

Original Research Article

Effect of diet, exercise and other contributing factors on menstruation

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ABSTRACT

Background: The poor knowledge and understanding of menstruation may lead to unsafe hygienic practice that in turn increases the risk of reproductive and genito-urinary tract infections and leads to overall poor quality of life. The food we consume have a complementary relationship with the pattern of menstrual cycle and so is the involvement of exercises. The study focused on understanding the relationship between effect of diet, exercise and other contributing factors on menstruation.

Methods: The study was a prospective observational study done with a sample size of 650 subjects of 9 to 18 age group in whom menstruation already occurred who were recruited from five different schools in regions of Pathanamthitta and Alappuzha.

Results: It was found that lack of exercise before and during menstruation has caused increased cramps and mood instability in girls. As well as skipping of breakfast and consumption of junk food was found to elevate pain, eventually affecting daily activities.

Conclusions: The importance of counselling to all girls from the age of 9 was found to be necessary through the study and thereby adequate changes for a healthy future. Lack of exercise, unhealthy food habits and delayed identification of menstrual problems can have a negative impact on health.

Keywords: Menstruation, Physical activity, Regular breakfast, Menstrual pain, Irregularities, Diet

INTRODUCTION

Menstruation

Menstruation is the monthly shedding of the lining of a woman's uterus. The menstrual blood comprises of blood and tissue which flows from the inside of the uterus and exits through the vagina.¹ Women and adolescent girls experience menstruation every month. Ability to manage menstruation hygienically is fundamental to the dignity and well-being of women and constitutes an integral component of basic hygiene, sanitation, and reproductive health services.²

Effect of diet

Some foods to be added during menstruation to manage the symptoms are following: Omega 3 fatty acid such as fish. Include diet high in vegetables i.e. five serves daily, fruits (two serves daily), nuts, seeds, fish, low fat dairy food, proteins such as legumes and eggs and also wholegrain such as rice. Lean meat such as red meat or chicken can be included as it is high in iron and protein.

Intake of calcium rich food should be increased such as nuts, low fat dairy product etc. Drink more water to maintain hydration.⁴ Foods to be avoided/ reduced:

reduce caffeine intake as in coffee, increased intake of caffeine can cause irritability, poor sleep and menstrual cramps. Avoid salt intake to reduce fluid retention, abdominal bloating, breast swelling and pain. Avoid saturated fats such as butter, cream and potato chips.⁴

Effect of exercise on menstruation

Yoga is a great form of exercise which can be performed during menstruation to relieve cramps whereas heavy intensity exercises should be avoided.³

Mechanism of exercise during menstruation

According to the Anxiety and Depression Association of America, regular participation in aerobic exercise may reduce overall levels of tension, elevate and stabilize mood, improve sleep and improve self-esteem. Even five minutes of aerobic exercise can have this effect. That's because physical activity releases endorphins, or "happy hormones," that detract from menstrual pain.⁵

Types of exercises

Cobra, cat, cow and fish yoga postures are a few good exercises to reduce heavy cramps.³

Objectives

The objective of the study was to analyse relationship between diet, exercise and other contributing factor on menstruation.

METHODS

A prospective observational study was carried out for 6 months (November 2019 to April 2020) in 5 different schools of Pathanamthitta and Alappuzha districts, students were recruited on the basis of inclusion and exclusion criteria. All subjects were provided with a brief introduction regarding the study and the confidentiality of data was explained to the subjects. A pre-counselling section was carried out in each school using a previously designed questionnaire. Based on the result obtained, after a month, changes in the menstrual practices were assessed through post-counselling questionnaire. Data collected was entered as well as analysed in Microsoft Excel 2010, statistical analysis was done, and results were obtained.

All their queries regarding menstruation and related topics were answered satisfactorily. The sample size of 650 adolescent girls was selected. Sample size was calculated based on the formula:

RESULTS

In current study, only about 35% of subjects were interested in doing regular physical activities. Similar results were found in the study conducted by Negi et al in which 79% of subjects were not involved in regular

physical activity.⁶⁻¹⁰ Negligence of physical activity can have negative impact in the future.

Table 1: Type of exercise practised during menstruation.

