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Relationship between menstruation signs and anxiety, depression, and stress among adolescent girls at Asyut city

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Abstract
Background: The menstruation signs are characterized by intense physical and psychological changes. The most common symptoms include anxiety, depression, stress the symptoms affect the quality of life of women, and cause impairment in many aspects of life.

Aim of the study: To define the association between menstruation signs and anxiety, depression, and stress among adolescent school girls.

Subject and methods: Cross sectional descriptive design was used in this study. The study included 600 students from public and private preparatory schools for girls at Asyut city. Four schools were selected randomly which namely; El-waledia, HodaSharawy, Dar-Heraa and Elslam schools three tools were used to accomplish this work.

Tool I: A structured Questionnaire was developed by the investigators and included two parts: Part I: personal characters; Part II: data related to menstruation:

Tool II: Menstrual Distress Questionnaire (MDQ),

Tool III: Depression, Anxiety, and Stress Scale (DASS).

Fieldwork: Data was collected in the period from the middle of February 2019 until the middle of May 2019. Results: half of the studied students 42% were age less than 15 years old with mean ± SD 14.80 ± 1.38, 44.2% of them menstruation duration less than 5 days with mean ± SD 4.85 ± 1.63. More than half of them (58%) within normal body weight. Nearly two third of them (71.8%, 60.5%) had average regular menstruation rhythm with premenstrual pain (63.7%). The majority of them did not complain from either bleeding nor breast engorgement (87.3%, 83.0%) respectively. (74.5%, 53.2% and 50.5%) of them had mood swings, depression and acne respectively. There is statistically significant difference between level of severity of distress before during and after menstruation p 0.000. There is a significant correlation between menstrual distress before, during and after menstruation and depression, anxiety and stress at p=0.000.

Conclusions and recommendations: We can be concluded that with regard to high prevalence of increase menstruation signs before, during and after menstruation, as well as high incidence of depression, anxiety, and stress signs among the students, So It is necessary that. Investigation using longitudinal studies with continual assessment and evaluation of education interventions for adolescent girls with psychological problems related to severity of menstruation would be of great value in primary health promotion. Early diagnosis, reassurance and management of symptoms will go a long way towards smoother passage of adolescence into stable adult identity formation.

Keywords: Menstruation signs, anxiety, depression, stress, adolescent girls

Introduction

Menstruation disorders occur at different ages among women. These disorders are more prevalent in early puberty among girls, especially during the first 2 years of menstruation in which many periods are without ovulation. One of the most common disorders at this time is menstruation signs, (Flug D, *et al.* 2000) which include irritability, tender breasts, low back pain, skin outbreaks, fatigue, palpitation, social isolation, nausea and vomiting, abdominal pain (cramps), and general weakness (Zegeye DT, *et al.* 2009) [2] occurring before, during, or after menstruation. (Thomas l, *et al.* (2006) [4] Retrospective and prospective studies have reported the prevalence of these signs over 60% and 23-67%, respectively. These signs not only affect the quality of life but also are the main reasons for adolescents and teenagers' school absenteeism. The intensity and frequency of menstruation-related signs differ based on menstruation cycle's stages and the cultures, Based on World Health Organization (WHO) report, menstruation signs have higher prevalence in Asian countries compared to Western countries (Carr-Nangle R 2006).

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Based on biopsychosocial model, menstruation-related signs are under the influence of not only biological factors such as, hormonal disorders and lifestyle (sports and nutrition) but also, environmental and social factors like interaction with friends, family, and colleagues and the attitude toward menstruation and psychological factors including anxiety, depression, and stress (Davydov DM, *et al*, 2005) [9] Psychological disorders may activate corticotrophin releasing hormone (CRH) from the nervous system followed by increased cortisol and prolactin lead to the incidence of menstruation signs (Lee CA, *et al.* 2009) [11].

Nowadays, there is more effort in evaluating adolescents' girl's menstruation problems in terms of improvement in individuals' health status, including physical and psychological well-being. Some scholars argue that when menstruation signs in adolescents is ignored, it can cause an impact on the adolescents' health and quality of life (Halas, 1987; Wilson and Keye, 1989) [12, 13]. An adolescent may develop an altered body image, a decrease in self-esteem, lack of self-confidence and subsequently affect their relationships with significant others. On reaching adulthood, these effects may give rise to broken engagement, marital distress, and difficulty in pursuing education goals or becoming withdrawn and socially isolated (Wilson and Keye, 1989) [13]. Thus the study aimed to define the association between menstruation signs and anxiety, depression, and stress among high school girls.

Aim of the study
The aim of this study was to define the association between menstruation signs and anxiety, depression, and stress among adolescent school girls.

