scale for Children (Adolescent Form)

The quality of life scale was first developed by Varni et al. in 1999 with a sample of cancer patients. In 2001, it was again reorganized by Varni and colleagues for healthy children and adolescents aged 2-18 years. Turkish validity reliability study of the five-point Likert-type scale was conducted by Memik et al. in 2007 for adolescents aged 13-18. As the total quality of life score can be calculated, emotional, social, physical and school functioning can be examined as a sub-branch of the quality of life scale as well. As the scale questions were constructed in negative structure, the total scores obtained from the scale were interpreted as the quality of life would be lower at that level as the obtained score increased.

The internal consistency for the total score of the study conducted by Varni et al. (2001) was 0.88. The internal coefficient of the scale, of which Turkish validity and reliability research was conducted with adolescents aged 13-18 by Memik et al. (2007), was found out to be 0.83. As a result of this research, total score Cronbach alpha coefficient was calculated as 0.82.

State-Trait Anger Expression Inventory

The scale aiming to measure anger dimension was developed by Spielberger (1988). Turkish adaptation and reliability study of the scale were conducted on high school and university students by Özer (1994). The scale that Spielberger developed consists of 44 questions and aims to measure situational emotion states (situational anger) and liability to anger. Turkish adaptation of the scale consists of 34 questions and does not include situational anger dimension (Evren et al. 2011). In this study, when the level of anger is examined, it is computed by calculating total anger score as in the study of Evren et al. (2011) and for the anger dimension of the study internal consistency Cronbach alpha coefficient is 0.68.

Statistical Analysis

Statistical data were analyzed using the SPSS 21.0 statistical data analysis program. Statistical evaluation was accepted as $p<.05$ significant value. Initially, “Pearson correlation analysis” has been used in order to examine the existence and the level of the relationship between PMS and depression, anger and life quality. In the second step, when PMS is determined as a dependent variable, mediator effectiveness and significance, that is mediator analysis, are examined by using "linear hierarchical regression analysis", considering that depression, anger and quality of life each have mediator effect on another variable. Detailed findings and structuring of mediator analysis are given in

results section.

Results

Correlation between PMS and Depression, Anger and Quality of Life

In the first step of the study, which was conducted to examine the correlation between PMS and depression, anger and quality of life of adolescents aged 15-18 years, it is focused on possible inter-correlations between PMS, depression, anger and quality of life as variables. Then, Pearson correlation test was applied to evaluate the dimensions and the direction of the related relations.

Table 1. Correlation between premenstrual syndrome and anger depression and quality of life

	PMS	Anger	Depression	Quality of Life
PMS	-			
Anger	.336*			
Depression	.459*	.255*	-	-
Quality of Life	.568*	.225*	.419*	-

*p<.01. PMS: Premenstrual syndrome

As seen in Table 1, between PMS level and quality of life (r=.568, p=.000), between PMS level and depression level (r=.459, p=.000) and between PMS level and anger level (r=.336, p=.000) there is a significant positive correlation. In other words, as the level of PMS increases, it can be interpreted that the level of depression and anger has also increased. However, although there is a positive correlation between PMS and quality of life scores, the correlation between these two variables must be interpreted negatively because the high scores on the quality of life scale represent low quality of life. In other words, the higher the PMS level, the lower the quality of life. Additionally, there is a significant correlation between quality of life and depression levels (r=.419, p=.000). In other words, as the quality of life drops, the level of depression increases. Depression and anger variables are also variables with a positive association (r=.255, p=.001). In other words, as the level of depression increases, the level of anger also increases. Moreover, a positive correlation between anger and quality of life levels of participants has been detected (r=.225, p=.005). All these data can be interpreted as a decrease in the quality of life will increase the level of anger.

Mediator Effect Analysis

As a result of Pearson's correlation analysis, it was found that there were significant relations among all variables. In addition, in order to understand these significant relations were affected by an intermediary variable, a mediator effect analysis was conducted by way of linear hierarchical regression analysis.

