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Research Article

Assessment and Comparison on Use of Non-Steroidal Anti-Inflammatory Drugs for the Management of Dysmenorrhea by Medical and Non-Medical Students

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Abstract

Background: Primary dysmenorrhea is one of the most common gynecological problems among adolescent females. It is defined as painful menses in women with normal pelvic anatomy, usually beginning during adolescence. This study aims to assess the prevalence, management practices, and associated side effects of dysmenorrhea among these students, focusing particularly on the use of NSAIDs and self-medication. **Method:** A cross-sectional study was conducted from July 8, 2024, to August 4, 2024, at PUSHS, GPCAR, and PUCEF in Koshi Province, Sundarharaicha. The study included 186 undergraduate female students from medical and non-medical faculties at Purbanchal University who experienced dysmenorrhea. A self-administered, semi-structured questionnaire was used to gather data on demographic characteristics, menstrual history, and NSAID usage. Convenient sampling technique was used, and data analysis was performed using IBM SPSS version 27. **Result:** A total of 186 students (126 medical and 60 non-medical) were included in the study. 88.6% of students experienced dysmenorrhea, with similar prevalence rates in medical (88.1%) and non-medical students (89.6%). Among those affected, 60.8% used over-the-counter pain relievers, with a higher proportion of non-medical students (66.7%) relying on self-medication compared to medical students (57.9%). Mefenamic acid was the most preferred NSAID, used by 90.3% of NSAID users, but non-medical students showed a higher preference (95.0%) compared to medical students (87.7%). Although NSAIDs were generally reported as effective by 61.9% of users, medical students reported slightly higher effectiveness (64.4%) than non-medical students (57.5%). Side effects were reported by 75.22 % of NSAID users: Non-medical students experienced slightly fewer side effects (72.5%) compared to medical students (76.71%). **Conclusion:** Dysmenorrhea is highly prevalent among both medical and non-medical students, with NSAIDs being a common management method. Despite the efficacy of NSAIDs, significant side effects were reported, particularly among non-medical students. This underscores the need for better educational programs on safe NSAID use and alternative pain management strategies.

Keywords: Dysmenorrhea, NSAIDs, Menstrual Cycle, Self-medication, Side Effects, Medical Students, Non-medical Students

INTRODUCTION

Every adult female menstruates for three to five days on average every month until menopause, marking one of the main pubertal changes in females. This period is occasionally accompanied by dysmenorrhea, which includes discomfort and excruciating uterine contractions.[1]

There are two types of dysmenorrhea: primary and secondary.[2] Usually originating in the lower abdomen, the discomfort can also spread to the back and inner thighs.[3] Primary dysmenorrhea is described as menstruation discomfort that does not have an identified cause.[4] The pain is usually spasmodic in character and may be accompanied by some other symptoms and complications such as nausea, vomiting, diarrhea, headache, fatigue, dizziness, and in severe cases. Secondary dysmenorrhea results from conditions like endometriosis.[5] The quality of life for female adolescents affected by dysmenorrhea is severely compromised.[6] Dysmenorrhea is very common in college students and is associated with low attendance, difficulty engaging in everyday tasks, and difficulties with social interactions and functioning.[7]

The prevalence of dysmenorrhea is very high and at least 50% of women experience this problem throughout their reproductive years.[8] The prevalence of dysmenorrhea among girls was documented to be as high as 85.4% in in Ethiopia, and this was linked with poor school attendance[9] , 62% in India , and it varies greatly across different populations and ethnic groups.[10] In this study

64.3% preferred self-medication pattern .The most commonly used drug was Meftal spas and for 96.8%, the treatment was found to be effective,57.6% have experienced ADR.[11]

Dysmenorrhea is thought to be caused by the release of prostaglandins in the menstrual fluid, which causes uterine contractions and pain. Vasopressin also may play a role by increasing uterine contractility and causing ischemic pain as a result of vasoconstriction. Elevated vasopressin levels have been reported in women with primary dysmenorrhea.[12]

The start of menstruation is marked by the simultaneous decrease in circulating progesterone and estradiol, initiating increased transcription of endometrial collagenases, matrix metalloproteinases (MMPs), and inflammatory cytokines . Upregulated MMPs specifically target and break down endometrial tissue, freeing phospholipids from the cellular membrane. Uterine phospholipases convert available phospholipids to arachidonic acid, which is then synthesized into prostaglandins (PG), prostacyclins, and thromboxane-2a via cyclooxygenase (COX)-1 and -2. Notably, COX-2 expression is highest during menses.[13] The end products PGE2 and PGF2α are elevated in the menstrual effluent in dysmenorrheic women when compared to healthy controls.[14]

Endogenous levels of prostaglandin F 2α and its main metabolites in plasma and endometrium of normal and dysmenorrheic women.[15]

