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RESEARCH ARTICLE

"BODY MASS INDEX AND MENSTRUAL PATTERN AMONG WOMEN": A CORRELATIONAL STUDY

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Abstract

The study aims to identify the menstrual pattern of women, to correlate body mass index with menstrual pattern among women and to associate the menstrual pattern with demographic variables among women.

Methodology: The study design was correlational descriptive survey design includes women age group between 15-30 years. The sample was 317 women on the basis of snowball sampling technique. Data was collected by Google form using self-structured questionnaire method and analyzed by chi square test.

Result: There was no correlation with BMI &Menstrual pattern. The majority (75.1%) were having regular periods. There was significant association between menstrual patterns with socio-demographic variables such as age with the interval between one menstrual cycle, manage menses during school with days of experiencing heavy bleeding, Hb level with days of experiencing heavy bleeding, effect of medication with menstrual period and days of experiences of heavy bleeding, effect of climate change with the menstrual pattern, daily activity with regular period at a significance level of $P< 0.05$.

Discussion: The present study revealed that there is a significant association between menstrual patterns with demographic variable.

Introduction:-

Menstruation is described as the exclusive sign of femininity. It is well known that the terms menstruation and menses are derived from the Latin word menses (month)[1]Menstrual cycles are describe as short cycles if <25 days, normal 26 to 34 days, or long>35days. Menstrual cycle interlude is different in each woman per month, generally ranging from 15 to 45 days, an average of 28 days, and the duration ranges from 2 to 8 days, an average of 4 to 6 days with blood of 60 to 80 ml per cycle. The first menstrual cycle (menarche) usually occurs in young women ages 12 to 15 years[2].The menstrual cycle is the monthly series of changes women's body goes through in a preparation for the possibility of pregnancy. Each month, one of the ovaries releases an egg a process called ovulation. At the same time, hormonal changes prepare the uterus for pregnancy[3]. For most women, a normal menstrual cycle ranges from 21-35 days in that adolescent girls are a high-risk group because during this stage major physical and mental changes occur[4].Menstrual irregularities mean missed, delayed, or erratic periods or abnormal bleeding patterns. The major abnormalities are dysmenorrhea, premenstrual syndrome and menstrual irregularities.Irregular periods are usually not harmful. However, persistent or long-term irregularity of other conditions, such as Iron deficiency anemia, Infertility, Osteoporosis, Cardiovascular disease, and Endometrial hyperplasia[5]. Many factors are

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responsible for the regularity and flow of a woman's menstrual cycle including hormonal changes, genetics, serious medical conditions, and body mass index. Of all these factors, body mass index or BMI had the most control over menstrual irregularity. Having a high or low BMI may cause one to experience an absence of menstruation, irregular menstruation, and painful menstruation[6]. According to WHO, body mass index (BMI) is a simple index of weight – for –a height that is commonly used to classify overweight and obesity in adults. It is defined person's weight in kilograms divided by the square of his height in meters (kg/m2)[7] and obesity are defined as abnormal or excessive fat accumulation in the body that may impair health and menstrual pattern in adolescent age girls[8]. The study aimed to identify the menstrual pattern of women, to correlate body mass index with menstrual pattern among women and to associate the menstrual pattern with demographic variables among women.

Material and Method:-

Quantitive approach with descriptive survey design was used for the correctional study.The sample is women who are meeting the inclusion criteria and who are available during the time of data collection in the age group between 15-30years. The sample size of the study was n=317.Snow-ball sampling technique was adopted to select the sample. The data was collected with a structural questionnaire & the tool was pilotested & validated.