In order to conduct a mediator effect analysis, Baron and Kenny (1986) mediator effect analysis which has four important criteria was chosen and before passing on to mediator effect analysis of the variables, it was analyzed whether criteria of Baron and Kenny was met or not. In company with the mediator analysis, it was seen the relations between the variables met the first three criteria. When the mediator variable was controlled, the fourth criterion that indicates effect of the predictor variable on the dependent variable should be non-significant was not met in any model. However, when the mediator variable was controlled, it was thought that the partial mediator effect might

be mentioned since a reduction in the strength of the correlation between mental health variables and PMS was recorded. In the analysis process, three different models were developed, in which PMS was selected as a dependent variable to examine the mediating effect of mental health variables on each other. The first of these is the one in which the quality of life is determined as the predictor (independent variable), PMS as the predicted (dependent variable), and depression as the mediator (mediator variable). The second is the model that is formed by selecting the quality of life; predictor (independent variable), PMS; the predicted (dependent variable) and anger; the mediator (mediator variable). The final model was established in a context in which depression was predictor (independent variable), PMS was predicted (dependent variable), and the anger was again mediator (mediating variable).

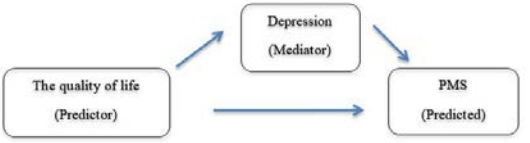

Figure 1. Model 1- The mediator effect of depression on the relation between the quality of life and PMS

Mediator Effect of Depression on Relation Between Quality of Life and PMS Levels

In this step of the study, a model in which the quality of life is predictor, PMS is predicted and depression is mediator variable has been developed (Figure 1).

Table 2. Mediator effect of depression on the quality of life and PMS

Model	B	β	*p*	*F*	R^2	ΔR^2
Quality of life	1.715	0.568	0.000	73.158*	0.322	0.322
Quality of life	1.375	0.455	0.000	47.241*	0.382	0.060
Depression	1.133	0.269	0.000			

* $p<.01$. B: unstandardised regression coefficient. β: standardised regression coefficient. *p*: p value. F: F statistic. R^2: R Squared. ΔR^2: Delta R Squared

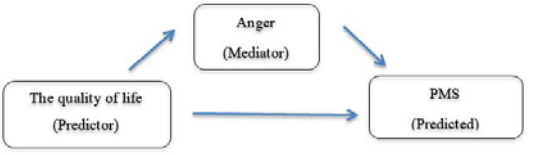

Figure 2. Model 2- The mediator effect of anger on the correlation between the quality of life and PMS

As it is in Model 1 and can be seen in Table 2, how the relationship between quality of life and PMS is influenced by the mediator presence of depression was examined. First, it is investigated that whether the quality of life predicts PMS in their relationship. In the relationship between quality of life and PMS, when it is focused on the mediator effect of quality of life on PMS, it is seen that the quality of life is found to be a significant predictor of PMS (β=.57, F(1,154)=73.158, p=.00) and about 32% of the variance of PMS is explained by the quality of life (b=1.715, R2=.32, p=.00). In the second step where focused on the relationship among the predictor variable quality of life and mediator variable depression, quality of life significantly predicts depression

level (β=.42, F(1,154)=32.712, p=.00) and explains about 17% of the variance of depression (b=0.301, R2=.17, p=.00). Finally, the predictor effect of quality of life and depression on PMS was examined in order to be able to assess the mediator effect of depression on quality of life and PMS. It is found that only depression significantly predicts PMS (β=.27, p=.00) and about 6% of PMS variance is explained by depression (b=1.133, R2change=.06, p=.00). On the other hand, when the mediating variable depression in the relationship between the quality of life and the PMS is controlled, the predictor effect of the quality of life on PMS is decreased (β=.45, F(2,153)= 47,241, p=.00), but does not lose significacy completely (b=1.375, R2=.38, p=.00). To investigate the significance of this reduction, the Sobel z test was conducted and it is found that depression has a significant partial mediator effect on the quality of life and PMS relationship (z=3.18, p=.00).

Mediator Effect of Anger on Relation between the Quality of Life and PMS Levels

It is intended to examine whether the level of anger is mediating variable between level of quality of life and PMS level through linear hierarchical regression analysis where the level of quality of life, PMS and anger were determined as predictor, predicted and mediator variables respectively (Figure 2).

