EVALUATION OF DYSMENORRHOEA AND ASSOCIATED PHYSIOLOGICAL AND PSYCHOLOGICAL DISTURBANCES IN PAKISTANI WOMEN

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ABSTRACT

Menstrual cycle is an essential feature of female reproductive system. Changes in the hormonal levels around ovulation are associated with dysmenorrhea followed by negative attitude, lost time from school and work, stress and depression in majority of females. This observational study included 1800 female subjects, divided in to 3 age groups and asked for the status of their menstrual cycle through a detailed questionnaire. Dysmenorrhea and its severity along with prevalence of various physiological and psychological disturbances were chiefly investigated. BMI, Waist to hip ratio were also determined as risk factors for dysmenorrhea. Blood pressure, hemoglobin and random sugar were also estimated. Dysmenorrhea was reported by 82% of the study subjects of which about 65% were having moderate to severe dysmenorrhea. More than 90% complained for associated symptoms before and especially during menstruation. Physiological disturbances like loss of appetite, lack of sleep, diarrhoea, constipation, nausea were reported by 68% of subjects. Disorientation, stress, mood fluctuation, anxiety, agitation and depression were found in 41% subjects. blood haemoglobin and random sugar did not show any significant change. Although this data is limited , it provided the mean values for the length of menstrual cycle, duration and flow of menstruation, age of menarche and pain during menstruation in this population and the association between dysmenorrhea and mental and physiological disturbances.

Key-words: Dysmenorrhea, Physiological and pshychological problems, Pakistani women.

INTRODUCTION

The *menstrual cycle* is a cycle of physiological changes that occurs in fertile females. For reproduction, menstrual cycle is necessary via the control of Endocrine system. It is divided into following phases: Menstrual phase, Proliferative phase, Follicular phase, Ovulatory phase (ovulation), luteal phase and Ischemic phase (Greenberg *et al*., 2007). The average length of menstrual cycle is 28 days; however it may vary from woman to woman and cycle to cycle (Losos *et al*., 2002). The term Menstruation may be called as menstrual bleeding, menses, a period or catamenia. Menstrual bleeding usually signals that a woman has not become pregnant. Normal regular flow of menses i.e. Eumenorrhea lasts for usually 3to 5 days though 2 to 7 days are also considered to be normal (Goldenring *et al*.,2007). The blood loss during menstruation on average is 35 millilitres with 10–80 ml considered normal (Healy, 2004). The onset of menstruation is known as Menarche which is of great significance in a woman's life. The Menarche age is a sensitive indicator of various characteristics of population inclusive of nutritional status, geographical location, environmental conditions and magnitude of socioeconomic inequalities in a society, Despite of the fact that the mean age at menarche varies from population to population (Chumlea *et al*., 2003.Thomas *et al*., 2001).Menstrual cycles are normally associated with difficult and painful bleeding well-known as dysmenorrhea which is a prevalent complaint in around 50% of post pubescent females (Karim *et al*., 2009). Dysmenorrhea is a medical condition signalized by intense uterine pain during menstruation. Although a minor pain during menstruation is a routine but when the pain is so intense and severe that it verges normal activities, or require medication, it is distinguished as dysmenorrhea. Various studies have proclaimed that Premenstrual syndrome is associated with discomfort and pain and is experienced by almost 60-80% women (Lee, 2002. Sharma *et al*., 2008) and at least one in four women complaints severe menstrual pain characterized by a need for medication and withdrawal from social activities (Ambresin *et al*., 2012). Dysmenorrhea show variation in severity of pain, including sharp, throbbing, dull, nauseating, burning, or shooting pain. Menstruation is often preceded by dysmenorrhea by several days or may accompany it, and as menstruation tapers off, it usually abates. Depending on the measurement method used, the pervasiveness of dysmenorrhea is highest in adolescent women, with estimates ranging from 20-90% (Davis and Westhoff., 2001. Strinic *et al*., 2003). About 15% of adolescent girls in the United States present with intense pain and thus making dysmenorrhea a leading cause of recurrent short-term school absenteeism (Davis and Westhoff., 2001, Banikarim *et al*., 2000). A longitudinal study of a representative cohort of Swedish women found that in women of 19 years of age the prevalence of dysmenorrhea is 90% however among the women of 24 years of age its prevalence is 67% (Sundell *et al*., 1990). Regarding dysmenorrhea a few women

