STATISTICAL STUDY OF MENSTRUAL IRREGULARITIES IN ADOLESCENT GIRLS FROM BARAMATI

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ABSTRACT: Menstrual disorders may affect the life of adolescent's girls and may sometimes cause problems. The patterns of menstrual cycles were analysed for association with age of menarche, prevalence of menstrual irregularity, menstrual bleeding, and effect of menstrual disorders The main aim of this research is to evaluate the knowledge of irregularities and significant factor affecting on the menstrual cycle of adolescents girls of age 11-22 years and also access the knowledge of irregularities with some selected variables of interest. . The study will also examine the relationship between different factors and irregular menstruation. This study seeks to offer significant insights for healthcare professionals, educators, and parents to better support the health and development of adolescent girls by comprehending the patterns and implications of menstrual abnormalities. The survey conducted among 306 girls of schools and colleges of Baramati from the period February 2023 to March 2023. Girls were interviewed using structured questionnaire regarding their menstrual cycle. The data was analysed by using chi-square test and logistic regression. In chi-square test it was found that factors like cycle length, dry fruit, outside food, blood loss, pain relief medicines, etc. are dependent on irregular periods also blood loss is dependent on factors like diet, cramps, clots, etc. regression analysis was conducted to test the significance of this factors on irregular periods it was found that cycle length, pain relief medicines and dry fruits have significant impact on irregular periods. To identifying potential Causes of menstrual irregularities in adolescent girls we used cause and effect diagram. Observed data were analysed by using MS-excel, R-software.

Keywords: Menarche, Menstrual disorders, Adolescents, Cause and Effect.

INTRODUCTION:

The crucial period of adolescence is characterized by considerable physiological and hormonal changes. The majority of teenage females who experience irregular periods around this time are girls. These irregularities, which may have an effect on their general health and quality of life, can appear as differences in menstrual cycle length, duration, and severity. Promoting the wellbeing of adolescent females requires identifying the causes of these irregularities and comprehending the effects of those causes. Adolescence is the period of transition between puberty and adulthood. Menarche is one of the markers of puberty and therefore, can be considered as an important event in the life of adolescent girls. Studies suggested that menarche tends to appear earlier in life as the sanitary, nutritional, and economic conditions of a society improve. For most girls, it occurs between the age of 10 and 16 years; however, it shows a remarkable range of variation. The normal range for ovulatory cycles is between

21 and 35 days. While most periods last from 3 to 5 days, duration of menstrual flow normally ranges from 2 to 7 days. For the first few years after menarche, irregular and longer cycles are common.

Menstrual disorders are a common presentation by late adolescence; 75% of girls experience some problems associated with menstruation including irregular periods, painful period cramps and heavy menstrual bleeding which are the leading reasons for the physician office visits by adolescents. Menstrual patterns are also influenced by a number of host and environmental factors. However, few studies in India have described the lifestyle factors associated with various menstrual cycle patterns. For successful ways to assist the wellbeing of Indian adolescent girls, it is imperative to comprehend the causes of menstrual abnormalities. Therefore, we surveyed the current changes in the age of menarche in India adolescents. We also evaluated general menstruation patterns, the incidence of common menstrual disorders. Historically, the age at menarche has gradually decreased by about 4 months in every 10-year interval. Some of these menstrual characteristics, such as irregularity in the menstrual cycle, premenstrual pain and discomfort at the time of a heavy menstrual discharge may affect the general reproductive health of a woman.