Table 3. Mediator effect of anger on the quality of life and PMS

Model	B	β	p	F	R2	ΔR2
Quality of life	1.715	0.568	0.000	73.158*	0.322	0.322
Quality of life	1.566	0.518	0.000	44.517*	0.368	0.046
Anger	0.825	0.220	0.001			

* $p<.01$. B: unstandardised regression coefficient. β: standardised regression coefficient. *p*: p value. F: F statistic. R^2: R Squared. ΔR^2: Delta R Squared

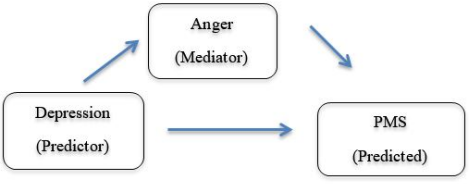

Figure 3. Model 3- The mediator effect of anger on the correlation between depression and PMS

In the light of findings shown in Table 3 and seen in Model 2, initially, it was considered that how much the quality of life predicts PMS in the relationship between them. That the quality of life is a significant predictor over PMS (β=.56, F(1,154)=73.158, p=.00), and the quality of life explains PMS at the rate of 32% is reported (b=1.715, R2=.32, p=.00). In the second analysis, we looked at whether the quality of life as a predictor predicts anger which is a mediator variable and it is found that the anger can be predicted significantly by the quality of life (β=.22, F(1,154)=8.231, p=.00) and the quality of life explains the variance of the anger at about 5% (b=0.181, R2=.05 p=.00). Finally, to examine the mediator effect of anger on the relationship between the quality of life and PMS when we looked at the predictor effect of anger and the quality of life on PMS, it is found out that only anger on its own is a significant predictor over PMS (β=.22, p=.00) and it explains variance of PMS at only 4% level (b=0.825, R2change=.04, p=.00). Furthermore, when the effect of anger

on the relationship between the quality of life and PMS is controlled, it is also seen that the quality of life has a significant predictive effect on PMS (β=.51, F(2,153)=44.517, p=.00), but this correlation is weakened (b=1.566, R2=.36, p=.00). The Sobel z test was performed to investigate the significance of this decrease. As a result, there is a significant partial mediator effect of anger level on the relationship between quality of life and PMS level (z=2.1653, p=.03).

Mediator Effect of Anger on Relation between Depression and PMS Levels

Finally, as shown in Figure 3, there is a significant positive correlation between the predictor and the predicted in the Model-3 where the level of depression is predictor and the PMS level is predicted. The model in which the anger level is mediator is formed in order to be able to look at whether this correlation is involved in an interaction with the presence of anger level.

According to the results of the mediator effect in Table 4, first, the extent to which depression predicts PMS in the relationship between depression and PMS is examined. It is seen that PMS is predicted significantly by depression (β=.45, F(1,154)=41.212, p=.00) and 21% of its variance is explained by depression (b=1.934, R2=.21, p=.00). Then, the situation that whether the predictor depression predicts mediator variable anger was evaluated and it is found that anger is predicted significantly by depression (β=.25, F(1,154)=10.709, p=.00) and depression explains variance of anger at the rate of 6% (b=0.286, R2=.06, p=.00). Finally, in order to understand the mediator effect of anger, when the predictor effect of anger and depression on PMS together is considered, it draws attention that anger on its own significantly predicts PMS (β=.23, p=.00) and explains the variance of PMS at the rate of 5% (b=0.880, R2change=.05, p=.00). Most importantly, when the mediator effect of anger is checked, it is seen that the predictor effect of depression on PMS continues significantly (β=.40, p=.00) but the strength of the correlation of depression and PMS weakens (b=1.682, F(2,153)=27.228, p=.00). To investigate the significance of this decrease, a Sobel z test was performed and it is seen that there is a significant partial mediator effect of anger on the depression and PMS relationship (z=2.31, p=.02)

Table 4. Mediator effect of anger on depression and PMS

Model	B	β	p	F	R2	ΔR2
Depression	1.934	0.459	0.000	41.212*	0.211	0.211
Depression	1.682	0.400	0.000	27.228*	0.262	0.051
Anger	0.880	0.234	0.001			

* $p<.01$. B: unstandardised regression coefficient. β: standardised regression coefficient. *p*: p value. F: F statistic. R^2: R Squared. ΔR^2: Delta R Squared

Discussion

The main purpose of the study is to examine the effects of PMS, which emerges especially during adolescence with menstruation, on the mental health variables such as the quality of life, depression and anger. The reason why this relationship is investigated is that although studies in which the relationship between quality of life (Lutsky et al. 2004, Pınar et al. 2011, Kırcan et al. 2012, Delara et al. 2012, Arıöz and Ege 2013, Şahin et al. 2014, Göker et al. 2015, Işık et al. 2016, Uran et al. 2017, Arslantaş et al. 2018), depression (Gözüm et al. 1996, Erci et al. 1999, Danacı et al. 2001, Akdeniz et al. 2002, Korkmaz et al. 2005, Yücel et al. 2009), anger (Pleog 1987, Smith and Thomas 1996, Öztürk Can et al. 2015) and PMS levels which are related to the mental

health of the individual are found separately in the literature. But the studies in question did not add to the analysis process the relationships of mental health variables with each other and how these relationships in question affect PMS.