Research question
- Is there a relationship between menstruation symptoms and depression, anxiety, and stress among adolescent girls at Asyut city?

- What is the level of Depression, Anxiety, and Stress Scale during menstruation symptoms among adolescent girls at Asyut city?

Subject and method
This is a cross-sectional study conducted on 400 governmental school girls in the school year 2018.

Setting
This study was conducted in the public and private preparatory schools for girls at Asyut city. The total number of these schools were (32); it's divided into West city included (11) schools and East city included (21) schools; four schools were selected randomly which namely; El-waledia, HodaSharawy, Dar-Heraa and Elslam schools

Sampling: The children were selected using convenient sampling technique.

Sample size: The total number of students in the selected schools were 1145; sample size was calculated by using Epi info version 3.3 with expected frequency of 50% and confidence level 99.9% the estimated sample size was (557); to avoid dropout the sample size expand to become (600).

Tools: Three tools were used to accomplish this *after* reviewing the relevant literature to elicit information; the researchers design self-administer questionnaire that included the following: personal characteristics, data related to menstruation cycle, Menstrual Distress Questionnaire (MDQ) and Depression, Anxiety, and Stress Scale (DAS).

Tool I: It divided into two parts;
Part (1): It included personal characteristics of the students' age, level of education, Weight and Height.
Part (2): It included data related to menstruation cycle as No. of day, amount, regularity, pain, breast engorgement, mood swings, overweight and acne.

Tool II: *Menstrual Distress Questionnaire (MDQ),* Rudolf Moos' *MDQ* (1986) was designed in New York University. This questionnaire is scored a four-point Likert scale (no sign = zero, very severe = 4) and contains 16 questions in four dimensions [pain, control, autonomic reactions, and (water) weight gain], and records the menstrual signs a week before menstruation, during bleeding, and a week after menstruation. A score of ≤16 is given for minor menstruation signs, 17 < score <32 for moderate menstruation signs, and 33 < score <48 is for acute menstruation signs. Scores over 49 were considered for very acute menstruation signs.

Tool III: Depression, anxiety, and stress Scale (DASS)
This questionnaire contains 21 questions measuring depression (7 questions), anxiety (7 questions), and stress (7 questions).These questions are scored by a four-point Likert scale: "never" (zero) to "very much" (three). The depression-related questions were questions 17, 16, 13, 10, 5, 21 and 3, anxiety-related questions were 20, 19, 15, 9, 7, 4, and 2, and stress-related questions were 18, 14, 12, 11, 8, 6, and 1. A score of 5-6 showed minor depression, 7-10 moderate, 11-13 acute, and over 14 showed very acute depression.

Validity& reliability of the tools
- **Validity of tools:** To evaluate the content validity of the tools. It was reviewed by three academic experts in medical and nursing science to measure validity; all comments and suggestions were done.
- **Reliability of tools:** To evaluate the tool reliability was analyzed by Cronbach's alpha to measure reliability which was 0.881

Methods of data collection
I-Administrative phase: An official approval letters were obtained from the Dean of Faculty of Nursing, Asyut University to Ministry of Education and to directors of selected schools. These letters includes a permission to carry out the study and explains the purpose and nature of the study.

II-Pilot study: A pilot study was applied before beginning of data gathering on (10%) of the participants, which included in the study sample for non-presence any modification. The purpose of the pilot study was to ensure the clarity of items and their comprehension applicability and relevance of the tools, in addition to identify obstacles and problems that may be occurring during data collection;

also to test wording questions and estimate the time that required to collections of study sample.

Data collection

The researchers first introduced themselves for the participants, explained the purpose of the study and getting their oral consent. Then the sheet was distributed to be answered within (25-30 minutes) according to the participants' response. It consumed around 3 months through two days weekly for collecting the questionnaire sheet; every week about (25), sheets were collected. Data was collected in the period from the middle of February 2019 until the middle of May 2019.

III- Ethical Consideration

The research proposal was approved from ethical committee in the Faculty of Nursing at Asyut University. There was no risk for study subject during application of research, the study followed the common ethical principles in clinical research, oral consent was obtained from students that were participated in the study after explaining the nature and purpose of the study, confidentiality and anonymity was assured and study participants have the right to refuse to participate or withdraw from the study.

Statistical design

Upon completion of data collection, data entry was done using Epi-Info 6.04 computer software package, while statistical analysis was done using SPSS 16.0 statistical software packages. Data were presented using descriptive statistics in the form of means and standard deviations for quantitative variables.

