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Statistics

KEY WORDS: Menstruation, Perception of Knowledge Factors , Adolescent School Girls,Component Matrix, Rotated Component Matrix

THE PERCEPTION OF KNOWLEDGE REGARDING MENSTRUATION AMONG THE HIGH SCHOOL STUDENTS OF KALABURAGI DISTRICT- A FACTOR ANALYSIS APPROACH

Dr, C. P. S. Hungund Department of Statistics, Gulbarga University Kalaburagi-585106, India

Ashwini S. R* Department of Statistics, Gulbarga University Kalaburagi-585106, India *Corresponding Author

ABSTRACT

Knowledge regarding menstruation, reproduction, contraception and diet is still lacking among school girls. Adolescent period is very important for females as it is a transition phase characterized by rapid physical growth, psychological and behavioral changes. Adolescence is defined by the world health organization as the age group between 10 and 19 years. Menarche generally occurs between the ages of 11 and 15 years with a mean of around 13 years [Rakhi Jain et al, (2017)]. The present study aimed at studying the awareness levels of menstruation and related aspects among adolescent school going girls, in the age group of 12 to 16 years, of 5 talukas of Kalaburagi district. A factor analysis approach is used to find the most decisive awareness factors regarding the perception of knowledge among the high school students of Kalaburagi district.

1.1 INTRODUCTION

Menstruation is a natural part of the female reproductive cycle in which periodic discharge of blood from the uterus exits through the vagina; it is the natural onset of puberty. For females, the menarche is one of the most memorable and defining moments of adolescence. Menstruation has been surrounded by taboos and myths that eliminate women from many aspects of socio-cultural life [Alzahrani, Amel Fayed(2018)]. Many studies reported that many girls had lots of misconception about the psychological changes during menstrual periods. Most of this information acquired from their mothers, television, friends and teachers. Menstruation is still considered as something shameful and young girls face many restrictions.

Menstruation is considered unclean and dirty in many societies. Taboos, myths and restrictions associated with menstruation leave a negative impact on adolescent girls. Previous studies have shown that many adolescent girls use cloth or no protection during menstruation which is highly unhygienic. Because of the entire stigma associated with menstruation, adolescent girls do not often discuss this topic openly with their parents and therefore lack adequate knowledge regarding menstruation and puberty. With this background the present study aimed at studying the awareness levels of menstruation and related aspects among adolescent school going girls, in the age group of 12 to 16 years, of 5 talukas of Kalaburagi district viz; Aland, Jevargi, Sedam, Chitapur and Kalaburagi with 1500 respondents. The respondents were selected randomly from high schools of five talukas. Structural questioners were formulated and information on the knowledge related to menstrual and related aspects were collected. A factor analysis test is conducted to find the most decisive awareness factors regarding the perception of knowledge among the high school students of Kalaburagi district.

In this paper the most influencing awareness factors regarding knowledge related to menstruation in which most of the girls gained information were identified through factor analysis by using SPSS package. To know the data adequacy and eligibility for the factor analysis we perform KMO and Bartletts test in the following sections.

1.2. SURVEY OF LITERATURE

Kartik Ramachandra, et al (2015): In the paper "A study on knowledge and practices regarding menstrual hygiene among urban adolescent girls" found that adolescence is a significant period in the life of a woman. Adolescent girls often lack knowledge regarding reproductive health including menstruation which cans be due to socio-cultural barriers in which they grow up. These differences create various problems for the adolescent girls. The need of the hour for girls is to have the information, education and an enabling environment to cope with menstruation issues. Hence the study explored the level of knowledge and practices regarding menstrual hygiene among the adolescent girls into menstruation can have an effect on their health. Finally they have concluded that there is need to equip the adolescent girls with knowledge regarding safe, hygiene practices to enable them to lead a healthy reproductive life.

Jagruti Prajapati*1,Riddhi Patel2 (2015): In the paper "Menstrual hygiene among adolescent girls: A cross sectional study in urban community of Gandhinagar" found that menstruation & menstrual practices are still bounded by socio cultural restriction & taboos resulting in adolescent girls remain ignore of scientific facts & hygienic practices during menstruation. The main objectives of the paper is to assess the knowledge, the restriction practiced, and practices of menstrual hygiene among the adolescent girls during menstruation. The cross sectional study reveals that menstrual hygiene was satisfactory among the adolescent girls but lack of knowledge and awareness regarding menstruation. Hence they concluded that education regarding reproductive health and hygiene should be given by Anganawadi workers as well as in schools.