Result:-

Table 01:- Distribution of socio-demographic variables of women. n=317

Sr.no	Demographic Data	Categorization	Frequency (f)	Percentage (%)
1	Age	15-20 Years	239	75.39
		21-25 Years	69	21.77
		26-30 Years	9	2.84
2	State	Maharashtra	165	52.05
		Kerala	140	44.16
		Bihar	2	0.63
		Gujarat	1	0.32
		Karnataka	3	0.95
		Madhya Pradesh	1	0.32
		TamilNadu	1	0.32
		UttarPradesh	1	0.32
		West Bengal	1	0.32
		Delhi	1	0.32
		Other	1	0.32
3	Age of firstmenstruation	Below 12	49	15.5
		13-15Years	222	70.0
		16-20Years	44	13.9
		Above20	2	0.6
4	Religion	Christian	102	32.2
		Hindu	200	63.1
		Muslim	10	3.2
		Other	5	1.6
5	Area of living	Urban	179	56.5
		Rural	117	36.9
		Tribal	5	1.6
		Other	16	5.0
6	Residencetype	Alongwithparents	274	86.4
		Relative	19	6.0
		Alone	5	1.6
		Other	19	6.0
7	Income	Upperclass	38	12.0
		Upper middleclass	131	41.3
		Lower middleclass	104	32.8

		Lowerclass	44	13.9
8	Food habits	Vegetarian	49	15.5
		Non-vegetarian	249	78.5
		Junkfood	10	3.2
		Other	9	2.8
9	Occupation	Student	297	93.7
		Self-employed	13	4.1
		Unemployed	4	1.3
		Other	3	0.9
10	Do you performany of thefollowingactivitiesduringmenstruationtorelievepain?	Walking	159	50.2
		Yoga	27	8.5
		Meditation	31	9.8
		Other	100	31.5
11	How do youmanage mensesduringschool?	Takesleave	85	26.8
		Medication	44	13.9
		Takearestinthe sick room	79	24.9
		None	109	34.4
12	How manyhours do yousleepatnight?	2 -4 hours	15	4.7
		5 -7 hours	226	71.3
		8 -10hours	72	22.7
		10hours andabove	4	1.3
13	Currenthemoglobinlevel	Below8 g/dl	3	0.9
		8-10g/dl	127	40.1
		11-13 g/dl	165	52.1
		14-16 g/dl	22	6.9
14	Do you take anymedications forrelieving themenstrualsymptoms?	YES	27	8.5
		Cyclopam	4	1.3
		Dicyclomine	1	0.3
		Dolo/PCM	4	1.3
		Krimson	1	0.3
		Meftal	7	2.2
		Meprate	1	0.3
		NO	272	85.8
15	Does climate change affect irregular menstruation patterns?	Yes	129	40.7
		No	188	59.3
16	Are you able todo dailyactivitiesduringmenstruation?	Yes	224	70.7
		No	93	29.3

Table 1 indicated that out of 317 women, majority (75.39%) were found in 15-20 age group. Regarding Age of first menstruation majority (70.0%) was found in 13-15 age groups.Regarding sleeping hours at night majority (71.3%) take 5-7 hours of sleep. Regarding Current hemoglobin level majority (52.1%) were having 11-13 g/dl.Majority

(85.8%) of girls were not taking any medication for relieving menstrual symptoms , followed by (14.2%) were saying Yes in that most of (1.3%) taking Dolo&cyclopam. Regarding Effect of climate change in irregular menstrual pattern majority (59.3%) was saying No. Majority (70.7%) were performed daily activity during Menstruation.

Table 2:- Distribution of Menstrual flow among women. n=317.

Sr.no	Questions	Categorization	Frequency(f)	Percentage (%)
	Pattern of flow			
1	Do you have regularperiods?	Yes	238	75.08
		No	79	24.92
2	Duration of menstrualperiod?	2days	16	5.05
		5days	226	71.29
		7days	62	19.56
		Morethan 7 days	13	4.10
3	Interval between onemenstrualcycles?	Lessthan 24 days	37	11.67
		25 -29 days	188	59.31
		30 -35 days	52	16.40
		Morethan 35 days	40	12.62
4	Howmanydaysdoyouexperience heavybleeding?	2days	221	69.72
		4days	77	24.29
		6days	14	4.42
		Morethan 6 days	5	1.58
5	Whichtypeofhygieneproduct do you useduringperiods?	SanitaryNapkin / Pad	308	97.16
		Cloths	4	1.26
		Tampons	0	0.00
		Menstrualcup	5	1.58
6	How often you changeyourhygieneproducts?	2Times	128	40.38
		4Times	162	51.10
		6Times	25	7.89
		Morethan 6times	2	0.63

