Original Article

# CORRELATING PRIMARY DYSMENORRHEA WITH ITS STRESSORS: A CROSS SECTIONAL STUDY INVESTIGATING THE MOST LIKELY FACTORS OF PRIMARY DYSMENORRHEA AND ITS EFFECTS ON QUALITY OF LIFE AND GENERAL WELL BEING

Komal Atta[*], Shireen Jawed[*], Sadaf Zia[*]
[*]Departemnt of Physiology, University Medical and Dental College, The University of Faisalabad, Sargodha Road, Faisalabad, Pakistan

## ABSTRACT

**Background:** Dysmenorrhea is a frequent gynecological condition associated with painful cramping of uterine origin. Pain of severe dysmenorrhea is associated with restriction of activity and absence from the workplace. The causative stressors and impact of dysmenorrhea on quality of life have been enunciated rarely in a Pakistani setup.

**Objectives:** To study relationship of primary dysmenorrhea with its stressors (family history, PMS, stress and physical activity) and to investigate the effect on Quality of Life (classabsenteeism, sleep and general wellbeing) of female university students.

**Methods:** a cross study, data was collected from 250 students aged 16-23 of which 200 students were included after applying inclusion/ criteria (64 medical, 68 dental, 59 nutrition and 62 physical therapy students). The data was collected regarding age of menarche, presence or absence of dysmenorrhea, PMS, physical activity quality life and dietary habits by a structured questionnaire.

**Results:** Dysmenorrhea was present in 86.5% of the girls. Majority reported PMS symptoms of cramping (32.7%), abdominal pain (44.7%), mood swings (40%). The major stressors for dysmenorrhea were stress (81.8%, p=0.018), followed by low physical activity(p=0.01). effects on quality of life due to dysmenorrhea included insomnia (51.8%, p=0.01),86.3% girls suffering from dysmenorrhea complained of difficulty concentrating in class and 39% of girls an odds ratio of greater than 1 in population experiencing dysmenorrhea to skip classes (p=0.005) and 64% of the girls described the pain to be interfering with daily activites(p=0.01)

**Conclusion:** Lack of physical activity and stress are important causes of dysmenorrhea, which lead to adverse effects on quality of life on university students such as decrease concentration span, insomnia and class absenteei

**Ethical Considerations:**

Consent was taken from the students prior to giving them the questionnaires. Complete anonymity was assured. Permission to carry out the research was taken from the Dean of Allied Health Sciences, University of Faisalabad and the respective heads of departments. The study was approved by the Ethics Review Board of The University of Faisalabad.

**Key words:** dysmenorrhea, stress, adolescents, class absenteeism, physical activity

## INTRODUCTION:

One of the commonest ailments of adolescent and young females is dysmenorrhea or painful menstruation. It has two subgroups: primary and secondary dysmenorrhea. Primary dysmenorrhea refers to the painful menstrual flow in absence of any pelvic disease or pathology, whereas secondary dysmenorrhea refers to painful menstruation owing to some pathological cause[1] Of these, primary

*Corresponding Author:*
Dr. Komal Atta,
Senior Demonstrator, Department of Physiology, UM&DC, Faisalabad
Email address: komal.atta@tuf.edu.pk, komal.atta@gmail.com

dysmenorrhea is more common. Studies on adolescent females reveal a huge range of prevalence from 20% to 90% in young girls.[2]. This is a debilitating condition, with numerous reported adverse effects on the quality of life. The intensity of dysmenorrhea has been shown to be proportional to tensions, domestic and external stresses, which effect the ability of students to learn effectively[3]. It is also known to result in loss of appetite, diarrhea, mood disturbances and depression.[4]. The main mechanism involved in primary dysmenorrhea appears to be release of prostaglandins from the uterine lining [5].Approximately 2 to 4 days prior to the start of menses, prostaglandins move into the uterine muscle where they build up very rapidly at the onset of menstruation and serve as contractors of smooth muscles , facilitating the expulsion of the endometrium. This leads to sensation of cramping pain.[6]

Another important finding shown in all studies on dysmenorrhea is the fact that the pain is not universal. It is individualized and cannot be quantified by a specific scale as each patient appears to have a unique threshold[(4)]. Different research studies show relevance of dysmenorrhea to various factors such as younger age, smoking, previous sterilization, early menarche, stress, psychiatric disorders etc.[(7)]. The alarming issue related to this problem is the increased number of young girls who go under the radar, without being properly treated or diagnosed. There is an increasing trend of self-medication and class absenteeism[(8)], rather than consultations with physicians and gynecologists to treat the core issue. This leads to vicious cycle of increased stress and depression due to loss of study time by skipping classes.

