How Can Dietary Habits Effects on Dysmenorrhea among Health Track Students – A Cross Sectional Study

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Authors’ contributions

This work was carried out in collaboration among all authors. Author WAA contributed in writing the first draft of manuscript. Author FHA contributed in data collection and preparation. Author TSP contributed in data analysis. Author AMG contributed in reviewing the manuscript. All authors read and approved the final manuscript.

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ABSTRACT

Objective: This study aimed to evaluate whether dietary habits can affect the dysmenorrhea and irregular menstruation.

Design: A cross sectional study.

Setting: A total of 655 female students from Imam Abdulrahman Bin Faisal University (IAU). A non-quantitative food frequency questionnaire was used to assess their food habits.

Participants: Female students in health track in IAU with no health problem, pregnant or even lactating and age from 17 – 26 years were included.

Results: The severity of dysmenorrhea was significantly associated with the less intake of seafood (P= 0.007) and low consumption of nuts (P= 0.02). High sweet consumption contributed with pain increased significantly during the menstrual days (P= 0.002), as well as elevates the severity of dysmenorrhea (P= 0.04). Drinking less coffee contributes significantly to the undesired effect of dysmenorrhea (P= 0.04). While there were no significant association between dairy products intake

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1. INTRODUCTION

Dysmenorrhea is a normal soreness through a period time. According to [1], the prevalence of dysmenorrhea is unknown, but the estimated prevalence range between 20-92% of the wild variety deepens on ethnic, sociocultural, or biological factors. Grievous period pain or menstrual issues are the alternative names of dysmenorrhea [2]. Dysmenorrhea begins at the initial three days of period and showing up as certain indications, for example, cramping in lower mid-region or even in pelvis, queasiness, retching, back soreness, legs soreness, looseness of the bowels and gastrointestinal tract gripes. However, these symptoms vary from woman to other women related to multifactor. Moreover, Food intake and women's lifestyles participate in dysmenorrhea and irregular feminine cycles for women in her different age groups, especially students. The researchers revealed that, the number of students who were feel of severe period pain are more than the number of students who were feel moderate to low period pain significantly. Cola drinking, eating too much meat observed to be a risk factor for dysmenorrhea [3]. Furthermore, a study done in Saudi females at a university found that more than two-thirds of the students were suffering from dysmenorrhea and severe pain causing them to consume a pain killer medication or herb drink, this problem may affect the daily activity, academic achievement and quality of life [4]. Encouraging to having breakfast routinely as opposed to skip it and intake of fast food, soda, processed meat for college students lead to forestall dysmenorrhea and irregular menstruation (menstrual disorders) [5]. A case control study examined the relationship between omega-3 supplementation and reducing dysmenorrhea. The results showed significant differences between two groups that saw omega-3 suplementsations have special characteristics that can reduce the pain of period [6]. This study aimed to determine whether dietary habits can affect the dysmenorrhea and irregular menstruation for university students.

2. METHODS

2.1 Study Design

A cross-sectional study was conducted to evaluate the dietary food intake of students in Imam Abdulrahman Bin Faisal University in Saudi Arabia and to identify whether the dietary habits affect dysmenorrhea and irregular menstruation. A complete and valid simple questionnaire was designed to identify some informative data regarding the menstrual cycle and dietary habits. Moreover, a non-quantitative food frequency questionnaire was conducted with ten groups of food items (Table 1) to measure the frequency of food intake either high or low.

2.2 Study Area

According to Imam Abdulrahman Bin Faisal University statistics in 2019-2020, the total number of students studied in Health Track College and preparatory section is 2813 students. There were 465 students in preparatory year, 732 in medicine college, 666 in college of applied medical science, 268 in dentistry college, 189 in pharmacy college, 170 in public health college, and 323 in nursing college. There is no statistical data available regarding dysmenorrhea among female students and according to that, the authors supposed that the prevalence is 50%. The sample size was calculated by the equation: \( Z^2 * p*(1-p)/ (c^2) \). Where: \( Z \) = Z value (e.g. 1.96 for 95% confidence level) \( P \) = expected prevalence (50%) \( C \) = confidence interval, expressed as decimal, e.g. (0.05 = ± 5) [7]. The sample size will be 384 subjects plus 10% to overcome incomplete data or withdrawal subjects during the study.