consult a physician, most adolescent women self-medicate with routine pain-killers while 10% of 24 year old reports pain that hinder their routine activities (Davis and Westhoff., 2001; Strinic *et al*., 2003). Dysmenorrhea may be caused by release of prostaglandins during menstruation in response to the destruction of the endometrial cells. This kind of dysmenorrhea is known as primary dysmenorrhea (Lethaby *et al*., 2007). The prostaglandins and other inflammatory mediators in the uterus cause the uterus to contract and are thought to be a major factor in primary dysmenorrhea (Wright and Wyatt., 2003). In women with primary dysmenorrhea elevated levels of vasopressin have been observed that causes ischemic pain by increasing uterine contractility as a result of vasoconstriction. The blood supply to the tissue of the endometrium is constricted when the uterine muscles contract causing the tissues to broke and die, however the continued contractions squeeze out the old, dead endometrial tissue through the cervix and out of the body through the vagina. The resulting temporary deprivation of oxygen to nearby tissues due to the contractions, are the main cause of pain or "cramps" experienced during menstruation. Women with primary dysmenorrhea have increased activity of the uterine muscle with elevated frequency of contractions (Rosenwaks and Seegar-Jones., 1980). In 75% of cases dysmenorrhea is primary (with no pelvic disorder) (Hafez, 1998). Secondary dysmenorrhea is associated with detectable organic defect with endometriosis as its most common cause (French., 2008). Other causes include leiomyoma, (Hilário *et al*., 2008) adenomyosis, (Nabeshima *et al*., 2008) ovarian cysts, and pelvic congestions (Hacker *et al*., 2004). The connection between endometriosis and dysmenorrhea is ambiguous. Endometriosis can be asymptomatic, or it can be accompanied with pelvic pain which is not limited to the menstrual period. A study of women undergoing elective sterilization was conducted between women with and without endometriosis and no difference was found in the prevalence of dysmenorrhea in both the groups (Moen and Stokstad., 2002). However, an observational study of women undergoing laparoscopy for infertility supported a relationship between dysmenorrhea and the severity of endometriosis (Karim *et al*., 2009. Momoeda *et al*., 2002). Secondary dysmenorrhea may involve various factors in its pathogenesis. Some pelvic pathological conditions that can lead to the secondary dysmenorrhea includes: Endometriosis, Pelvic inflammatory disease, Intrauterine adhesions, Ovarian cysts and tumors, Fibroids, Cervical stenosis or occlusion, Adenomyosis, Uterine polyps, Congenital malformations (eg, bicornate uterus, subseptate uterus), Intrauterine contraceptive device, Transverse vaginal septum, Pelvic congestion syndrome, Allen-Masters syndrome. So it is observed that any process which can affect the pelvic organs can produce cyclic pelvic pain (Smith., 1993). The severity of pain in the lower abdomen, in the umbilical region or the supra-pubic region of the abdomen, is the main symptom of dysmenorrhea, commonly felt in the right or left abdomen and may radiate to the thighs and lower back. Associated symptoms can be Nausea, Vomiting, Diarrhoea or constipation. Also Headache, Dizziness, Breast tenderness, Disorientation, Hypersensitivity to sound, light, smell and touch are often observed. Dysmenorrhea can also cause Fatigue, Cramping in the abdomen, back, or upper thighs, Mood changes, Irritability, Fainting, Sweating and Fever. The vaginal discharge, low back pain and medial/anterior thigh pain are obvious symptoms. Lower abdominal/pelvic pain begins with onset of menses and lasts 8-72 hours. The changes in hormonal levels in the body during Ovulation are normally associated with dysmenorrhea that is why the symptoms of dysmenorrhea usually begin following the ovulation phase and can remain till the end of menstruation. Risk factors of dysmenorrhea can be modifiable or non-modifiable for example; Young age and nulliparity are associated with dysmenorrhea (Andersch and Milsom., 1982, Teperi and Rimpela., 1989). Dysmenorrhea is also coupled with heavy menstrual flow which can lead to iron deficiency (Teperi and Rimpela., 1989). The reason behind women being more prone to iron deficiency than men is the heavy menstrual flow during dysmenorrhea (Harvey *et al*., 2005). A significant relationship has been reported between dysmenorrhea and family history (Widholm and Kantero., 1971). Andersch and Milsom also reported that women having dysmenorrhea are more likely to have a sister or mother who has dysmenorrhea as compared to women who don't suffer from dysmenorrhea. In women 14 to 20 years of age, attempts to lose weight are linked with elevated menstrual pain independent of body mass index (Montero *et al*., 1996). However the association between dysmenorrhea and overweight is not consistent (Sundell *et al*., 1997, Harlow *et al*., 1997). But obesity was found to be associated with dysmenorrhea in some (not all) studies (Andersch and Milsom., 1982, Sundell *et al*., 1990, Parazzini *et al*., 1994). Different observational studies also report a connection between dysmenorrhea and smoking (Sundell *et al*., 1990, Harlow and Park., 1997, Parazzini *et al*., 1994). The modifiable risk factors include mental health problems and are said to be potent to some extent. Depression and anxiety are the most common problems associated with menstrual pain (Alonso and Coe., 2001). As compared to men women are more prone to depression with the onset beginning during puberty. It is evident that the vulnerability to depression is heightened in women at puberty because of the regular influence of gonadal steroids on the HPA axis. Ovarian steroids show a