Hence it is essential to find correlations between factors that increase or decrease dysmenorrhea and how and why is it such a bane for female college students. This study investigates the correlation of dysmenorrhea to stress, class absenteeism, BMI and general quality of life of adolescent undergraduate university students

## MATERIALS AND METHODS:

A Cross sectional study was carried out. A total of 250 female students from various disciplines of the University of Faisalabad were chosen for this based on random sampling. Different class rooms were chosen at random in each department and questionnares were distributed among students by 3 different faculty members, who first gave a brief over view and ensured consent and anonymity. Of the 250 students who filled the questionnaires ,200 students were finally included (64 medical, 68 dental, 59 nutrition and 62 physical therapy students).50 were excluded due to incomplete data and application of the exclusion criteria.

### INCLUSION CRITERIA :

1. Students between ages 16 to 23
2. Pain in lower abdomen and pelvis at start of period and continuing 9-72 hours.
3. Lower back pain
4. Regular cycles
5. Onset of pain 6-12 hours after the onset of menstruation

### EXCLUSION CRITERIA:

1. Student with pre-existing gynecological condition
2. Major medical/psychological isues
3. Students taking Oral Contraceptive Pills due to any hormonal problem or other reasons.
4. Students above the age of 24 and below the age of 15.

The Questionnaire we used comprised of 36 questions and additional demographic details of the students including hometown, age, height, weight, parent's occupation.

The questionnaire was divided into two parts of 18 questions each, the first part inquired about stressors of dysmenorrhea and the second part consisted of questions asking about lifestyle factors. Questions in the first part addressed the nature of the menstrual cycle by asking menstrual cycle length, age of menarche, interval between cycles any flooding episodes an clot passage. Pain during menstruation was addressed with regards to its intensity, frequency and duration by a modified Visual Assessment Scale (VAS). History of dysmenorrhea in other first degree relatives was also explored. Students were asked to describe the pain and also to relate it

to limitations in physical activity (if any).Physical activity questions included amount of exercise performed on weekly basis, hours of sleep and issues related to sleeplessness. Premenstrual syndrome was explored by asking about whether pain was relieved at beginning of period or, breast tenderness, intense mood swings and depression[7] Parental education, family status, stress related to home issues were also inquired into[9]. The students were also asked about their living surroundings whether they were day scholars or boarders and whether they had sufficient exposure to sunlight at home and during the day.[10] Questions regarding stress and anxiety were also asked to determine the mental state of the student and how it affects dysmenorrhea.

In the second part, factors relating to quality of life were inquired. Queries regarding nutritional status and general well being asked about student's dietary habits including breakfast intake, skipping meals and junk food consumption.Pain-relieving methods were explored, whether they were by home remedies, exercise or by the help of painkillers, and whether these drugs were self-administered or prescribed by physicians. Sleeping habits of the students were also asked. Factors disturbing studies were inquired by asking about any class skipping due to the pain, lack of concentration in class and increase in amount of stress due to painful menstruation.

**STATISTICAL ANALYSIS:**

Data analysis was carried out by using the Statistical Software Package for Social Sciences (SPSS) version 22.0. Demographic data of study population was evaluated by descriptive statistics. Continuous variables like age, height, age of menarche, weight and BMI were expressed as means ±SD. Categorical variables (dysmenorrhea and stress) were presented by frequency and percentages. After assumptions were satisfied parametric test (ANOVA) was used for comparison of means (age, height, weight, BMI,a ge of menarche) among the four study groups. Dysmenorrhea and stress were analyzed as dichotomous outcomes (absence vs presence) and Chi square test was performed to compare the percentages of the categorical variables between the four study groups. Accepted confidence interval was 95% significance level for all analyses was p ≤0.05.

**RESULTS:**

Present study comprised of 200 female students(64 medical, 68 dental, 59 nutrition and 62 physical therapy students) of age ranged from 16-23 years with a mean and SD of 18.3±0.67 .Mean age of menarche for participants of our study was 12.9 years(figure 1).Out of the 200 participants 86.5% experienced dysmenorrhea. Demographic details of the study groups have been shown in Table 1.ANOVA indicates significant differences with respect to means of age (p=0.01), weight (p=0.01), height (p=0.01) and BMI (p=0.01) (Table 2).