Response	N
Simple yoga	100
Breathing exercise	54
Stretching exercise	47
Cycling	109
Skipping	2
No exercise	175
Badminton	35
Simple yoga, breathing exercise	47
Simple yoga, breathing exercise, stretching exercise	9
Simple yoga, breathing exercise, cycling	3
Simple yoga, stretching exercise	2
Simple yoga, cycling	14
Breathing exercise, stretching, exercise	19
Breathing exercise, cycling	16
Stretching exercise, cycling	12
Others	4
Total	650

As far as exercise is concerned, many studies in India have revealed that many adolescent girls believe that doing physical activity during menstruation aggravate dysmenorrhea but it is not so. Exercises helps in releasing endorphins, helping to maintain an emotional balance.

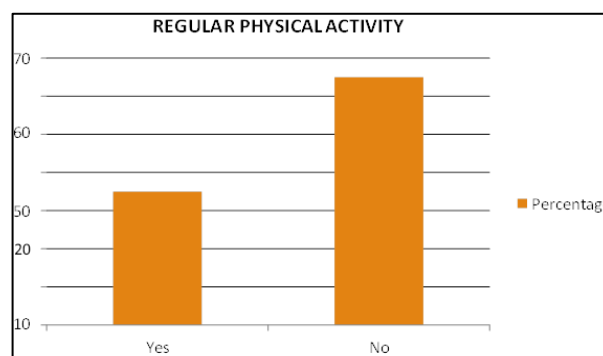


Figure 1: Regular physical activity.

The above were the type of exercises practiced by subjects during menstruation. Several studies mentioned the correlation between physical activities and menstrual disorders like dysmenorrhea. In the above graph it is evident that exercise has an impact in resolving pain during menstruation.

Monthly and weekly intake of fast foods along with lack of exercises might be a reason for irregular menstruation for 53% of the study population who mentioned about

heavy bleeding, clots in their blood and changes in their menstrual flow.

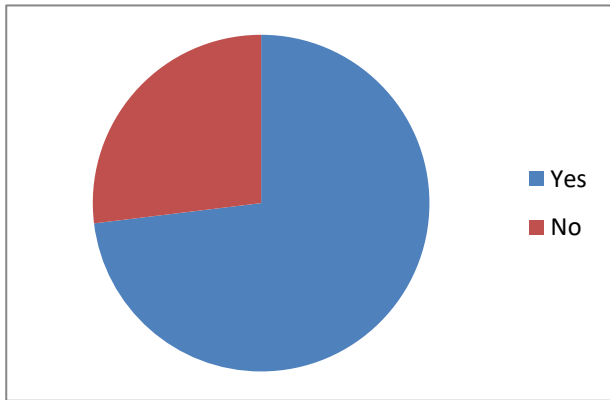


Figure 2: Exercise during menstruation by study population.

In the present study, out of 650 of the study population, a majority of about 67% of study population reduced intake of junk food after identifying the ill effects of junk food on menstruation followed by about 33% of study population even after attaining proper awareness were not willing to reduce intake of junk food.

A study conducted by Priya et al has revealed a strong relationship between regular intake of breakfast and regular occurrence of menstruation and it was found that nearly 15% of adolescent girls skipped breakfast and were found to have menstrual irregularities along with premenstrual symptoms.⁸

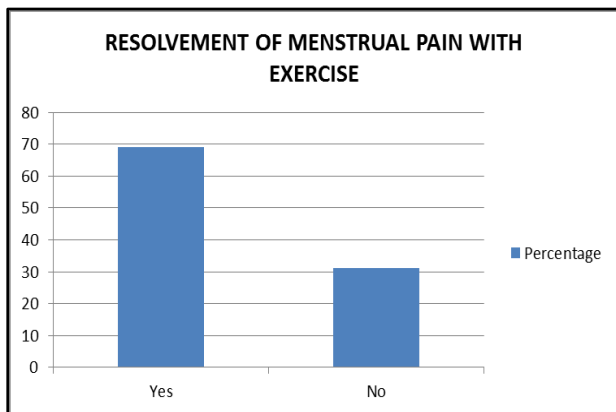


Figure 3: Whether menstrual pain can be resolved by exercise.