On the other hand, the reason for evaluating the mediator effects of mental health variables in this study in which the mental health variables are determined as predictors and PMS as the predicted variable is to focus on the contrary to the notion that premenstrual stress syndrome causes mental health problems, as in the literature (Gözüm et al. 1996, Smith and Thomas 1996, Danacı et al. 2001, Yücel et al. 2009, Kırcan et al. 2012, Akyol et al. 2013, Arıöz et al. 2013, Şahin et al. 2014, Öztürk Can et al. 2015) and to defend the idea that actually mental health problems can cause premenstrual syndrome. For example, in the study by Akdeniz et al. (2002), young girls aged 15-18 who are diagnosed with depression and the syndromes of the ones who do not have depression has been evaluated and PMS levels of girls diagnosed with depression were found to be significantly different from PMS levels of young girls without depression. In short, in this study, it is not aimed to examine the levels of mental health variables that originate from PMS levels, but rather examining the impact of the presence of mental health variables on PMS is aimed, as in the study of Akdeniz et al. When all these data are evaluated, the purpose of this study is to illuminate mediator effect possibilities of mental health variables by focusing on the relationship among mental health variables and examining how the variables in question affect PMS.

Analyzes were basically initiated by examining the extent and significance of the relationships between both premenstrual syndrome and mental health variables such as quality of life, depression and anger and mental health variables in themselves, and the first hypothesis of the research was based on these relationships. By using Pearson correlation analysis, the relationships between premenstrual syndrome and the quality of life, depression and anger levels were examined and it was seen that as the level of premenstrual syndrome increased, the level of quality of life was negatively affected and decreased. In addition, as premenstrual syndrome level increased, depression and anger levels increased and showed a positive and significant interaction with PMS. On the other hand, Pearson correlation analysis was used in the analysis step where the relationships of mental health variables in theirselves (with each other) were examined. According to the results, depression and anger level increased as the quality of life progressed in negative direction and went down. Moreover, the higher the depression level, the higher the level of anger goes.

In literature, there are many studies examining the relationships among the quality of life (Lutsky et al. 2004, Pınar et al. 2011, Kırcan et al. 2012, Delara et al. 2012, Arıöz and Ege 2013, Şahin et al. 2014, Göker et al. 2015, Işık et al. 2016, Uran et al. 2017), depression (Gözüm et al. 1996, Erci et al. 1999, Danacı et al. 2001, Akdeniz et al. 2002, Korkmaz et al. 2005, Yücel et al. 2009) and anger levels (Smith and Thomas 1996, Akyol et al. 2013, Öztürk Can et al. 2015). It was found that the studies were consistent with our study and that the quality of life, depression and anger levels had a significant correlative relationship with PMS.

In the light of these findings, it is worth noting that focusing on the relationship between mental health variables and PMS in studies, it is not clear enough whether PMS predicts mental health variables or mental health variables predict PMS (Pleog 1987, Smith and Thomas 1996, Akdeniz et al. 2002, Yücel et al. 2009, Kircan et al.

2012, Şahin et al. 2014, Öztürk Can et al. 2015). Hence, based on the significance of the examined relations, the second hypothesis has been drawn on the subject which is supposed to be the contribution of future work and which is not included in the literature. According to this hypothesis, it has been thought that in the relationship among the quality of life, depression, anger levels- which are the mental health variables- and premenstrual syndrome, again considering the significant relationship among mental health variables, each variable will be a mediator for another one. The mediator model steps of the Baron and Kenny were followed in order to examine the mediator effects.

In the first model focusing on the relationship between quality of life and PMS, at first focus is on the power of the relationship between quality of life and PMS to examine the possible mediator effect of depression. According to the findings, when the mediator effect of depression is controlled, it is seen that the relation between predictive, and dependent variables does not lose significance but the power of the relationship weakens. When all these data are evaluated, it is found that depression may have a partial mediator effect, although not having a full mediator effect between PMS and quality of life. In the last step of the analysis of this model, the Sobel z test is applied to test the significance of the possible partial mediator effect of depression and the results have shown that in its predictive effect on PMS, depression has a significant and partial mediator effect.

