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A Study of Health Problems Facing During Menstruation among School Going Girls of Meerut District

Dr. Md. Abdul Latif
Associate Professor
Department of Statistics
Liberal College, Luwangsambam, Manipur

Abstract

This paper examines the health issues school-age girls in the Meerut district face when they menstruate. The primary goal of the research is to use factor analysis to determine and evaluate the health factors and preventative actions that have the greatest influence during menstruation. A random selection of 1500 responders was made from high schools spread across several talukas in the Meerut district. In this study, eighteen factors were taken into account. Using the SPSS software, factor analysis was used to identify the most important health and precautionary aspects.

Key Words: Menstruation, Health factors, Factor Analysis, Component matrix, Rotated Component matrix

1. Introduction

The monthly physiological shift that women who have reached menstruation undergo is known as the menstrual cycle. Gynecological issues are the main cause of menstrual troubles, and most women experience them on a regular basis. The most prevalent outward signs of the menstrual cycle are acne and sleeplessness. Changes in appetite can also be associated with the menstrual cycle, and some women may also experience hot flashes, exhaustion, back acne, headaches, abdominal pain, and infections. Some women also experience mood swings, heaviness, and joint or menstrual discomfort throughout their periods. The most uncomfortable menstrual discomfort that truly interferes with all activities is abdominal cramping. [(2015) Kavitha T].

Few studies have been conducted on the health issues related to menstruation that teenage schoolgirls face. A lot of research has been done in India and overseas on menstrual hygiene, knowledge assessments, and belief sourcing regarding menstruation among adolescent girls. For this reason, the current study was conducted among the teenage schoolgirls in the Meerut district. The primary goal of the research is to use factor analysis to determine and evaluate the health factors and preventative actions that have the greatest influence during menstruation. In this study, eighteen factors were taken into account. Using the SPSS software, factor analysis was used to identify the most important health and precautionary aspects.

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2. Survey if Literature

Oche M. O.et al (2012): Dealt "menstrual health: the unmet needs of adolescent girls' in Sokoto, Nigeria". The study is aimed to assess the level of knowledge on menstruation and hygienic practices among adolescent school girls in an urban city, Nigeria. The study was a cross sectional survey and a total 122 girls from 4 out of the 9 schools' were recruited using a multistage sampling technique to select the schools, and systematic sampling method proportionate to size (proportion of total study unit accounted by each school) after a random selection of the first respondent, using the list of students as the sampling frame and sampling interval of 30. Overall, a total of 79 (65%) of the respondents had high knowledge.15% of respondents' indicated their major source of information on menstruation from their school teachers. There is a significant gap in knowledge and with minimal role played by the school environment to provide appropriate information during their formative years. The ages of the respondents (P = 0.93), education of their mothers (P = 0.173) and the sources of information regarding menstruation (P = 0.575) were found not to be statistically significant with respect to the knowledge of menstruation while there was a statistically significant relationship between religion (P = 0.0001) and level of study of the girls and knowledge of menstruation (P = 0.048) Concerning the practice of menstrual hygiene, the majority 106 (87%) of the girls used sanitary pads, only. There was a significant statistically association between education of their mothers (P = 0.015), religion (P = 0.0001) and occupation of respondents mother (P = 0.0028) with respect to the reported menstrual hygiene practices.

Marni Sommer et al (2015): In the paper "**Comfortably, Safely, and Without Shame: Defining Menstrual Hygiene Management as a Public Health Issue"** found that in recent years, the menstrual hygiene management challenges facing schoolgirls in low-income-country contexts have gained global attention. Authors applied Gusfield's sociological analysis of the culture of public problems to better understand how this relatively newly recognized public health challenge rose to the level of global public health awareness and action. **S**imilarly they applied the conceptualization by Dorfman et al. of the role of public health messaging in changing corporate practice to explore the conceptual frames and the news frames that are being used to shape the perceptions of menstrual hygiene management as an issue of social justice within the context of public health.The analysis suggests that interest and action on the issue of MHM had their initial origins in the global concern for narrowing the gender gap in education. Important lessons were revealed for getting other public health problems onto the global-, national-, and local-level agendas.