Table 3:- Distribution of Practices among women. n=317

Sr.no	Questions	Categarization	Frequency(f)	Percentage (%)
	Practices			
1	Which technique doyou use to relievemenstrual symptomsduringmenstruation?	Takerest	202	63.7
		Usehot waterbag	88	27.8
		Medication	12	3.8
		None	15	4.73
2	What kind ofpracticesyouincludeat the time ofmenstruation?	Stretches/rangeofmotion	52	16.4
		Musictherapy	189	59.6
		Meditation	32	10.1
		None	44	13.9
3	Has your doctor or healthprofessional evertreatedyoufor?	Ovariancyst	9	2.84
		Infertility	13	4.10
		PCOD	45	14.20
		None	250	78.86
4	Do you have any ofthe	Anemia	40	12.6

	following diseasecondition?	PCOS/PCOD	34	10.7
		Thyroiddisorder	8	74.1
		None	23 5	74.1 3

Table 4:- Distribution of Sign & Symptoms among women. n=317

Sr.no	Questions	Categorization	Frequency(f)	Percentage (%)
	Sign and symptoms			
1	Which of thefollowing symptomsyouexperienceduringth edaybefore /aroundyour Menstrualperiod?	Anger/Irritability	208	656
		Anxiety/Tension	93	29.3
		Feelingdepressed/H opelessness	97	30.6
		Difficultywith sleeping	62	19.6
		Abdominalpain	164	51.7
		Breasttenderness	47	14.8
		Headache	76	24.0
2	Whichofthe Followingsymptoms Doyouexperienceatthetime ofmenstruation?	Acne	156	49.2
		Anger/Irritability	180	56.8
		Anxiety/Tension	92	29.0
		Feelingdepressed/ Hopelessness	91	28.7
		Difficultywith sleeping	73	23.0
		Abdominalpain	216	68.1
		Breasttenderness	5	1.6

Table 2,3&4 Indicated that out of 317 women, majority (75.08%) were having regular periods.Regarding duration of menstrual period, majority (71.29%) women have 5 days. Majority (59.31 %) women have 25–29 days interval between one menstrual cycle. Majority (69. 72 %) women have experience 2 days of heavy bleeding. Regarding use of hygiene product during period majority (97.16 %) women were using sanitary napkins/pad. Regarding changing of hygiene product majority (51.10%)women change 4 times.majority (63.7%) women take rest to relieve menstrual symptoms.Regarding practices they include at the time of menstruation, majority (59.7%) includes music therapy followed by (16.4%) includes stretches / range of motion. Regarding treatment (40.2%) treated for PCOD (4.1%) has treated for infertility. Regarding underlying disease condition, majority (74.1%) having no any disease condition (10.7%) followed by (12.6%) were having anemia. Regarding symptoms experienced during the day before or around menstrual period, majority (65.65%) experiences anger / irritability, followed by (51.7"%) experiences abdominal pain.Regarding symptoms experiencing at the time of menstruation, majority (68.1%) experiences abdominal pain, followed by (56.8%) experiences anger / irritability.

BMI Classification

WEIGHT STATUS	WHO CRITERIA FOR BMI	"ASIAN CRITERIA" FOR BMI
Underweight	<18.5	<18.5
Normal range	18.5-24.9	18.5- 22.9
Over weight	25-29.9	23- 24.9
Obese	>30	>30

Table 5:- Describing the correlation of BMI and regular period. n=317

Srno.	Item	Mean	SD	Mean (%)	R value
1	BMI	21	4.3	6.6	-0.1199
	Regularperiods	0.74	0.43	0.2	

Table 5 shows the correlation of BMI with a regular period. The result indicates that the women had the highest BMI mean score of 6.6% with an SD of 4.3 and regularity of period mean score of 0.2 % with an SD of 0.43 in the aspect of correlation of BMI and regular periods. There is a negative correlation between BMI with regular periods. (r=-0.1199)(r=1)

Table 6:- Describing the correlation between BMI and Duration of menstrual pattern n=317.