2.3 Study Population

Saudi female students aged 17-26 years were recruited using convenience sampling from Rakkah campus (health track colleges and preparatory section) at Imam Abdulrahman Bin Faisal University. The inclusion criteria were healthy Saudi female students (17-26 years) enrolled into health track colleges. The exclusion
criteria were pregnancy or students having a chronic disease that affecting dysmenorrhea and irregular menstruation. Questionnaires were sent to 2813 students and responses were received from 655 students from 1 March, 2020 to 21 May 21, 2020. All students were asked for their acceptance to participate in this study.

2.4 Statistical Analysis

The collected data was analyzed using IBM SPSS Statistics 26. Data is presented as frequency tables. The association analysis was done by using Chi-square analysis. P value < .05 is considered as statistically significant.

3. RESULTS

3.1 Demographic, Dietary Habits and Other Menstrual Cycle Data Analysis

A total of 655 female students responded to the following questions related to demographic data, dietary habits and menstrual cycle information as shown in Table 2. These questions were asked about their age group, marital status, weight and height to find out the body mass index classification. Moreover, they were asked about their menstrual cycle issues and the habit of skipping meals.

3.2 Dietary Intake Patterns in Relation to Dysmenorrhea

The findings showed that students who consumed high carbohydrates (58.4%) suffer from dysmenorrhea than students who consumed fewer carbohydrates (45.8%) (Table 3). However, students who consumed high amounts of meat and poultry (43.3%) are less susceptible to irregular menstruation than students who consumed less amount of meat and poultry (47.5%) which they had no irregular menstruation (Table 4). Dairy/milk products consumption had no significant effect of dysmenorrhea (Table 3) as well as in irregular menstruation (Table 4) and severity of pain (Table 5). Also, the study indicates that consumption of vegetables was no association with dysmenorrhea (Table 3), irregular menstruation (Table 4) and severity of pain (Table 5). On the other hand, results showed that students who have less intake of seafood in their diet were manifested to have severe dysmenorrhea significantly (P = 0.007) as shown in Table 3. Furthermore, high sweet consumption leads to increased pain during the menstrual days significantly (P= 0.002) as shown in Table 5. As well as, high consumption of sweets in students elevates the severity of dysmenorrhea significantly (P = 0.04) as present in Table 3. Fast food intake seems to have no significant differences for students in dysmenorrhea (Table 3), irregular menstruation (Table 4) and pain severity (Table 5). Drinking of tea showed no significant difference in pain severity, dysmenorrhea and irregular menstruation. Drinking less coffee contributed significantly towards reducing undesired effects of dysmenorrhea in female students (Table 3). Moreover, lower consumption of nuts was associated significantly with a likelihood of dysmenorrhea among students (Table 5). In addition, fewer intakes of nuts increase the severity of dysmenorrhea significantly around female students (Table 3).

| No. | Food groups | Food items |
|-----|-------------|------------|
| 1   | Carbohydrates | Rice, bread, pasta, cereals and potato. |
| 2   | Meat and Poultry | Red meats, ground meats, meat organs, chicken and chicken organs. |
| 3   | Sea Foods | Fish, canned fish, shrimp and crab. |
| 4   | Dairy Products | Milk, yoghurt, ice cream and cream cheese. |
| 5   | Vegetables | Yellow vegetables, green leafy vegetables, starchy vegetables, tomatoes and other vegetables. |
| 6   | Sweets | Sugar, honey, sweetened juice, chocolates, jelly, jam and candy. |
| 7   | Fast Foods | Burger, French fries, hotdog, pizza and nuggets. |
| 8   | Tea | Green tea, red tea and white tea. |
| 9   | Coffee | Black coffee, coffee latte and Arabic coffee. |
| 10  | Nuts | Salted nuts, unsalted nuts. |
| Characteristics                     | Statement       | No.   | Percentage |
|-------------------------------------|----------------|-------|------------|
| **Age group**                       |                |       |            |
| 17-20 years                         | 322            | 49.2% |            |
| 21-26 years                         | 333            | 50.8% |            |
| **Marital Status**                  |                |       |            |
| married                             | 91             | 13.9% |            |
| single                              | 564            | 86.1% |            |
| **Body Mass Index classification**  |                |       |            |
| Underweight                         | 89             | 13.6% |            |
| Normal                              | 399            | 60.9% |            |
| Overweight                          | 121            | 18.5% |            |
| Obese                               | 46             | 7.0%  |            |
| **Irregular menstruation**          |                |       |            |
| Yes                                 | 140            | 21.3% |            |
| No                                  | 286            | 43.7% |            |
| Sometimes                           | 229            | 35.0% |            |
| **Pain during menstruation**        |                |       |            |
| Yes                                 | 375            | 57.3% |            |
| No                                  | 30             | 4.6%  |            |
| Sometimes                           | 250            | 38.1% |            |
| **Severity of pain**                |                |       |            |
| Severe                              | 247            | 37.7% |            |
| Average                             | 322            | 49.2% |            |
| Light                               | 68             | 10.4% |            |
| I don't feel of pain                | 18             | 2.7%  |            |
| **Eating your breakfast daily**     |                |       |            |
| Yes                                 | 201            | 30.7% |            |
| No                                  | 207            | 31.6% |            |
| Sometimes                           | 247            | 37.7% |            |
| **Eating your lunch daily**         |                |       |            |
| Yes                                 | 387            | 59.1% |            |
| No                                  | 94             | 14.4% |            |
| Sometimes                           | 174            | 26.6% |            |
| **Eating your dinner daily**        |                |       |            |
| Yes                                 | 262            | 40.0% |            |
| No                                  | 121            | 18.5% |            |
| Sometimes                           | 272            | 41.5% |            |

