The measurement of menstrual symptoms:

Factor structure of the menstrual symptom questionnaire in adolescent girls

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Abstract

This study examined the factor structure of the Menstrual Symptom Questionnaire (MSQ) in a sample of 210 adolescent girls (11–17 years). Such an examination has not been carried out with an adolescent sample. In addition, the definitions of menstrual disorders have evolved since the creation of the MSQ. Exploratory factor analysis supported a three factor structure indicating abdominal pain, negative affect/somatic complaints, and back pain. Partial correlations indicated all three MSQ factors were correlated with depressive symptoms, but only the negative affect factor was correlated with trait anxiety. Future research should explore potential associations in multiple areas of functioning as menstrual symptoms may alter healthy developmental processes during adolescence.

Keywords

Menstrual symptoms are a broad collection of affective and somatic concerns that occur around the time of menses. Some women manage their monthly periods easily with few or no concerns while other women experience a number of physical and/or emotional symptoms that may be more problematic. In general, menstrual symptoms can be classified into menstrual-related diagnoses such as dysmenorrhea or premenstrual syndrome (PMS). However, many women may experience menstrual symptoms that do not necessarily fit within the aforementioned diagnoses based on the quality, timing, or interpretation of the symptoms. Dysmenorrhea is more related to the symptoms of pain accompanying menses while PMS is generally focused on the emotional or psychological concerns. However, there is considerable overlap in the symptoms of both of these menstrual-related diagnoses. While the high prevalence of menstrual symptoms may connote a relatively normative occurrence, the possible effect on other aspects of women's lives may be cause for concern.

Primary dysmenorrhea is defined as pain during menses in the absence of an identifiable pathologic lesion (Davis, Westhoff, O'Connell, & Gallagher, 2005). Lower abdominal

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cramping is the most common symptom of dysmenorrhea, but symptoms can include nausea, vomiting, headaches, backaches, and dizziness occurring during menses (Harel, 2006; Klein & Litt, 1981). Dysmenorrhea is a common gynecological disorder in young women with widely ranging prevalence estimates, between 50 percent and 91 percent (Alvin & Litt, 1982; Andersch & Milsom, 1982; Hillen, Grbavac, Johnston, Straton, & Keogh, 1999; Jamieson & Steege, 1996; Wilson & Keye, 1989). With such widely varying estimates the true prevalence is unknown. Mild symptoms may be relatively common potentially representing a normal experience of menstruation whereas severe symptoms may affect daily functioning. For example, 15 percent of adolescents describe their symptoms of dysmenorrhea as severe, affecting participation in regular activities for 1–3 days per month (Klein & Litt, 1981).

The effects of dysmenorrhea can cross over into many areas important to health and development. The disorder is highly prevalent among adolescent girls and has been identified as the leading cause of school and work absences among adolescents and young adults (Davis & Westhoff, 2001; Klein & Litt, 1981). Studies in the USA have reported a school absenteeism rate of 14 to 52 per cent among adolescents with dysmenorrhea (Banikarim, Chacko, & Kelder, 2000; Johnson, 1988). Absences from school may be especially pronounced due to undertreatment or no treatment of menstrual problems in this age group (Davis & Westhoff, 2001; O'Connell, Davis, & Westhoff, 2006). For example, studies in the USA found that as few as 14.5 per cent of adolescents with dysmenorrhea have ever sought treatment from a physician (Dawood, 1986; Harel, 2006; Klein & Litt, 1981; Widholm, 1979). Absence from school may have an important impact on psychosocial and cognitive development during an important time of growth. Although dysmenorrhea is less common during the first two to three years after menarche, it becomes more prevalent during mid- and late adolescence (Klein & Litt, 1981). Further, the severity of symptoms of dysmenorrhea is positively correlated with early menarche and increased duration and amount of menstrual flow (Andersch & Milsom, 1982; Balbi et al., 2000), which may influence quality of life.