Results

Table 1: Distribution of demographic data among study sample (No=600)

	No. (600)	%
Age: (years)		
< 15	252	42.0%
15-16	134	22.3%
>16	214	35.7%
Mean ± SD (Range)	14.80 ± 1.38 (12.0-22.0)	
Educational level:		
Preparatory	378	63.0%
Secondary	222	37.0%
BMI:		
Underweight	84	14.0%
Normal	348	58.0%
Overweight	142	23.7%
Obese	26	4.3%
Menstrual duration: (days)		
< 5	265	44.2%
5-6	222	37.0%
≥7	113	18.8%
Mean ± SD (Range)	4.85 ± 1.63 (1-12)	
Menstrual RYSM:		
Regular	363	60.5%
Irregular	237	39.5%
Pain:		
Present	488	81.3%
Absent	112	18.7%
Pre-menstrual pain:		
Present	382	63.7%
Absent	218	36.3%
Amount:		
Heavy	121	20.2%
Average	431	71.8%
Little	48	8.0%
Breast engorgement:		
Present	102	17.0%
Absent	498	83.0%
Bleeding:		
Present	76	12.7%
Absent	524	87.3%
Mood swings:		
Present	447	74.5%
Absent	153	25.5%
Depression:		
Present	319	53.2%
Absent	281	46.8%
Overweight:		
Present	88	14.7%
Absent	512	85.3%

Acne:		
Present	303	50.5%
Absent	297	49.5%

Table 1: This table show that nearly half of the studied students 42% were age less than 15 years old with mean ± SD 14.80 ± 1.38, 44.2% of them menstruation duration less than 5 days with mean ± SD 4.85 ± 1.63. More than half of them (58%) within normal body weight. Nearly two third of them (71.8% and 60.5% respectively) had average regular menstruation rhythm with premenstrual pain (63.7%). The majority of them did not complain from either bleeding nor breast engorgement (87.3% and 83.0% respectively). Finally, (74.5%, 53.2% and 50.5% respectively) of them had mood swings, depression and acne.

Table 2: Severity of menstruation distress before during and after menstruation among the study sample

Menstrual distress	Before (n= 600)		During (n= 600)		After (n= 600)		P-value[1]	P-value[2]
	No.	%	No.	%	No.	%		
Minor menstruation signs	302	50.3	202	33.7	186	31.0	0.000*	0.000*
Moderate menstruation signs	229	38.2	309	51.5	349	58.2		
Acute menstruation signs	59	9.8	81	13.5	59	9.8		
Very acute menstruation signs	10	1.7	8	1.3	6	1.0		

Table (2): This table reveal that the severity of menstruation distress before during and after menstruation there is statistically significant difference between level of severity of distress before during and after distress at p 0.000*
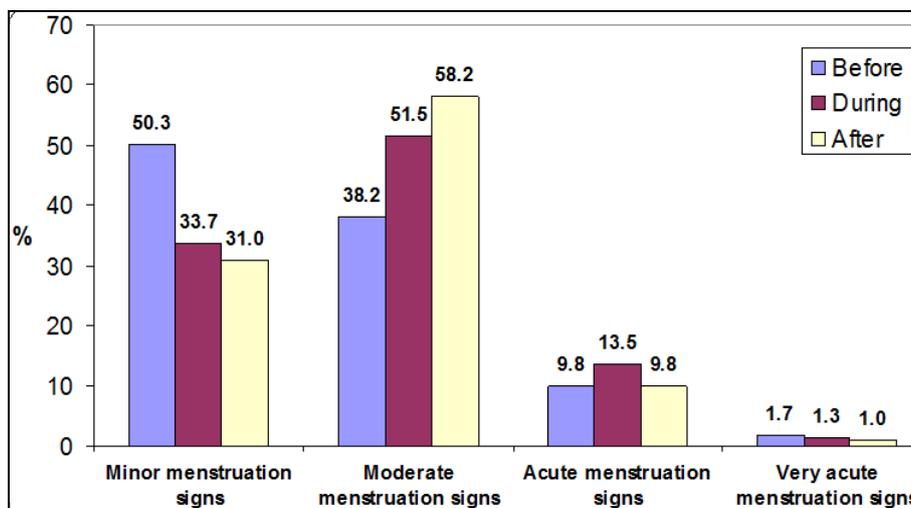
Fig 1: The severity of menstruation distress before during and after menstruation among study sample