Williams C.E., Creighton S.M. (2012): In the paper "Menstrual Disorders in Adolescents: Review of Current Practice" found that menstrual disorders are common in adolescent girls. Periods can be irregular, heavy and/or painful, especially in the first few years following menarche. Serious pathology is rare; however, menstrual dysfunction can have a significant effect on daily activities and result in school absence. There are many treatment options which are safe to use in adolescents, although the evidence for their use is extrapolated from adult data. This paper presents

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a clinical review of the current practice, including management of girls with other medical problems and learning difficulties. In addition, girls with learning difficulties and their families may find even normal menstruation difficult to manage due to pain, fear or hygiene issues and may request intervention.

3. KMO and Bartlett's Test

Table 3 : KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.704
Bartlett's Test of Sphericity	Approx. Chi-Square	7443.772
	Df	153
	Sig.	.000

From the above table the KMO calculated value 0.704 is greater than 0.5, which indicates that the data is adequate. The Bartlett's test is another indication of the strength of the relationship among the variables. In our study Bartlett value < 0.05. Which indicates the multi normality among variables?

4. Analysis of Descriptive Statistics

The results of analysis of descriptive Statistics for all the variables under investigation are presented below.

Table 4: Descriptive Statistics

	Mean	Std. Deviation	Analysis N
IRRMC_1	2.82	1.185	1500
HB_2	2.83	1.161	1500
SPOTTING_3	3.02	1.228	1500
ABP_4	2.93	1.164	1500
BACKP_5	2.96	1.153	1500
SLEEP_6	2.83	1.201	1500

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WEAK_7	3.02	1.214	1500
INFECTION_8	2.86	1.128	1500
DW_9	3.14	1.381	1500
DIRRV_10	2.79	1.320	1500
CD_11	2.85	1.116	1500
PLAY_12	2.93	1.112	1500
RASH_13	2.78	1.073	1500
MPD_14	2.85	1.113	1500
ANTIB_15	2.94	1.051	1500
DPM_16	2.84	1.107	1500
YOGA_17	2.79	1.100	1500
DIP_18	3.03	1.108	1500

The mean , standard deviation and number of respondents (N) who participated in the survey are given in the table 3 is a table of descriptive statistics for all the variables which shows the mean rating and standard deviations of 18 factors regarding health problems facing during menstrual cycle. The mean ranged from 2.78 to 3.14; standard deviation from 1.051 to 1.381.

5. The Initial Factor Analysis Solution (Extraction Method: PCA)

Communalities: The communalities which shows how much of the variance in the variables has been accounted for by the extracted factors for instances 89% of the variance in factors " heavy bleeding", "spotting", " medicine prescribed by doctor" are accounted for while, 87% in "how many times you consulted the doctor" (Table 4).

Initial: By definition, the initial values of communality in principle components analysis are always 1.

Extraction: Extraction is the final estimate of the communality which is given in the third column, of the table 4 the value in this column indicates the proportion of each variables variance that can be explained by the principle components. The variables with high values are well represented in the column of the extraction space. The table 4 shows the initial and final communalities for each factor.

Table 4: Communalities

	Initial	**Extraction**
IRRMC_1	1.000	.471
HB_2	1.000	**.889**

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SPOTTING_3	1.000	**.887**
ABP_4	1.000	**.743**
BACKP_5	1.000	**.537**
SLEEP_6	1.000	.309
WEAK_7	1.000	**.569**
INFECTION_8	1.000	**.504**
DW_9	1.000	**.540**
DIRRV_10	1.000	**.546**
CD_11	1.000	**.873**
PLAY_12	1.000	**.825**
RASH_13	1.000	**.506**
MPD_14	1.000	**.858**
ANTIB_15	1.000	**.708**
DPM_16	1.000	**.828**
YOGA_17	1.000	**.818**
DIP_18	1.000	**.680**
Extraction Method: Principal Component Analysis.		

