"EFFECT OF HEALTH EDUCATION ON KNOWLEDGE AND ATTITUDE OF REPRODUCTIVE HEALTH AMONG PRE-UNIVERSITY GIRLS IN AN URBAN AREA."

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LIST OF ABBREVIATIONS USED

S.No.	Abbreviations	Expansion of the abbreviations
1.	WHO	World health organization
2.	UNICEF	United Nations Children's Fund
3.	NFHS	National Family Health Survey
4.	STD	Sexually Transmitted Diseases
5.	PUC	Pre-university college
6.	DDPI	Deputy Director of Public Instructions
7.	NGO	Non-Governmental Organization
8.	CPI	Consumer price index
9.	SES	Socioeconomic Status
10.	MF	Multiplication factor
11.	SPSS	Statistical package for social science
12.	PG	Post graduate
13.	%	Percentage
14.	>	Greater than
15.	<	Lesser than
16.	≤	Lesser than or Equal to

ABSTRACT

TITLE: EFFECT OF HEALTH EDUCATION ON KNOWLEDGE AND ATTITUDE OF REPRODUCTIVE HEALTH AMONG PRE-UNIVERSITY GIRLS IN AN URBAN AREA

Introduction:

According to World Health Organization, Reproductive health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity in all matters relating to reproductive system and its functions and process.

Adolescence denotes the transition period from child to adult. As per WHO, those who are 10-19 years old belong to this category and this phase brings out both biological and psychological growth in children. India has nearly 250 million adolescents of which 45% of them are females according to 2011 census.

Puberty that occurs during adolescence marks a time of increased susceptibility to leaving school, early marriage and teenage pregnancy. For every women, menstruation is a natural physiological process that occurs throughout their reproductive years and adolescence is a critical period which marks the beginning of menstruation process where the females have to prepare and adjust themselves to manage them. Several belief and cultural taboos has been the problem for both adolescent girls and women in both rural and urban areas.

According to National Family Health Survey 5, only 77.3% of women aged 15-24 years use hygienic methods of protection during their menstrual period. Other major problems in adolescent age group are child marriage, early pregnancy and child birth.

Child marriages are more common in developing countries which violates children's rights and exploits their health.

Early marriage mainly affects the education of the girls which leads to lack in job prospects and skills thereby contributing to poverty in family and affecting overall economy of the country. Recently there has been a decline in prevalence of adolescent girls getting married before 18 years. This is mainly due to multiple factors such as strong legislation, strong public messaging about child marriage illegality, increased literacy in mothers and increased rate in girl's education.

In India, there is very little awareness among the adolescent girls regarding reproductive health as there is social prohibition and negative attitude among parents in discussing these matters with them thereby blocking access to right information.

According to NFHS-5 statistics, 12.6% of females belonging to 15-19 years are already married which is more in rural (14.6%) than urban(7.3%). 18% female aged 15-19 years with no schooling have already begun childbearing. Recent statistics shows that 7% of female aged 15-19 years gave birth to child already. The level of teenage pregnancy decreases with increasing level of schooling.

Health education given to adolescent girls improve their knowledge, encourages them to improve and maintain their health, prevent diseases and reduce risky behaviors. Health decisions taken by one generation will affect the health and wellbeing of next generation.

Investing right knowledge in girls directs better future for women, children and families thereby leading to intergenerational impact. Therefore this study was undertaken to assess the knowledge and attitude of reproductive health among pre-

university girls in the urban area of Belagavi. After the health education intervention, knowledge and attitude of pre-university girls was assessed again to see the impact.

Objective:

To assess the effect of health education on knowledge and attitude of reproductive health among pre-university girls.

Materials and Methods:

The present study was an interventional study conducted to assess the effect of health education on knowledge and attitude of reproductive health among pre-university girls in the urban area of Belagavi. Data was collected for 1 year from 1st January 2021 to 31st December 2021. A sample size of 500 was calculated and obtained by systematic random sampling method. Pre-university girls studying in I and II PUCs were randomly selected from 4 colleges (125 Girls from each college), one from each zone (North, South, East, West) for the study.

Ethical clearance was obtained from Institutional Ethical Committee. Data was collected regarding socio-demographic variables, knowledge and attitude about puberty and menstruation, pregnancy, antenatal care and contraception. Knowledge was assessed by multiple choice questions and attitude was assessed using 5 point Likert scale.

Pre-test was followed by health education session. Health education was given using audio-visual aids such as lecture videos, power point presentation and flip charts. Health education session was followed by interactive session where the students doubts were clarified. After 1 month, impact of health education on knowledge and attitude of reproductive health were assessed by administering the post-test questionnaire.

Results:

Mean age of the participants was 17.15± 0.7 years. 279(55.8 %) were in Class III SES. 248(49.60%) of participants answered menstruation is physiological process which was increased to 405(81%) in post-test. 364(72.8%) of them answered that interval between two menstrual cycles was 21-35 days which was increased to 433(86.6%). There was also improvement in usage of sanitary pad from 79.8% to 93.6% and correct disposal of pads in dustbin from 89.2% to 95.4% after intervention. 29.8% strongly agreed that poor menstrual hygiene predisposes to infection which was increased to 42.8% in the post-test.

