



EVALUTION OF CORRELATION OF BMI AND QUALITY OF LIFE WITH SEVERITY OF DYSMENORRHEA IN HEALTHY PHYSIOTHERAPY STUDENTS

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ABSTRACT

Background: Primary dysmenorrhea is a common problem among women, resulting in a decline in their Quality of life. Previous studies have not indicated a definite relationship of body mass index and Quality of life with dysmenorrhea. Therefore this study was conducted to investigate relation of BMI and QOL with dysmenorrhea among young females of physiotherapy college at surat. **Method:** 50 volunteers were invited for participation in this study who were willing to participate and who were of 18 to 23 years age-group were included. Those who agreed to participate in the study were informed of the study objectives, procedures and risks. Written informed consent was obtained from the volunteers. Severity of dysmenorrhea is tested with Numerical Pain Rating Scale (NPRS), BMI is tested with simple formula which is weight/height and Quality Of Life is tested with Life Enjoyment and Satisfaction Questionnaire (LES-Q). For this study, we correlated severity of dysmenorrhea with BMI and Quality Of Life by using Pearson's correlation coefficient. And level of significance is at $p < 0.05$. **Results:** result suggested that, the relationship between severity of dysmenorrhea and BMI shows positive ($p > 0.05$) significant correlation coefficient whereas the relationship between severity of dysmenorrhea and Quality Of Life shows negative ($p < 0.05$) non-significant correlation coefficient **Conclusion:** In this study, dysmenorrhea was highly prevalent among female adolescents. There was a significant association between BMI and dysmenorrhea. However there was non significant correlation between QOL and dysmenorrhea we recommend that future studies consider the confounding factors. Also, further research is required to find the relationship between the amount of body fat and dysmenorrhea.

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INTRODUCTION

The actual word dysmenorrhea is derived from the Greek words, "dys" meaning difficult, "meno" meaning month, and "rrhea" meaning flow. So, it's difficult menstruation flow.^[1] Study results showed that high prevalence of dysmenorrhea, that is, 78.8% among technical secondary school girls nearly half of the technical Secondary School girls (43.7%) had experienced dysmenorrhea during the last one to three years. Majority of participants had pain in every cycle. Menstrual pain primarily began at the onset of menstrual flow (48.1%). The pain location was mostly in the lower abdomen and lumbar region (57.9%) and followed by lower abdomen (31.7%). More than two third of participants (88.1%) with dysmenorrhea reported some associated symptoms. The most frequently reported symptoms loss of appetite (51.9%), decrease in concentration (46.8%), and headache (46.7%), Dizziness (44.3%). (86.8%) of participants with dysmenorrhea reported that the pain adversely affected their school

performance. (74.1%) of participants were unable to focus on their courses, more than two thirds of the participants (78.3%) had bad relationships with their families due to dysmenorrhea.^[2] However, Studies on the prevalence of menstrual pain have shown that many factors are related to this disorder. These factors include a younger age, low body mass index (BMI), smoking, early menarche, prolonged or aberrant menstrual flow, premenstrual somatic complaints, pelvic infections, previous sterilization, somatization, psychological disturbance, genetic influence, and a history of sexual assault influencing the prevalence and severity of dysmenorrhea.

Pain or cramping sensations in the lower abdomen may accompanied by headaches, dizziness, diarrhea, nausea and vomiting, backache and leg pain.^[5] These symptoms are reported to be the most common reasons for adolescents visiting gynecologists.^[6] The high prevalence of dysmenorrhea among adolescents especially in the first years of their reproductive life influences their daily activities and can lead to high rates of school absenteeism.^[7] Despite its high prevalence and associated negative effects, many women do no seek medical care for this condition.^[8]

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Emotional and behavioral problems may exacerbate menstrual cycle problems and dysmenorrhea. For example, depression and/or anxiety symptoms are reported to have an impact on menstrual cycle function and dysmenorrhea. Due to the negative effects of dysmenorrhea on an individual's psychological status, health-related quality of life may be disrupted among adolescent women.^[7] Furthermore, dysmenorrhea is a common cause of sickness absenteeism from both classes and work by the female student community.^[9]