Shriram Vitthal Gosavi, et al (2015): In the paper "Awareness and practices about menstrual hygiene and its impact among migrant adolescent girls of Dera: a community based cross-sectional study from Nashik (Maharashtra)" found that Onset of menstruation is one of the most important changes occurring during adolescence. In various parts of India, there are several cultural traditions, myths and misconceptions related to menstruation, which make them vulnerable to genital tract infections. There is very little awareness about menstruation among girls when they first experience it. Social prohibitions and negative attitude of parents in discussing the related issues openly has blocked the access of adolescent girls to right kind of information especially among migrant adolescent girls. Women having better knowledge regarding menstrual hygiene and safe practices are less vulnerable to Reproductive Tract Infections (RTI) and its consequences. Hence this study was conducted with objective to assess awareness and practices of menstrual hygiene among adolescent in migrant population. The study results reveals that lack of awareness about proper menstrual hygiene and improper sanitary practices may be because of social prohibition, educational gap and negative attitude of parents in discussing menstrual related topic openly. There is need to give focus on such migrated adolescents girls to aware them about proper menstrual hygiene and practices.

1. 3. KMO and Bartlett's Test

Table 1.3 : KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.825
Bartlett's Test of Sphericity	Approx. Chi-Square	3908.774
	Df	136
	Sig.	.000

The KMO – Bartlett's test significance value are, KMO 0.5 and Bartlett's value < 0.05. This significance paves the way for factor analysis. From the above table the KMO calculated value 0.825 is greater then 0.5, which indicates that the data is adequate. Bartlett's test of Sphericity is used to test the null hypothesis that correlation matrix is an identity matrix, since calculated P value 0.000 is less than 0.05, which indicates multi normality among the variables.

1.4. Analysis of Descriptive Statistics

The results of analysis of descriptive Statistics are presented below

Table1. 4: Descriptive Statistics

	Mean	Std. Deviation	Analysis N
MMC_1	1.98	.801	1500
CMC_2	1.89	.770	1500
SMB_3	2.06	.834	1500
AGEM_4	2.20	.781	1500
ADBF_5	2.14	.808	1500
DCD_6	2.21	.793	1500
QBF_7	1.94	.802	1500
ORGAN_8	2.04	.841	1500
DNMC_9	2.16	.795	1500
OMO_10	2.01	.801	1500
FO_11	2.08	.799	1500
MBUH_12	1.93	.799	1500
KMH_13	2.01	.790	1500
IBMC_14	2.14	.786	1500
ADMC_15	2.16	.787	1500
ISN_16	2.09	.785	1500
DP_17	2.21	.781	1500

The table 4 is a table of descriptive statistics for all the variables which shows the mean rating and standard deviations of 17 factors regarding awareness of knowledge about menstrual cycle. The mean ranged from 1.86 to 2.21; standard deviation from 0.770 to 0.841.As evidenced by the ratings, the highest mean score ratings for the factors source of the knowledge, duration of cycle in days and age at menarche attend regarding menstrual cycle among the high school students which are the most important variables that influences students to have the knowledge about menstruation with mean scores 2.21 and 2.20. Analysis also reveals that the factors of knowledge about the menstruation viz; duration of natural menstrual cycle, absorbent should be use during menstrual cycle, average duration of blood flow, interval between menstrual cycle, knowledge about ideal sanitary napkin, foul odder, source of menstrual blood, knowledge of organ where bleeding occurs, know about menstrual hygiene and how often menstruation occurs are equally important to have knowledge about menstruation which shows the mean rate more than 2. The reaming variables meaning of menstrual cycle, cause of menstrual cycle, quantity of blood flow and menstrual blood is unhygienic scores the mean nearly 2.

The variable knowledge of organ where bleeding occurs has the highest standard deviation with score 0.841 followed by the source of menstrual blood scores standard division 0.834 and the variables average duration of blood flow, meaning of menstrual cycle, quantity of blood flow and how often menstruation occurs has standard deviation more than 0.8 and the reaming variables have standard deviation nearly 0.8.

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

Communalities: The sum of the squared factor loadings for all factors for a given variables (row) is the variance in that variable accounted for by all the factors and this is called the communality.

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 table1.5, 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 1.5 show the initial and final communalities for each factor.