This figure clarify that the severity of menstruation distress in minor menstruation signs increased before, then decrease during and become more intense after (50.3, 33.7, 31.0 respectively). While, in moderate menstruation signs the severity started mild then moderate and finally sever after menstruation (38.2, 51.5, 58.2 respectively). Finally, the acute menstruation signs were vague in severity.
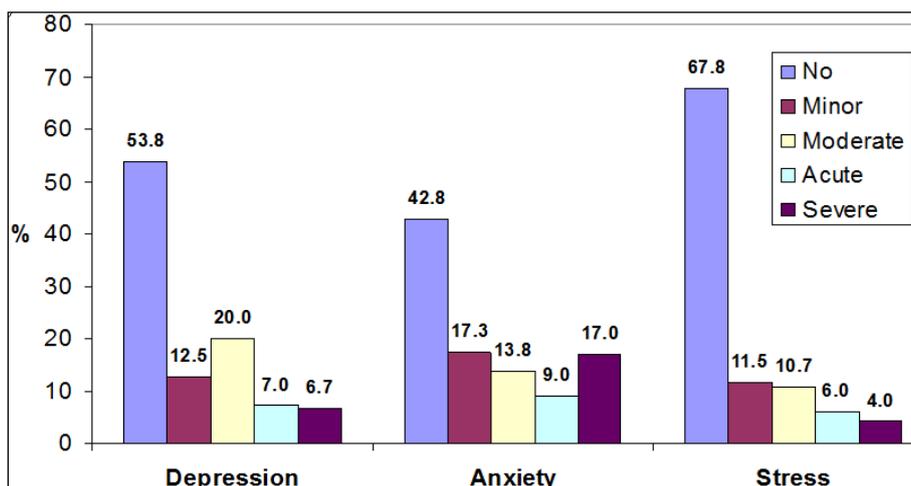
Fig 2: The relation between anxiety, depression and stress of students have during menstruation.

Fig 2: This figure show that the relation between anxiety, depression and stress of students have during menstruation. It revealed that during menstruation, the students with moderate menstruation signs had more depression (20%) than anxiety and stress (13.8% and 10.7%, respectively). While the students with minor menstruation signs were more anxious (17.3) than depression and stress (12.5%, 10.7% respectively).

Table 3: Correlation of menstrual distress before, during and after menstruation with depression, anxiety and stress scores

Menstrual distress	Depression		Anxiety		Stress	
	r-value	P-value	r-value	P-value	r-value	P-value
Before menstruation	*0*.508	0.000*	0.500	0.000*	0.479	0.000*
During menstruation	0.467	0.000*	0.445	0.000*	0.457	0.000*
After menstruation	0.488	0.000*	0.460	0.000*	0.474	0.000*

Table 3: This table shows that there is a significant correlation between menstrual distress before, during and after menstruation and depression, anxiety and stress at p=0.000*
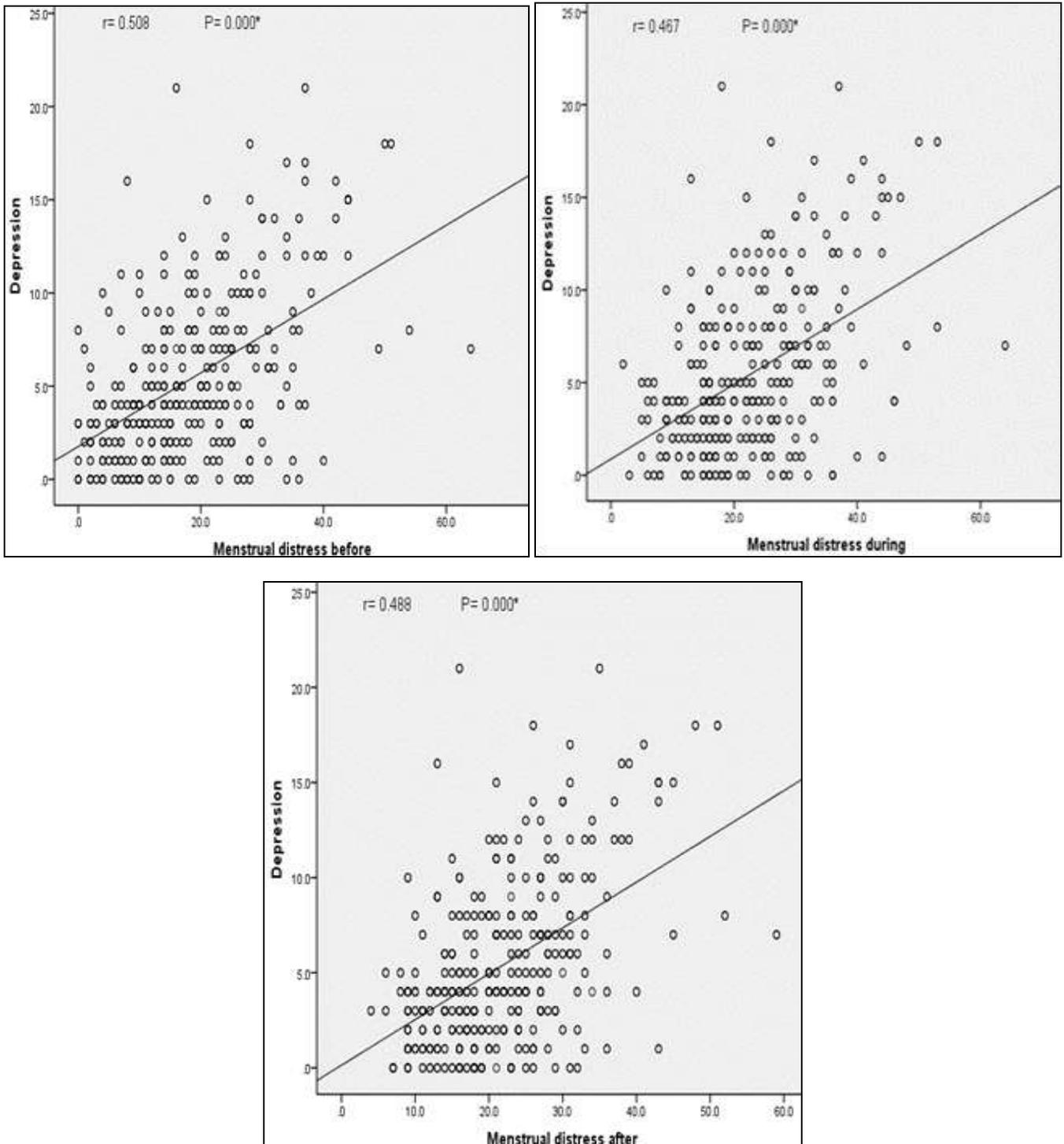
Fig 3: Correlation between depression score and menstrual distress before, during and after menstruation