Dysmenorrhea is divided into primary dysmenorrhea and secondary dysmenorrhea. Primary dysmenorrhea is defined as cramping pain in the lower abdomen occurring at the onset of menstruation in the absence of any identifiable pelvic disease. Primary dysmenorrhea usually presents during adolescence within 3 years of menarche. It is unusual for symptoms to start within the first 6 months after menarche.^[1] It is differentiated from secondary dysmenorrhea, which refers to painful menses resulting from an identifiable pelvic pathology like fibroid, adenomyosis, pelvic inflammatory diseases.^[1]

Body mass index is a statistical measure which compares a person's height and weight. Due to its ease of calculation, BMI is the most widely used diagnostic tool to identify obesity problems within a population. BMI is defined as the individual's bodyweight divided by the square of his height. Hence, it has been used by the WHO as the standard for recording obesity statistics since 1980s. The WHO considers BMI\18.5 as underweight and may indicate malnutrition, an eating disorder, or other health problems while a BMI 25 is considered overweight. Normal BMI ranges from 18.5 to 25. Severely underweight (starvation) is BMI <16.5. Obese Class 1 is BMI between 30 and 35, Obese Class 2 is BMI between 35 and 40, and Obese Class 3 is BMI >40.^[1] The World Health Organization defined health as being not only the absence of disease and infirmity but also the presence of physical, mental, and social wellbeing.^[26]

QOL is defined as a subjective phenomenon based on individual perception, experiences, beliefs, and expectations.^[27] Nowadays, QOL has become an issue in many clinical studies.^[28]

A recent study in Turkey elucidated lower scores for indicators of QOL (physical functioning, bodily pain, general health perception, and vitality) in females with dysmenorrhea.^[29] Results from a study in Georgia also showed significantly lower physical and psychosocial health-related QOL in females with dysmenorrhea than their healthy peers.^[30] Although dysmenorrhea has been reported to affect the ability of women to carry out daily activities, the impact of primary dysmenorrhea on QOL has been enunciated rarely.^[31]

There are many scores to measure quality of life. Amongst those Life Enjoyment and Satisfaction Questionnaire - Short Form (Q-LES-Q-SF) is the most reliable and valid questionnaire.^[32]

There are many factors affecting the severity of dysmenorrhea such as BMI, Age, QOL, pelvic infection and psychological distress. So the purpose of this study was to evaluate the correlation between BMI and QOL with severity of dysmenorrhea.

METHODOLOGY

Study Design: co-relational study

Study Population: 18- 23 years old adult female students of S.P.B.

Physiotherapy College, Surat

Sample Size: 50

Inclusion Criteria

- Age (18-23 year) girls with dysmenorrhea
- Lower back pain; and Medial or anterior thigh pain.

Exclusion Criteria: Participants with any endocrine disorders, chronic disease, or who had undergone major surgery were excluded from the study.

Outcome Measures

- NPRS
- BMI
- Quality of Life Enjoyment and Satisfaction Questionnaire (Q-LES-Q-SF)

Material Used

- weighing machine
- Inch tape
- Pencil/Pen

NPRS

To assess the intensity of primary dysmenorrhea, the Numeric Pain Rating Scale (NPRS) questionnaire was used (McCaffery & Beebe, 1993). According to the guideline of the NPRS, participants were classified as dysmenorrheic if they circled 1 to 10. (McCaffery & Beebe, 1993).^[42] 10 cm was used for assessing pain intensity. The scale describes the intensity of pain with least as "No pain" and the worst discomfort as "worst pain". The scale had marking at every one centimeter distance^[8]

Pain classification scale: 0 = No Pain

1-3 = Mild Pain (nagging, annoying, interfering little with Activities of Daily living (ADLs))

4-6 = Moderate Pain (interferes significantly with ADLs) 7-10 = Severe Pain (disabling; unable to perform ADLs)^[43]

Body Mass Index (BMI)

Body Mass Index (BMI) is a simple index of weight-for-height that is commonly used to classify underweight, overweight and obesity in adults. It is defined as the weight in kilograms divided by the square of the height in meter (kg/m²). For example, an adult who weighs 70kg and whose height is 1.75m will have a BMI of 22.9.