OBJECTIVES

- This study seeks to assess irregular patterns of menstrual cycle in adolescent girls aged 12 to 21 years.
- To study the important and significant factors affecting the regular patterns of menstruation cycle among adolescents of selected schools and colleges of Baramati.
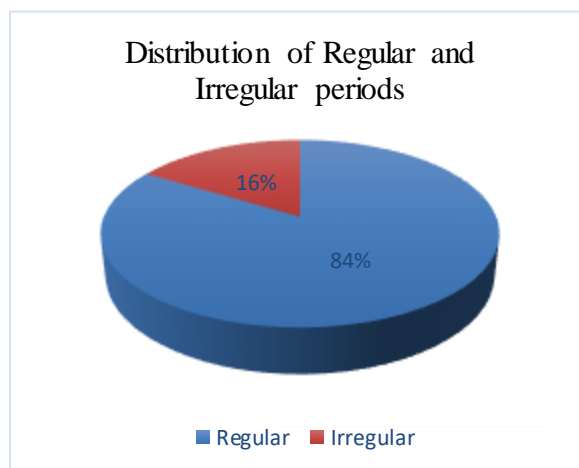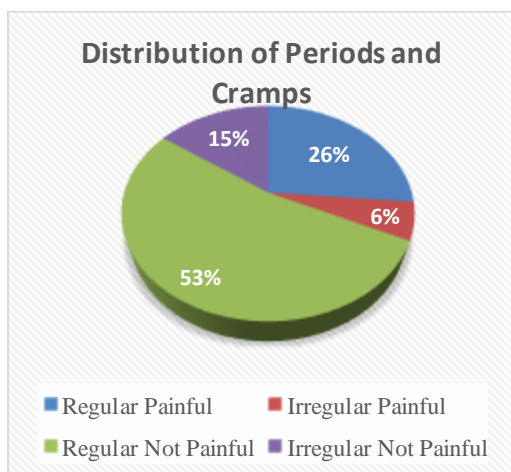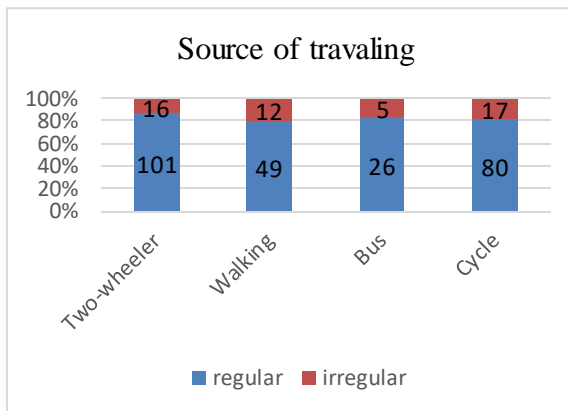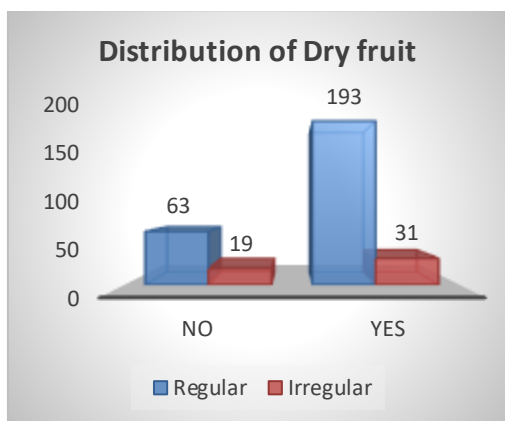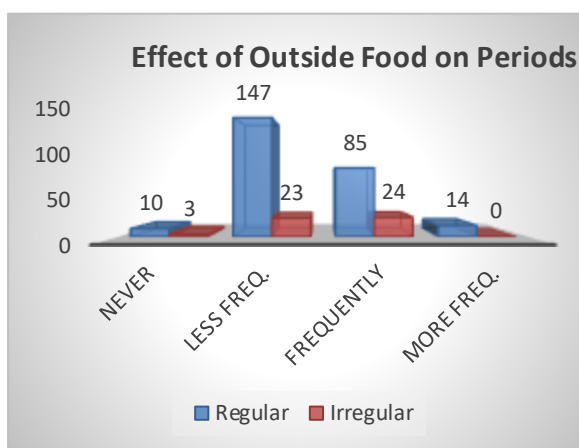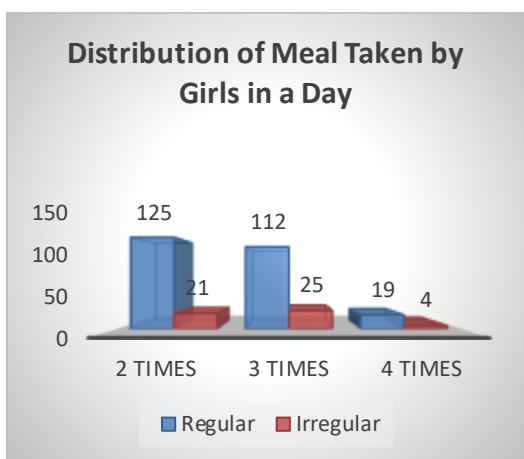
MATERIALS & METHODS

For this research 306 female students chosen from Baramati Maharashtra, educational institutions, a cross-sectional survey was conducted. By keeping this information in mind, we have visited gynaecologist in Baramati who have given us lot of information about menstruation cycle. We have also selected all schools and colleges in Baramati city and took the permission of school and colleges for collection of data regarding menstruation cycle in adolescent girls. So, we collect information of 306 girls.