Fig 3: Described the correlation between depression score and menstrual distress before, during and after menstruation. There was a positive correlation between the depression score, and menstrual distress before, during, and after menstruation, therefore a higher intensity of menstruation distress lead to increased depression with highly statistically significant differences before, during and after (P=0.000/r=0.508, P=0.000/r=467, P=0.000/r=488 respectively).
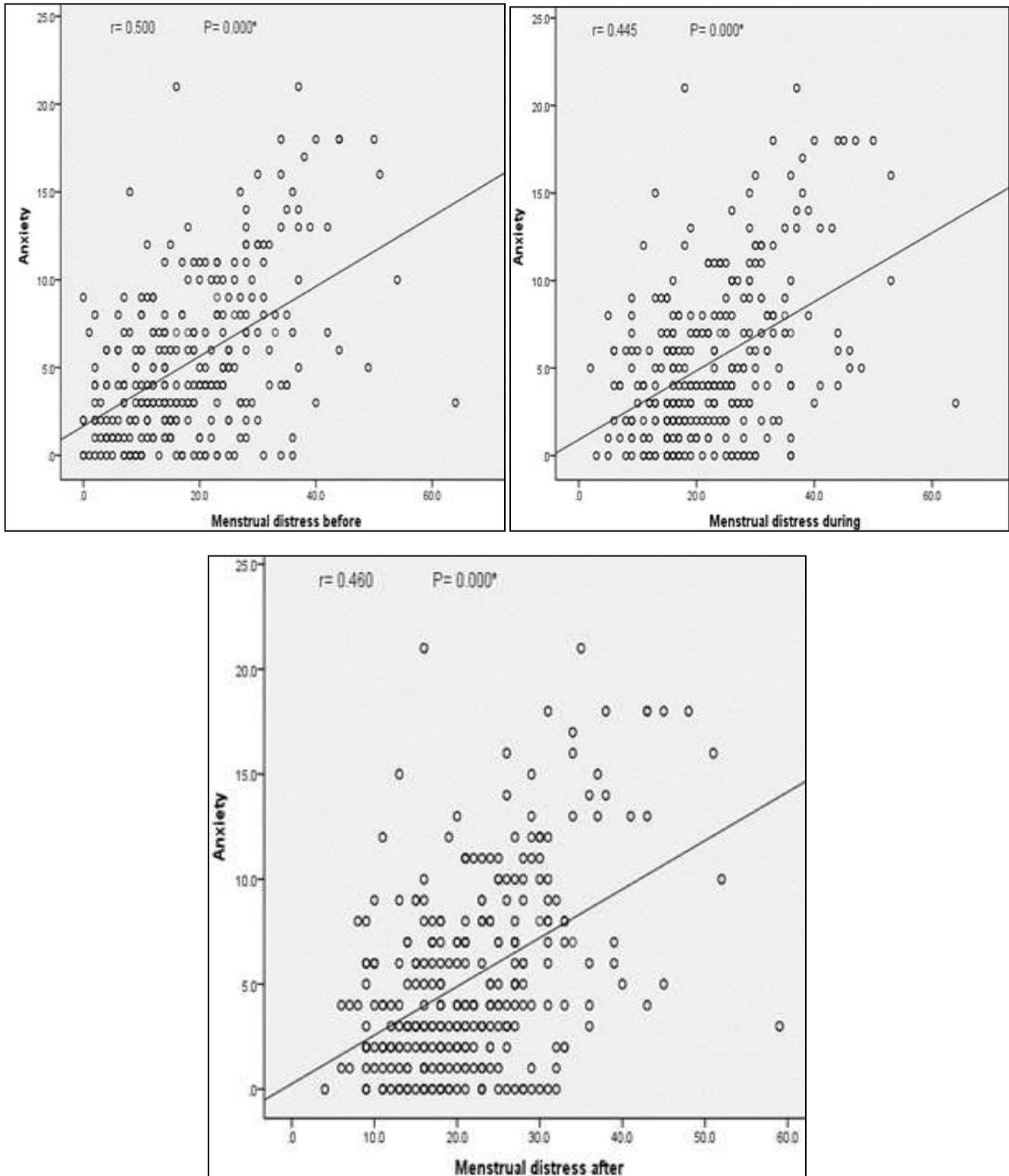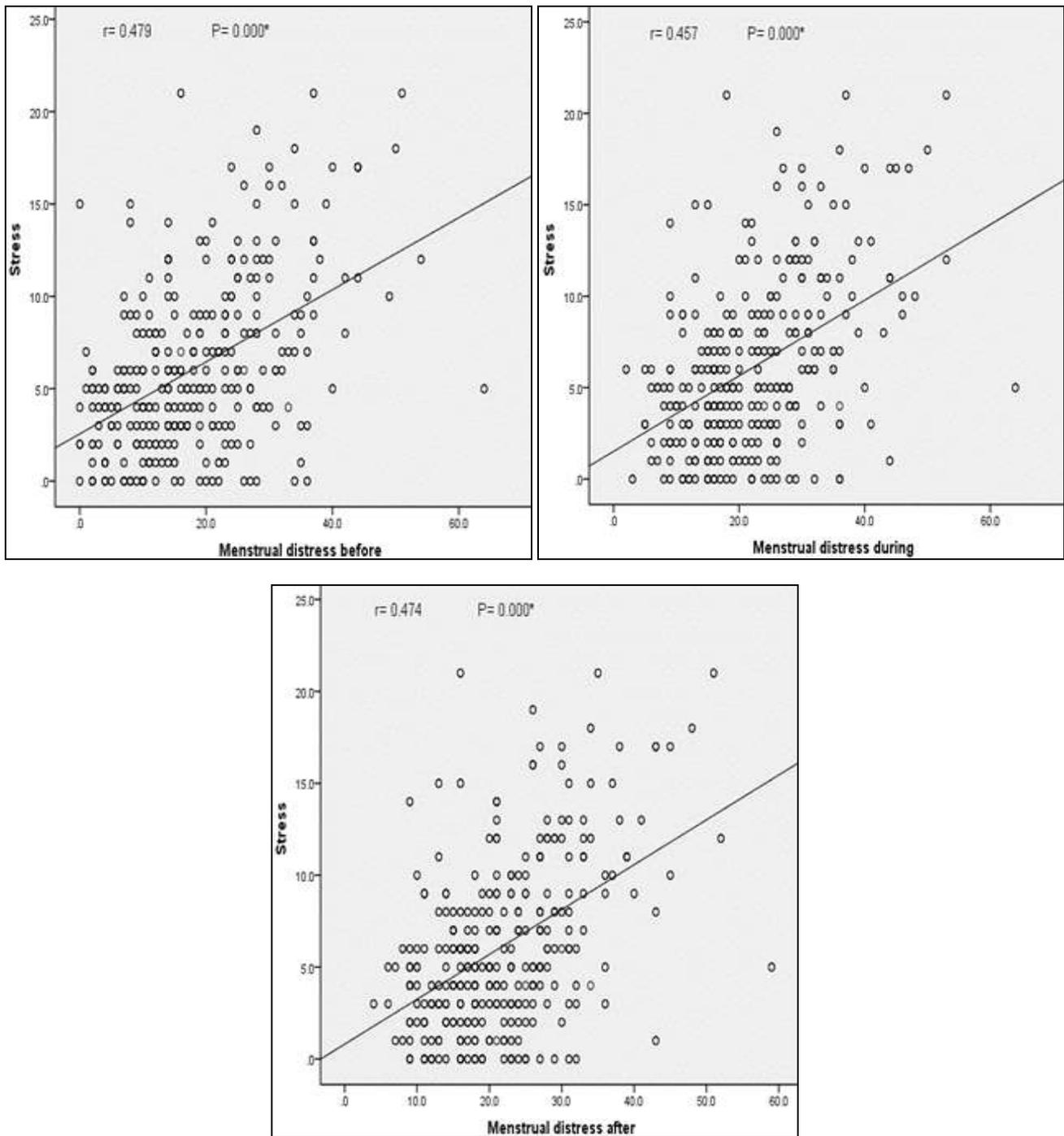

