ASSOCIATION OF PRIMARY DYSMENORRHEA WITH STRESS AND BMI AMONG UNDERGRADUATE FEMALE STUDENTS- A CROSS SECTIONAL STUDY

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ABSTRACT

Background: Dysmenorrhea is one of the common gynaecologic problems among female students. It results in long resting period and regular college absenteeism among that age group. Dysmenorrhea among female medical students may be associated with high stress level. Also both obesity and dysmenorrhea are prevalent among women. This study aims to investigate the association of dysmenorrhea with BMI and stress.

Objective: To find out the relation between frequency of dysmenorrhea with BMI & degree of stress, also to find out the relation between frequency of dysmenorrhea and body mass index among medical female students of Noida International University.

Methodology: An observational study carried out using snowball sampling technique among the medical student enrolled in the NIU. The questionnaire was sent via what's app, Facebook, and G-mail and also requested to further share among their contacts and encouraged to fill by students of SON&HS,NIU. A questionnaire containing anthropometric data and menstrual history along with the PSS (perceived stress scale) was provided to participating students.

Results: Out of 56 students, 82.14% students were suffering from dysmenorrhea. In the present study mean perceived stress score among students with dysmenorrhea was not significantly higher than students with normal menstruation. All girls with normal BMI have moderate stress.

Conclusion: No association was found between dysmenorrhea with severity of stress scale and BMI.

Keywords: Dysmenorrhea, BMI, Stress, medical students.

I. INTRODUCTION:

Dysmenorrhea is a painful menstrual condition derived from the Greek word dysmenorrhea, which means "difficult monthly flow." It's marked by pain at the start of menstruation that lasts 48–72 hours.¹ The most common gynaecologic condition, it affects roughly 20-90 percent of women during their reproductive years.² Primary and Secondary Dysmenorrhea are the two forms of dysmenorrhea. Primary dysmenorrhea, commonly known as, is a type of dysmenorrhea that occurs when there is no obvious pelvic disease and usually happens within a year of menarche.³ Secondary dysmenorrhea is dysmenorrhea caused by organic pelvic pathology, such as fibroids, adenomyosis, pelvic inflammatory disease, or endometriosis.⁴ Secondary dysmenorrhea commonly arises later in life, around two years following menarche.⁵ Primary dysmenorrhea epidemiology is difficult to establish since it is a symptom that is interpreted differently by various women, as well as a wide range of diagnostic criteria. Estimates of prevalence among women and adolescents range from 25 to 90 percent.⁶ According to Indian studies, the prevalence ranges from 50 to 87.8%.⁷ According to other research, dysmenorrhea affects up to 90% of women of
childbearing age in various degrees. Pain is reported by 5-20% of women who have severe dysmenorrhea or pain that prohibits them from doing their normal activities.

The prevalence of dysmenorrhea has been estimated to be between 25 to 97 percent, with roughly 20 percent of instances resulting in excruciating discomfort. Primary dysmenorrhea often begins between the ages of 15 and 17 and peaks between the ages of 20 and 24. In compared to other females, individuals suffering from severe dysmenorrhea show higher indicators of despair, suicidal thoughts, heightened anxiety, and a lack of feeling well.

Dysmenorrhea symptoms include cramping lower abdomen pain that radiates to the lower back and upper thighs and is centred in the suprapubic area and sacral region. Pain normally begins a few hours before menstruation begins and peaks during the first day or two of the cycle, when the flow is at its highest. Nausea, vomiting, headaches, exhaustion, diarrhoea, nervousness, mood swings, and (in rare circumstances) syncope are also common symptoms.

Primary dysmenorrhea is neither life threatening or disabling, but it does cause absenteeism and has a substantial impact on one's quality of life.

Dysmenorrhea is linked to less activity and time away from school or job. Dyymenorrhea has a high health burden as well as a high social and economic cost. Non-attendance has been reported to range from one-third to one-half of students skipping school or job at least once, with 5% to 14% missing more regularly. Non-Steroidal Anti-Inflammatory Drugs (NSAIDs), analgesic tablets that lower menstruation pain by reducing prostaglandin levels, and Oral Contraceptive Pills are the most popular treatments for dysmenorrhea. The negative consequences of such drugs are well-known (nausea, breast tenderness, and inter-menstrual bleeding, dizziness, drowsiness, hearing and visual disturbances). Essential fatty acids, vitamins, supplements, Transcutaneous Electrical Nerve Stimulation (TENS), acupuncture, medicinal plants, acupressure, massage treatment, and workouts are examples of complementary and alternative medicine. According to new research, the majority of menstruation diseases are linked to obesity and BMI. The most likely explanation for this link is that fat cells in the body begin manufacturing the hormone oestrogen, which disrupts the normal menstrual cycle and ovulation.

