Impact of Overweight and Obesity on Dysmenorrhea: A Study of Prevalence Among Young Female Adults

Dr. Rajkiran Tiku[1], Rutuja Kasbe[2]

[1]Professor (Physiotherapy),[2]Student Intern;
[1,2] College of Physiotherapy (Tilak Maharashtra Vidyapeeth deemed to be university) Pune.

Corresponding Author: Dr. Rajkiran Tiku

ABSTRACT

Dysmenorrhea, characterized by painful uterine cramps during menstruation, is a common gynecological condition affecting women of reproductive age. It often leads to significant physical discomfort, reduced academic performance, and diminished quality of life. The condition is categorized into primary dysmenorrhea, which occurs without underlying pelvic pathology, and secondary dysmenorrhea, which is associated with conditions such as endometriosis. This study aims to investigate the prevalence of dysmenorrhea among young female adults and examine the impact of overweight and obesity on the severity of dysmenorrhea symptoms. The study included young female adults, categorized based on their Body Mass Index (BMI) into overweight and obese groups. The prevalence and severity of dysmenorrhea were assessed using standardized pain measurement tools, including the WaLIDD and NPRS scores. The findings indicate a significant correlation between higher BMI and the severity of dysmenorrhea symptoms. Over 90% of the participants reported experiencing painful menstruation, with those classified as overweight or obese showing more severe pain, as reflected in the WaLIDD and NPRS scores. The study also highlighted factors such as age at menarche and menstrual cycle regularity, which may contribute to the severity of dysmenorrhea. The study underscores the substantial impact of overweight and obesity on the prevalence and severity of dysmenorrhea among young female adults. Given the high prevalence of dysmenorrhea in this population, particularly among those with higher BMI, targeted interventions focusing on weight management and lifestyle modifications are recommended to alleviate menstrual pain and improve overall quality of life.

Keywords: Dysmenorrhea, Menstrual Pain, BMI, WaLIDD Score, NPRS Score.

INTRODUCTION

Dysmenorrhea is characterized by painful uterine cramps that typically occur during menstruation.[1] The word dysmenorrhea is derived from the Greek words, "dys" meaning difficult, "meno" meaning month, and "rrhea" meaning flow.[2] It is a leading cause of pelvic pain and menstrual disturbances. In addition to severe cramps, it is frequently associated with other symptoms such as sweating, headaches, nausea, vomiting, diarrhea, and trembling, which can occur just before or during menstruation.[3] Dysmenorrhea is a common gynecological condition that affects the majority of women of reproductive age, with 2–29% experiencing severe pain.[4] It