significant influence on HPA axis and many other brain systems and ultimately these systems are exposed to such influences on a monthly basis. The elevated levels of these steroids are followed by sharp decreases with pregnancy and childbirth, and then finally cessation of steroid effects at menopause. The continually changing steroid levels may be a major factor sensitizing women to stress. Despite of the fact that dysmenorrhea is not consistently associated with socioeconomic status, but an association between poor self-rated overall health and dysmenorrhea has been noted (Teperi and Rimpela., 1989).

MATERIALS AND METHODS

This study was conducted in Karachi on a limited population. The study included females between the age of 11 ~ 46 year and divided into three age groups i.e.; group I (11 ~ 19), group II (20 ~ 29) and group III (30~ above). This study was conducted during the period of February, 2009 to November, 2009 and included females from various Schools, Colleges and departments of Karachi University as well as household and working women. This data also included females of different age groups from Punjab (Bahawalpur). A questionnaire was prepared in accordance with the objectives and theme of the study. Subjects were asked thoroughly for their menstrual cycles. The length of cycle, duration and intensity of menstrual flow, dysmenorrhea, backache, vaginal discharge were specially investigated. Presence of physiological and psychological signs and symptoms were given more attention. Personal and familial history of any disease was also investigated. Use of contraceptives was specifically asked. The body mass index (BMI) of each subject was calculated by dividing the weight (kg) of the subject by the square of his or her height (m^2) to categorize the underweight and obese females. Waist to hip ratio was calculated to discriminate central or upper body obesity. Hypertension was diagnosed by using JNC VIII criteria. Those with B.P>140/90 were labeled as hypertensive. Diabetes was diagnosed as fasting blood sugar more than 126 mg/dl on more than one occasions and random blood sugar more than 200 mg/dl more than one occasion. Laboratory investigations included blood sugar (Winckers *et al* 1971) and hemoglobin (Drabkin and Austin., 1932). The data is presented as mean ± SDE and percent analysis. Differences between the three age groups were exhibited through graphs.