$$BMI = 70 \text{ kg} / (1.75 \text{ m}^2) = 70 / 3.06 = 22.9$$

Table 1 The International Classification of adult underweight, overweight and obesity according to BMI

Classification	BMI(kg/m ²)	
	Principal Points	cut-off Additional points cut-off
Underweight	<18.50	<18.50
Severe thinness	<16.00	<16.00
Moderate thinness	16.00 - 16.99	16.00 - 16.99
Mild thinness	17.00 - 18.49	17.00 - 18.49
Normal range	18.50 - 24.99	18.50 - 22.99

		23.00 - 24.99
Overweight	≥25.00	≥25.00
Pre-obese	25.00 - 29.99	25.00 - 27.49
		27.50 - 29.99
Obese	≥30.00	≥30.00
Obese class I	30.00 - 34.99	30.00 - 32.49
		32.50 - 34.99
		35.00 - 37.49
Obese class II	35.00 - 39.99	37.50 - 39.99
Obese class III	≥40.00	≥40.00

Source: Adapted from WHO, 1995, WHO, 2000 and WHO 2004

Quality of Life Enjoyment and Satisfaction Questionnaire-Short Form (Q-LES-Q-SF)

There are many scores to measure quality of life. Amongst those Life Enjoyment and Satisfaction Questionnaire - Short Form (Q-LES-Q-SF) is the most reliable and valid questionnaire. The scoring of the Q-LES-Q-SF involves summing only the first 14 items to yield a raw total score. The last two items are not included in the total score but are standalone items. The raw total score ranges from 14 to 70. The raw total score is transformed into a percentage maximum possible score using the following formula:

$$\frac{\text{(Raw total score - Minimum Score)}}{\text{(Maximum possible raw score - Minimum score)}}$$

The minimum raw score on the Q-LES-Q-SF is 14, and the maximum score is 70. Thus, the formula for % maximum can also be written as (raw score -14)/56.^[32]

Data Analysis

The SPSS 20.0 software was used for data analysis , Standard statistical method were used for the calculation of means and SD, Relationship between test variables (severity of dysmenorrhea , BMI and Quality Of Life) were determined using multiple bivariate correlation, represented by the Pearson correlation coefficient. Level of statistical significance was set at p<0.05

RESULTS

Table 1 Mean and Standard deviation of BMI, NPRS, Q-LES-Q-SF

	Mean	SD
BMI	20.5562	11.61776
NPRS	6.26	4.242641
Q-LES-Q-SF	42.58	9.1923882

Value of mean and standard deviation of BMI is 20.5562 and 11.61776 respectively. Value of mean and standard deviation of NPRS is 6.26 and 4.242641 respectively. Value of mean and standard deviation of Q-LES-Q-SF is 42.58 and 9.1923882 respectively.

Table 2 Correlation between BMI and Dysmenorrhea

		Dysmenorrhea
BMI		P value 0.265 r value 0.161

Correlation between BMI and dysmenorrhea was done by Karlpearsons correlation coefficient which shows there is non significant correlation.(p>0.05)

Table 3 Correlation between Quality of life and Dysmenorrhea

		Dysmenorrhea
Q-LES-Q-SF		p value 0.001 r value -0.470

Correlation between BMI and dysmenorrhea was done by Karlpearsons correlation coefficient which shows there is significant correlation. (p<0.05)

Table 4 Interpretation of correlation between BMI and Quality of life with Dysmenorrhea

		Dysmenorrhea
BMI		Positive non-significant correlation
Quality of life		Negative significant correlation

There is positive non significant correlation between BMI and dysmenorrhea where as negative significant correlation between QOL and dysmenorrhea.

Table 5 Demographic distribution: Dysmenorrhea

Variables (NPRS Scale)	Frequency(n=50)	Percentage
Mild pain(1 to 3)	4	8%
Moderate pain(4 to 7)	32	64%
Severe pain(8 to 10)	14	28%

In our study 8%subjects having mild pain, 64%subjects having moderate pain, 28%subjects having severe pain.