As many subjects preferred to stay indoors, a lack of proper exercise and skipping of breakfast has contributed to menstrual irregularities (53%) and pre-menstrual symptoms. At the same time staying outdoors during menstruation, engaging in outdoor activities and breathing in fresh air has found to elevate the mood, decrease the symptoms and improve the release of endorphins.

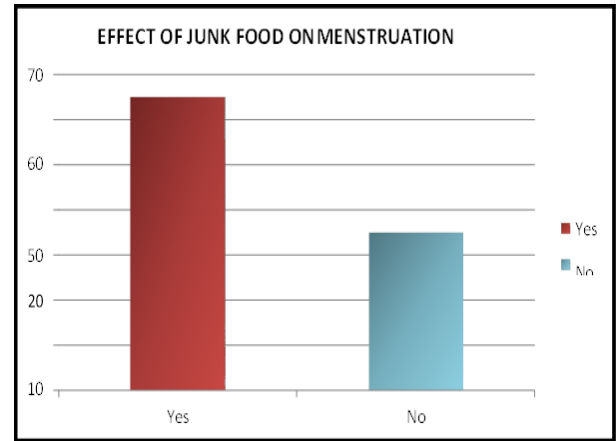


Figure 4: Effect of junk food on menstruation.

Out of 650 subjects, about 53% found that they had small irregularities followed by about 47% who found that they had a normal menstrual pattern. A study was conducted by Deshpande et al where 82% of subjects found that they had no irregularities and 18% of subjects had irregularities.⁶

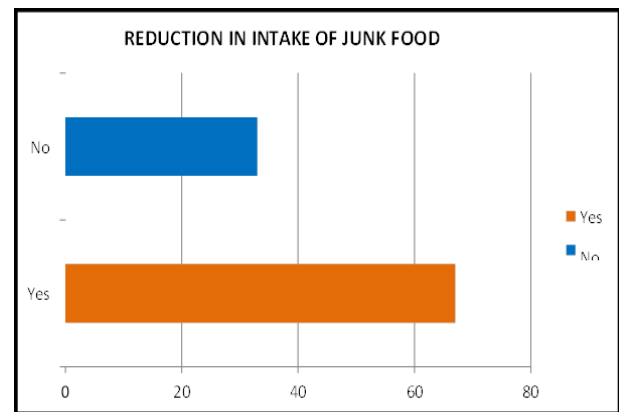


Figure 5: Reduction in intake of junk food after counselling.

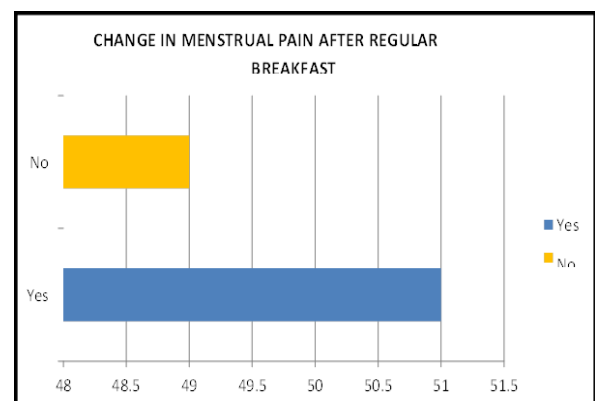


Figure 6: Assessing change in menstrual pain after a regular breakfast.

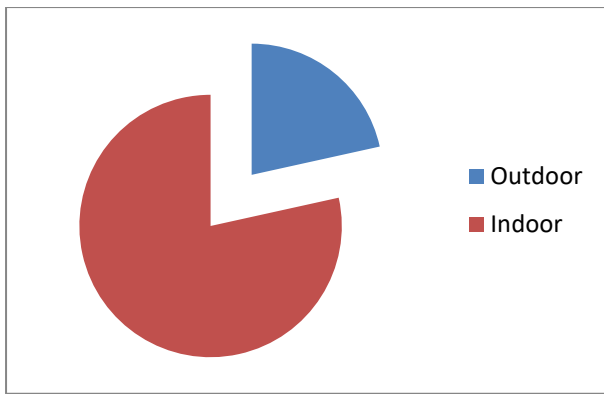


Figure 7: Spare time spent by subjects.