Although dysmenorrhea is clearly prevalent in the adolescent population, recent research has turned its focus to premenstrual syndrome (PMS). The American College of Obstetrics and Gynecology defines PMS by affective and somatic symptoms occurring in the five days prior to menstruation and resolving within four days after menstruation. The affective symptoms include depression, angry outbursts, irritability, anxiety, confusion, and social withdrawal; somatic complaints include breast tenderness, abdominal bloating, headache, and swelling of extremities (American College of Obstetricians and Gynecologists, 2000). The prevalence of PMS among adolescents is not known. Moreover, research has not examined whether PMS and dysmenorrhea are distinguishable in adolescents. The symptoms of PMS have become more clearly defined in recent decades but there is considerable overlap with the symptoms of dysmenorrhea. Furthermore, many adolescents and young women experience menstrual symptoms that do not fit into either clinical classification, and it is important to have a means to measure and study these symptoms and their potential impact. Thus, examining the spectrum of menstrual symptoms, and not just symptoms associated with PMS or dysmenorrhea is germane to understanding adolescents' experience of menstrual symptoms and related problems.

The Menstrual Symptom Questionnaire

The Menstrual Symptom Questionnaire (MSQ) was designed by Chesney and Tasto (Chesney & Tasto, 1975) to measure symptoms of dysmenorrhea. However, the definitions and classification of menstrual symptoms has evolved since the time the MSQ was developed. A greater understanding of menstrual symptoms has led to the classification of certain symptoms into distinct disorders that include PMS and dysmenorrhea. Therefore, the definition of dysmenorrhea as used by Chesney and Tasto (1975) to develop the MSQ may not necessarily concur with the current definition. Thus, the MSQ can no longer be assumed to measure dysmenorrhea, but simply is an instrument to assess menstrual symptoms. In addition, the samples used to develop the MSQ and those used in subsequent examinations were primarily composed of college-aged women. Younger adolescents are in the early stages of ovulation which may affect the type and experience of menstrual symptoms. The factor structure and validity of the scale for younger adolescent girls has yet to be examined.

The MSQ was based on a theory developed by Dalton (1964, 1969) that there are two distinct types of dysmenorrhea: spasmodic and congestive. Chesney and Tasto (1975) completed a series of factor analyses on 51 items of the MSQ with 56 college-aged women who identified themselves as having menstrual discomfort. The revised scale (25 items) was then factored with 48 participants who described themselves as having menstrual discomfort. The results of their final factor analysis supported two factors which they referred to as congestive and spasmodic dysmenorrhea. Spasmodic symptoms were thought to occur primarily at the time of menses whereas congestive reflected pre-menstrual symptoms of discomfort and mood disturbance. Each type was thought to result from a different underlying hormonal imbalance presuming that some women have spasmodic symptoms while others have congestive and thus both symptom types rarely occur together. However, this assumption has been invalidated by subsequent studies; women have been found to experience both types of symptoms (Webster, Martin, Uchalik, & Gannon, 1979). Chesney and Tasto (1975) may have been distinguishing subtle differences in the symptoms of PMS and dysmenorrhea, and it is possible for women to have both disorders. However, it is difficult to compare their terminology of dysmenorrhea with current rhetoric due to more recent clarifications of menstrual-related symptoms.

There are also a number of issues with the methodology used to derive the initial factor structure. As Webster and colleagues (1979) noted, factor analysis has limitations when the number of subjects is not large relative to the number of items included in the factor analysis. There is near universal agreement that factor analysis is inappropriate when sample size is below 50. There are a number of opinions on the adequate sample size for factor analysis, one being that the subjects-to-variables ratio should be no lower than five (Bryant & Yarnold, 1995). Additionally, Webster commented that using factor analysis on women who identify themselves as having menstrual discomfort results in bias. As conceptualized, the scoring of the MSQ does not differentiate those women who have both congestive and spasmodic symptoms or those who have neither. Since some women experience both premenstrual and menstrual symptoms, the scoring system is confounded (Webster et al., 1979).