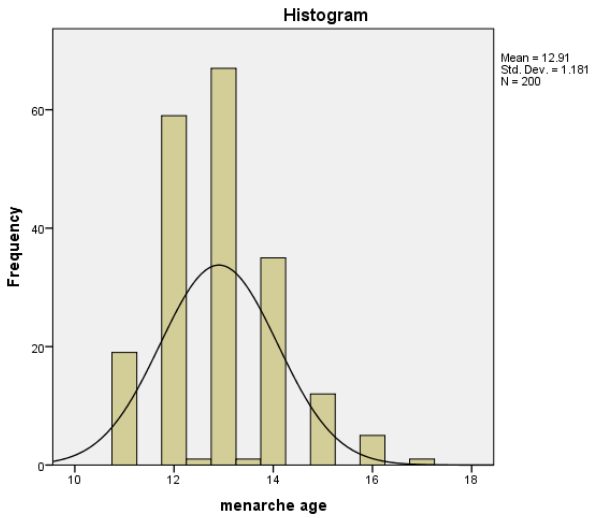


**Figure 1. Sorting out of Age of Menarche**

In the population who had dysmenorrhea**,** the commonest type of pain experienced was Spasmodic (49.7%), followed by cramping (32.7%) and then piercing and pinching in lower percentages. Most students localized the pain to lower abdomen region (44.7%), legs and lower back (35%) and others (20%) included upper abdomen, iliac crest, uterus etc.

Amongst the various stressors of painful periods, students who experienced stress and anxiety due to any reasons were more likely to experience dysmenorrhea (81.8%, p=0.018 on chi-square test).

Dysmennorhea was also present in 54.6% of girls who had no or low physical activity per week. This made exercise a significant stressor (p=0.019).

86.5% of subjects reported to have a family history of dysmenorrhea with either mother or sister experiencing similar episodes in menstrual cycles, but no significant relation was established between family history and dysmenorrhea experienced in our study. (p=0.698)

Amongst strategies used for alleviation of pain, 40.2% adolescent girls preferred home remedies included drinking ginger tea and eating garlic, or taking a warm glass of milk. This was followed closely by 34.2% of the population self –medicating with Non-steroidalanti-inflammatory drugs (NSAIDS) and 19.6% using antispasmodics. This is illustrated in figure 2

Regarding lifestyle changes due to dysmenorrhea, students who were experiencing painful periods also reported higher rates of absenteeism from classes(p=0.005), 34% reporting skipping 1 to 2 days and 5% skipped more than two days. 64% girls who experienced pain reported it to as being severe enough to interrupt daily activities r. (p=0.001).

51.79% girls with dysmenorrhea also experienced sleepless, however this was not significant as a Pearson chi-square significance of 0.73 was observed. A risk estimate of 1.075 demonstrated as odds ratio for people with dysmenorrhea likely to experience insomnia.

Out of the population of girls who experienced insomnia due to dysmenorrhea a direct relation with severity of pain was observed (p=0.01). 42% subjects reported that the pain interfered significantly with their daily activities and 19% stated that they could not move at all. Pain severity also correlated with a decrease in concentration span in classes (86.3%, p=.011).

In our study, no relationship was shown between dysmenorrhea and area of residence i.e. there was no link between a higher rate of dysmenorrhea being observed either in day scholars or hostel boarders. No association was observed in girls who had exposure to passive smoking (45.7%) and also none was observed in females who had lack of exposure to the sun (43.5%) or those who ate fast food more than 2 to 3 times per week (40%).

**TABLE 1 . Demographic measurements of Study Groups**

| Variables | Group 1 MBBS students(n =64) | Group 2 BDS (n =68) | Group 3 DND (n =59) | Group4 Physiotherapy (n =63) |
|---|---|---|---|---|
| | mean ± SD | | mean ± SD | |
| Age(years) | 18.5± 0.70 | 19.5 ±0.68 | 21.0± 0.97 | 19.9±0.99 |
| Weight (kg) | 53.9±8.9 | 53.3±6.8 | 57.3±8.6 | 51.9±10.9 |
| Height(m) | 1.6±0.05 | 1.6±0.04 | 1.6±0.05 | 1.5±0.06 |
| BMI($kg/m^2$) | 20.9±03.3 | 20.89±2.6 | 23.5±3.6 | 21.1±5.8 |
| Age of menarche (years) | 12.9±1.2 | 13.1±1.2 | 12.9±1.1 | 12.6±1.2 |