6. Total Variance Explained

Eigen value actually reflects the number of excreted factors whose sums should be equal to number of items which are subjected to factor analysis. The next item show all the factors extract table from the analysis along with their eigen values. Eigen value table has been divided into three sub sections, that is, initial eigen values, excreted sums of squared loadings and rotation sums of square loadings. The factor greater than 1 are considered as most influencing factors. This is determined by examining the total variance explained shown in the table 5

Table 5: Total Variance Explained

Component	Initial Eigen values			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.237	17.982	17.982	3.237	17.982	17.982	3.222	17.902	17.902
2	1.868	10.379	28.361	1.868	10.379	28.361	1.849	10.272	28.173

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3	1.658	9.210	37.571	1.658	9.210	37.571	1.658	9.211	37.384
4	1.169	6.496	44.067	1.169	6.496	44.067	1.136	6.312	43.696
5	1.093	6.072	50.139	1.093	6.072	50.139	1.077	5.985	49.681
6	1.043	5.795	55.934	1.043	5.795	55.934	1.063	5.903	55.585
7	1.018	5.657	61.591	1.018	5.657	61.591	1.046	5.811	61.395
8	1.004	5.576	67.167	1.004	5.576	67.167	1.039	5.772	67.167
9	.985	5.472	72.639						
10	.951	5.282	77.922						
11	.939	5.218	83.140						
12	.888	4.934	88.074						
13	.849	4.717	92.791						
14	.418	2.324	95.115						
15	.340	1.891	97.006						
16	.224	1.247	98.253						
17	.192	1.065	99.318						
18	.123	.682	100.000						
Extraction Method: Principal Component Analysis.									

Component-There are as many components extracted during a principle components analysis as there are variables that are put into it. In our study, we used 18 variables and 8 components are extracted.

Initial Eigen Values-Initial eigen values are the variance of the principle components in which the communalities are one. Because we conducted our principle component analysis on the correlation matrix, the variables are standardized, which means that the each variable has a variance of 1, and the total variance is equal to the number of variable used in the analysis, in this case 18. The final communalities are estimated by iteration for the principle axis factor analysis, as mentioned earlier. As can be seen from the 5 they are somewhat less than one, and the amount of variance accounted for is reduced, as can be seen in the table 5 in the section headed extraction sums of squared loadings. The rest of the factor analysis is based on first six factors, because first six factors have eigen values greater than one.

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Total-This column contains the eigen values. The first factor will always account for the maximum variance and the next factor will account for lesser variance compared to the first factor as observed and so on. Hence each factor will account for lesser and lesser variance.

Percentage of Variance-This column contains the percent of variance accounted for by each principle component. The knowledge factors whose percentage of variance accounted maximum are further considered for extraction sums of squared loadings and factors sums of squared loadings.

In our case the first eight components total Eigen values are greater than 1. The total Eigen values for the first component are 3.237 which is accounted for 17.982% of variance extracted. For the second component the total eigen values is 1.868 which accounts for 10.379% of variance. For the third component the total eigen values is 1.658 which is accounted for 9.210% of variance. For fourth component the total eigen values is 1.169 which is accounted for 6.496% of variance. For the fifth component the total eigen values is 1.093 which is accounted for 6.072% of variance extracted. For t For the sixth component the total eigen values is 1.043 which is accounted for 5.795% of variance execrated. For the seventh component the total eigen values is 1.018 which is accounted for 5.657% of variance execrated. For the eighth component the total eigen values is 1.004 which is accounted for 5.576% of variance execrated

Cumulative Percentage- This column contains the cumulative percentage of variance accounted for by the current and all preceding principle components. For example, the eighth row shows a value of 67.167. This means that the first seven components together account for 67.167% of the total variance.

Extraction Sums of Squared Loadings- The six columns of this half of the table exactly reproduce the values given on the same row on the left of the table. The number of rows reproduce on the right side of the table is determined by the number of principal components whose eigen values are 1 or greater.