Conclusion:

The present interventional study showed significant improvement in knowledge and attitude regarding reproductive health among pre-university college girls in urban area of Belagavi, Karnataka. Among the 500 participants 70.5% of the study participants gained knowledge regarding menstruation from their mothers. 66% of the participants attained menarche between 10-15 years. Therefore more emphasis should be given to health education and peer education programmes in young age to improve the quality of reproductive health in adolescents.

Keywords: Reproductive health, Menstruation, Knowledge, Attitude, Puberty.

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INTRODUCTION

According to World Health Organization, Reproductive health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity in all matters relating to reproductive system and its functions and process.[1]

The term Adolescent is taken from the Latin word adolescere which means to grow into maturity. Likewise it denotes the transition period from child to adult. As per WHO, those who are 10-19 years old belong to this category and this phase brings out both biological and psychological growth in children. [2] India has nearly 250 million adolescents of which 45% of them are females according to 2011 census.[3]

In 1994, the International Conference on Population and Development requested specific reports in reproductive health to appreciate the required reproductive and sexual health needs of the young people. Throughout the world, adolescence is the most pivotal period for girls. Puberty that occurs during adolescence marks a time of increased susceptibility to leaving school, early marriage and teenage pregnancy. [4]

For every women, menstruation is a natural physiological process that occurs throughout their reproductive years and adolescence is a critical period which marks the beginning of menstruation process where the females have to prepare and adjust themselves to manage them. [5] In this society, menstrual hygiene is neither properly acknowledged, never received adequate attention. This inadequate knowledge leads to negative implication on female's health and it also needs special attention because of the physical and emotional problems associated along with it. [6]

Several belief and cultural taboos has been the problem for both adolescent girls and women in both rural and urban areas. Also, discussing sexual and reproductive health within and between generations is restricted by several cultural taboos.[7] According to National Family Health Survey 5, only 77.3% of women aged 15-24 years use hygienic methods of protection during their menstrual period.[8]

Other major problems in adolescent age group are child marriage, early pregnancy and child birth. Child marriages are more common in developing countries which violates children's rights and exploits their health. According to UNICEF, child marriage is defined as marriage of a boy or girl before 18 years which includes both formal and informal marriages where the children under age of 18 years live with their partner as if married. Approximately 16 % of 15-19 years girls are presently married.[9]

Marriage in childhood affects both boys and girls but extremely affects girls more. In India, estimates states that around 1.5 million girls under 18 years get married every year, which gives one-third of the global total. This makes our country home to large number of child brides. [9]

Early marriage mainly affects the education of the girls which leads to lack in job prospects and skills thereby contributing to poverty in family and affecting overall economy of the country. Recently there has been a decline in prevalence of adolescent girls getting married before 18 years. This is mainly due to multiple factors such as strong legislation, strong public messaging about child marriage illegality, increased literacy in mothers and increased rate in girl's education. [9]

In India, there is very little awareness among the adolescent girls regarding reproductive health as there is social prohibition and negative attitude among parents in discussing these matters with them thereby blocking access to right information. [10]

There is increased chance of indulging in sexual activity in early age due to urbanization and liberal attitude in contemporary Indian society where the burden of such was borne by female.[11] The lack of knowledge and ignorance around these issues makes adolescents vulnerable and unprepared which leads to inappropriate sexual behaviors like teen age pregnancy leading to unsafe abortion or early parenthood and sexually transmitted diseases (STDs). [7]

It is estimated that in developing countries approximately 12 million girls aged 15–19 years and 7,77,000 girls under 15 years give birth each year. Leading cause of death was complications during pregnancy and child birth among adolescent girls. [12]

According to NFHS-5 statistics, 12.6% of females belonging to 15-19 years are already married which is more in rural (14.6%) than urban(7.3%). 18% female aged 15-19 years with no schooling have already begun childbearing. Recent statistics shows that 7% of female aged 15-19 years gave birth to child already. The level of teenage pregnancy decreases with increasing level of schooling.[13]

Both millennium development goals 5 and 6 and the sustainable development goals have been attentive on reducing pregnancy rate among 15-19 year old girls.[14] To lead a healthy fulfilling life, young people need to know more information on physical and psychological changes that occurs during and after puberty.[15]

WHO defines Health education as ‘consciously constructed opportunities for learning involving some form of communication designed to improve health literacy,

including improving knowledge, and developing life skills which are conducive to individual and community health'. [16] Health education given to adolescent girls improve their knowledge, encourages them to improve and maintain their health, prevent diseases and reduce risky behaviors.[17] Health decisions taken by one generation will affect the health and wellbeing of next generation.[18]

Investing right knowledge in girls directs better future for women, children and families thereby leading to intergenerational impact.[19] Therefore this study was undertaken to assess the knowledge and attitude of reproductive health among pre-university girls in the urban area of Belagavi. After the health education intervention, knowledge and attitude of pre-university girls was assessed again to see the impact.