A number of subsequent studies have failed to replicate the original two factor structure (Monagle, Dan, Chatterton, DeLeon-Jones, & Hudgens, 1986; Stephenson, Denney, & Arberger, 1983; Webster et al., 1979; Wildman & White, 1986), and instead provided evidence for three, five, six, and seven factors. Thus, although the two factor structure is clearly not supported in the adult population, there is ambiguity as to the best simple structure and interpretable number of factors that can be achieved from the items of the MSQ.

The results of Webster and colleagues' (1979) analyses with 275 college-aged women indicated 7 factors, 5 of which were interpretable from item loadings. The authors' conclusion was that the pattern of factors suggests viewing the symptoms as either premenstrual or menstrual with several categories within each. Supporting the possibility of the two factor solution, Stephenson and colleagues (1983) suggested that the distinction between spasmodic and congestive dysmenorrhea may be obscured in relatively asymptomatic samples. This hypothesis was tested with an initial sample of 423 women aged 18–22 years and a cross-validation sample of 294. In order to enhance generalizability, report of menstrual symptoms was not an inclusion criterion when they constructed the sample. The results from the initial sample indicated seven factors, six of which were interpretable. Five of these factors corresponded closely with the factors from Webster's factor analysis (Webster et al., 1979). From the cross-validation sample six factors emerged, five of which also mirrored those from Webster's analysis. Additionally, the factor structure was almost identical when conducted only with subjects who reported dysmenorrhea, indicating that even in symptomatic women, the concept of having either spasmodic or congestive symptoms is invalid.

In a sample of 330 women (mean age 25.3 years ± 5.5), a 6 factor solution was found (Monagle et al., 1986), 4 of the factors closely resembled those published by Webster et al. (1979) and Stephenson et al. (1983). Alternatively, a study with 302 females aged 17–25 indicated a three-factor solution: premenstrual symptoms, menstrual pain, and psychophysiological discomfort (Wildman & White, 1986). To explain the variation in factor solutions across studies, Wildman and White (1986) suggested that the factor structure of the MSQ may be reactive to the sample on which is conducted. For example, women over age 25 and those who have been pregnant are considered to have lower risk for menstrual pain, but higher risk for premenstrual symptoms and menstrual discomfort (Friederich, 1983; Murray, 1981). Additionally, menstrual symptoms are less common in the first few years after menarche until ovulation begins (Klein & Litt, 1981). Thus, it is plausible that adolescent girls may provide reports of menstrual symptoms that vary considerably from those of college-aged or older women.

The current study

There is a dearth of instruments designed to measure adolescent menstrual symptoms, thus it is important to examine the utility of the MSQ for this age group. The last reference to the MSQ factor structure was over 10 years ago and thus a reanalysis of the psychometric properties of the instrument is warranted for several reasons. First, all previous factor analyses were restricted to orthogonal rotations that do not allow for intercorrelations among

factors. It is likely that categories of menstrual symptoms are intercorrelated, thus imposing an orthogonal rotation may not accurately represent the relationships between symptoms. Second, all previous analyses were conducted with women who were college-aged or older. To our knowledge, no studies have been conducted in adolescents who are recently menarcheal where the experience of menstrual symptoms may be substantively different. Third, there is evidence that age at menarche has decreased in recent cohorts (Anderson, Dallal, & Must, 2003; Herman-Giddens, 2007), which may alter adolescents' menstrual symptoms and/or their perception of them. Due to the limitations of previous factor analyses of the MSQ, the fact that it has not been investigated with an adolescent sample, and the shift in age at menarche, the purpose of this study was to examine the factor structure and the utility of the MSQ to assess menstrual symptoms (not menstrual disorders) in a sample of adolescent girls. Additionally, depressive symptoms and anxiety were correlated with the MSQ factors to provide validity for the interpretations of the factors.