Rotation sum of squared loadings- In final part of the table labeled ration sum of squared loadings, the eigen values of the factors after rotation are displayed. Rotation has the effect of optimizing the factor structure and one consequence for data is that the relative importance of eight factors is equalized. Before rotation, factor one accounted for considerably more variance than reaming seven, that is 17.982% variance compare to 10.379%,9.210%,6.496%,6.072%,5.795%,5.657%,5.576%, however after extraction it accounts 17.902% of variance compared to 10.272%, 9.211%, 6.312%, 5.985%, 5.903%, 5.811%, 5.772%

7. Scree test – The scree plot is graph of the eigen values against all the factors. The graph is useful for determining how many factors to retain. The point of interest is where the curve start to flatten.

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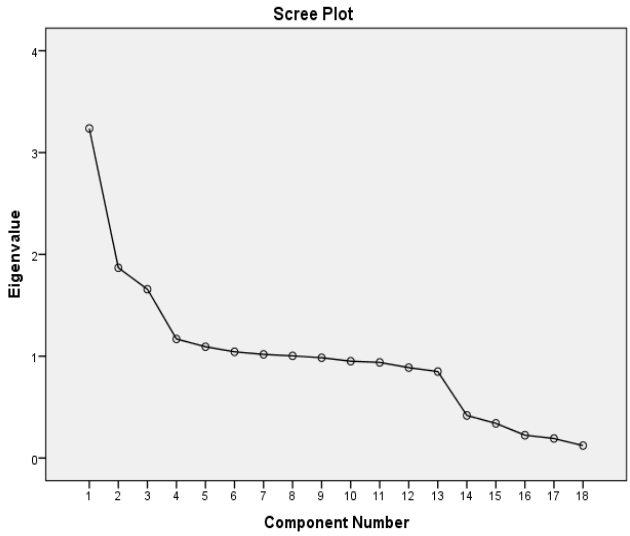

The scree plot graph the eigen values against the component number. From the above scree plot graph, it is clear that the first eight components viz; irregularity in cycle, heavy bleeding, spotting during cycle, abdominal pain during cycle, back pain during cycle, sleepiness during cycle, weakness during cycle, infection during cycle accounts for maximum variance and from ninth component and onwards viz; able to do domestic work, are you facing primary dysmenorrheal/irritability/headache/vomiting, how many time consulted doctor, do you able to play and exercise, do you get rashes/unitary track infection, medicines prescribed by doctor, to avoid infection do you using anti bacterial/sanitizers/homemade remedies, medicine prescribed by doctor, practicing yoga/exercise, discuss menstrual related issues with parents/friends/doctor accounts for smaller and smaller amounts of total variation in the data one can observe from the scree plot which shows that the curve is almost decreasing pattern. We are interested in keeping only those principle components whose egien values are garter then one, that is, only eight factors viz; irregularity in cycle, heavy bleeding, spotting during cycle, and abdominal pain during cycle, back pain during cycle, sleepiness during cycle, weakness during cycle, infection during cycle are retained.

8. Component matrix

The table 7 shows the loadings of 18 variables on the eight factors excreted. The higher absolute value of loading, the more the factor contributes to the variable. Rotation of factors helps in the better interpretation of factors. The following table represents the components loadings for item (prior to rotation). The factor with highly loaded factor values is considered first and the next highest and similarly for all the factors. The factors with highly loaded values (which are greater than 0.5) presented boldly in each component.

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Table 7: Component Matrix

	Component							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
IRRMC_1	.035	.305	.061	-.159	.340	.356	.227	.233
HB_2	-.057	-.919	-.169	.026	.077	.067	.029	-.007
SPOTTING_3	.059	.917	.147	-.001	-.098	-.079	-.064	-.027
ABP_4	-.011	.027	-.051	.175	.430	.091	-.483	.532
BACKP_5	.020	.018	.018	.269	-.283	.106	.544	.276
SLEEP_6	.021	-.047	-.162	.123	-.418	.081	-.107	.268
WEAK_7	.017	.037	-.026	.297	-.302	.598	.132	.109
INFECTION_8	.078	-.002	-.063	.619	-.048	.031	-.268	-.187
DW_9	.056	-.001	.001	.217	.086	-.554	.419	-.004
DIRRV_10	.091	-.007	.074	-.305	-.241	.297	-.177	-.511
CD_11	.933	-.038	-.032	.005	-.005	-.005	-.007	.016
PLAY_12	.041	-.183	.884	.066	.002	-.029	-.041	.042
RASH_13	.070	.131	-.071	.598	.086	-.073	-.131	-.302
MPD_14	.925	-.020	-.029	.023	-.009	.023	.012	-.001
ANTIB_15	.032	.046	-.025	.148	.594	.339	.324	-.331
DPM_16	.908	-.052	-.009	-.011	-.010	-.009	.014	-.003
YOGA_17	.033	-.164	.880	.107	-.009	.048	-.021	.021
DIP_18	.807	-.015	-.017	-.131	.051	-.036	-.026	.081
Extraction Method: Principal Component Analysis.								
a. 8 components extracted.								