### Table 3. Association between the Dietary intake and Dysmenorrhea

| Food items/intake         | Dysmenorrhea | X², DF, N | P value |
|---------------------------|--------------|-----------|---------|
|                           | Yes          | Sometimes | No      |         |
|                           | n(%)         | n(%)      | n(%)    |         |
| **Coffee**                | Less intake  | 245(55.1) | 174(39.1) | 26(5.8) | 6.32, 2, 655 | .043 |
|                           | More intake  | 130(61.9) | 76(36.2)  | 4(1.9)  |           |     |
| **Nuts**                  | Less intake  | 294(60.5) | 171(35.2) | 21(4.3) | 8.13, 2, 655 | .017 |
|                           | More intake  | 81(47.9)  | 79(46.7)  | 9(5.3)  |           |     |
| **Sweets**                | Less intake  | 82(49.7)  | 68(41.2)  | 15(9.1) | 12.53, 2, 655 | .002 |
|                           | More intake  | 293(59.8) | 182(37.1) | 15(3)   |           |     |
| **Carbohydrate**          | Less intake  | 27(45.8)  | 30(50.8)  | 2(3.4)  | 5.34, 2, 655 | .069 |
|                           | More intake  | 348(58.4) | 220(36.9) | 28(4.7) |           |     |
| **Meat and poultry**      | Less intake  | 27(45.8)  | 30(50.8)  | 2(3.4)  | 4.43, 2, 655 | .109 |
|                           | More intake  | 348(58.4) | 220(36.9) | 28(4.7) |           |     |
| **Seafood**               | Less intake  | 301(58)   | 201(38.7) | 17(3.3) | 9.74, 2, 655 | .008 |
|                           | More intake  | 74(54.4)  | 49(36)    | 13(9.6) |           |     |
| **Dairy product**         | Less intake  | 39(57.4)  | 23(33.8)  | 6(8.8)  | 3.36, 2, 655 | .187 |
|                           | More intake  | 336(57.2) | 227(38.7) | 24(4.1) |           |     |
| **Vegetable**             | Less intake  | 82(56.6)  | 55(37.9)  | 8(5.5)  | .38, 2, 655 | .829 |
|                           | More intake  | 293(57.5) | 195(38.2) | 22(4.3) |           |     |
| **Fast food**             | Less intake  | 167(56.8) | 108(36.7) | 19(6.5) | 4.43, 2, 655 | .109 |
|                           | More intake  | 200(57.6) | 142(39.3) | 11(3)   |           |     |
| **Tea**                   | Less intake  | 209(55.7) | 151(40.3) | 15(4)   | 2.01, 2    | .366 |
|                           | More intake  | 166(59.3) | 99(35.4)  | 15(5.4) |           |     |