Fig 4: Correlation between anxiety score and menstrual distress before, during and after menstruation

Fig 4: Described the correlation between anxiety score and menstrual distress before, during and after menstruation. There was a positive correlation between the anxiety score, and menstrual distress before, during, and after menstruation, therefore a higher intensity of menstruation distress lead to increased, anxiety, with highly statistically significant differences before, during and after (P=0.000/r=0.500, P=0.000/r=455, P=0.000/r=460 respectively).

Fig 5: Correlation between stress score and menstrual distress before, during and after menstruation

Fig 5: Described the correlation between depression score and menstrual distress before, during and after menstruation. There was a positive correlation between the stress scores and menstrual distress before, during, and after menstruation, therefore a higher intensity of menstruation distress lead to increased stress with highly statistically significant differences before, during and after (P=0.000/r=0.479, P=0.000/r=457, P=0.000/r=474 respectively).

Table 4: Relation between DAS (yes, No) and menstrual distress categories) (before, during and after with: Severity of menstruation

Menstrual distress	Depression		No depression		Anxiety		No anxiety		Stress		No stress	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Before menstruation												
Minor	79	26.2	223	73.8	123	40.7	179	59.3	50	16.6	252	83.4
Moderate	144	62.9	85	37.1	161	70.3	68	29.7	95	41.5	134	58.5
Acute/very acute	54	78.3	15	21.7	59	85.5	10	14.5	48	69.6	21	30.4
P-value	0.000*				0.000*				0.000*			
During menstruation												
Minor	54	26.7	148	73.3	84	41.6	118	58.4	26	12.9	176	87.1

Moderate	155	50.2	154	49.8	184	59.5	125	40.5	107	34.6	202	65.4
Acute/ very acute	68	76.4	21	23.6	75	84.3	14	15.7	60	67.4	29	32.6
P-value	0.000*				0.000*				0.000*			
After menstruation												
Minor	46	24.7	140	75.3	74	39.8	112	60.2	28	15.1	158	84.9
Moderate	177	50.7	172	49.3	212	60.7	137	39.3	111	31.8	238	68.2
Acute/very acute	54	83.1	11	16.9	57	87.7	8	12.3	54	83.1	11	16.9
P-value	0.000*				0.000*				0.000*			

Table 4: Illustrated the relation between DAS (yes, No) and menstrual distress categories) (before, during and after with severity of menstruation, its clarified that before menstruation, students with minor menstruation signs majority of them hadn't complain from stress, depression and anxiety (83.4%, 73.8% and 59.3% respectively). While students with moderate menstruation signs nearly two third of them complain from anxiety and depression (70.3% and 62.9% respectively), with no stress (58.5%). As well as students with acute / very acute menstruation signs, majority of them complain from anxiety, depression and stress (85.5, 78.3, and 69.6 respectively), with highly statistically significant differences. During menstruation, the results showed that, Also students with minor menstruation signs majority of them had no signs of stress, depression and anxiety (87.1%, 73.3% and 58.4% respectively). On the other hand, students with moderate menstruation signs more than half of them complain from anxiety and depression (59.5% and 50.2% respectively), with no stress (62.4%). In the same line, students with acute/very acute menstruation signs, majority of them complain from anxiety, depression or stress (84.3%, 76.4, and 67.4 respectively), with highly statistically significant differences. After menstruation. As mentioned before, students with minor menstruation signs majority of them had no signs of stress, depression or anxiety (84.9%, 75.3% and 60.2% respectively). On the other hand, students with moderate menstruation signs more than half of them complain from anxiety and depression (60.7% and 50.7% respectively) with no stress (68.2%). In the same line, students with acute / very acute menstruation signs, majority of them complain from anxiety, depression or stress (87.7%, 83.1, and 83.1 respectively) with highly statistically significant differences.