The body mass index, also known as the quetelet index, is a statistic that compares a person's height and weight. BMI is the most extensively utilised diagnostic measure for identifying obesity concerns in a population due to its ease of calculation. Body mass index (BMI) is calculated by dividing an individual's weight by the square of his height.

Many elements, such as frame size, muscularity, fat, bone, cartilage, water weight, and so on, are not taken into consideration by BMI. Regardless, BMI may be calculated rapidly and without the use of pricey equipment. As a result, the WHO has used it as the standard for collecting obesity statistics since the 1980s. A BMI of 18.5 is considered underweight by the WHO and may suggest malnutrition, an eating disorder, or other health issues, whereas a BMI of 25 is considered overweight. The normal BMI is between 18.5 and 25. BMI 16.5 indicates severe underweight (starvation). Obese Class 1 is defined as a BMI of 30 to 35, Obese Class 2 is defined as a BMI of 35 to 40, and Obese Class 3 is defined as a BMI of 40 or higher. The impact of BMI on dysmenorrhea has been the subject of numerous studies. Dysmenorrhea is caused by a combination of physiological, cultural, and psychological factors, according to multiple research. Although some studies have found a link between BMI and the occurrence and severity of dysmenorrhea, the evidence is still inconclusive. Because the existing data is inconclusive and insufficient to illustrate the effects of BMI on primary dysmenorrhea, the current study may aid us in gaining a better understanding of BMI's impact on primary dysmenorrhea.

Psychological problems such as sadness, stress, and anxiety have been linked to dysmenorrhea and menstrual disorders in the past. One of the most common causes of primary dysmenorrhea in young women is mental stress. There appears to be a link between the severity of stress and the number of women who experience dysmenorrhea. However, finding a level of stress that interferes with their natural menstrual cycle has proven difficult. A big percentage of young females enrolled in medical schools are constantly stressed by their coursework and exams. Only a few studies on stress-induced dysmenorrhea in female medical students have been conducted.

Because the evidence on the effects of BMI on primary dysmenorrhea is ambiguous and weak, so the present study may help us to provide a better insight association of primary dysmenorrhea with BMI and stress.
II. MATERIALS AND METHODS

Study Design and Participants

A cross sectional survey to investigate the relationship between primary dysmenorrhea with stress and BMI among female undergraduate students.

On the basis of inclusion and exclusion criteria, 56 participants’ responses were included out of a total of 60. The criteria for inclusion were Females in their late teens and early twenties who were attending college and were between the ages of 18 and 25, patients having normal menstrual cycle and nulliparous patients. Pain must be regular (at least every three menstrual cycles), midline, and persistent. Lower abdominal cramps or low back pain that begins one day before menses or lasts for 6–12 hours after menses which lasts for the 3 days of bleeding.

Exclusion criteria were Females who had a gynaecological pathology in the past (endometriosis, PCOD), Women who had irregular menstrual cycle The study also excluded women experiencing pain that was not related to menstrual flow or who had undergone significant surgery, females who were given medications that could alter the study's outcomes, or who had a history of smoking, cardiovascular disease, or pulmonary disease were excluded. Before they answer the questionnaire, each participant had to give their approval over the internet.

Procedure

The present study was conducted on female student enrolled in the SON&HS,NIU. A snowball sampling technique was used. The questionnaire was sent via what's app, Facebook, and G-mail and participants were requested to further share it among their contacts of NIU and encouraged them to fill it.

The study began with a brief description of the study itself, followed by a detailed informed consent and screening questionnaire. Utmost care was taken to maintain confidentiality and privacy of study. It took 10 minutes to fill out the questions. A total of 79 students responded to the survey; 23 did not meet the eligibility criteria. Therefore, 56 students who had complete data on all variables were included in the analyses.

The Questionnaire was developed by using Google form which included screening form, consent, and 2 sections. The first section was Questions related to perception of stress in last month which included 10 questions. The second section was related to intensity of pain which included 3 questions.

Statistical analysis

The IBM SPSS Version 21.0 Software programme was used for the data analysis. Mean and Standard deviation (S.D) of the demographic characteristics of Age and Weight were analysed. Pearson chi square test was used with Significant value <0.05 to interpret the association of Dysmenorrhea with BMI stress. Significant value was considered as <0.05.