*P value is significant if <.05*
Table 4. Association between the dietary intake and irregular menstruation

| Food items/intake | Irregular menstruation | X², DF, N | P value |
|-------------------|------------------------|-----------|---------|
|                   | Yes n(%)               | Sometimes n(%) | No n(%) |               |           |         |
| Coffee            | Less intake 91(20.4)   | 153(34.4) | 201(45.2) | 1.41, 2, 655 | .495     |
|                   | More intake 49(23.3)   | 76(36.2)  | 85(40.5)   |               |           |         |
| Nuts              | Less intake 107(22)    | 175(36)   | 204(42)    | 2.18, 2, 655  | .336     |
|                   | More intake 33(19.5)   | 54(32)    | 82(48.5)   |               |           |         |
| Sweets            | Less intake 34(20.6)   | 59(35.8)  | 72(43.6)   | .10, 2, 655   | .951     |
|                   | More intake 106(21.6)  | 170(34.7) | 214(43.7)  |               |           |         |
| Carbohydrate      | Less intake 8(29.6)    | 8(29.6)   | 11(40.7)   | 1.18, 2, 655  | .554     |
|                   | More intake 132(21)    | 221(35.2) | 275(43.8)  |               |           |         |
| Meat and poultry  | Less intake 15(25.4)   | 16(27.1)  | 28(47.5)   | 1.85, 2, 655  | .396     |
|                   | More intake 125(21)    | 213(35.7) | 258(43.3)  |               |           |         |
| Seafood           | Less intake 110(21.2)  | 178(34.3) | 231(44.5)  | .76, 2, 683   | .683     |
|                   | More intake 30(22.1)   | 51(37.5)  | 55(40.4)   |               |           |         |
| Dairy product     | Less intake 13(19.1)   | 21(30.9)  | 34(50)     | 1.24, 2, 655  | .538     |
|                   | More intake 127(21.6)  | 208(35.4) | 252(42.9)  |               |           |         |
| Vegetable         | Less intake 29(20)     | 48(33.1)  | 68(46.9)   | .79, 2, 672   | .672     |
|                   | More intake 111(21.8)  | 181(35.5) | 218(42.7)  |               |           |         |
| Fast food         | Less intake 71(24.1)   | 104(35.4) | 119(40.5)  | 3.19, 2, 203  | .203     |
|                   | More intake 69(19.1)   | 125(34.6) | 167(46.3)  |               |           |         |
| Tea               | Less intake 84(22.4)   | 127(33.9) | 164(43.7)  | .73, 2, 693   | .693     |
|                   | More intake 56(20)     | 102(36.4) | 122(43.6)  |               |           |         |

*P value is significant if < 0.05*

Table 5. Association between the dietary intake and severity of pain

| Food items/intake | Severe n(%) | Average n(%) | Light n(%) | No pain n(%) | X², DF, N | P value |
|-------------------|-------------|--------------|------------|--------------|-----------|---------|
| Sea food          | Less intake 208(40.1) | 245(47.2) | 56(10.8)  | 10(1.9)     | 13.57, 3, 655 | .007 |
|                   | More intake 39(28.7)  | 77(56.6)   | 12(8.8)   | 8(5.9)      |           |         |
| Sweets            | Less intake 50(30.3)  | 85(51.5)   | 23(13.9)  | 7(4.2)      | 7.94, 3, 655 | .047 |
|                   | More intake 197(40.2) | 137(48.4) | 45(9.2)   | 11(2.2)     |           |         |
| Nuts              | Less intake 194(39.9) | 238(49.0) | 45(8.4)   | 13(2.7)     | 9.35, 3, 655 | .025 |
|                   | More intake 53(31.4)  | 84(49.7)   | 27(16.0)  | 5(3.0)      |           |         |
| Carbohydrate      | Less intake 9(33.3)   | 13(48.1)   | 5(18.5)   | 0(0)        | 2.72, 3, 655 | .437 |
|                   | More intake 238(37.9) | 309(49.2) | 63(10)    | 18(2.9)     |           |         |
| Meat and poultry  | Less intake 21(35.6)  | 26(44.1)   | 10(16.9)  | 2(3.4)      | 3.21, 3, 655 | .360 |
|                   | More intake 226(37.9) | 296(49.2) | 68(10.4)  | 16(2.7)     |           |         |
| Dairy product     | Less intake 31(45.6)  | 26(38.2)   | 9(13.2)   | 2(2.9)      | 3.69, 3, 655 | .296 |
|                   | More intake 216(36.8) | 296(50.4) | 59(10.1)  | 16(2.7)     |           |         |
| Vegetable         | Less intake 55(37.9)  | 64(44.1)   | 21(14.5)  | 5(3.4)      | 4.31, 3, 655 | .230 |
|                   | More intake 192(37.6) | 258(50.6) | 47(9.2)   | 13(2.5)     |           |         |
| Fast Food         | Less intake 100(34)   | 150(51)    | 33(11.2)  | 11(3.7)     | 4.56, 3, 655 | .025 |
|                   | More intake 147(40.7) | 172(47.6) | 35(9.7)   | 7(1.9)      |           |         |
| Tea               | Less intake 144(38.4) | 183(48.8) | 38(10.1)  | 10(2.7)     | 21, 3, 655 | .976 |
|                   | More intake 103(36.8) | 139(49.6) | 30(10.7)  | 8(2.9)      |           |         |
| Coffee            | Less intake 178(40)   | 206(46.3)  | 46(10.3)  | 15(3.4)     | 6.21, 3, 655 | .102 |
|                   | More intake 69(32.9)  | 116(55.2)  | 22(10.5)  | 3(1.4)      |           |         |