When it comes to treating primary dysmenorrhea, NSAIDs and hormonal contraceptives are the most often utilized treatment modalities. NSAIDs, including diclofenac, ibuprofen, mefenamic acid, naproxen, ketoprofen, celecoxib, and naproxen sodium, have been shown to work by preventing cyclooxygenase from producing as much polyphenols.[16]

Cyclooxygenase (COX) is the pivotal enzyme in prostaglandin biosynthesis. It exists in two isoforms, constitutive COX-1 which is responsible for physiological functions and inducible COX-2 involved in inflammation. Most NSAIDs like ibuprofen, diclofenac, mefenamic acid etc. are non-selective COX inhibitors; and have more side effects where as NSAIDs like celecoxib are selective COX 2 inhibitors. A NSAID which selectively inhibits COX-2 is likely to retain maximal anti-inflammatory efficacy combined with less toxicity.[17]

In Single-Blind Randomized Controlled Trial the efficacy of Dark Chocolate, Coconut Water, and Ibuprofen in Managing Primary Dysmenorrhea was compared using the numeric rating score and the multivariate Kruskal–Wallis test revealed a significant difference in effectiveness among the three interventions , Ibuprofen 400 mg being the 3 most effective in management of dysmenorrhea .[18] In a meta-analysis, comparison of the efficacy and safety of non-steroidal anti-inflammatory drugs for patients with primary dysmenorrhea was conducted . Altogether 13 drugs were taken which included aspirin, diclofenac, flurbiprofen, ibuprofen, indomethacin, ketoprofen, mefenamic acid, mefenamic, nimesulide, piroxicam, rofecoxib, tiaprofenic acid, and valdecoxib. The result found thatThe results of our network meta-analysis suggested that all the drugs except aspirin were significantly more efficacious than placebo. Complementary to their results, the SUCRA ranking in our research provided the information of more efficacious treatments: flurbiprofen, piroxicam, and tiaprofenic acid. naproxen was not significant efficacious compared to other NSAIDs drugs and showed an average efficacy in ranking. As for the safety outcome, tiaprofenic acid and mefenamic acid were indicated as the safest NSAIDs drugs, while indomethacin was the worst one which was more likely to cause mild gastrointestinal discomfort.[19]

In a study done in Serbian medical students, most commonly used group of drugs were ibuprofen (53.03%), and diclofenac (10.61%).20 In an another study in Nepal, commonly used drugs for self-medication for dysmenorrhea was reported to be mefenamic acid 48%, followed by ibuprofen 20.3% and paracetamol 16.3%.[21]

Antispasmodics, such as dicyclomine and drotaverine, work synergistically with NSAIDs to alleviate menstrual cramps, lowering pain in primary dysmenorrhea. Hormonal treatment, in the form of oral contraceptive tablets, is reserved for individuals who do not respond well to NSAIDs.[22] Commonly employed non-pharmacological home therapies include applying heat, drinking warm liquids, taking vitamin B1 or magnesium supplements, following a low-fat diet, and using herbal remedies.[23]

METHODOLOGY

During the university visit, data was taken from female students of medical and non-medical faculty regarding dysmenorrhea (inclusion criteria mentioned). Mathematical and the numerical analysis of data collected were visualized into graphs, charts and tables. The study was cross-sectional quantitative study. The study population were undergraduate female students of Medical and Non-Medical faculty of Purbanchal University. Here, medical students were selected from the intake of 2019 to 2024 that represent the undergraduate students from 1st year to 4th year and non-medical students. In this study, respondents from the medical faculty and non-medical were selected by convenient sampling technique. Total sample size was 322. Data was collected by using semi-structured questionnaires that includes demographic characteristics, educational background, menstrual history details of NSAIDs and other medication used for management of dysmenorrhea. The data collected was entered and analyzed using IBM SPSS version 27.

Data collection was done in the following steps: A self-administered semi-structured questionnaire was used for data collection. It consists of includes demographic characteristics, educational background, menstrual history including age at menarche, severity and duration of dysmenorrhea, and associated symptoms and details of NSAIDs and other medication used to include pattern, efficacy and tolerability. Pilot study using the designed data collection form was conducted and necessary modifications in the form were made. After the

completion of the data collection, it was reviewed and checked for accuracy and completeness

Permission to conduct a study was approved by institutional review committee of Purbanchal University School of Health Sciences (PUSHS-IRC). Respective authorities and the participants were clearly explained the objectives of the study. Permission was taken from the authorities of respective faculties of university. Informed consent was taken from the participants before data collection. Confidentiality of the participants was maintained. No respondent was forced to answer any questions.