Result

Demographic Characteristics: The Demographic data included medical students of age 18-25 years. Perceived stress scale (PSS) is most commonly used psychological tool for assessing stress perception. The PSS questionnaire contains 10 questions, the items are easy to understand and the response alternatives are simple to grasp. Moreover, the questions are of a general nature and hence are relatively free of content specific to any subpopulation group. Its score ranges from 0 – 40 in which scores ranging from 0-13 would be considered low stress,14-26 would be considered as moderate stress, and 27-40 would be considered as high perceived stress.

According to andersch and milsom(1982) scoring for severity of dysmenorrhea is categorised into grades ie; Grade 0, Grade 1, Grade 2, Grade 3. In Grade 0 Menstruation is not painful and daily activity is unaffected. In Grade 1 Menstruation is painful but seldom inhibits normal activity; analgesics are seldom required; mild pain. In Grade 2, Daily activity is affected; analgesics required and give sufficient relief so that absence from school is unusual; moderate pain. In Grade 3, Activity is clearly inhibited; poor effect of analgesics; vegetative symptoms (headache, fatigue, vomiting, and diarrhoea); severe pain.

The pie chart shows that the 83% (46 females) were having dysmenorrhea and 17% (10 females) were without dysmenorrhea (Figure1).
In the Figure 2, the G0, G1, G2 and G3 are grades of dysmenorrhea namely No dysmenorrhea, mild dysmenorrhea, moderate dysmenorrhea and severe dysmenorrhea. The table depicts the severity of dysmenorrhea as 10 (17.85% females) of them having no dysmenorrhea, 14 (25% females) of them having mild dysmenorrhea, 25 (44.6% females) of them having moderate dysmenorrhea and 7 (12.5% female) of them having severe dysmenorrhea.

Among 56 females, 5 of reported low stress, 47 of them reported moderate stress and 4 of them reported high perceived stress. The frequency of females having moderate stress was quite high (Figure 3).
III. DISCUSSION

This study aims to establish the association of Dysmenorrhea with BMI and stress. This study concluded that prevalence of dysmenorrhea is 87.3% (Figure 1). The moderate dysmenorrhea is more severe ie. 25% of the females. The severities of moderate stress are quite high. This study depicts that there is no association between dysmenorrhea and BMI and there is significant relationship between dysmenorrhea and stress. The findings of this study is similar to the Masoomi et al, Maryam et al (2015) concluded that Dysmenorrhea was highly prevalent among female adolescents. However, there was no significant association between BMI and Dysmenorrhea. Yang et al, Cho et al, Lee et al, Lee et al (2009) conducted a statistical analysis and concluded that no significant correlation is found between BMI and the severity of dysmenorrhea. Shah et al, monga et al, Patel et al, Shah et al, bakshi et al (2013) showed in their study that 45 % had primary Dysmenorrhea and majority (46) of these had regular menstrual cycles. BMI and ovarian volume did not demonstrate any significant association with presence of dysmenorrhea and regular menstrual cycles. Richard et al conducted an observational study and concluded that There were no statistically significant differences in the probability of dysmenorrhea among women of different BMI groups. Rodrigues et al(2011) found out that 62.8% experience menstrual pain,65.7% reported limitations in their daily activities and 42% had anxiety/depression. Deligeorgilou et al,Creatsas et al (2012) stated in their

![Figure 3 SEVERITY OF STRESS](image)

![Figure 4 DISTRUBUTION OF STUDENTS AS PER BODY MASS INDEX](image)
article that the menstrual disorders are very common in adolescence and can be the cause of a significant amount of stress to both the patients and their parents.\textsuperscript{33} Ju et al, Jones et al, Mishra et al, (2014) concluded in their study that dysmenorrhea is inversely related to age, parity or number of livebirths, and oral contraception use; and it is positively associated with stress related to both work and general life, as with family history of dysmenorrhea.\textsuperscript{34} Kordi et al, Mohama dirizi et al, and Shaketi et al (2013) showed that occupational stress is associated with increased risk of severe dysmenorrhea and also.\textsuperscript{35} Bajalan et al, Moafi et al, Bagloeei et al and Alimoradi et al (2019) showed in their study that several factors including demographic, reproductive, lifestyle, psychological and social factors can affect incidence and severity of primary dysmenorrhea.\textsuperscript{36} Chang et al (2017) concluded that Premenstrual syndrome and stress were the most prevalence in the female type.\textsuperscript{36} Pakpour et al, Kazemi et al, Alimoradi et al, Griffiths et al (2020) investigated the relationship between depression and stress.\textsuperscript{37} Katwal et al, Karki et al, Sharma et al, and Tamrakar et al (2016) concluded that there is a positive relationship between psychological stress and dysmenorrhea.\textsuperscript{37}

CONCLUSION

This study establishes the relation between Dysmenorrhea and stress. And also states that there is not any significant relationship between dysmenorrhea and BMI All the results are reported as Mean and standard deviation. The Mean and standard deviation calculated for demographic data has showed in table.