significantly impacts women's lives, often leading to restrictions in daily activities, lower academic performance among adolescents, poor sleep quality, and negative effects on mood, including increased anxiety and depression.[5] Symptoms of Dysmenorrhea: Throbbing or cramping pain in the lower abdomen, Pain that radiates to the lower back and thighs, Nausea and vomiting, diarrhea or loose stools, Headache, Dizziness.[6] Dysmenorrhea can be categorized into two types: primary dysmenorrhea and secondary dysmenorrhea.[7] Primary dysmenorrhea is defined as painful, spasmodic cramping in the lower abdomen that occurs just before or during menstruation, without any detectable pelvic pathology.[8] It typically begins in adolescence, often within 6 to 24 months after menarche. The pain associated with primary dysmenorrhea usually follows a clear and predictable pattern, starting shortly before or at the onset of menstruation.[9] The pain associated with primary dysmenorrhea typically lasts between 8 and 72 hours, with the most severe discomfort occurring during the first or second day of menstruation. It may also radiate to the back and thighs.[10] In adolescents and young adults, the majority of dysmenorrhea cases are classified as primary (or functional). These cases are linked to a normal ovulatory cycle and lack any underlying pelvic pathology, with a clear physiological etiology.[11] After ovulation, there is an accumulation of fatty acids in the phospholipids of cell membranes. The high intake of omega-6 fatty acids in Western diets leads to their predominance in these phospholipids.[12] As progesterone levels decline before menstruation, these omega-6 fatty acids, particularly arachidonic acid, are released. This release triggers a cascade of prostaglandins (PG) and leukotrienes (LT) production in the uterus. The inflammatory response mediated by these prostaglandins (PG) and leukotrienes (LT) results in both menstrual cramps and systemic symptoms such as nausea, vomiting, bloating, and headaches. Specifically, prostaglandin F2α, a metabolite of arachidonic acid produced by cyclooxygenase (COX), induces strong vasoconstriction and myometrial contractions. This leads to reduced blood flow (ischemia) and subsequent pain.[11] Secondary dysmenorrhea arises from identifiable pathological conditions such as endometriosis, adenomyosis, uterine fibroids (myomas), and pelvic inflammatory disease. The onset of secondary dysmenorrhea typically occurs more than 2 years after menarche and can begin at any time. Depending on the underlying condition, it may be accompanied by other gynecological symptoms, including intermenstrual bleeding and menorrhagia.[9] Endometriosis is the most prevalent cause of secondary dysmenorrhea in adolescents and young adults. It is characterized by the presence and growth of uterine glands and stroma outside the uterine cavity. Most endometriosis implants are found within the pelvis, with the ovaries being the most common site of involvement.[13] Other common sites for endometriosis implantation include the pelvic peritoneum, anterior and posterior cul-de-sac, uterosacral ligaments, pelvic lymph nodes, cervix, uterus, vagina, vulva, rectosigmoid colon, and appendix. Rare sites can include the umbilicus, surgical scars, bladder, kidneys, lungs, and extremities. In adolescents presenting with chronic pelvic pain, the incidence of endometriosis has been reported to range from 45% to 70%.[14] The global prevalence of dysmenorrhea is estimated to be between 60% and 93%.[15] Risk factors include a high body mass index (BMI), increased body fat, an unstable diet (marked by low intake of protein and vitamin-rich foods and high intake of fatty foods), smoking, menarche before age 12, nulliparity, being unmarried, and a family history of the condition.[15] While dysmenorrhea is multifactorial in origin, emerging evidence suggests that overweight and obesity may be important contributing factors. The global rise

in obesity rates among young women has prompted growing concern about its potential implications on reproductive health, including menstrual disorders such as dysmenorrhea.[16] A focused medical history and physical examination typically provide enough information to diagnose primary dysmenorrhea. This condition often begins 6 to 12 months after menarche.[17] The pain associated with primary dysmenorrhea is typically sharp and intermittent, centered in the suprapubic area, and begins within hours of menstruation onset, reaching its peak during maximum blood flow.[18] Despite this discomfort, the physical examination usually appears normal. Menstrual pain may also be accompanied by systemic symptoms such as nausea, vomiting, diarrhea, fatigue, fever, headache, and insomnia. While ultrasound is not routinely necessary for evaluating primary dysmenorrhea, it can be valuable for ruling out secondary causes like endometriosis and adenomyosis.The World Health Organization (WHO) describes overweight and obesity as the accumulation of excessive or abnormal fat that can pose a significant risk to one's health.[19] Body mass index (BMI) is a basic measurement that estimates overall body fat by dividing a person's weight in kilograms by the square of their height in meters. For adults, both the US Centers for Disease Control and Prevention (CDC) and the World Health Organization (WHO) set the normal BMI range between 18.5 and 24.9. A BMI of 25 kg/m² or higher is classified as overweight, while a BMI of 30 kg/m² or more is considered obese, with a BMI of 40 kg/m² or greater indicating severe obesity.[20] Globally, the prevalence of overweight and obesity has been on the rise, with a particularly notable increase observed among young adults.[19] Lifestyle changes are a major contributing factor to the rise in overweight and obesity, aside from genetic influences. According to the latest data from the WHO, approximately 1.6 billion adults worldwide are overweight. Of these, at least 400 million adults are classified as obese. Obesity, which is both increasingly prevalent and challenging to treat, affects more women than men.[6] Nutritional status is a key factor influencing the onset of puberty and menarche. It is hypothesized that reaching a "critical body weight" is necessary to trigger the onset of puberty. Leptin, a hormone secreted by adipocytes, has been extensively studied for its effects on both puberty and reproduction. Elevated leptin levels in children with obesity, which correlate with adiposity and BMI, suggest a potential neuroendocrine mechanism that may explain the earlier onset of puberty and menarche observed in these children.[21] Obesity and overweight are linked to various health complications, including metabolic syndrome, cardiovascular diseases, and type 2 diabetes. Excessive body fat can lead to hormonal imbalances, which may worsen menstrual pain. Adipose tissue, in particular, can affect estrogen levels, potentially contributing to menstrual irregularities and increased dysmenorrhea.[22] Emerging evidence indicates that overweight and obesity may worsen menstrual pain and increase the prevalence of dysmenorrhea.[23] Several mechanisms may explain the association between higher body weight and more severe dysmenorrhea. Specifically, adipose tissue, particularly visceral fat, produces inflammatory cytokines and prostaglandins that can exacerbate menstrual cramping. These substances contribute to increased inflammation and uterine contractions, which may intensify the pain experienced during menstruation.[21] Understanding the specific impact of overweight and obesity on dysmenorrhea among young female adults is crucial for developing effective management strategies and interventions. This study aims to investigate the prevalence of dysmenorrhea among young female adults and examine how overweight and obesity influence its severity. By analyzing these associations, the research seeks to contribute to the growing body of