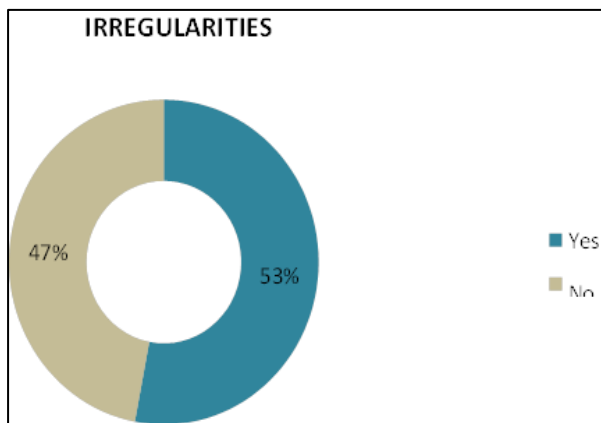


Figure 8: Whether subjects are able to identify menstrual irregularity after counselling.

Menstrual irregularities are closely associated with occurrence of polycystic ovary syndrome (PCOS) in the later stage. According to Mayo Clinic, an online platform it was found that to an extent PCOS can be identified in early stages with signs such as irregular menstrual flow, presence of excess hair growth and increased body weight.¹¹⁻²¹

The dire need for requirement of counselling about menstrual hygiene at school is highly evident from this study because even though subjects were aware about menstruation, the information were sparse, some didn't have proper awareness whereas some already.

DISCUSSION

Age distribution

Out of 650 subjects enrolled in the study, the majority of subjects (44%) were under the age group of 15-16 years because most girls have begun menstruation at this age. Similar results were found in the study conducted by Nagar et al in which age of subjects were 14-15 years (20%), 16-17 years (41%), 12-13 years (4%) and above 17 years (35%).²²

Age of menarche

The study conducted over 650 subjects of which about 58% of subjects attained menarche in the age group of 12-13, while 28% of subjects attained menarche in the age group of 10-11, and 11% of subjects attained menarche in the age group of 14-15 whereas 2% of subjects who attained menarche were above the age of 16 and only 1% of subjects who attained menarche were below age of 9 which is similar to the study conducted by Hemapriya et al where 53.8% of subjects attained menarche in the age group of 12 to 14.¹⁴

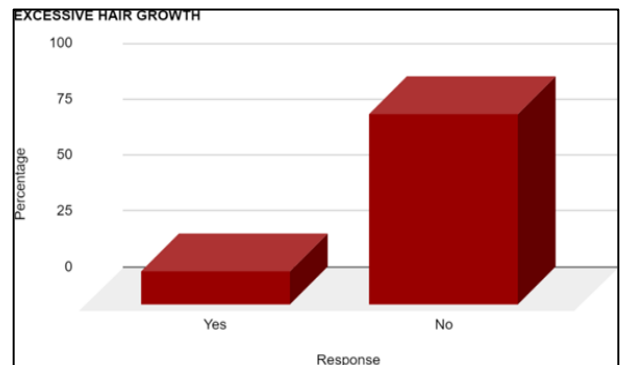


Figure 9: Study population having excessive hair growth over the body.

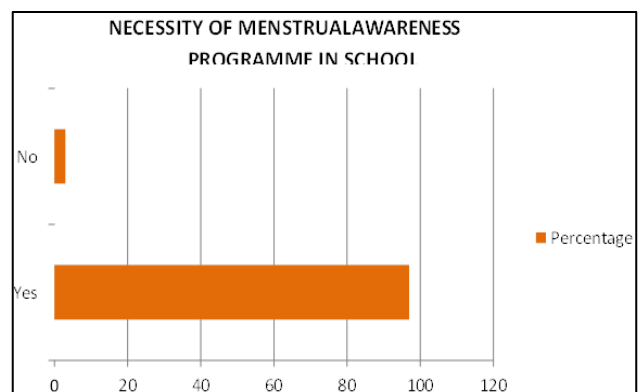


Figure 10: Requirement of counselling about menstrual hygiene at school.