RESULTS:

The study surveyed a total of 210 respondents, with 143 from the Medical faculty and 67 from the Non-medical faculty. The prevalence of dysmenorrhea was found to be slightly higher among Non-medical faculty respondents at 89.6% (60 out of 67) compared to 88.1% (126 out of 143) among Medical faculty respondents. Overall, 186 respondents, or 88.6% of the total sample, reported experiencing dysmenorrhea, indicating a high prevalence across both groups. The average age of the respondents was 22.81 years, with a slight variation between the Medical faculty (22.78 ± 2.56) and Non-medical faculty (22.87 ± 1.89).

In terms of ethnicity, the majority of respondents were Brahmin/Chhetri, accounting for 55.9% of the total sample, with a higher representation in the Non-medical faculty (61.7%) compared to the Medical faculty (53.2%). Janajati respondents made up 25.3% of the total, with a higher proportion in the Medical faculty (28.6%) than in the Non-medical faculty (18.3%). Dalit and Madhesi respondents constituted 3.8% and 12.9% of the total sample, respectively. The vast majority of respondents were unmarried, with 91.4% being unmarried, and only 8.6% were married. Additionally, only 3 respondents from the Medical faculty reported being pregnant or having a child, with no such cases reported among the Non-medical faculty respondents.

In the study, the characteristics of the menstrual cycle among participants divided into two groups: medical and non-medical, with a total of 186 participants. For age of menarche, according to the study, more than half of the participants (55.9%) experienced menarche at the age of 13 or younger. A larger proportion of medical students (62.7%) had an earlier menarche compared to non-medical students (41.7%). 44.1% of the participants had menarche after 13 years of age, with a higher percentage among non-medical students (58.3%) compared to medical students (37.3%). The majority of participants (79.0%) reported having a regular menstrual cycle, with similar proportions in both the medical (79.4%) and non-medical (78.3%) groups and 21.0% of participants had an irregular menstrual cycle, with a slightly higher percentage in the non-medical group (21.7%) compared to the medical group (20.6%).

Only a small fraction of participants (1.6%) experienced bleeding for less than 2 days, with similar distributions between medical (1.6%) and non-medical (1.7%) students and 17.2% of participants had bleeding for 2-3 days, slightly more common among non-medical students (18.3%) compared to medical students (16.7%). The majority of participants (64.0%) reported bleeding for 4-5 days, with 65.1% of medical and 61.7% of non-medical students falling into this category. Followed by 17.2% of participants experienced bleeding for more than 5 days, equally distributed between medical (16.7%) and non-medical (18.3%) students.

A small percentage (2.7%) reported scanty menstrual flow, with no non-medical students experiencing this. The majority (83.9%) had moderate menstrual flow, more common in the medical group (88.1%) than in the non-medical group (75.0%). 13.4% of participants reported heavy menstrual flow, with a higher percentage in the non-medical group (25.0%) compared to the medical group (7.9%).

11.8% of participants had cycles shorter than 28 days, more common in non-medical students (15.0%) compared to medical students (10.3%). The majority (59.7%) had a menstrual cycle interval of 28-30 days, with similar proportions in both groups (medical: 59.5%, non-medical: 60.0%). 28.5% of participants had cycles longer than 30 days, with a higher percentage among medical students (30.2%) compared to non-medical students (25.0%).

23.1% of participants experienced discomfort throughout the menstruation period, with similar distributions between medical (23.0%) and non-medical (23.3%) students. The majority (69.9%) experienced discomfort mainly during the first 2 days, more common in medical students (73.0%) than non-medical students (63.3%). 7.0% reported discomfort throughout the entire menstrual cycle, with a higher percentage among non-medical students (13.3%) compared to medical students (4.0%).

A significant majority (89.2%) reported abdominal pain, with slightly more medical students (90.5%) affected compared to non-medical students (86.7%) followed by cramps (83.9%) and back pain (81.7%). Headache, Diarrhea, Myalgia, Loss of appetite and Irritability were other symptoms experienced.

52.2% of participants experienced abdominal pain on the same day as the onset of menstrual bleeding, slightly more common among non-medical students (55.0%) than medical students (50.8%) and 47.8% experienced abdominal pain before or after one day of the start of menstrual bleeding, slightly more common among medical students (49.2%) than non-medical students (45.0%).

Studying about the abdominal pain, 11.3% of participants experienced mild pain, with more medical students (14.3%) reporting mild pain compared to non-medical students (5.0%). 41.4% of participants experienced moderate pain, with similar rates between medical (42.9%) and non-medical (38.3%) students. 33.9% experienced severe pain, with a higher proportion among non-medical students (41.7%) compared to medical students (30.2%). 9.7% reported very severe pain, with more medical students (11.1%) experiencing it compared to non-medical students (6.7%). 3.8%

experienced the worst pain, with a higher percentage among non-medical students (8.3%) compared to medical students (1.6%).