evidence on the impact of body weight on menstrual health aimed at improving menstrual health and overall well-being for young women.

METHODOLOGY
Study design: Cross sectional survey type
Study duration: 1 year
Sample size: 40
Study setting: College of Physiotherapy (Tilak Maharashtra Vidyapeeth Deemed To Be University)
Sampling method: Convenient sampling method
Study population: Young female adults aged 18-30 yrs

Inclusion criteria:
- Young females
- Age group between 18-30
- BMI – 25 to 34.5
- i.e. Overweight and obese class 1 females

Exclusion criteria:

1. BMI Distribution
BMI distribution among sampled females

BMI Class	BMI Category	Number of Females
25-29.9	Overweight	20
30-34.9	Obese class 1	20

2. WaLIDD Scale
WaLIDD score among Sampled Females

WALIDD Score	Number of Females
1-2	0
3-4	3
5-6	13
7-8	24
9-10	0

- Females with age more than 30 yrs
- Females with previously diagnosed metabolic disorder other than PCOS
- Females on any medication for Dysmenorrhea

Outcome measures
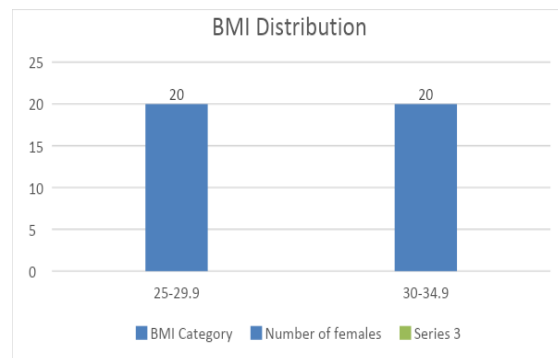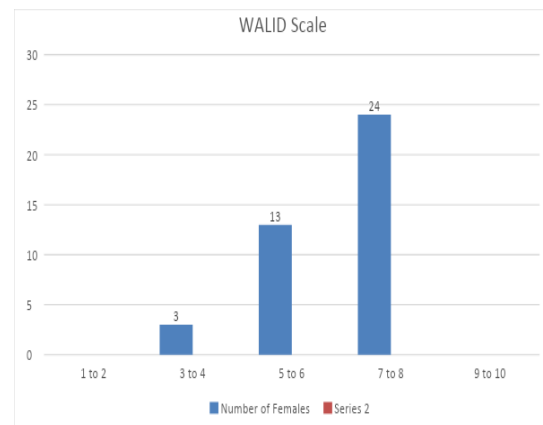- WaLIDDD score
- pain- NPRS