Table 1.5:Communalities

	Initial	Extraction
MMC_1	1.000	**.667**
CMC_2	1.000	**.661**
SMB_3	1.000	**.584**
AGEM_4	1.000	.447
ADBF_5	1.000	**.573**
DCD_6	1.000	.450
QBF_7	1.000	**.647**
ORGAN_8	1.000	.472
DNMC_9	1.000	**.562**
OMO_10	1.000	.377
FO_11	1.000	**.682**
MBUH_12	1.000	**.542**
KMH_13	1.000	**.586**
IBMC_14	1.000	**.682**
ADMC_15	1.000	.479
ISN_16	1.000	**.606**
DP_17	1.000	**.616**

Extraction Method: Principal Component Analysis.

From above table of communalities which shows how much of the variance in the variables has been accounted for by the extracted factors. For instance the variance in the factor interval between menstrual cycle and foul odder accounted for 68.2%, meaning of menstrual cycle is accounted for 66.7%, cause of menstruation accounted for 66.1%, quantity of blood flow accounted for 64.7%, disposal place accounted for 61.6%, ideal sanitary napkin accounted for 60.6%, know about menstrual hygiene accounted for 58.6%, source of menstrual blood accounted for 58.4%, average duration of blood flow accounted for 57.3%, duration of natural menstrual cycle accounted for 56.2%, while menstrual blood is unhygienic accounted for 54.2%. The communality value which should be more than 0.5 to be considered for further analysis.

1.6. Total Variance Explained

The table 1.6 shows the eigen values and the amount of variance explained by each successive factor. The factor greater than 1 are considered as most influencing factors. This is determined by examining the total variance explained shown in the table1.6

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 17 variables and 6 components are extracted.

Table1.6: 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	3.910	22.998	22.998	3.910	22.998	22.998	2.196	12.920	12.920
2	1.274	7.491	30.489	1.274	7.491	30.489	1.921	11.298	24.217
3	1.220	7.177	37.666	1.220	7.177	37.666	1.695	9.971	34.188
4	1.132	6.662	44.328	1.132	6.662	44.328	1.364	8.021	42.209
5	1.079	6.345	50.672	1.079	6.345	50.672	1.229	7.228	49.438
6	1.017	5.982	56.654	1.017	5.982	56.654	1.227	7.216	56.654
7	.882	5.187	61.841						

8	.830	4.884	66.725						
9	.794	4.670	71.395						
10	.759	4.467	75.862						
11	.705	4.149	80.011						
12	.678	3.987	83.998						
13	.627	3.687	87.685						
14	.600	3.529	91.213						
15	.560	3.292	94.506						
16	.491	2.888	97.394						
17	.443	2.606	100.000						
Extraction Method: Principal Component Analysis.									

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 17. The final communalities are estimated by iteration for the principle axis factor analysis, as mentioned earlier. As can be seen from the table 1.5 they are somewhat less than one, and the amount of variance accounted for is reduced, as can be seen in the table 1.6 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.

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 six components total eigen values are greater than 1. The total eigen values for the first component is 3.910 which is accounted for 22.998% of variance extracted. For the second component the total eigen values is 1.274 which accounts for 7.491% of variance. For the third component the total eigen values is 1.220 which is accounted for 7.177% of variance. For fourth component the total eigen values is 1.132 which is accounted for 6.662% of variance. For the fifth component the total eigen values is 1.079 which is accounted for 6.345% of variance extracted. For the sixth component the total eigen values is 1.017 which is accounted for 5.982% of variance exctated.

Cumulative Percentage- This column contains the cumulative percentage of variance accounted for by the current and all preceding principle components. For example, the sixth row shows a value of 56.654. This means that the first six components together account for 56.654% 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 six factors is equalized. Before rotation, factor one accounted for considerably more variance then reaming five, that is 22.998% variance compare to 7.491%, 7.177%, 6.662%, 6.345%, 5.982%, however after extraction it accounts 12.920% of variance compared to 11.298%, 9.971%, 8.021%, 7.228%, 7.216%.

Scree test –A scree plot is a simple line segment plot that shows the fraction of total variance in the data. It is graphical method for determining the number of factors is called scree test, it is descending order of magnitude, of eigen values of correlation matrix. In the context of factor analysis or principal component analysis, scree plot help us the analysis to visually assess which component or factor explain most of the variability in the data.