**TABLE 2. COMPARISON OF DEMOGRAPHIC MEASUREMENTS BETWEEN DIFFERENT STUDY BYANOVA**

| | | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| age | Between Groups | 209.380 | 3 | 69.793 | 87.164 | .000 |
| | Within Groups | 156.940 | 196 | .801 | | |
| | Total | 366.320 | 199 | | | |
| weight | Between Groups | 1041.963 | 3 | 347.321 | 3.816 | .011 |
| | Within Groups | 17749.575 | 195 | 91.023 | | |
| | Total | 18791.539 | 198 | | | |
| height | Between Groups | .101 | 3 | .034 | 11.237 | .000 |
| | Within Groups | .585 | 195 | .003 | | |
| | Total | .686 | 198 | | | |
| BMI | Between Groups | 184.805 | 3 | 61.602 | 4.393 | .005 |
| | Within Groups | 2734.618 | 195 | 14.024 | | |
| | Total | 2919.423 | 198 | | | |

p value significant if ≤0.05
BMI= body mass index
Df=degree of freedom

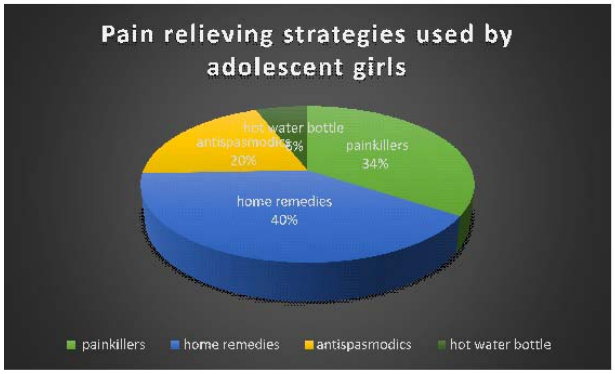


**Figure 2. Pain relieving strategies used by adolescent girls.**

## DISCUSSION:

This study aimed to see effects of various stressors on dysmenorrhea and consequently see effects of dysmenorrhea on quality of life of adolescent university students.

Regarding the precipitating factors stress and physical activity seemed to have a greater probably link with painful menstruation.

Of all psychological ailments, stress is probably the commonest and one of the most debilitating.[11] Stress not only causing social withdrawal and difficulty in thought processes but different studies have shown its effects in altering the menstrual cycle, particularly in adolescent females[8,11–14]. Our study also showed a positive correlation between the stress experienced in undergraduate university students and dysmenorrhea experienced by them. Furthermore, greater anxiety led to greater severity of pain. However it did not show significant alterations in cycle length in contrast to studies by Agarwal *et al.* 2009.

Moreover, there was a significant link between physical activity and dysmenorrhea. Students who were physically active experienced less dysmenorrhea as compared to their sedentary counterparts. Physical activity plays a pivotal role in body homeostasis including hormonal control and regulation of the menstrual cycle [(15)]. Physical activity has not only been shown by various studies to reduce dysmenorrhea[6,16,17] but physiotherapy studies are also using it as a treatment and adjunct to medications for pain relieve in painful menstruation.[18].

Our study also echoed similar results showing physical activity to be a significant factor in pain experienced by girls during their period. Those who were very active experienced the least symptoms of pain as compared to those with low or no physical activity, as shown in

table 2a. A possible mechanism could be the production of endorphins by endorphins by exercise which blunt the pain perceived in menstruation due to prostaglandin production, however this requires further detailed investigation.

Where there is a significant relation to physical activity, a probable link to body mass index should also be established. Most studies have shown that there is no relationship of dysmenorrhea to BMI,[19,20] such was the case in said research also. This may have been due to our limitation of a small sample size, and this parameter definitely warrants further studies with much larger populations.

Similarly, we were not able to establish any link of dysmenorrhea with residence or family history, however an odds ratio of 1.5 was demonstrated between dysmenorrhea and family history hence showing a possible relationship, which might not have been established by our study due to small sample size. These findings were consistent with other studies.[3].

Other factors which were observed but did not show any significance included parental stress, socio economic status, exposure to sunlight.