RESULT
For this study, statistical analysis was performed to examine the relationship between BMI (overweight and obesity) and the prevalence and severity of dysmenorrhea. Descriptive statistics were calculated for demographic variables, including age, occupation, BMI classification, age at menarche, and menstrual cycle regularity. Categorical variables, such as age groups and occupations, were summarized using frequencies and percentages. Means and standard deviations were calculated for continuous variables, including WaLIDD and NPRS score

3. NPRS Scale
NPRS score among Sampled Females

NPRS Score	Number of Females
1-2	0
3-4	2
5-6	11
7-8	25
9-10	2
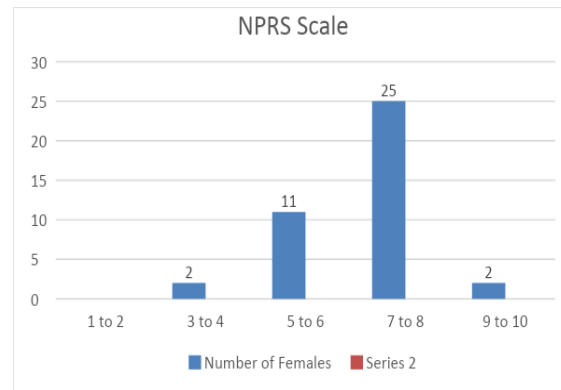
DISCUSSION
The study aimed to investigate the prevalence of dysmenorrhea among young female adults, focusing on the impact of overweight and obesity. The findings suggest a significant correlation between higher BMI and the severity of dysmenorrhea symptoms. Age Distribution: The majority of the subjects were between the ages of 21 and 22, which aligns with the typical age range for young adults. This age group is often in a transitional phase of life, such as college or early career, which may influence stress levels, lifestyle choices, and overall health, potentially exacerbating menstrual issues like dysmenorrhea. Occupational Influence: A significant portion of the subjects were students (80%), which might reflect the population most likely to participate in such studies. The sedentary lifestyle associated with student life, combined with stress, could contribute to both weight gain and menstrual pain. The small representation of other occupations limits the ability to generalize findings across different professional groups. BMI Classification: Half of the participants were categorized as overweight, and the other half as obese class 1. The study highlights the prevalence of dysmenorrhea within these BMI ranges, suggesting that higher body weight may be linked to more severe menstrual pain. This could be due to increased inflammation, hormonal imbalances, and the physical stress that excess weight places on the body. Menarche Age: Most subjects experienced menarche between the ages of 13 and 14, with a smaller group beginning menstruation earlier or later. Early menarche is often associated with an increased risk of menstrual disorders, which may be exacerbated by overweight or obesity. However, in this study, the distribution of menarche age did not show a strong correlation with dysmenorrhea severity. Menstrual Cycle Regularity: Over two-thirds of the participants reported regular menstrual cycles, while the remaining subjects experienced irregular periods. Irregular cycles can be a symptom of underlying hormonal issues, often linked to obesity, which may contribute to the prevalence and severity of dysmenorrhea. Pain Experience: An overwhelming majority (92.5%) of the subjects reported experiencing painful menstruation. The high prevalence of dysmenorrhea in this study is consistent with existing literature, which suggests that menstrual pain is common among women, especially those with higher BMI. WaLIDD and NPRS Scores: The distribution of WaLIDD and NPRS scores indicates that most participants experienced moderate to severe pain. The scores further support the hypothesis that higher BMI is associated with increased pain severity during menstruation.

CONCLUSION

This study highlights the significant impact of overweight and obesity on the prevalence and severity of dysmenorrhea among young female adults. The findings suggest that higher BMI is correlated with more severe menstrual pain, as indicated by both WaLIDD and NPRS scores. Given the high prevalence of dysmenorrhea observed, particularly among those classified as overweight or obese, there is a clear need for targeted interventions aimed at weight management and lifestyle modifications. These interventions could potentially alleviate menstrual pain and improve the overall quality of life for young women. Further research with a larger and more diverse sample size is recommended to validate these findings and explore the underlying mechanisms linking obesity and dysmenorrhea.

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