The study's protocol and goals were described to the chosen girls, and they were asked to fill out questionnaires to gather data on their demographics, menarche age, and menstrual characteristics. The demographic data included family details such as family size, type, parent's education, occupation, house type, mode of transportation from school to home. This data was used to determine the socioeconomic status of the family members. Also data consists of information about education, age of menarche, HB, regular/irregular cycle of menstrual, cycle length, blood loss, diet, exercise etc.

We analyse the data by classifying the blood loss, cycle length, dry fruits, outside food, clots, periods, cramp, frequency of changing pads, pain relief medicine, etc. In appropriate counting of observation. The data were analysed using MS excel and R-software. Statistical significance of differences between variables was tested using chi-sq. test and logistic regression was used for analysis.

STATISTICAL ANALYSIS

EXPLORATORY DATA ANALYSIS:

Distribution of Meal Taken by Girls in a Day

Effect of Outside Food on Periods

Distribution of Dry fruit

Source of travaling

Distribution of Periods and Cramps

Distribution of Regular and Irregular periods

DESCRIPTIVE STATISTICS:

Table 1:

Statistics	Menarche age	BMI	Mother age
N	306	306	306
Mean	13.05	19.34	39.42
Median	13	18.7	39
Mode	13	16.36	40
Min	5	10.56	30
Max	18	59.79	70
Q1	12	16.36	36
Q3	14	21.36	42

Conclusion: Average menarche age is 13 years and maximum age is 18. Average BMI for Girls is 19.34 which is good.

Table 2:

HB	Responses	proportion	Prop. excluding no test
<10	25	8.169	15.06
10 to 12	81	26.47	48.79
12 to 14	58	18.95	34.93
>14	2	0.653	1.2
No test	140	45.75	-
TOTAL	**306**	**100**	**100**

Conclusion: 46% of girls among the collected data have not done HB test. 48.79 % of girls those who have their HB between 10-12 which is not good because according to WHO HB level in female must be 13g/dl to 15g/dl.

CHI-SQUARE TEST OF INDEPENDENCE:

Table 3:

Variable 1	Variable 2	P-value	Results
Type of period	Fruit	0.732	Independent
Type of period	Cycle length	9.664e-15	Dependent
Type of period	Diet	0.7743	Independent
Type of period	Meal	0.6642	Independent

Type of period	Dry-fruit	0.05	Dependent
Type of period	Area	0.8703	Independent
Type of period	Socio-economic status	0.9306	Independent
Type of period	Exercise	0.6054	Independent
Type of period	Outside food	0.0814 (Here α=9%)	Dependent
Type of period	Source of travailing	0.752	Independent
Type of period	Duration of flow	0.4129	Independent
Type of period	Clots	0.218	Independent
Type of period	Hemoglobin	0.2451	Independent
Type of period	Frequency of changing pads	0.02925	Dependent
Type of period	Medicine	0.02508	Dependent
Type of period	Family	0.1976	Independent
Type of period	Blood loss	3.386e-06	Dependent
Blood Loss	Outside Food	2.2e-16	Dependent
Blood Loss	Meals	0.6607	Independent
Blood Loss	Dry-fruit	0.2656	Independent
Blood Loss	Fruit	0.1923	Independent
Blood Loss	Diet	1.734e-09	Dependent
Blood Loss	Medicine	8.43e-05	Dependent
Blood Loss	Hemoglobin	0.9004	Independent
Blood Loss	Cramps	0.002442	Dependent
Blood Loss	Clots	0.00194	Dependent
Dry-fruit	Economic status	0.0426	Dependent

LOGISTIC REGRESSION:

Logistic regression with an indicator explanatory variable is a very special case. It is important because many multiple logistic regression analysis focus on one or more such variables as the primary variable for interest.

$$\ln(\Pi(x)/1 - \Pi(x)) = \beta_0 + \beta_1 x$$

Here, ln denotes natural logarithm. β_0 is the intercept and β_1 is the regression coefficient. $\Pi(x)$ ranges 0 to 1.