*P value is significant if < 0.05*
4. DISCUSSION

The present study showed that most of the individuals were in normal body mass index (BMI) (Table 2). However, a cross sectional study had total sample size 4709 females shows that most of their population was in normal weight to height [8]. In a cross-sectional study among 407 students (high school), over (66%) of total population were in the normal category of BMI [9]. Almost (57.3%) of the participants had dysmenorrhea during menstruation and this percentage shaped the most responses in this study (Table 2). According to [1] in cross sectional study handled 408 young women, about (84.1%) of respondents suffered from dysmenorrhea significantly. As reported by [10], the majority of participants had dysmenorrhea and they were representing (81.74%) of the whole population. In the present analysis, students were nearby skipping their breakfast daily that may affect their health in future (Table 2). As well as, an observational study was conducted with 315 young females, the authors measuring the effect of skipping breakfast in young women, reported that skipping breakfast definitely affects their quality of life and academic affairs [5]. According to our results as shown in Table 5 consumption of seafood among the students can take a significant role in dysmenorrhea by reducing its severity. This result is in line with [6]. It is an intervention study which was performed among 24 adolescents by taking omega 3 supplementation daily in a period of two months. After the duration of intervention, the authors found significant reduction of pain and symptoms during the menstruation. However, the authors can link between these two studies because of the high content of omega 3 in seafood. On the other hand, [1] found there were no significant differences between eating fish and dysmenorrhea. This study suggested drinking a moderate amount of coffee (caffeine) to reduce dysmenorrhea in female students (Table 3). And the opposite of that represented by [9] which found there was no correlation or differences between caffeine and dysmenorrhea in females. In addition [10] reported that there was a significant correlation between drinking caffeine and limiting dysmenorrhea. Authors found high intake of sweet association with raising the severity of dysmenorrhea. Moreover [1] noticed no differences between excess sugar intake and dysmenorrhea. In facts, the strengths of this study represented in high collaboration, rapid response and honest replay of students that appear to the authors. The age category and characteristics of students were matched with the purpose of study. This is a cross sectional study that found the relationship between dietary patterns and dysmenorrhea for female students. Moreover, the sample size is efficient to analyze and take in consideration. On the other hand, the study has limitations as well. A self-reported questionnaire may lead to data losing. There are not many founding that can support the research in this area, hence further research is still needed to extrapolate towards other age groups.

5. CONCLUSION

Dietary patterns can influence health and well-being, as well as increase the consequences of morbidity in some individuals. Therefore, dysmenorrhea and its consequences are temporarily affected by the female nutritional patterns. The study concluded that regular consumption of seafood, coffee and nuts can alleviate dysmenorrhea. On the other hand, consuming too many sweets has negative outcome related to the severity and risk of dysmenorrhea. Despite highlighted and significant results obtained, more studies are needed among different female groups.

CONSENT

As per international standard or university standard written participants consent has been collected and preserved by the authors.

ETHICAL APPROVAL

The application was reviewed and approved at Imam Abdulrahman Bin Faisal University institutional Review Board (IRB, 2020-03-071) through an Expedited Review on Sunday, March 1, 2020. The participants were asked about their acceptance in participation.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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