Methods

Participants

The participants for this study were girls enrolled in a longitudinal study on smoking, mood, and metabolic complications including bone and reproductive health in adolescent girls ($N = 264$). Out of the full sample there were 210 girls (80% of total sample) who had reached menarche and thus completed the MSQ. For these 210 girls, the ethnic composition was primarily Caucasian (57%) or African American (40%). The remaining three percent of the girls represented mixed-race or other race/ethnicities. Girls were enrolled in the study by an initial eligibility questionnaire in age cohorts of 11, 13, 15, and 17 years old and based on 5 previously defined levels of smoking experience. Participants were recruited from an urban teen health clinic and surrounding community. Exclusion criteria were: (1) pregnancy or breast feeding within 6 months, (2) primary or secondary amenorrhea (menarche > age 16; < 6 cycles/year, respectively), (3) body mass index less than the 1st percentile or body weight above 300 pounds, (4) medication/medical disorder influencing bone health, and (5) psychological disabilities impairing comprehension or compliance. This study received approval from the Institutional Review Board.

Procedures

Participants came to an urban children's hospital for their study visits. After consent and assent were obtained, the parent was directed to a separate room to complete questionnaires. The adolescent then had a physical examination conducted by a physician or nurse practitioner. During that time, a standardized interview was conducted focusing on menstrual history, use of medications, and the MSQ. Other procedures followed but were not the focus of this paper (e.g. blood draw, questionnaires and interviews, and measurement of bone density).

Measures

Menstrual Symptom Questionnaire—Menstrual symptoms were measured using the MSQ (Chesney & Tasto, 1975). The MSQ is a 24 item self-report measure which assesses menstrual pain and symptoms (e.g. 'I have cramps that begin on the first day of my period';

'I feel depressed for several days before my period'). The score on each item ranges from 1 (never) to 5 (always) with a higher composite score indicating more symptoms.

Children's Depression Inventory—Self-report depressive symptoms were obtained from the 27-item Children's Depression Inventory (CDI) (Kovacs, 1981). Each item contains three answer options with statements such as 'I am sad all the time' and 'I feel like crying every day' indicating the highest level of depressive symptoms while statements such as 'I am sad once in a while' and 'I feel like crying once in a while' indicating the lowest level of symptoms. The composite T-scores for all 27 items were used in these analyses. T-scores are based on a mean of 50 and standard deviation of 10. Alpha reliabilities for the CDI have been adequate in various samples and it has been shown to correlate strongly with other measures of childhood depressive symptoms (Kovacs, 1992). The Cronbach's alpha was .89 in the present sample.

Trait anxiety—Trait anxiety was determined by the State-Trait Anxiety Inventory (STAI) (Spielberger, Gorusch, & Lushene, 1970) for those aged 12 and above, or the child version for the age 11 year cohort (STAIC) (Spielberger, 1973). Trait anxiety includes 20 items (e.g. 'I am tense') with responses ranging from 1 = 'not at all' to 4 = 'very much so'. Trait anxiety is thought to be more stable than state anxiety and represents how the girl generally feels. State anxiety reflects anxiety at the present moment, and thus was not appropriate to compare with menstrual symptoms experienced over the past year. In this sample, the Cronbach's alpha for trait anxiety was .88 and .93 for the STAIC and STAI, respectively.

Covariates—The covariates included in the data analyses were age, race, socioeconomic status (SES) (Hollingshead, 1976), use of hormonal contraception (any type), and gynecologic age (years since menarche). In the current sample mean SES was 35.90 (blue collar/working class) with a range of 14–66 (possible range = 13–66). These covariates were chosen based on evidence that they are related to pubertal development and menstrual symptoms.

Data analyses

Exploratory factor analysis was conducted to determine the factor structure of the MSQ in the current sample of adolescent girls. The polychoric correlations between all 24 items of the MSQ were entered into a principal axis analysis and the number of factors based on Velicer's minimum average partial test were rotated via promax.

Once a stable factor solution was obtained, to provide evidence of construct validity partial correlations were computed between each of the MSQ factors and depressive symptoms and anxiety controlling for age, SES, race, gynecological age, and use of hormonal contraception.

Results

Descriptives

Descriptive statistics can be found in Table 1 for the demographic and study variables.