In the second mediator effect model in which concentrated on the possible mediator effect of anger level on the relationship between quality of life and PMS levels, at the beginning it is examined the relationship between the levels of quality of life and PMS again. According to the findings, when the possible mediator effect of anger related to the quality of life and PMS level is controlled, it is found that the relationship keeps its significance but it weakens. In the light of the results it is understood that the level of anger may have a partial mediator effect on the relationship between quality of life and PMS levels. Finally, the Sobel z test is applied to analyze the significance of the partial mediator effect of the anger, and it is identified that anger level is a significant mediator effect in the quality of life and PMS relationship.

In the final model examining the possible mediating effect of anger level on the relationship between depression and PMS, the power of the relationship between depression and PMS levels was assessed primarily. In the light of the results, it is observed that when the level of anger is controlled to affect the relationship between depression and PMS levels, the relationship does not lose significance but the strenght of the relationship between depression and PMS decreases. This decline implies that the anger may have a partial mediator effect on the relationship between depression and PMS. Based on this, when the Sobel z test is used to test the significance of the partial mediator effect of the anger, it can be seen that the partial mediator effect of the anger is significant on the relationship between depression and PMS.

When we look at the world literature, there are no studies examining the mediator effect of mental health variables in relation to again mental health variables such as quality of life, depression and anxiety, and premenstrual syndrome. Literature studies have generally investigated the effect of presence and level of premenstrual syndrome on quality of life, depression and anger which are the mental health variables (Pleog 1987, Smith and Thomas 1996, Öztürk Can et al. 2015), however, it has not been adequately examined how their relationship with premenstrual syndrome will be formed in each

other's presence. For this reason, in this study the mediating effect of mental variables such as quality of life, depression and anger, which are significantly associated with PMS and included in the literature, has been extensively investigated via their relations with PMS and included in the research.

On the other hand, our study differs from previous researches by only evaluting and calculating the total scores of scales instead of subscales of scales while examining the relationships between the PMS level and the mental health variables and the relationship between the mental health variables in themselves (Smith and Thomas 1996, Erci et al. 1999, Danacı et al. 2001, Akdeniz et al. 2002, Pınar et al. 2011, Kırcan et al. 2012, Delara et al. 2012, Arıöz and Ege 2013, Şahin et al. 2014, Göker et al. 2015, Öztürk Can et al. 2015, Işık et al. 2016, Uran et al. 2017). However, literature research mostly preferred to conduct the research by classifying the variables of the scales dimentionally (such as non-existent, low-moderate-severe) or by using subscales of the scales rather than total scores. Thus, when the possible relationships between the levels of mental health and PMS examined, it could be especially understood that in which subdimensions of the variables had significant relationships with others in addition to whether there was a significant relationship between variables. Therefore, subdimensions of our scales may be included in the future studies to have more extensive information.

In conclusion, for young girls or women who are suffering from PMS and seeking for help, it would be useful to be understood by first evaluating their quality of life and measuring the levels of anger and depression with necessary tools because mental health variables have a persistent factor characteristic for PMS. Therefore, unless the levels of mental health variables are not controlled, it is possible that PMS treatment process may be ineffective and the PMS symptoms may not be relieved. On the other hand, according to our findings, when we looked closely at the relationship between PMS and the mental health variables which are quality of life, depression and anger, it is seen that the most powerful and significant correlation is between PMS and quality of life (r =.568). Therefore, it is also important to evaluate the life events and behaviors that may affect the quality of life in further research. It is thought that as a result of problems encountered in life or unmet expectations stress that is effective on the physical and psychological aspects may be a determinant on the quality of life (Moksnes and Haugan 2015) because in addition to studies of the relationship between stress and PMS (Lutsky et al. 2004, Potter et al. 2009, Yamamoto et al. 2009), studies examining the mediator effect of stress (Groer et al. 1993, Lutsky et al. 2004) are also conducted and it is reported to have a significant effect (Lee and Im 2016). In connection with all these, it is thought that it will be important to consider the presence of stress and its level in future studies as an important factor that may influence the people's quality of life, and it is considered that stress may have a possible mediator effect on PMS and quality of life.

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Authors Contributions: All authors attest that each author has made an important scientific contribution to the study and has assisted with the drafting or revising of the manuscript.
Ethical Approval: The study was approved by the Local Ethics Committee. Written informed consent was obtained from all participants.
Peer-review: Externally peer-reviewed.
Conflict of Interest: No conflict of interest was declared by the authors.
Financial Disclosure: The authors declared that this study has received no financial support.