RESULTS AND DISCUSSION

The menstrual cycle is an output of various physiological and hormonal changes that take place inside the body. These changes help prepare a woman's body for pregnancy each month. The progression of the cycle from one to the next is caused by the rise and fall of hormone levels throughout a specific interval, usually about 28 days, or one month. Shedding endometrium during menstruation occurs in approximately monthly cycles throughout a woman's reproductive life, except during pregnancy and stops permanently at menopause. Menstrual cycles normally range from about 25 to 36 days. Only 10 to 15% of women have cycles that are exactly 28 days. Usually, the cycles vary the most and the intervals between periods are longest in the years immediately after menarche and before menopause. Dysmenorrhea was chiefly investigated in our study. Several other studies reported its prevalence as 7.7% (Lee *et al*., 2006) and 59.7%. The ranges of prevalence of dysmenorrhea from 51% to 80% have been reported by many other studies (Pullon *et al*., 1988; Ng *et al*., 1992). In our study it was reported by 82% of the study subjects. In an another study 6.32%, 30.37% and 63.29% participants were suffering from severe, moderate and mild grades of dysmenorrhea, while another study showed that 14% severe, 38% moderate and 49% subjects were mild. In our study those subjects who reported dysmenorrhea, 65% of them were having moderate to severe dysmenorrhea. Pain was reported to occur during first three days of menstruation in all age groups. However it was also complained by around 20% subjects prior to menstruation (Fig 1). Dysmenorrhea was further investigated as abdominal cramps, backache and neck pain as most of the females have a combination of all of them. Abdominal pain was reported by above 70% subjects in Group I, 77.27% in Group 2 and 50.87% in group 3 during menstruation but some also mentioned the pain before and after menstruation (Fig 1). Backache was reported by 48.38% in Group 1, 66.23% in Group 2 and 42.10% in group 3 during menstruation but a large number of subjects also reported pain before and after menstruation. Dysmenorrhea is also the leading cause of recurrent short-term school absence in adolescent girls and a common problem in women of reproductive age. In our study more than 60% of school going girls in group I had symptoms of dysmenorrheal which were severe enough for them to be absent from school, and 54% university girls were absent from classes during menses. Several studies reported that rate of absenteeism from school/ work as ranging from 34 to 50% (Andersch and Milsom., 1982; Banikarim *et al*., 2000 & Sundell *et al*., 1990). Physiological disturbances were found with higher frequency. Some important

physiological findings like breast tenderness, muscle rashes, gastrointestinal distress, temporary weight gain, joint pain, fatigue, headache, lack of sleep, food craving, nausea, loss of appetite were variably found in all age groups (Table 3; Fig 2).These findings were relatively greater in group I and group III. The most common finding with the highest frequency was fatigue and was exhibited by all age groups. Then headache, loss of appetite, lack of sleep, gastrointestinal distress and nausea were reported by majority of the subjects. This data is supported by another similar study. Psychological symptoms during menstruation were also observed by almost all subjects of all age groups. Anger, depression, anxiety and emotional hypersensitivity were chiefly reported by the subjects. However other findings like oversensitivity to sound, impaired concentration and memory were also reported in relatively lower frequency (Table 4; Fig 3). Depression during menstruation may be caused by low estrogen level, Young and colleagues established that blood levels of reproductive hormones (luteinizing hormone, follicle-stimulating hormone, and progesterone) were generally normal in women with depression, but the blood level of estradiol was significantly lower (Young *et al*., 2000). There is no significant correlation between BMI and dysmenorrheal in this study. However, the evidence of an association between overweight and dysmenorrheal is inconsistent (Frenchl, 2005; Harlow and Park., 1996). Another study has not found an association with obesity (Parazzini *et al*., 1994). Similar findings were obtained for waist to hip ratio. Dietary habits and exercise activity were not correlates in this study, may be due to less number of participants or influence of the cultural background of the subjects as most eastern women do not do exercise regularly. Another study also reported that physical activities have not been associated consistently with menstrual dysfunction (Lee *et al*., 2006). The study also included occurrence of leucorrhoea during menstrual cycle. Leucorrhoea happens often normally, but if excessive may be a symptom of infection. It may be thick, viscid and foul smelling. There is normally more discharge at puberty, when the sexual functions are becoming established. Leucorrhoea can also be classified as cervical leucorrhoea or vaginal leucorrhoea. More than 50% subjects reported leucorrhoea occurrence is around 60% in group I &II but 40% in group III. In all age groups secretions are normal because are white in color. Prevalence of pathologic discharge is non-significant. However pain during these vaginal secretions throughout menstrual cycle is reported in all age groups around 75% subjects.

Table 1. Subjects profile.