Exploratory factor analysis

The 24 items of the MSQ were subjected to a principal components analysis. The number of factors was determined by Velicer's minimum average partial (MAP) test (O'Connor, 2000; Velicer, 1976). Based on the MAP test four factors were extracted with principal axis and rotated via promax to an equamax target. Factor 4 contained only three items, one which loaded below .30 (item 6: 'know period by calendar') and was therefore dropped. Subsequently, there were only two items that loaded on factor four. Because a factor cannot be determined by two items and due to the low reliability of those two items, Factor 4 was dropped and the solution was recalculated with three factors which accounted for 56.97 percent of the variance. The final solution resulted in nine items loading on Factor 1, eleven items on Factor 2, and three items on Factor 3. Factor 1 was named abdominal pain, Factor 2 named negative affect/somatic complaints, and Factor 3 named back pain. The factor loadings, reliabilities, and factor intercorrelations are shown in Tables 2 and 3. Overall the reliabilities of the three factors were high indicating a good degree of internal consistency. Also the factor intercorrelations were high indicating that the menstrual symptoms factors are highly related, although they were not so highly correlated to preclude their individual dimensionality in relation to the other factors.

Correlations with related variables

Partial correlations were computed between the MSQ factors, depressive symptoms and trait anxiety controlling for age, SES, race, gynecological age, and use of hormone contraception (see Table 4). For depressive symptoms there were significant positive correlations with all three MSQ factors; however, trait anxiety was significantly positively correlated only with MSQ Factor 2 (negative affect/ somatic complaints).

Discussion

The purpose of this study was to examine the factor structure of the MSQ in a sample of adolescent girls. Additionally, relationships between menstrual symptoms and mood variables were examined. The psychometric properties of this instrument have not been examined in adolescent girls. Previous analyses were limited to uncorrelated factor solutions, and we cannot presume that adolescents and adults experience menstrual symptoms similarly.

The final solution from the exploratory factor analysis indicated three factors. The first factor was named 'abdominal pain' and is consistent with the symptoms of primary dysmenorrhea. The second factor was named 'negative affect/somatic complaints' and included both psychological and physiological symptoms. The third factor was named 'back pain' and clearly included only symptoms of premenstrual and menstrual back pain. The most important difference between previous factor solutions and our solution is that the premenstrual and menstrual items did not necessarily separate into two distinct factors. This may be an artifact of the younger adolescent sample. Teenage girls may be less able to differentiate which symptoms are associated with menstruation and which are not (e.g. from an illness; from lack of sleep). This may be due to the fact that many symptoms related to menstruation are not well-defined, and thus may increase the misclassification for symptoms

as 'menstrual' when they in fact are not. In addition, adolescents may not be skilled at recalling whether the symptoms occurred during or before menstruation and they may still be learning about their menstrual cycle. The distinction of the 'back pain' factor from the other two may indicate that adolescent girls do not necessarily comprehend that back pain is a normal symptom associated with menses. Therefore, clinicians may want to consider specifically asking adolescent females about back pain when addressing dysmenorrhea or inquire about related menstrual symptoms when an adolescent female presents with back pain.

The correlations between the MSQ factors and depressive symptoms and trait anxiety showed some interesting associations. After controlling for age, race, SES, gynecological age, and use of hormone contraception, there were significant correlations between depressive symptoms and all three MSQ factors. This is of significance because it demonstrates common variance between physiological and psychological variables. Additionally, Factor 2 (negative affect/somatic complaints) was positively correlated with trait anxiety, indicating that higher anxiety is associated with more menstrual symptoms. The correlation of both depressive symptoms and anxiety with this factor in particular lends validity to the interpretation that it is capturing the psychological aspects of menstrual symptoms more so than Factor 1 (abdominal pain) and Factor 3 (back pain). Unfortunately, we did not have other measures of abdominal and back pain in order to examine the validity of the other scales. Interestingly, depression was related to both pain scales. Previous studies have also found depression to be related to menstrual pain (Alonso & Coe, 2001), however to our knowledge this is the first study to investigate these associations in a sample of teenage girls. Although the factor structure of menstrual symptoms may vary between adult women and teenagers, our results show that in both age groups depressive symptoms are associated with increased menstrual pain.