Suppose we consider the case for the explanatory variable is dry fruit in diet, which we have coded using an indicator variable X_3 with value $X_3 = 1$ for girls those who include dry fruit in diet and $X_3 = 0$ for girls those who do not include dry fruit in diet. The response variable(y) is also an indicator function. Thus, $(Y = 1)$ the girls either having irregular periods or $(Y = 0)$ for girls not having irregular periods. The model says that the probability that the girls having irregular periods depends upon the dry fruits in diet ($X_3 = 1$ or $X_3 = 0$). The slope in this logistic regression model is the difference between the log (ODDS) for girls taking dry fruits and the log (ODDS) for girls not taking dry fruits. Interpretation of the results in terms of the regression slope is difficult. Usually, we apply a transformation to help us. It can be transformed e^{slope} undoes the logarithm and transforms the logistic regression into odds ratio. Also, explanatory variable Blood loss (x1) is coded with value $X_1 = 0$ for less blood loss, $X_1 = 1$ for moderate blood loss, $X_1 = 2$ for abundant blood loss. Explanatory variable cycle length (X_2) which we have coded with value $X_2 = 0$ for cycle length less than 21 days, $X_2 = 1$ for cycle length of 21 to 27 days, $X_2 = 2$ for cycle length of 28 to 35 days, $X_2 = 3$ for cycle length greater than 35 days. Explanatory variable outside food (X_4) is coded with value $X_4 = 0$ for girls eating outside food never, $X_4 = 1$ for girls eating outside food less frequently, $X_4 = 2$ for girls eating outside food frequently, $X_4 = 3$ for girls eating outside food most frequently. Explanatory variable frequency of changing pads (X_5) is coded with value $X_5 = 0$ for changing pads after 3 hours, $X_5 = 1$ for changing pads after 6 hours, $X_5 = 2$ for changing pads after 8 hours, $X_5 = 3$ for changing pads after 12 hours. Explanatory variable Pain relief medicine (X_6) is coded with value $X_6 = 0$ for girls never taking pain relief medicines, $X_6 = 1$ for girls taking pain relief medicines sometimes, $X_6 = 2$ for girls taking pain relief medicines every time. Response variable (Y) irregular periods is coded with value $Y = 1$ for girls having irregular periods and $Y = 0$ for girls having regular periods.

LOGISTIC REGRESSION MODEL FOR IRREGULAR PERIODS

Table 4:

Dependent	Independent	Estimate for variable	Estimates for intercept	p-value	logistic model	Significant in model	ψ hat	1-ψ hat
Periods (regular- 0 & irregular - 1)	Cycle length	1.0982	-3.5203	8.41E-07	Y= -3.5203+ 1.0982X	Significant	2.9988	1.9987
	changing pad	-0.0557	-1.5606	0.749	Y=-1.5606- 0.0557x	Not significant	----	----
	pain relief medicine	0.6375	-1.8982	0.00947	Y=-1.8982+ 0.6375X	Significant	1.8917	0.8917
	Outside food	0.04214	-1.69263	0.86	Y=-1.69263+ 0.004214X	Not significant	----	----
	Dry fruit	-0.63	-1.1987	0.0529	Y=-1.1987- 0.63X	Significant at 7%	0.5326	0.4674
	Blood loss	-0.0864	-1.5514	0.827187	Y=-1.5514- 0.08637X	Not significant	----	----