Srno.	Item	Mean	SD	Mean(%)	rvalue
	BMI	21	4.3	6.6	-0.03
	Duration of menstrualperiod	3.58	0.76	1.1	

Table 6 shows the correlation of BMI with the duration of menstrual pattern. The result indicates that the women had the highest BMI mean score of 6.6% with anSD of 4.3 and a duration of menstrual pattern mean score of 1.1% with an SD of 0.76 in the aspect of correlation of BMI and duration of menstrual pattern. There is a negative correlation between BMI with theduration of menstrual pattern.(r=-0.03), (r=1)

Table 7:- Describing the correlation of BMI with an interval between one menstrual cycle. n=317

Srno.	Item	Mean	SD	Mean (%)	rvalue
	BMI	21	4.3	6.6	
3	Interval between one menstrual cycle	3.2	1.05	1.0	-0.042

Table 7 shows the correlation of BMI with the interval between one menstrual cycle. The result indicates that the women had the highest BMI meanscore of 6.6% with an SD of 4.3 and an interval between one menstrual cycle mean scoreof 1.0% with an SD of 1.05 in the aspect of correlation of BMI and interval between onemenstrual cycle. Thereis a negative correlation between BMI andwith the interval lbetween one menstrual cycle.(r=-0.042),(r=1)

Table 8:- Describing the correlation of BMI with days which experience heavy bleeding n=317.

Srno.	Item	Mean	SD	Mean (%)	r value
	BMI	21	4.3	6.6	
4	Days ofexperiencing Heavybleeding	3.62	0.62	1.1	-0.037

Table 8 shows the correlation of BMI with days that experience heavybleeding. The result indicates that the women had the highest BMI mean score of6.6% with an SD of 4.3 and experience of heavy bleeding mean score of 1.1 % with an SD of 0.62in the aspect of correlation of BMI and days which experience heavy bleeding. There is a negative correlation between BMI with days that experience heavy bleeding.(r=-0.037),(r=1)

Table9:- Describing the association between age of first menstruation and menstrual patterns.

Sr. no	Socio demographic Variables	Categorization	Interval between one menstrual cycle				X^2	P value	Significance Level
			<24 day	25-39	30-35	>35 days			
1	Age of first menstruation	13-15	19	138	369	2	0.020096	0.05	S
		16-20	6	25	8	5			
		Above 20	2	0	0	0			
		Below 12	10	25	8	6			

Table 9 .Describes the association between age of first menstruation and menstrual pattern. The result indicates there is significant association between age of first menstruation with interval of menstrual cycle (x^2=0.020096) as(P <0.05).

Table 10:- Describing the association between manage of menses during school and menstrual pattern.

Sr. no	Socio demographic Variables	Categorization	Days of experiencing heavy bleeding				X^2	P value	Significance Level
			2 day	4 day	6 day	>6day			
2	Manage of menses during school	Takesleave	55	24	4	2	0.0003	0.05	S
		Medication	24	17	2	1			
		Takearestinthe sick room	53	22	4	0			
		None	89	14	3	2			

Table 10. Describes the association between manage ofmenses during school and menstrual pattern. The result indicates there is a significant association between the management ofmenses duringschool andexperienceof heavybleeding(x^2=0.0003) as (P < 0.05)

Table11:- DescribingtheassociationbetweenCurrent hemoglobin level and menstrual pattern.

Sr. no	Socio demographic Variables	Categorization	Days of experiencing heavy bleeding				X^2	P value	Significance Level
			2 day	4 day	6 day	>6day			
2	Current hemoglobin Level	11-13g/dl	112	43	7	3	0.0006441	0.05	S
		14-16 g/dl	13	7	2	0			
		8-10 g/dl	94	27	5	1			
		Below 8 g/dl	2	0	0	1			

Table11. Describes the association between Hemoglobin level and menstrual pattern there is significant association between Hb level with experience of heavy bleeding (x^2=0.006441) as (P <0.05).

Table12:- Describing the association between use of medication for relieving pain and menstrual pattern.