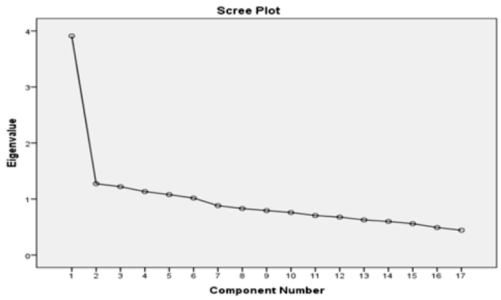

Fig – 1.6. scree plot

The scree plot graph the eigen values against the component number. From the above scree plot graph, it is clear that the first six components viz; meaning of menstrual cycle ,cause of menstrual cycle, source of menstrual blood, Age at which menarche attend, average duration of blood flow, duration of cycle in days accounts for maximum variance and from seventh component and onwards viz; quantity of blood flow, knowledge of organ, duration of natural menstrual cycle, how often menstruation occurs, foul odder, menstrual blood is unhygienic, know about menstrual hygiene, interval between menstrual cycle, absorbent used during menstrual cycle, ideal sanitary napkin, disposal place 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 meaning of menstrual cycle ,cause of menstrual cycle, source of menstrual blood, Age at which menarche attend, average duration of blood flow, duration of cycle in days.

1.7. Component matrix

The principle component matrix gives the component matrix which is rotated using the Varimax with Kaiser Normalization rotation technique which gives the rotated component matrix with factor loading values. 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.

Table1.7:Component Matrix[a]

	Component					
	1	2	3	4	5	6
MMC_1	.295	**.628**	-.319	-.246	.107	-.110
CMC_2	.054	**.516**	.353	.387	-.145	.312

SMB_3	.466	.101	-.316	.477	-.076	.153
AGEM_4	**.614**	.003	-.218	.099	.108	.025
ADBF_5	**.648**	-.063	-.258	.164	-.065	.228
DCD_6	**.565**	-.026	-.054	-.133	-.240	.229
QBF_7	.497	-.378	.145	.311	.358	.107
ORGAN_8	.454	.001	-.019	.408	-.211	-.236
DNMC_9	**.522**	-.023	-.302	-.150	-.180	-.378
OMO_10	**.569**	.156	.071	.044	.083	-.120
FO_11	.406	.188	-.239	-.456	.176	.431
MBUH_12	.213	.483	.481	-.019	-.118	-.133
KMH_13	.365	.211	.239	-.023	**.517**	-.287
IBMC_14	**.531**	-.180	.428	-.164	.238	.318
ADMC_15	.499	-.151	.041	-.026	.256	-.373
ISN_16	.486	-.113	.262	-.159	-.485	-.165
DP_17	**.571**	-.223	.245	-.304	-.291	.048
Extraction Method: Principal Component Analysis.						
a.6 components extracted.						

1.8. 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 1.8: Rotated Component Matrix[a]

	Component					
	1	2	3	4	5	6
MMC_1	.165	-.041	.313	.466	.153	-.547
CMC_2	.167	-.080	-.108	-.007	.782	.057
SMB_3	.755	-.029	.000	.042	.103	.002
AGEM_4	.531	.150	.286	.228	-.076	.052
ADBF_5	.655	.227	.057	.264	-.046	.129
DCD_6	.349	.463	-.019	.327	.035	.074
QBF_7	.392	.036	.343	-.026	-.097	.603
ORGAN_8	.529	.244	.186	-.289	.108	-.049
DNMC_9	.344	.413	.291	.052	-.273	-.334
OMO_10	.319	.238	.425	.126	.148	.005
FO_11	.123	.108	.061	.806	-.043	.012
MBUH_12	-.103	.254	.287	-.014	.607	-.129
KMH_13	.003	-.056	.740	.092	.141	.078
IBMC_14	.035	.328	.291	.341	.138	.595
ADMC_15	.191	.214	.590	-.039	-.200	.082
ISN_16	.112	.757	.074	-.083	.086	-.016
DP_17	.088	.727	.101	.176	-.018	.194
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.						
a. Rotation converged in 11 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 foul odder is heavily loaded on component four while cause of menstrual cycle is heavily loaded on component five, the factors ideal sanitary napkin and disposal place are heavily loaded on component two, the factors know about menstrual hygiene and average duration of menstrual cycle loaded on component three, the factors source of menstrual blood, age at which menarche attend, knowledge of organ where menstrual blood occurs, are heavily loaded on component one and the factors quantity of blood flow, interval between menstrual cycle are heavily loaded on components 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 for factor loading values.