9. Rotated Component Matrix

The idea if rotation is to reduce the number of factors on which the variables under investigation have high loadings. Rotation makes interpretation of the analysis easier.

Table 8: Rotated Component Matrix[a]

	Component							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
IRRMC_1	.038	.248	-.016	-.318	.441	.209	-.053	.256
HB_2	-.013	-.942	.001	-.009	-.023	-.005	-.008	.000

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SPOTTING _3	.012	**.939**	-.019	.059	-.002	-.012	-.008	-.015
ABP_4	.006	-.011	.000	.081	-.011	-.088	-.069	**.851**
BACKP_5	.010	.011	.035	-.071	-.031	**.624**	.357	-.114
SLEEP_6	.026	-.035	-.115	.038	-.428	.316	-.061	.076
WEAK_7	-.005	.000	.003	.135	.026	**.696**	-.257	.006
INFECTIO N_8	.038	-.023	.013	**.694**	-.060	.089	-.036	.084
DW_9	.049	.009	.006	.079	.036	-.097	**.701**	-.172
DIRRV_10	.080	.024	.034	-.001	.023	-.096	-.583	-.434
CD_11	**.932**	.001	.004	.059	-.005	.020	.005	-.009
PLAY_12	.018	-.015	**.907**	-.027	-.007	-.035	.014	.000
RASH_13	.023	.093	-.034	**.689**	.111	-.008	.094	-.005
MPD_14	**.921**	.015	.003	.073	.018	.049	-.004	-.023
ANTIB_15	.013	-.068	-.049	.140	**.824**	.051	-.007	-.021
DPM_16	**.908**	-.009	.024	.042	.004	.014	.007	-.039
YOGA _17	.006	-.005	**.903**	.006	.032	.034	-.023	-.011
DIP_18	**.816**	.025	-.001	-.083	-.005	-.061	-.003	.047
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.								
a. Rotation converged in 7 iterations.								

The above rotated component matrix displays the factor loading for each item on each rotated component, which helps in better interpretation of factors. Looking at the above table, we can see that the factor spotting during cycle is heavily loaded on component two. The factors how many time do you consulted doctor, medicines prescribed by doctor, for pain relief do you prefer doctor prescribed medicine, discuss menstrual related issue with parents/friends/doctor are heavily loaded on component one, while the factors do you able to play and exercise and are you practicing yoga/exercise to avoid medicine are heavily loaded on component three, the factors abdominal pain during cycle is heavily loaded on component eight, the factors to avoid infection, are you using anti bacterial/sanitizers/homemade remedies is loaded on component five, the factor are you able to do domestic work during cycle is heavily loaded on component seven, infection during cycle and do you get rashes/urinary track infection are heavily loaded on components four, the factors back pain during cycle and weakness during cycle are heavily loaded on component six. All the other factors are substantially loaded. The heavily loaded factor value in each column of component matrix are considered and tabulated in the following table 10 for factor loading values.

10. Component Transformation Matrix

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The component transformation matrix again displays the correlation among the components prior to and after rotation

Table 9 : Component Transformation Matrix

Component	1	2	3	4	5	6	7	8
1	.996	.046	.028	.061	.017	.019	-.002	-.022
2	-.044	.973	-.181	.034	.119	.042	-.001	.047
3	-.032	.180	.975	-.086	.059	-.034	-.019	-.054
4	-.055	-.040	.108	.839	.025	.377	.317	.190
5	.012	-.099	-.012	-.006	.752	-.411	.148	.484
6	-.009	-.077	.001	-.053	.375	.600	-.690	.122
7	-.001	-.044	-.043	-.328	.409	.453	.569	-.439
8	.039	.015	.039	-.416	-.329	.347	.280	.718
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.								