Table 6 Demographic distribution: BMI

Variables (BMI)	Frequency(n=50)	Percentage
<18 (underweight)	19	38%
18-24.9(normal)	22	44%
25-29.9(overweight)	7	14%
>30(obese)	2	4%

In our study, 38%subjects are in underweight, 44% subjects are normal, 14% subjects are overweight, 4% subjects are obese

The Numeric Pain Rating Scale (NRS-11) is an 11-point scale for patient self-reporting of pain. It is for adults and children 10 years old or older.^[39]

Table 7 Numeric Pain Rating Scale

Rating	Pain Level
0	No Pain
1-3	Mild Pain (nagging, annoying, interfering little with ADLs)
4-6	Moderate Pain (interferes significantly with ADLs)
7-10	Severe Pain (disabling; unable to perform ADLs)

DISCUSSION

Menstruation is a natural phenomenon in women after puberty and is often associated with dysmenorrhea. Earlier studies have demonstrated an association between BMI and the incidence and severity of dysmenorrhea. Dysmenorrhea usually develops within hours of the beginning of menstruation and increases as flow becomes maximum during 1st or 2nd day. The etiology and pathophysiology of primary dysmenorrhea are not fully known, but most symptoms are by the action of uterine prostaglandins (PG), particularly PGF2α, which are released from the disintegrated endometrial cells as menstruation begins. The PGF2α stimulates myometrial contractions, ischemia, and sensitization of nerve endings. The

evidence of this theory is that women with more severe dysmenorrhea have higher levels of PGF2 α in their menstrual blood.^[4] Some studies have also shown the possible increased levels of leukotrienes and vasopressin.^[45, 46]

The primary purpose of this study was to determine the relationships between severities of dysmenorrhea with BMI that subsequently affect Quality Of Life. Dysmenorrhea is one of the most common and serious problems in the reproductive Period. This common problem reduces females' quality of life and daily activities.^[49] Based on the literature it was found that the prevalence of dysmenorrhea in young female students is very high. Shah M *et al* reported prevalence of 72% of dysmenorrhea. Dambhare DG *et al* found that prevalence of dysmenorrhea and PMS was 56% in their cross sectional study conducted on 1100 school adolescent girls.^[50] Unsal A *et al* had found out that prevalence of dysmenorrhea among college going students was 72.7% (n = 453).^[51] These findings were in concordance with our study.^[52]

To assess the intensity of primary dysmenorrhea, the Numeric Pain Rating Scale (NPRS)^[53] was used as an outcome measure. In our study mean value of severity of dysmenorrhea on NPRS is 20.55. According to the guideline of the NPRS, participants were classified as dysmenorrheic if they circled 1 to 10. Mild, moderate, and severe intensity were assigned as 1 to 3, 4 to 6, and 7 to 10.^[53] Based on that 8 % students have mild pain, 68% students having moderate pain, and 24 % students shows severe pain, This method is also used in the study of Margaret *et al* it was revealed that among dysmenorrheic study subjects (n=224), 52.3%, 35.7% 12% of students had mild, moderate and severe pain (dysmenorrhea) respectively.^[54]

In our study, 44% of the students were with normal body mass index, 38% of the students were underweight, 14% were overweight and 9% was obese. (Table-6)^[55] There are many researches available on the correlation between BMI and severity of dysmenorrhea, but still there is no clear conclusion about this association. Hence this study was conducted to find out the exact relationship between BMI and severity of dysmenorrhea in adult girls. In a study by Chung *et al* on Taiwanese nurses, nurses with a lower BMI suffered from dysmenorrhea more than other participant.^[56] Similarly, in a study by Hirata, the frequency of dysmenorrhea was the highest in the underweight group.^[57] Moreover, Fujiwara showed that pain intensity was higher in those with lower weight, compared to others.^[58,59] Tangchai and colleagues found that low BMI was significantly associated with dysmenorrhea.^[60] They have given the explanation that Low caloric intake, body weight, and fat mass disturb pulsatile secretion of pituitary gonadotrophins might lead to an increase in rate of dysmenorrhea. In contrast to this Harlow *et al*. concluded overweight as an important risk factor for dysmenorrhea.^[61]