Limitations of Study:

Research was done among particular Age group between 18 and 25 years.

Sample size taken was small.

Scope for Future Research:

Further investigation of this study may overcome limitations of study by Using larger sample size & Varying the Age limit.

Conflict of interest-The authors has no competing interests to declare.

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REFERENCES

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SUPPLEMENTARY INFORMATION

Appendix 1

Table No: 1 Distribution of Student as Per Severity of Dysmenorrhea

<table>
<thead>
<tr>
<th>GRADE</th>
<th>NO OF STUDENT</th>
<th>PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>G0</td>
<td>10</td>
<td>17.85</td>
</tr>
<tr>
<td>G1</td>
<td>14</td>
<td>25</td>
</tr>
<tr>
<td>G2</td>
<td>25</td>
<td>44.6</td>
</tr>
<tr>
<td>G3</td>
<td>7</td>
<td>12.5</td>
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</table>

Table No 2: Descriptive analysis of BMI

<table>
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<tr>
<th>N</th>
<th>Range Statistic</th>
<th>Minimum Statistic</th>
<th>Maximum Statistic</th>
<th>Mean Statistic</th>
<th>Std.Err</th>
<th>Std.Deviation Statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI</td>
<td>56</td>
<td>12.5</td>
<td>14.8</td>
<td>27.3</td>
<td>19.568</td>
<td>.3984</td>
</tr>
<tr>
<td>Valid N (listwise)</td>
<td>56</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table No 3: Association between Dysmenorrhea and BMI

<table>
<thead>
<tr>
<th>CHI – SQUARE TEST</th>
<th>Value</th>
<th>df</th>
<th>Asymptotic Significance (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi square</td>
<td>91.139&lt;sup&gt;a&lt;/sup&gt;</td>
<td>82</td>
<td>.230</td>
</tr>
<tr>
<td>Likelihood ratio</td>
<td>55.149</td>
<td>82</td>
<td>.990</td>
</tr>
<tr>
<td>N of valid cases</td>
<td>56</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table No 4: Association between Dysmenorrhea and Stress

<table>
<thead>
<tr>
<th>CHI – SQUARE TEST</th>
<th>Value</th>
<th>df</th>
<th>Asymptotic Significance (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi square</td>
<td>112.000&lt;sup&gt;a&lt;/sup&gt;</td>
<td>36</td>
<td>.000</td>
</tr>
<tr>
<td>Likelihood ratio</td>
<td>61.741</td>
<td>36</td>
<td>.005</td>
</tr>
<tr>
<td>N of valid cases</td>
<td>56</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

APPENDIX 2

Why our study is important?

There are various reports regarding the impact of Body Mass Index (BMI) on dysmenorrhea. As several studies have indicated, various physiological, cultural and psychological factors are involved in dysmenorrhea. Although some studies have demonstrated an association between BMI and the incidence and severity of dysmenorrhea, this relationship is still controversial.

As the existing data is inconclusive and insufficient to demonstrate the effects of BMI on primary dysmenorrhea, so the present study may help us to provide a better insight into the relationship between BMI and primary dysmenorrhea.

Psychological disorders such as depression, stress, and anxiety are reported as important factors associated with dysmenorrhea and menstrual disorders. Mental stress is one of the important cause of primary dysmenorrhea among young females. There appears to be an association between severity of the stress and the frequency of females who suffer from dysmenorrhea. But it has been difficult to find a level of stress which interferes with their normal menstrual cycle. A large number of young females studying in medical colleges are under regular pressure of medical studies and exam. There have been only few researches on stress induced dysmenorrhea among female medical students.

As the existing data is inconclusive and insufficient to demonstrate the effects of BMI on primary dysmenorrhea, so the present study may help us to provide a better insight of primary dysmenorrhea with BMI and stress.

Relevance to the Journal’s readership-

It is relevant to your JOURNAL as the current paper talks about dysmenorrhea which has a high prevalence worldwide and also suggests the importance of mental health and BMI in reducing the prevalence of dysmenorrhea.
Research Question –
Is there any correlation between dysmenorrhea with stress and BMI.

What question your research answers?
Dysmenorrhea is associated with Stress but not with BMI.

Conclusions-
Stress is having a significant relationship with dysmenorrhea.

The manuscript has not been published and is not under consideration for publication in any other journal.

All authors approved the manuscript and its submission to the journal, and the authors have not published or submitted any related papers from the same study.