11. Factors Loadings

The heavily loaded value in each column is considered and tabulated in the following table for factor loading.

Table 10: Factors loading values

Components	Factors name	Factors loading value	Factors name
1	How many time do you consulted doctor	0.932	Precautionary measures during menstrual cycle
	medicines prescribed by doctor	0.921	
	For pain relief do you prefer doctor prescribed medicine	0.908	
	Discuss menstrual related issue with parents/friends/doctor	0.816	

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2	spotting during cycle	0.939	Spotting during cycle
3	Do you able to play and exercise	0.907	Preventions for health problems
	Are you practicing yoga/exercise to avoid medicine	0.903	
4	Infection during cycle	0.694	Possibilities of infection during cycle
	Do you get rashes/urinary track infection	0.689	
5	to avoid infection, are you using anti bacterial/sanitizers/homemade remedies	0.824	Remedies for infection
6	weakness during cycle	0.696	Health problems during cycle
	back pain during cycle	0.624	
7	Are you able to do domestic work during cycle	0.701	Able to do domestic work during cycle
8	Abdominal pain during cycle	0.851	Abdominal pain during cycle

12. The interpretation of health problem issues and precautions taken during menstrual cycle.

From the table 10 it can be seen that, the first component is heavily loaded by the factors, how many time do you consulted doctor with value 0.932 , medicines prescribed by doctor with value 0.921, for pain relief do you prefer doctor prescribed medicine with value 0.908, discuss menstrual related issue with parents/friends/doctor with value 0.816. The second component is heavily loaded by the factors, spotting during cycle with value 0.939. Third component is heavily loaded by the factors, do you able to play and exercise with value 0.907, and are you practicing yoga/exercise to avoid medicine with value 0.903. Fourth component is heavily loaded by the factors, infection during cycle with value 0.694, and do you get rashes/urinary track infection with value 0.689. Fifth component is heavily loaded by the factor, to avoid infection are you using anti

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bacterial/sanitizers/homemade remedies with value 0.824. Sixth component is heavily loaded by the factors, back pain during cycle with value 0.624 and weakness during cycle with value 0.696. Seventh component is heavily loaded by the factor, are you able to do domestic work during cycle with value 0.701 and eighth component is heavily loaded by the factor, abdominal pain during cycle with value 0.851.

Looking at the analysis of above table we can interpret the component 1 as precautionary measures during menstrual cycle, the component 2 as spotting during cycle, component 3 as preventions for health problems, component 4 as possibilities of infection during cycle, component 5 as remedies for infection, component 6 as health problems during cycle, component 7 as able to do domestic work during cycle, component 8 as abdominal pain during cycle which are the major influencing health and precautionary variables for school going girls.

13. Conclusion

Health related practices and precautionary measures during the menstruation are of considerable importance as it has impact on health. In our study the factor analysis identified the most decisive health factors which are spotting, infection, rashes or urinary track infection, back pain, weakness and abdominal pain during menstrual cycle. Though the awareness about menstruation is not satisfactory [C.P.S.Hungung et al (2019)] but they discuss their health problems and remedies related to menstruation with their parents, friends or doctors. It also noted that majority of the girls prefers doctor prescribed medicines and taking precautionary measures by performing yoga or exercise daily in order to be healthy and able to do domestic work. Many of them using sanitizers and homemade remedies to avoid infection.

Good hygiene practices such as use of sanitary pads and adequate washing of genital area are essential during menstruation. Adolescent school going girls need access to clean and soft absorbent sanitary products which can in long run protect their health. Along with hygiene related practices during menstruation a simple modifications in life style such as,

- Exercising 3 to 4 times each week
- Practicing yoga every day
- Eating well balanced diet that includes whole grain, vegetables and fruits, and decreasing salt, sugar, calories and alcohol intake
- Getting adequate sleep and rest

Can help to keep themselves healthy during menstrual period.

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