Variable	11 ~ 20 years	21 ~ 30 years	>31 years
Waist circumference	26.45 ± 3.50	27.5 ± 3.91	34 ± 4.64
Hip circumference	33.9 ± 3.98	36 ± 4	40 ± 4.50
W/H ratio	0.78 ± 0.069	0.93 ± 2.1	0.84 ± 0.061
Body weight	47.85 ± 10.32	53.87 ± 8.26	65 ± 12.55
Height	61.65 ± 2.81	62.1 ± 3.12	62 ± 3.32
BMI	19.61 ± 3.52	29.36 ± 136.08	26.41 ± 5.06

BMI= Body mass index; W/H= Waist to Hip ratio; Numerical values are presented as Mean ± SD.

Table 2. Subjective and biochemical estimations.

Variable	11 ~ 20 years	21 ~ 30 years	>31 years
Hemoglobin	10.75 ± 0.957	11.056 ± 1.709	10.68 ± 2.01
Systolic BP	118 ± 10.93	112.76 ± 13.03	119.33 ± 6.532
Diastolic BP	70 ± 10	73.10 ± 6.84	80.38 ± 6.377
Glucose	89.3 ± 3.9	93.5 ± 4.20	86.76 ± 8.29

BP = Blood Pressure; Numerical values are presented as Mean ± SD.

Table 3. Physiological disturbances during menstruation (%).

	11 ~ 20 years	21 ~ 30 years	>31 years
Breast tenderness	3.89	16.55	33.33
Muscle rashes	18.00	12.00	29.82
Gastrointestinal distress	36.10	44.45	42.10
Temporary weight gain	21.93	17.20	22.80
Joint pain	23.39	18.50	19.12
Fatigue	73.55	82.14	57.71
Headache	42.58	45.13	70.17
Lack of sleep	27.09	46.10	43.86
Food craving	19.35	13.63	12.28
Nausea	23.87	37.66	15.78
Loss of appetite	44.51	51.62	31.57
Clinically suspected pelvic disease	0.00	1.62	1.75
Exercise	2.58	5.19	5.26

Table 4. Psychological disturbances during menstruation (%).

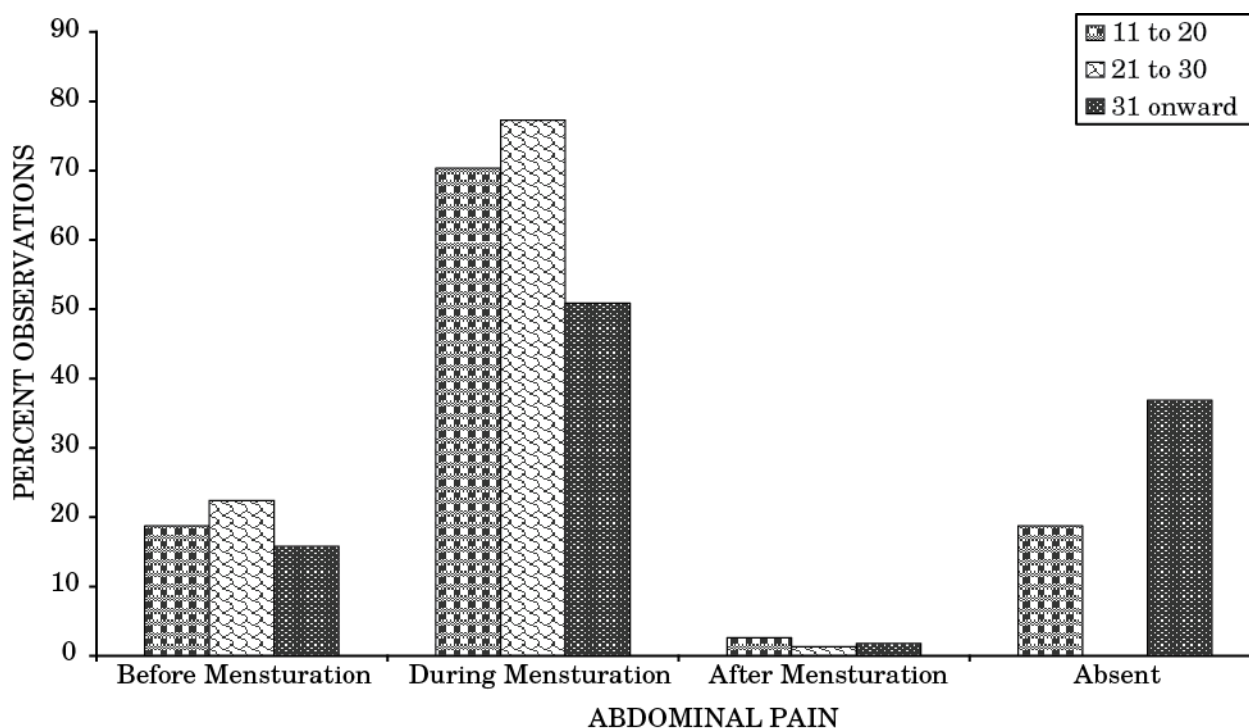|	11 ~ 20 years	21 ~ 30 years	>31 years
Depression	42.58	61.69	71.93
Emotional hypersensitivity	46.45	59.41	49.12
Oversensitivity to sound	28.39	22.73	38.59
Anxiety	44.52	39.28	69.65
Anger	62.58	69.15	82.46
Impaired concentration	34.19	49.67	45.10
Memory loss	10.96	14.28	36.84