In the methods used for dysmenorrhea management over-the-counter pain relievers is the most common method used utilized by 68.5% of participants, with slightly more non-medical students (74.1%) using this method compared to medical students (65.8%).

Only 6.1% of participants used prescription medications, with similar usage rates between medical (6.3%) and non-medical (5.6%) students. Heat therapy like hot water bottle, heating pad was used by 73.3% of participants, more commonly by non-medical students (79.6%) than medical students (70.3%). 21.8% of participants used exercise as a management method, with similar usage rates between medical (22.5%) and non-medical (20.4%) students. Relaxation techniques were used by 37.0% of participants, with nearly identical usage between medical (36.9%) and non-medical (37.0%) students. 19.4% of participants made dietary changes, with slightly more medical students (19.8%) doing so compared to non-medical students (18.5%).

Only 0.6% of participants used Vitamin B1 or magnesium supplements, with this method being exclusive to medical students (0.9%). 12.1% of participants used herbal treatments, with a higher prevalence among non-medical students (24.1%) compared to medical students (6.3%). A small percentage (1.2%) reported using other methods, with a nearly equal distribution between medical (0.9%) and non-medical (1.9%) students.

In the study, 60.8% of participants used NSAIDs, with a higher usage rate among non-medical students (66.7%) compared to medical students (57.9%). 29.2% of participants consulted a healthcare professional before using NSAIDs, with similar rates between medical (30.1%) and non-medical (27.5%) students. 70.8% of participants practiced self-medication with NSAIDs, slightly more common among non-medical students (72.5%) than medical students (69.9%).

The most preferred NSAID was mefenamic acid, used by 90.3% of participants, with a slightly higher preference among non-medical students (95.0%) compared to medical students (87.7%). Mefenamic acid + dicyclomine were used by 2.7% of participants, with a higher usage rate among non-medical students (5.0%) than medical students (1.4%).

38.1% of participants used paracetamol, with nearly equal usage between medical (38.4%) and non-medical (37.5%) students. 23.9% of participants used a combination of paracetamol and ibuprofen, more common among medical students (26.0%) compared to non-medical students (20.0%). 25.7% of participants used ibuprofen, with a higher preference among medical students (28.8%) compared to non-medical students (20.0%).

1.8% of participants used tranexamic acid, with nearly equal usage between medical (1.4%) and non-medical (2.5%) students. 8.0% of participants used diclofenac, more common among medical students (9.6%) than non-medical students (5.0%). 8.8% of participants used nimesulide, with a higher preference among non-medical students (17.5%) compared to medical students (4.1%). 2.7% of participants used other NSAIDs, exclusively among medical students.

8.8% of participants found NSAIDs to be very ineffective, with a higher dissatisfaction rate among non-medical students (12.5%) compared to medical students (6.8%). 1.8% of participants found NSAIDs ineffective, with this being reported only by medical students (2.7%). 11.5% of participants had a neutral response to NSAIDs, with similar rates between medical (12.3%) and non-medical (10.0%) students. 61.9% of participants found NSAIDs effective, more common among medical students (64.4%) compared to non-medical students (57.5%). 15.9% of participants found NSAIDs very effective, with a higher satisfaction rate among non-medical students (20.0%) compared to medical students (13.7%).

The study examined the side effects of NSAIDs among 85 respondents, with 56 from the Medical faculty and 29 from the Non-medical faculty. The most commonly reported side effects were lethargy (43.5%) and decreased blood flow (34.1%). Lethargy was more frequently reported by Medical faculty respondents (46.4%) compared to Non-medical faculty respondents (37.9%). Loss of appetite was also a notable side effect, experienced by 29.4% of respondents, with a higher incidence in the Non-medical group (37.9%) than in the Medical group (25.0%). Nausea and vomiting were reported by 24.7% of respondents, and decreased blood flow was noted by 34.1%, with similar rates between the two groups. Less commonly reported side effects included inability to concentrate (17.6%), shortened days of menstruation (15.3%), and loss of consciousness (3.5%). Overall, 76.71% of the Medical faculty and 72.5% of the Non-medical faculty reported experiencing side effects from NSAIDs.

CONCLUSION

This study reveals that dysmenorrhea is a common issue among both medical and non-medical students, with NSAIDs being the most commonly used management method. Medical students are more likely to use NSAIDs and reports more side effects, likely due to their greater medical knowledge. However, the high prevalence of self-medication in both groups raises concerns about the safe use of these drugs. Non-medical students, in particular, appear to be at higher risk for adverse effects due to a lack of information. The data also highlights the need for more education and awareness regarding menstrual health and safe, effective management practices.

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