Discussion
Menstruation is typically a universal event during a woman's reproductive life, up to 90% perceive one or more symptoms during the days before menstruation, and nearly all components of normal functioning of women can be affected by the changes related to phase of the menstrual cycle in either a negative or a positive way (Partoazam, 2009) [14]. Nowadays, the research on and consideration of menstruation signs are widely spread and organized and are counted as an important research issue. Meanwhile, although menstruation signs are of great importance, they are not yet discussed enough. (Navabinejad, 2011) [15]. The present study showed that, half of the studied students 42% were age less than 15 years old. And most of the students has average regular menstrual rhythm (71.8%, 60.5%) with premenstrual pain (63.7%) and the majority of them had mood had mood swings, depression and acne (74.5%, 53.2% and 50.5%) these finding was in the accordance with Vichin (2006) [16], who reported that the prevalence of pre-menstruation signs as 59% among 13-18-year-old students in the USA. In the same line Mohamadirizi and Kordi,

(2013) [17] who stated, that their study showed a high percentage of the students suffer from psychological disorders despite the menstruation pain in pre-menstruation, As regarding the severity of menstruation distress the present study revealed that there was nearly half of the students had minor menstruation signs before, during, and after menstruation with statistically significant difference p 0.000*. In the same line of these finding (Chen, 2005 and Lee, 2011) [20, 18] which reported that most menstruation signs among students were abdominal cramps (46.5%), low back pain (28.4%), acne (21.4%), and tender breasts (17.5%). Also in the agreement Chang *et al*. (2009) [19] which mentioned, that the most common signs, obtained dysmenorrhea, acne, and tiredness. Bakhshani (2009) [21] in her study on 18-28-year-old students in Zahedan reported low back pain, abdominal bloated feeling, and tender breasts as the most prevalent pre-menstruation signs. This variety in these appraisals might be identified with the variety of the strategies for gathering information, chose gathering of study, and nonattendance of a largely acknowledged meaning about severity of menstruation distress.

Furthermore, the students with moderate menstruation signs had depression (20%) more than anxiety and stress (13.8%, 10.7%) during menstruation, while students with minor menstruation signs complain from anxiety (17.3) then depression and stress (12.5%, 10.7%) respectively during menstruation. This finding was supported by the fact that psychological problem during menstruation is still an important public health problem among adolescents Similar findings were demonstrated by Mohamadirizi and Kordi, (2013) [17]. Meanwhile, the results of health and disease project investigating the mental health among Iranian individuals over 15 years of age reported the prevalence of mental disorders to be 21% in the total population of Iran.

Besides, in this findings there was a positive correlation between correlation between menstrual distress before, during and after menstruation and depression, anxiety and stress at p=0.000, therefore, an increase in menstruation signs increased the intensity of depression, anxiety, and stress. Mohamadirizi and Kordi, (2013) [17] and Ionelli (2010) [22] showed a positive correlation between pre-menstruation signs and depression, anxiety, and stress disorders.

The results of the present study indicated that, There was a positive correlation between the depression, anxiety and stress scores, and menstrual distress before, during, and after menstruation, therefore a higher intensity of menstruation distress lead to increased depression with highly statistically significant differences before, during and after. This may be attributed by, women who experience greater levels of premenstrual or postmenstrual symptoms, yet feel they have little or no control over such changes, may be more susceptible to the development of depression or anxiety. These finding is consistent with the findings of Morse *et al*. (1988) [23], and Christensen and Oei (1989) [24], who found

women experiencing menstrual symptom to exhibit greater levels of anxiety and depression.

The current study showed that, before, during and after menstruation, students with minor menstruation signs majority of them had not complain from stress, depression or anxiety. While students with moderate menstruation signs nearly two third of them complain from anxiety and depression with no stress. As well as students with acute / very acute menstruation signs, majority of them complain from anxiety, depression and stress with highly statistically significant differences. Similar findings were demonstrated by Vichnin, Freeman, Lin, Hillman and Bui (2006) [16]. Who reported that, most severe menstruation signs reported more signs of depression, anxiety, and stress.

Finally, this study might formulate baseline information for future researches in menstruation signs and anxiety, depression, and stress among adolescence girls in the Upper Egypt. Strengths in this study included its prospective nature and multi-center study with reasonable number of cases included. Moreover, early detection for menstruation signs and anxiety, depression, and stress in adolescent girls leads to early management that may reduce the psychological problems and improve the quality of life.

Limitation of study: As with any research, there are certain limitations of the study firstly, the nature of data was self-reporting, and it may have resulted in under-reporting of the conditions in few cases. Secondly, lack of students' cooperation, and interference of the study with their school assignments.

Conclusion and recommendation

We can be concluded that with regard to high prevalence of increase menstruation signs before, during and after menstruation, as well as high incidence of depression, anxiety, and stress signs among the students, So It is necessary that. Investigation using longitudinal studies with continual assessment and evaluation of education interventions for adolescent girls with psychological problems related to severity of menstruation would be of great value in primary health promotion. Further, a lack of general knowledge related to menstruation as reflected in the findings and reviewed by students themselves indicates a need to extend the education. Early diagnosis, reassurance and management of symptoms will go a long way towards smoother passage of adolescence into stable adult identity formation. More effective and appropriate interventions to help adolescents manage symptoms of depression and menstrual pain should be incorporated in further programs.

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