CAUSE AND EFFECT DIAGRAM
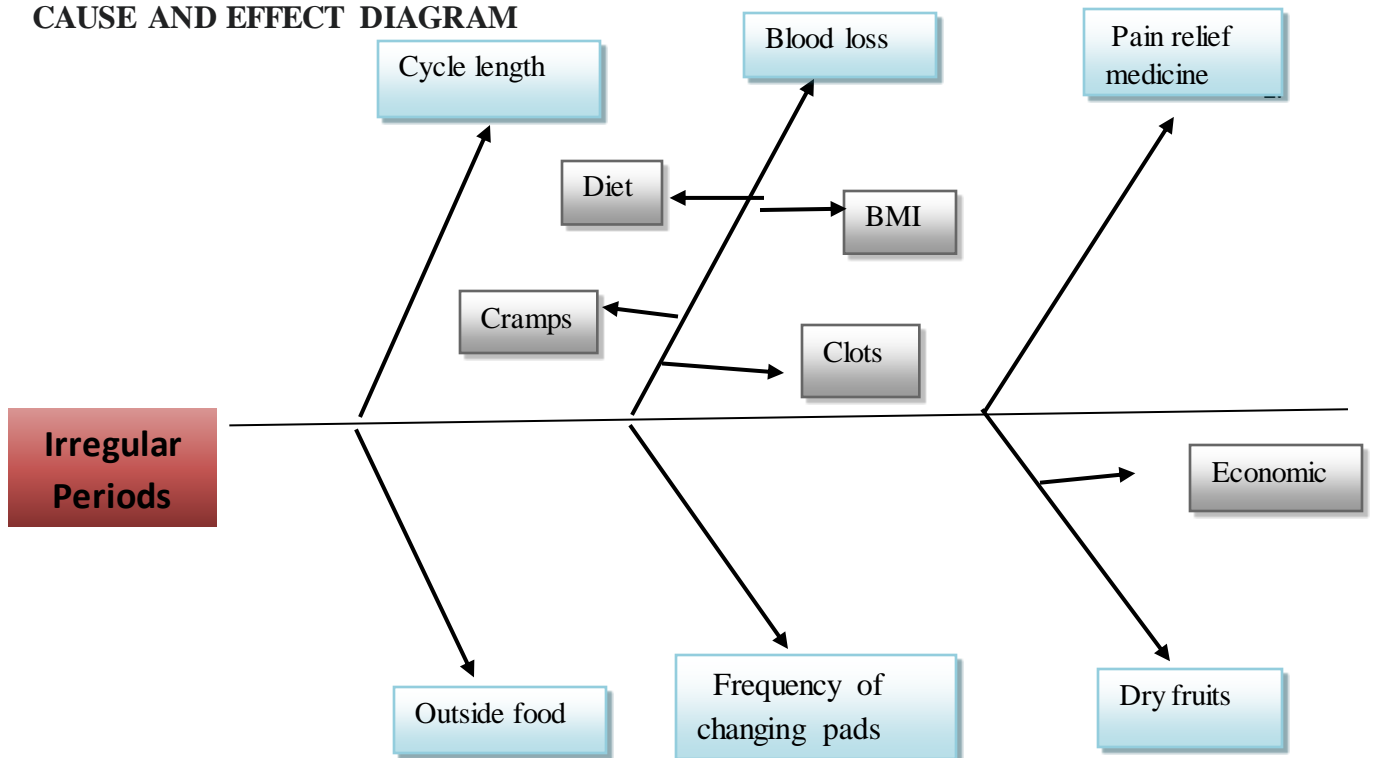
RESULTS AND DISCUSSION:

From the graph we can say that 48% girls having regular periods take 2 times meal whereas 57% girls having regular periods eat outside food less frequently. 38% girls not including dry fruits in their diet have irregular periods. Nutrients found in dry fruits may contribute to overall reproductive health, it's important to note that the impact of diet on menstrual regularity is influenced by a combination of factors. Study reveals that 34% girls having irregular periods use bicycle as source of travelling. Similarly, 10% girls having irregular periods use bus as source of travelling. From diagram we can say that 21% of adolescent girls have irregular periods and 26% girls have regular period but with painful.6% of adolescent girls have irregular periods with painful cramps. It is noticed that that 60% girls having irregular periods change pads after 6 hours.

From cause-and-effect diagram it is summarized that cycle length, blood loss, and pain relief medicines, outside food, dry fruits and frequency of changing pads main categories of irregular periods. There are some sub causes of blood loss and dry fruits as shown in diagram. From Chi- square independence of test we got results such that type of period may dependent on cycle length, dry fruit consumption, outside food, frequency of changing pads, intake of pain relief medicine and blood loss. Also blood loss during periods may depend on outside food, diet, intake of pain relief medicine, period cramps, and clots. After fitting bivariate Logistic regression model we say that for increase in cycle length will increase odds of irregular periods by 1.99 times For increase in consumption of pain relief medicine will increase odds of irregular periods by 0.89 times. For increase in consumption of dry fruits will decrease odds of irregular periods by 0.46 times.

CONCLUSION

Study reveals that out of 306 adolescent girls 21% of have irregular periods and 26% girls have regular period but with painful.6% of adolescent girls have irregular periods with painful cramps. Type of period may dependent on cycle length, dry fruit consumption, outside food, frequency of changing pads, intake of pain relief medicine and blood loss. Also blood loss during periods may depend on outside food, diet, intake of pain relief medicine, period cramps, and clots. Cycle length, consumption of pain relief medicine, consumption of dry fruits are significant factors for irregular menstrual cycle.

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