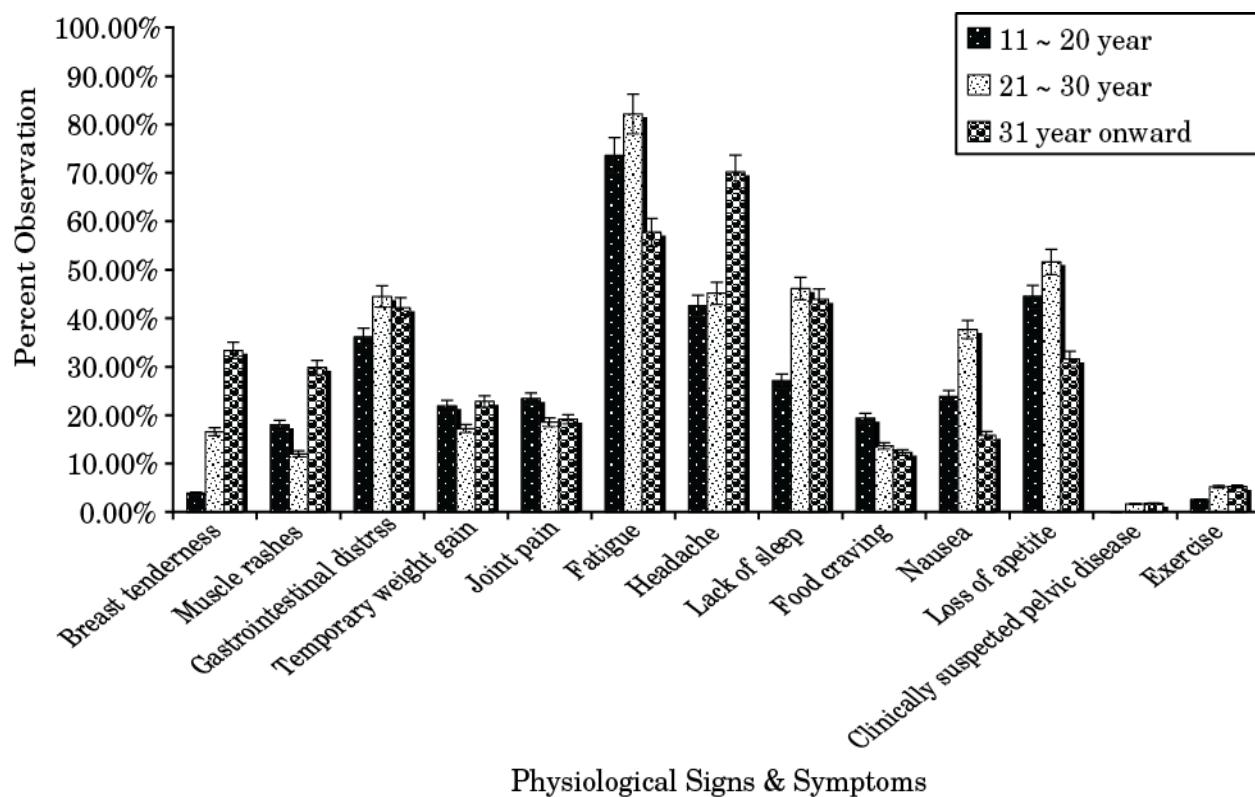Fig. 1. Abdominal pain during mensturation in different age groups.
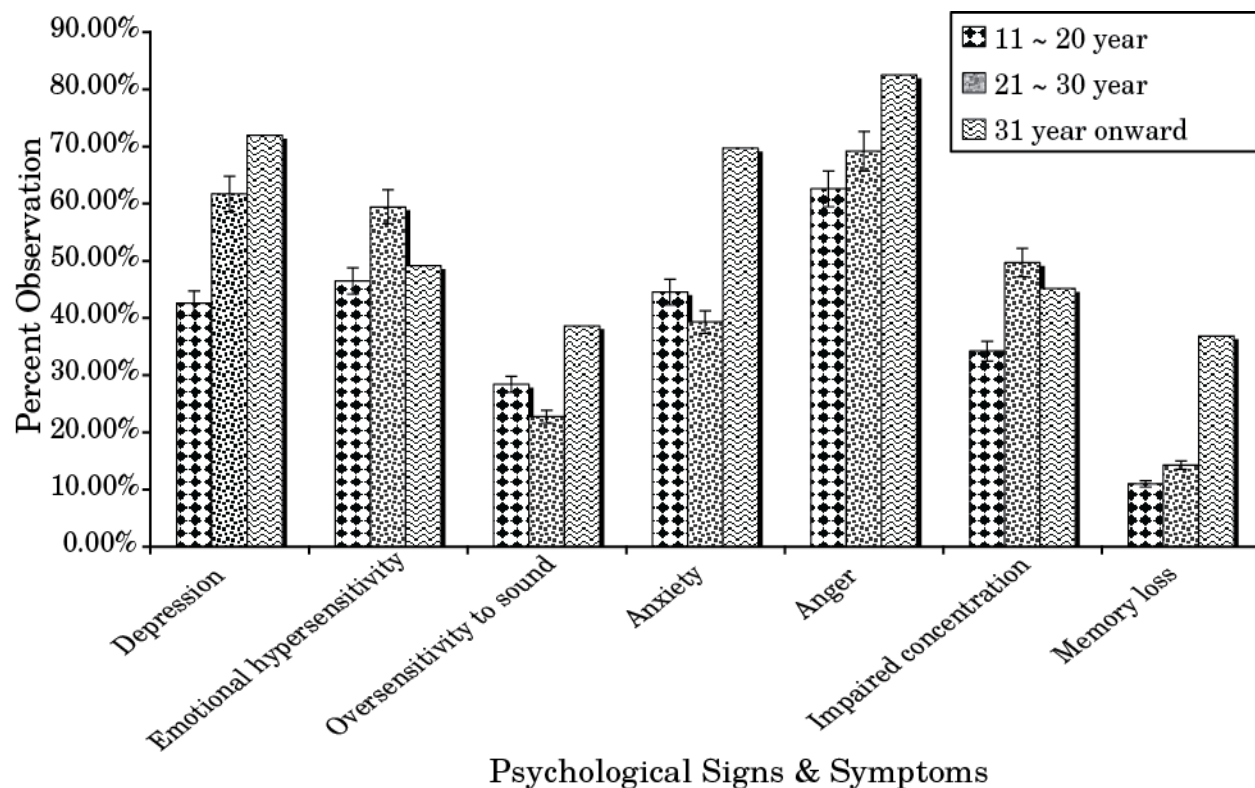
Fig. 2. Physiological signs and symptoms.

Fig. 3. Psychological signs and symptoms.

LIMITATIONS OF THE STUDY

This study was completed in different areas of Karachi and some areas of Punjab (Bahawalpur) in a short period of time and cannot be considered for the population at large scale. The most accurate assessment of menstrual cycle and its consequences can be determined only in large population based cohort studies.

CONCLUSION

It is concluded that dysmenorrhea is a common feature of our population. Numerous genetic, behavioral and environmental factors are responsible for its origin and severity. Management of dysmenorrhea can be accomplished through modification of these factors and steps should be taken for the betterment of reproductive health in females.

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