Although oral contraceptives are often used for the treatment of dysmenorrhea (Davis et al., 2005; Davis & Westhoff, 2001; Hendrix & Alexander, 2002), in this study there were no significant differences in severity of menstrual symptoms for those girls who were taking oral contraceptives in the past 12 months (27%) to those who were not (73%) (data not shown). This is in contrast to the finding by Stephenson and colleagues (Stephenson et al., 1983) that oral contraceptive users scored significantly lower on menstrual pain than non-users. This difference may be due to the relatively low levels of menstrual symptoms in our sample. Although the present sample showed good variability of menstrual symptoms, there were few at the very high end of the scale. Treatment with hormone contraceptives is often used for those girls with severe menstrual symptoms, however there is little evidence from randomized controlled trials that oral contraceptives are effective for the treatment of dysmenorrhea. We did not query the girls on the specific reason for taking hormone-related contraceptives and we had no data on compliance. There also are a number of girls in this sample that are recently menarcheal limiting the probability that they are experiencing severe menstrual symptoms, as these symptoms often begin after regular ovulation (up to two to three years post menarche). While our findings are more generalizable to the general population of teenage girls than those studies that have enrolled participants based on the severity of menstrual symptoms, the results cannot be applied to all populations of adolescent girls.

In spite of the strengths, there are several limitations of this study that should be noted. First, this sample of girls did not report a high frequency of severe menstrual symptoms. As discussed previously, the performance of the MSQ may be reactive to the sample. Thus, examination of the MSQ on an adolescent sample and one that had generally moderate menstrual symptoms may in part be responsible for the difference from previous factor solutions. However, this factor structure may be more generlizable to normative populations who may have less severe symptoms. Second, we did not have access to a validation sample to confirm the factor structure derived from the exploratory analysis. This is recommended for establishing the validity of this factor solution for adolescent girls. A confirmatory factor analysis in an independent sample will add support to the results of this article. Third, because all the measures were self-report some of the associations between variables may be due to shared variance. Lastly, because the MSQ was developed previous to current definitions of menstrual symptoms and disorders there may be symptoms that are not included in the scale. Our results show three scales relating to pain and affective symptoms whereas there may be meaningful aspects of menstruation that are not captured by the MSQ.

Despite the lack of a validation sample the findings still make a significant contribution to the field. There is a dearth of instruments to measure menstrual symptoms and use of these measures on adolescents has not been validated. Our results demonstrate the utility of the MSQ to measure menstrual symptoms in a normative sample of adolescent girls. The characteristics of our sample may be closer to the general population of adolescent girls than those studies that selected their sample based on severity of menstrual symptoms. In addition we found that affective symptoms on the MSQ were significantly correlated with depressive and anxiety symptoms providing evidence for the validity of this scale. Due to the decrease in age of menarche (Herman-Giddens, 2007), the experience of menstruation and related symptoms may be very different than in older studies. Girls are entering puberty at younger ages than in the past and may not be cognitively mature to comprehend the significance of pain occurring around their period, or developmentally able to distinguish these symptoms as menstrual, premenstrual, or not menstrual-related. In addition the specification of PMS has shifted the focus of menstrual symptoms to a more psychologically based concept, which may be distinct from dysmenorrhea. While there are a number of issues that still need to be addressed regarding menstrual symptoms in adolescents, this study is the first to examine the utility of the MSQ to measure menstrual symptoms in adolescents as well as the associations with indicators of mood.