Regular physical activities undertaken by study population

In this study, only about 35% of subjects were interested in doing regular physical activities. Similar results were found in the study conducted by Negi et al in which 79% of subjects were not involved in regular physical activity. Several other studies, show similar results and everyone concluded that there was a correlation between physical activity and menstrual disorder.²¹

Negligence of regular physical activity leads to many menstrual problems like dysmenorrhea, PMS which further increases absenteeism from school, interference in

daily activities, menstrual irregularities like excessive bleeding, irregular flow and also increases intake of drugs, to relieve all these symptoms which will ultimately affect their psychological behavior. This creates a negative impact about menstruation.

Exercise during menstruation

During pre-counselling, subjects were asked about their physical activity pattern and majority of 65% were not interested in doing daily activities. As far as the exercise is concerned, many studies in India (study conducted by Garg et al Sadiq et al 33% of subjects were not doing any physical activities) and elsewhere have revealed that many adolescent girls believe that, doing physical activity during menstruation, aggravate dysmenorrhea while in reality, exercise can help to relieve the menstruating women with symptoms of premenstrual syndrome and dysmenorrhea by relaxing the muscles and relieving bloating. Exercise also causes a release of serotonin, making one feel much happier.¹³

Type of exercise practised during menstruation

According to The American college of obstetricians and gynecologists, “for many women aerobic exercise lessens PMS symptoms” and “moderate physical exercise may help in relieving pain”. They stated that participation in regular exercise can improve some of the types of symptoms (i.e., mood disturbance, fatigue, cognitive dysfunction, and bloating) typically experienced by women who suffer from PMS or dysmenorrhea.

In the study conducted by Billig et al proposed that women with dysmenorrhea had contracted ligamentous bands in the abdomen and subsequently developed a series of stretching exercises for which he claimed a high rate of symptom relief.” Based on which subjects were asked to do certain simple stretching exercises, yoga breathing exercises, light cardio, walking, or aerobic exercises and advised them not to do severe tiring exercises like cycling, skipping etc, because this may increase strain and may eventually increase pain.²³

Whether menstrual pain can be resolved by exercise

In this study, when they were asked about their physical activity 65% of them were not doing any kind of physical activity; similar results were obtained in the study conducted by Negi et al where 79% were not interested in doing daily physical activities.¹⁰ But several studies mentioned the correlation between physical activities and menstrual disorders like dysmenorrhea, PMS etc. In the study conducted by Safarzadeh et al 53.8% of population played sports less than 2 times a week, 27.5% had exercise 2 to 4 days a week and 18.8% had exercise more than 4 days a week, population who had done more exercises experienced lesser menstrual disorders compared to others.¹²

Type of food frequently taken by the subjects

Among 650 study population enrolled in the study, 55% of study population included non-vegetarian food in their diet and 45% of study population liked to have vegetables and fruits in their diet. While in the study conducted by Mohamadirizi et al large number of subjects had non-vegetarian food for 0-5 times a week.¹¹ They found out there was a positive correlation with diet and menstrual irregularities. Subjects who had frequent fast food and other products experienced more pain, mood swings, depression, heavy flow, irregularities and other menstrual symptoms during or around the time of their menstrual cycle. In this study also, many subjects experienced all these symptoms and it can be correlated with their diet and lifestyle. Adequate amount of high fiber rich food, unsaturated fatty acids and other essential elements are required in order to have a healthy menstrual cycle.

Pattern of fast food intake

In the present study, 53% of subjects took fast food monthly, 39% took fast food weekly and 7% of subjects had the habit of having fast food daily. In the study conducted by Vani *et al* contradictory results were observed compared to the present study in which 66% of subjects took fast food in a time gap of 3 days and they found that premenstrual symptoms were significantly more common among girls who were overweight and in girls who were consuming junk food regularly.²⁰ These monthly and weekly intake of fast foods along with lack of exercises might be a reason for irregular menstruation for 53% of the study population who mentioned about heavy bleeding, clots in their blood and changes in their menstrual flow (116 subjects), thus a positive correlation between diet and lifestyle and menstrual irregularities can be observed.

