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

Welayah A. Alammar[1], Fatima H. Albeesh[1], Tunny S. Purayidathil[1] and Arafat M. Goja[1*]

[1]Department of Clinical Nutrition, College of Applied Medical Sciences, Imam Abdulrahman Bin Faisal University, P. O. Box 1982, Dammam, Saudi Arabia.

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

**Corresponding author: Email: amdangol@iau.edu.sa;*

and vegetables consumption with the severity of dysmenorrhea as well as irregular menstruation.
Conclusion: Regular consumption of seafood and nuts can alleviate the severity of dysmenorrhea. Eating too many sweets increased the severity of dysmenorrhea among 17 to 26 year old female.

Keywords: Dietary habits; dysmenorrhea; female students; health track; menstrual cramps.

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 supplementations 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).

Table 1. Food groups and items

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.

Table 2. Distribution of study participant's characteristics (N=655)

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%
	Sometime	174	26.6%
Eating your dinner daily	Yes	262	40.0%
	No	121	18.5%
	Sometime	272	41.5%

Table 3. Association between the Dietary intake and Dysmenorrhea

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

P value is significant if < 0.05

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

Food items/intake		Severity of pain				X^2, DF, N	P value
		Severe n(%)	Average n(%)	Light n(%)	No pain n(%)		
Sea food	Less intake	208(40.1)	245(47.2)	56(10.8)	10(1.9)	13.57,	.007
	More intake	39(28.7)	77(56.6)	12(8.8)	8(5.9)	3, 655	
Sweets	Less intake	50(30.3)	85(51.5)	23(13.9)	7(4.2)	7.94, 3,	.047
	More intake	197(40.2)	137(48.4)	45(9.2)	11(2.2)	655	
Nuts	Less intake	194(39.9)	238(49.0)	4(8.4)	13(2.7)	9.35, 3,	.025
	More intake	53(31.4)	84(49.7)	27(16.0)	5(3.0)	655	
Carbohydrate	Less intake	9(33.3)	13(48.1)	5(18.5)	0(0)	2.72 3,	.437
	More intake	238(37.9)	309(49.2)	63(10)	18(2.9)	655	
Meat and	Less intake	21(35.6)	26(44.1)	10(16.9)	2(3.4)	3.21, 3,	.360
poultry	More intake	226(37.9)	296(49.2)	68(10.4)	16(2.7)	655	
Dairy product	Less intake	31(45.6)	26(38.2)	9(13.2)	2(2.9)	3.69, 3,	.296
	More intake	216(36.8)	296(50.4)	59(10.1)	16(2.7)	655	
Vegetable	Less intake	55(37.9)	64(44.1)	21(14.5)	5(3.4)	4.31, 3,	.230
	More intake	192(37.6)	258(50.6)	47(9.2)	13(2.5)	655	
Fast Food	Less intake	100(34)	150(51)	33(11.2)	11(3.7)	4.56, 3,	.205
	More intake	147(40.7)	172(47.6)	35(9.7)	7(1.9)	655	
Tea	Less intake	144(38.4)	183(48.8)	38(10.1)	10(2.7)	.21, 3,	.976
	More intake	103(36.8)	139(49.6)	30(10.7)	8(2.9)	655	
Coffee	Less intake	178(40)	206(46.3)	46(10.3)	15(3.4)	6.21, 3,	.102
	Moe intake	69(32.9)	116(55.2)	22(10.5)	3(1.4)	655	

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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