In conclusion, this study supports a three factor structure for the MSQ in a sample of teenage girls. The experience of menstrual symptoms for teenagers may be substantively different than for adult women as they are likely in the early phases of regular ovulation and they are also learning to distinguish between symptoms related to the menstrual cycle from those that are not related. However, correlations between the MSQ factors and mood variables indicate that teenage girls and adult women show similar associations between menstrual symptoms and affective variables such as depression and anxiety. Future research should confirm the factor solution presented here in a group of adolescents as well as examine associations with additional health and behavioral variables. Additionally, longitudinal associations should be examined to determine the mechanisms responsible in these associations. Clearly, a number of adolescent girls have menstrual symptoms and this is not an isolated problem. As we have

shown, menstrual symptoms are related to more depressive symptoms and anxiety, whereas in other studies association with school and work absences have been found (Banikarim et al., 2000; Sundell, Milsom, & Andersch, 1990). Thus, future research should explore the potential associations in multiple areas of functioning as menstrual symptoms may alter healthy developmental processes in adolescents.

Acknowledgments

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Table 1

Descriptive statistics for 210 adolescent girls

	Mean	Standard deviation (SD)	Range
Age (yrs)	15.69	1.74	11.07–17.99
SES	35.90	13.25	14–66
Gynecological age (yrs)	3.41	1.91	.01–10.07
Depressive symptoms	47.11	11.18	34–90
Trait anxiety	45.94	8.50	23–76

Note: SES = socioeconomic status; Depressive symptoms = T score from Children's Depression Inventory, Trait anxiety=T score from State Trait Anxiety Inventory

Table 2

Factor loadings for Menstrual Symptom Questionnaire exploratory factor analysis in 210 adolescent girls

Item		Factor 1 Abdominal pain	Factor 2 Negative affect/somatic complaints	Factor 3 Back pain	Mean (SD)
2	m. cramps	1.06			3.25 (1.38)
15	m. heat Tx abdomen	.80			2.99 (1.53)
18	m. pain spasms	.74			2.45 (1.26)
4	p. stomach pain	.69			2.64 (1.35)
19	m. dull aching	.68			2.23 (1.15)
12	m. aspirin for pain	.64			2.96 (1.51)
20	p. stomach pain	.49			2.24 (1.32)
23	m. nausea	.44	.37		1.92 (1.17)
7	m. Rx for menstrual pain	.39			1.75 (1.33)
3	p. depression		.79		2.14 (1.16)
16	p. weight gain		.70		1.80 (1.13)
9	p. tense/nervous		.68		1.72 (.97)
5	p. fatigue		.67		2.49 (1.32)
10	m. diarrhea		.64		1.41 (.88)
17	m. constipation		.61		1.46 (.81)
22	p. bloating		.48		2.36 (1.30)
13	p. breast pain		.48		2.25 (1.40)
8	m. weak/dizzy		.46		1.98 (1.18)
24	p. headache		.44		2.20 (1.29)
1	p. irritability		.43		3.21 (1.24)
21	m. backache			1.03	2.09 (1.35)
11	p. backache			1.02	2.06 (1.27)
14	m. lower back pain			.54	2.13 (1.28)
Excluded items					
6	know period by calendar				2.06 (1.33)

Notes: m = menstrual; p = pre-menstrual; Rx = prescription; Tx = treatment; cross loadings above .34 are underlined; *SD* = standard deviation

Table 3

Factor intercorrelations and internal consistencies for the Menstrual Symptom Questionnaire in 210 adolescent girls

	Factor 1 Abdominal pain	Factor 2 Negative affect/ somatic complaints	Factor 3 Back pain
Factor 1	.86		
Factor 2	.66	.84	
Factor 3	.65	.61	.84

Cronbach's alpha in diagonal

Table 4

Partial correlations between Menstrual Symptom Questionnaire (MSQ) factors and depressive symptoms, anxiety, and covariates

	MSQ factor 1 Abdominal pain	MSQ factor 2 Negative affect/somatic complaints	MSQ factor 3 Back pain
Depressive symptoms	.19[*]	.37[**]	.18[*]
Trait anxiety	.07	.22[**]	.07

Notes: Covariates were age, race (white/non-white), SES, hormonal contraception, and gynecological age; Depressive symptoms were obtained from the Children's Depression Inventory;

[*]
p < .05,

[**]
p < .01