Reduction in intake of junk food

According to study conducted by Teixeira et al junk foods were found to be deficient in macro nutrients, vitamin B6, calcium, magnesium and potassium and were found to be triggering the occurrence of pre-menstrual symptoms.¹⁹

Change in diet after counselling

Diet plays a major role in menstruation. Therefore, it is important to include vegetables, fruits, cereals and nuts in diet. While vegetables and fruits are vital source of nutrients and fibers in anyone’s life, they also play a role in menstrual cycle. In the study conducted by Martinez et al suggests that subjects who included more vegetables and fruits in diet had fewer menstrual irregularities and less menstrual cramps.¹⁶ Consumption of cereals, pulses and nuts are also required to replenish energy sources during menstruation. Study conducted by Mohamadirizi has shown that there is a relationship to nutritional status and menstruation.¹⁵ The subjects were given counselling showcasing the importance of healthy diet and

menstruation.

Subjects skipping breakfast

Breakfast is the main meal of the day. In addition to remaining the biggest source of energy for the day, it is also required for normal menstruation. In the present study, a majority of about 79% of subjects avoided skipping breakfast but a minority of subjects of about 21% found it difficult to have breakfast. This clearly shows that the subjects were aware about the importance of consuming breakfast for regular menstruation and after counselling the importance was more assuring to them. The results found here were contradictory to the study conducted by Priya et al.⁸

Assessing change in menstrual pain after regular breakfast

Consumption of breakfast is needed for all age groups of women, especially during menstruation. According to the study conducted by Eittah et al it was found that skipping breakfast is likely to cause pre-menstrual symptoms including constipation, irritability and edema several days before menstruation.¹⁸ Regular consumption of breakfast during menstruation is also mandatory to cope with the pain. Dysmenorrhea is likely to occur in subjects who skipped breakfast. In the present study out of 650 subjects who attained counselling, about 51% of subjects identified that having a healthy breakfast during menstruation helped to reduce the pain they experienced followed by 49% of subjects who did not find any difference. The probable reason why 49% of subjects did not find any difference could be because of lack of time, tight learning schedule. The results obtained in the present study was similar to the study conducted by Dandotiya et al where dysmenorrhea was observed in subjects who skipped breakfast to consuming regular breakfast had changed from 60% to 4%.⁸

How the study population utilizes their spare time

The way of spending spare time differs from person to person. But in the present generation, many are accustomed to stay indoors than moving outside. It is high time to emphasize the need of educating children and parents regarding the importance of engaging in outdoor activities. Involving in outdoor activities promotes cognitive, social and emotional well-being. About 78% of subjects were interested in indoor activities during their free time followed by about 22% of subjects liked to engage in certain outdoor activities. The results was found to be similar to the study conducted by Singh et al where majority of adolescents were engaged in staying indoors and were reported to increase their time in front of internet and playing online games.

Subjects engagement in outdoor activities

The current study on 140 participants who were interested

in outdoor activities during their spare time, drew to the conclusion that about 62% of participants were interested in playing outside followed by about 33% of participants who loved to travel during their free time and about 5% of participants were interested in both playing and travelling.

The results obtained were similar to study conducted by Singh et al where more than 40% of subjects were engaged in riding, whereas 15% of subjects were involved in playing games. Engaging in outdoor activities during menstruation is beneficial as it helps to decrease menstrual cramps and helps to relieve stress.¹⁷

Indoor activities of the subjects

In the present scenario many prefer to stay indoors during their leisure time than to move outside. Many more subjects are interested in spending time indoors due to lack of interest and lack of knowledge in understanding the importance of spending time outdoor, they indulge in activities such as surfing in browser, playing indoor games and online games. The shift has greatly occurred due to the influence of social media where adolescents find everything more interesting not to underestimate the fact that lack of time to indulge in outdoor activities is also an issue that everybody faces including children.

In the present study out of 510 subjects who were interested in indoor activities and the results obtained were similar to the study conducted by Singh et al where some of the subjects were spending spare time listening to music, watching movies and playing online games.

Whether subjects are able to identify menstrual irregularity after counselling

Considering menstruation, patterns can vary from subject to subject. Therefore, it is important that a woman is able to identify her own menstrual irregularity and regularity.