Sr. no	Socio demographic Variables	Categorization	Duration of menstrual period				X^2	P value	Significance Level
			2 day	5 day	7 day	>7day			
2	Use of medication for relieving pain	Cyclopam	0	1	1	0	0.0023327	0.05	S
		Dicyclomine	0	0	1	0			
		Dolo/PCM	0	0	1	0			
		Krimson	0	1	0	0			
		Meftal	0	4	0	1			
		Meprate	0	0	0	1			
		No	14	194	54	10			
		Yes	2	22	3	0			
Sr. no	**Socio demographic Variables**	**Categorization**	**Days of experiencing heavy bleeding**				**X^2**	**P value**	**Significance Level**
			2 day	5 day	7 day	>6day			
2	Use of medication for relieving pain	Cyclopam	2	0	0	0	0.0484465	0.05	S
		Dicyclomine	0	0	1	0			
		Dolo/PCM	1	0	0	0			
		Krimson	1	0	0	0			
		Meftal	4	1	0	0			

		Meprate	**0**	**1**	**0**	**0**			
		No	**192**	**65**	**10**	**5**			
		Yes	**17**	**8**	**2**	**0**			

Table12 .Describes the association between use of medication to relieve pain and menstrual pattern. The result indicates that there is a significant association between use of medication to relieve pain with a duration of menstrual period(x^2=0.0023327) & experience of heavy bleeding(x^2=0.0484465)as(P<0.05)

Table13:- Describing the association between climate affect on menstrual pattern and menstrual pattern

Sr. no	**Socio demographic Variables**	**Categorization**	**Regular period**		**X^2**	**P value**	**Significance Level**
			Yes	**No**			
2	**Climate affect on menstrual pattern**	Yes	**81**	**48**	**0.00003**	**0.05**	**S**
		No	**157**	**31**			

Sr. no	**Socio demographic Variables**	**Categorization**	**Interval between one menstrual cycle**				**X^2**	**P value**	**Significance Level**
			<24 day	**25-39 day**	**30-35 day**	**>35day**			
2	**Climate affect on menstrual pattern**	Yes	**59**	**28**	**15**	**27**	**0.0000541**	**0.05**	**S**
		No	**129**	**24**	**22**	**13**			

Table13. Describes the association between climate affect menstrual pattern and menstrual pattern.The result indicates there is asignificant association between the effect of climate change with regular periods (x^2=0.00003), and the interval between one menstrual cycle(x^2=0.0000541)as (P <0.05).

Discussion:-

The study was to assess body mass index and menstrual pattern among women: A correlation study. The data was collected from 317 women all over India through the google form. From this study, we came to understand there was no correlation with BMI &Menstrual pattern. The majority (75.1%) were having regular periods. There was significant association between menstrual patterns with socio-demographic variables such as age with the interval between one menstrual cycle, manage menses during school with days of experiencing heavy bleeding, Hb level with days of experiencing heavy bleeding, effect of medication with menstrual period and days of experiences of heavy bleeding, effect of climate change with the menstrual pattern, daily activity with regular period at a significance level of P< 0.05.

This study result is slightly similar to my study Most of the respondents had normal BMI, menstrual interval, amount and duration. There was no relationship between BMI and menstrual interval and menstrual amount (0.74 and 0.878 respectively), however there was relationship between BMI and menstrual period (p= 0.036). Conclusions: Menstrual abnormalities among female adolescents are common. Based on this study, BMI seems to be moderately associated with menstrual cycle, especially with menstrual period, although a possibility still remains that body fat affects the menstruation superiorly[9].

This study result is dissimilar to my study. The study shows that the mean age of the study population was 21.98 yrs. The mean of BMI in the study population was found to be 21.42kg/m2. Irregular menses (including short and long cycles) is highly significantly associated with underweight and overweight BMI as clear with P- value of 0.0001 and 0.0001 respectively. Irregular cycles were seen in 45 cases out of which 9 were having Polymenorrhea i.e. cycle length less than 21 days, 10 were having irregular cycle with no fixed length, and 26 were having oligomenorrhea. Out of 45 cases with irregular cycle 19 were in underweight category, 9 in overweight category, and 2 in obese class 2 and rest 15 in normal BMI category[1].

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