Parental stress and reduced parental bonding has been shown to cause increased stress and dysmenorrhea in adolescent girls[9]. However in our study this effect seemed to be negligible due to two reasons. First, a small sample size might have proven insufficient to compute such data and secondly most of the students involved in our study reported good relationships at home with strong parental bonding, only 6% reported stressful bonding with parents and this population did not experience any significant increase in dysmenorrhea or even increase in intensity of pain as compared to other girls in the study.

Adolescents girls who experienced dysmenorrhea also reported increased more mood swings, with increased bouts of crying (60%) and more temperamental changes (40%). Again this is attributed to disturbed quality of life essentially due to pain and was in consistency with findings of other studies also.[17,21]

Pain relieving strategies by the females mainly included home remedies such as ginger and a glass of warm milk at bed time. Interestingly enough, ginger has been proven to have medicinal effects in alleviation of dysmenorrhea.[23]. The study shows that anti-inflammatory effects of ginger inhibit prostaglandin synthesis in the uterus. Second to home remedies were over-the-counter anti-inflammatories and anti-spasmodic. However the students were mostly self-medicating, as only a 10% of the population had consulted general practitioners. These trends of self-medication in dysmenorrhea were also touched upon by other authors[24,25] and these warrant further detailed investigation so more awareness may be created in adolescents to curb this trend and visit their physicians in order to avoid unwanted side effects of NSAIDS.

In quality of life parameters, sleep, concentration span, eating habits and class abseenteism were explored and showed to be significantly altered due to dysmenorrhea.

Intensity of the pain experienced by students coincided to their lack of concentration and also to their class absenteeism. The students who experienced intense pain as compared to rest of the girls in the dysmenorrhea group were also shown to skip more classes and have a considerably decreased concentration span. This finding was also consistent with various other studies.[17,21]

Although, a majority of the population experiencing dysmenorrhea reported a decreased sleep time, a statistical relation was not established. However, amount of sleep was directly correlated to the severity of pain, with girls experiencing intense dysmenorrhea sleeping two hours or less.

Sleep is a crucial part of adolescent wellbeing, as it is needed for their growth, development and emotional wellbeing. Dysmenorrhea especially in the adolescent population not only affected the quantity but also quality of sleep leading to issues such as increased anxiety in the mornings for going to school, increased stress and mood swings.[22]

Sleep can also be correlated to class absentees and stress felt as all three factors are interdependent. Hence when a painful menstrual cycle disturbs one of them, the others are also affected.

Finally, the purpose of grouping students, and choosing from different disciplines was to establish a relationship if any, between dysmenorrhea and a particular discipline of education. Various studies have shown that medical and dental students experience more stress than students from other disciplines [6,11,19], however we were not able to establish a link between dysmenorrhea and increased anxiety in medical students. On the contrary, all four groups showed similar results, indicating that adolescents in general irrespective of study disciplines face this issue.

**CONCLUSION:**

So in conclusion, the purpose of our study was to explore various factors that lead to dysmenorrhea and its relationship with quality of life and emotional wellbeing in adolescent girls. Dysmennorhea was shown to be highly prevalent among university going girls, it was one of the leading causes of class absenteeism, insomnia and unhealthy diets, therefore wxhibiting a negative effect on quality of life.
The main underlying stressors of this condition included lack of physical activity an increased anxiety and stress.

**LIMITATIONS:**

Our research was limited to a singly university and a small sample size.hence it was not representative of the whole district or province. Statistical data obtained from a larger population can prove to be more helpful in giving a clearer picture about the stressors of dysmenorrhea.The second limitation was that as this was a cross sectional survey, the causality amongst variables cannot be confirmed and warrants further investigations The third issue could be bias induced due to self -reporting, which may have caused under-reporting of some cases.

**RECOMMENDATIONS:**

We recommend the carrying out of further clinical trials to find a definitive linkage between dysmenorrhea and its stressors.
Based on our result, we recommend encouragement of physical fitness in university girls and also counselling them regarding any stress factors, issues bothering students, so they may be able to improve their quality of life.

**CONFLICT OF INTEREST:**

The authors declare no conflict of interest

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Submitted for publication: 16-07-2016

Accepted for publication: 22-09-2016

| SR # | Author Name | Contribution |
|---|---|---|
| 1 | Komal Atta | Data Collection & Writing of article |
| 2 | Shireen Jawed | Statistical Analysis and reviewing of article |
| 3 | Sadaf Zia | Reviewing and data collection for article |