1.9. Component transformation Matrix

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
1	.614	.535	.470	.303	.048	.146
2	.015	-.227	.159	.295	.701	-.587
3	-.471	.311	.219	-.259	.576	.485
4	.608	-.387	-.067	-.589	.295	.204
5	-.118	-.630	.614	.260	-.162	.344
6	.131	-.136	-.570	.582	.247	.489
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.						

1.10. Factors Loadings

The factors with highly loaded factor values is considered first and the next for the next highest and similarly for all the factors. The heavily loaded value in each column is considered and tabulated in the following table for factor loading.

Table 1.10: Factors loading values

Components	Factors name	Factors loading value	Factors name
1	Source of menstrual blood	0.755	Knowledge about Menstrual cycle
	Age at which menarche attend	0.531	
	Average duration blood flow	0.655	
	Knowledge of organ where menstrual blood occurs	0.529	
2	Ideal sanitary napkin	0.757 0.727	Use and Disposal of Napkins
	Disposal place		

3	Know about menstrual hygiene	0.740	Knowledge about Menstrual hygiene
	Average duration of menstrual cycle	0.655	
4	Foul odder	0.806	Foul odder
5	Menstrual blood is unhygienic	0.607	Cause of menstruation
6	Quantity of blood flow	0.603	Blood flow during menstrual cycle
	Interval between menstrual cycle	0.595	

1.11. The Interpretation of factors of Perception of Knowledge about

Menstruation

The rotated component matrix shows that our first component is heavily loaded by following factors and is measured by

- SMB-Source of menstrual blood, with value 0.755
- AGEM-Age at which menarche attend, with value 0.531
- ADBF-Average duration blood flow, with value 0.655
- ORGAN-Knowledge of organ where menstrual blood occurs, with value 0.655

These variables all relate to the respondents receiving clear information on assessment of knowledge about menstrual cycle. Therefore we interpret component 1 as **"Knowledge about Menstrual cycle."**

Second component is heavily loaded and is measured by

- ISN-Ideal sanitary napkin, with values 0.757
- DP-Disposal place, with values 0.727

These variables all relate to the respondents receiving clear information on use and disposal of sanitary napkins. Therefore we interpret component 2 as **"Use and Disposal of Napkin".**

Third components is heavily loaded and is measured by

- KMH-Know about menstrual hygiene, with value 0.740
- ADMC-Average duration of menstrual cycle, with value 0.655

These variables all relate to the respondents receiving clear information on knowledge about menstrual hygiene. Therefore we interpret component 3 as **"Knowledge about Menstrual** hygiene"

Fourth component is heavily loaded and is measured by

- FO-Foul odder, with value 0.806

These variables all relate to the respondents receiving clear information on foul odder during menstrual cycle. Therefore we interpret component 4 as **"Foul odder"**

Fifth components is heavily loaded and is measured by

- MBUH- Menstrual blood is unhygienic, with value 0.607.782

These variables all relate to the respondents receiving clear information on cause of menstrual cycle. Therefore we interpret component 5 as **"Cause of Menstrual cycle"**

Sixth components is is heavily loaded and is measured by

- QBF-Quantity of blood flow, with value 0.603
- IBMC-Interval between menstrual cycle, with value 0.595

These variables all relate to the respondents receiving clear information on blood flow during MC. Therefore we interpret component 6 as **"Blood flow during menstrual cycle."**

The interpretation of the most decisive factors, knowledge about menstrual cycle, use and disposal of napkins, knowledge about menstrual hygiene, fouls odder, cause of menstruation, blood flow during MC.

1.12. CONCLUSION

The results of factor analysis reveals that the factors of knowledge about menstrual cycle, use and disposal of napkins, knowledge about menstrual hygiene, fouls odder, cause of menstruation and blood flow during menstruation cycle are the most decisive factors of knowledge about menstruation

The study was conducted to ascertain knowledge about menstruation among high school going girl students. The study revealed that the knowledge and awareness is satisfactory. Lack of sufficient knowledge and awareness among girls regarding menstruation may be due to low level of education among themselves and their mother. Hence all mothers irrespective of their educational status should be taught to break there inhibitions about discussing with their daughters regarding menstruation before the age of menarche. Also education regarding knowledge about menstruation should be included as a part of school curriculum.

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