These findings were not consistent with our study results. In this study we found out that severe dysmenorrhea in normal-weight students was more prevalent than underweight and overweight subjects, which may be due to differences in BMI grading and less number of subjects having low BMI and High BMI when compared to the number of normal BMI subjects. However, in this study, correlation between dysmenorrhea with BMI p is 0.265 with r value is 0.161, which shows there is non significant co relationship between BMI and

Dysmenorrhea. Findings of this study is supportive to Anil K Agarwal *et al* ^[62] and Montero *et al*. who concluded that dysmenorrhea was not significantly correlated with BMI.^[63,59] Singh *et al* showed that, no significant relationship was found between BMI and the frequency or severity of dysmenorrhea^[57,59] Sundel *et al* found that severity of dysmenorrhea is neither associated with height or weight^[2] which was in consistence to the study of Margaret A* and Manjubala Dash.

Dysmenorrhea was found to be an important clinical cause in young girls for being absent in college and reduced physical activity, thus having negative effect on QOL, leading to absenteeism, reduced physical activity, loss of concentration, and poor social relationship. This clearly indicates that dysmenorrhea is disturbing the life of girls when compared with the lives of girls without dysmenorrhea. These results are on par with other studies where the researchers have explained the effects of dysmenorrhea on physical functioning and emotional disturbances.

In our study QOL is measured by Q-LES-Q-SF questionnaire supported by D. Stevanovic MD *et al* Result of correlation between QOL and dysmenorrhea in this study shows p is 0.001 with r value is -0.470 which is suggestive of significant negative correlation between QOL and dysmenorrheal severity. Similar findings were also observed by Adeyemi and Adekanle.^[66] In the study of at el Shrotriyah Charu, Ray Amita, Ray Sujoy, George Aneesh Thomas With number of subjects 560 which shows a significant association between Quality of Life and severity of dysmenorrhea.^[52] A cross sectional study conducted by Mamta K Shewte, Manik S Sirpurkarin Medical College and Hospital in central India, among 311 medical and nursing students to determine effects of severity dysmenorrhea on Quality Of Life depicts significant correlation coefficient.^[52]

Limitations

- In our study, normal BMI Subjects were more than underweight, overweight and obese.
- In our study, normal healthy subjects were 50, it can be taken more.

Future Scope of Study

- Further studies can be done to evaluate the correlation of Dysmenorrhea severity with other components rather than BMI and QOL.
- Further experimental studies can be done to find out the effect of various treatments to reduce severity of Dysmenorrhea.

CONCLUSION

The main purpose of doing this study is to measure significant relation between severity of dysmenorrheal with BMI and Quality Of Life in students of Physiotherapy. The relationship between severity of dysmenorrhea and BMI shows positive (p>0.05) significant correlation coefficient whereas the relationship between severity of dysmenorrhea and Quality Of Life shows negative (p<0.05) non-significant correlation coefficient. The researchers should do further studied on the effects of severity of dysmenorrhea on BMI with Quality Of Life.

Summary

The primary purpose of our study was to examine whether there is any relation between severity of dysmenorrhea with

BMI and Quality Of Life. This study was conducted at SPB Physiotherapy College, Surat where 50 volunteers were invited for participation in this study who were willing to participate and who were of 18 to 23 years age-group were included. Those who agreed to participate in the study were informed of the study objectives, procedures and risks. Written informed consent was obtained from the volunteers. Severity of dysmenorrhea is tested with Numerical Pain Rating Scale (NPRS), BMI is tested with simple formula which is weight/height and Quality Of Life is tested with Life Enjoyment and Satisfaction Questionnaire (LES-Q). For this study, we correlated severity of dysmenorrhea with BMI and Quality Of Life by using Pearson's correlation coefficient. And level of significance is at $p < 0.05$. Our result suggested that, the relationship between severity of dysmenorrhea and BMI shows positive ($p > 0.05$) significant correlation coefficient whereas the relationship between severity of dysmenorrhea and Quality Of Life shows negative ($p < 0.05$) non-significant correlation coefficient in Physiotherapy students. The severity of dysmenorrhea contributes significantly in BMI and Quality Of Life (QOL). So, the researchers should do further studied on the effects of severity of dysmenorrhea on BMI with Quality Of Life.

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