Menstrual irregularity can be identified from several factors such as change in menstrual flow, shift of dates and change in number of sanitary pads used in a day. The subjects were given counselling on how to identify menstrual irregularities and all of them were able to identify whether they have menstrual irregularity or not.

Identification of pattern of menstrual flow after counselling

Menstrual irregularity can happen in girls due to heavy exercising, consumption of junk food, sedentary lifestyle as well as one's physiological differences. Menstrual irregularities can be identified through change in pattern of menstrual flow, identifying the number of pads used daily and shift of menstrual dates.

Probable reason for occurrence of menstrual irregularities could be because of lack of exercise, sedentary lifestyle

and skipping of breakfast. A study was conducted by Deshpande et al where 65% of subjects had moderate flow, followed by 33% of subjects had scanty flow and 2% of subjects had heavy flow.⁶

Pattern of menstrual pain found in subjects

The pattern of menstrual pain is divided into three categories; pain beginning days before menstruation, pain during menstruation and pain persisting after a week of menstruation. In certain cases pain persists even after menstruation can be due to uterine incapacity (A condition in which an amount of blood will remain in the uterus after menstruation has ended, when this happens the uterus contracts to remove the extra blood. These contractions can cause cramping and symptoms usually relieve within a few days), uterine fibroids or ovarian cysts and for some pain may occur days before menstruation is due to release of prostaglandins.

The results obtained is similar to the study conducted by Grandi et al where 50.7% of subjects experienced pain during menstruation, 18.7% of subjects experienced pain 2 days before menstruation and 22.2% of subjects experienced pain 1 day before menstruation.⁹

Study population having excessive hair growth over the body

In the present study out of 650 study population, majority of the study population of about (85%) did not have any excessive hair growth all over the body. The results obtained were similar to the study conducted by Harris et al where hirsutism was found in 10.3% of subjects.²³

Effectiveness of counselling and further clarification requested by subjects

In the study conducted with 650 subjects, about 83% of subjects found that the counselling session was effective, as well as a majority of about 92% of study population required no further clarification on menstruation. This clearly shows that counselling provided was effective by analyzing results obtained in post counselling section.

Requirement of counselling about menstrual hygiene at school

The extent and quality of information which has been passed from mother to child is limited often due to lack of time and up-to-date knowledge. Moreover, it is futile if this information is not communicated in comprehensive manner. This is further complicated by the social issue in India, where discussing menstruation in public is avoided and this leads to shyness in disclosing menstrual problems and issues. These factors negatively affect a women's reproductive health, thereby restricting the progress of a healthy generation. It was possible to assess the subject's unawareness, misconceptions, negative attitude and misbelieves via this study.

Limitations

As the study was conducted in different schools, time available for each of the sessions to be completed was not adequate due to tight schedule of school hours. Moreover, some of them refused to participate in the study as the topic was more of personalized questions and answers. Whereas some schools were reluctant to spare any time in public health awareness topics.

CONCLUSION

From the study it was found that 65% of subjects did not have any regular physical activity but 73% exercised during menstruation in which cycling was performed by 102 subjects added to which 69% of subjects understood menstrual pain can be relieved through exercise. The diet and lifestyle followed by the subjects is as follows: 55% of subjects were non-vegetarian, 53% of subjects had monthly consumption of junk food, 65% were aware of the influence of junk food on menstruation, 67% of subjects reduced their intake of junk food and 46% included more fruits in their diet after counselling. A change in the number of subjects who did not skip breakfast after counselling has increased to 79%, where 51% of subjects found a change in menstrual pain after consuming regular breakfast. 78% of subjects spent their spare time indoors in which 37% used mobile phones, 62% of subjects chose playing outdoors. 53% of subjects were able to identify menstrual irregularities by themselves following counselling and 82% of subjects identified their menstrual flow to be 'normal' after counselling. From the study it was found that 85% of subjects had pain at the time of menstruation and 85% of subjects did not have excessive hair growth over the body. Regarding effectiveness of counselling, 83% of subjects had found it be beneficial and 97% of subjects recommend the need for counselling on menstrual hygiene at school.

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