OBJECTIVE OF THE STUDY

To assess the effect of health education on knowledge and attitude of reproductive health among pre-university girls.

REVIEW OF LITERATURE

In a study conducted among 309 adolescent girls aged between 14 to 19 years in Saudi Arabia, 59 item questionnaire was used to evaluate the knowledge and perception of the girls regarding different aspects of reproductive health. It was observed that after health education intervention, average knowledge regarding menstruation and puberty increased from 67.32% to 83.97%, pregnancy and antenatal care knowledge increased from 71.05% to 84.99% and contraceptive methods knowledge increased from 26.91% to 46.35%. Total knowledge about reproductive health increased from 55.09% to 71.77%.[4]

An interventional study was conducted among 400 school going girls aged between 13 to 18 years in rural Maharashtra to assess the effectiveness of reproductive and sexual health education. Results showed that after intervention, the knowledge regarding source of menstrual blood increased from 25.8% to 77.5%. 24.3% of the study participants agreed that girls should talk openly about menstruation. The study concluded that pretest knowledge and attitude among participants regarding adolescent health were poor in majority of students and the interventional program resulted in improvement.[7]

A community based interventional study was done among 250 adolescent girls aged 11-16 years studying in a high school of Nidamanuru village in Vijayawada district in Andhrapradesh to find the effectiveness of reproductive health education. Pretest was conducted by personal interview followed by 15 hours of comprehensive health education. After one month, post-test was conducted. It was found that after intervention, the knowledge regarding pubertal changes increased from 28.40% to

96.20%. Knowledge regarding unsafe sex risk also increased from 7.21% to 65.16% and knowledge of teenage pregnancy risk improved from 56.80% to 82%.[11]

In the urban slum of Pune city, Maharashtra, a cross-sectional study was done among 211 girls studying VI-XII class in a Government High school. The results showed that overall knowledge in reproductive health awareness was good in only 9% of participants and average in 13.7%, poor in 77.2% of participants. Regarding knowledge in contraception, only less than 30% of the girls were aware of oral contraceptive pills and condoms. These findings showed the persistence of social stigma regarding reproductive health still in the community.[14]

In Udupi taluk, Karnataka, a school based interventional study was done among 791rural pre-university girls aged 16-19 years from randomly selected coastal villages to assess the knowledge regarding reproductive health. Results showed that after health education intervention, the knowledge regarding menstruation improved significantly from 77.2% to 95.6% whereas contraceptive knowledge increased from 14.4% to 68%. Knowledge regarding ovulation, first sign of pregnancy and fertilization improved by 37.2%. Knowledge regarding importance of diet during pregnancy increased from 66% to 95% following intervention.[15]

An educational interventional study was conducted among 150 secondary school girls between the age group of 13 to 18 years in Hoskote taluk, rural Bangalore to assess the overall knowledge regarding adolescent health. From results, it was observed that only 42.0%of the girls knew the normal menstrual cycle duration and 56% of the girls knew the normal number of days of flow which occurs per cycle but on intervention the knowledge increased to a significantly high value of 90% and 95.3% respectively. Initial knowledge regarding how pregnancy occurs and the ideal

child bearing age was 61.3% and 70% but after intervention their knowledge increased significantly to 96% and 97.3% respectively.[17]

In Bhopal, Madhya Pradesh, an educational interventional study was conducted among 197 girls studying 9^{th}, 10^{th}, 11^{th} and 12^{th} standard in government school. Semi-structured questionnaire was used to assess the knowledge. It was observed that after health education intervention the usage of sanitary pads by girls increased to 69.5% from 58.3% and the usage of cloth during menses decreased to 14.72% from 26.39%. Proper disposal of pads by girls increased to 100% after health education intervention where the pre-test score was 61.42%. [19]

A school based educational study was conducted in Bagalkot, Karnataka among 1249 girls between the age group of 11 to 19 years to find the impact of adolescent health education. Questionnaire was used to test the level of knowledge on various aspects of adolescent health. From the results, it was identified that after the health education intervention, average knowledge regarding menstruation and menstrual hygiene increased from 58.24% to 95.2%, pregnancy, antenatal care and contraceptive methods knowledge increased from 49.31% to 95.64%. The study showed that their knowledge was poor during pretest and remarkable improvement took place after educational intervention.[20]

A pre-post study was conducted in Pulwama, Kashmir to assess the effect of health education on reproductive health among 60 adolescent girls between 13 to 19 years. Health education was done on the same day following pre-test and post-test was conducted using the same questionnaire on day 7. Mean post-test knowledge score (33.10± 3.03) was higher than the mean pre-test score (16.52±4.44). After interventional health education, knowledge regarding menstruation and menstrual

hygiene increased from 41.79% to 84.62% , pregnancy and antenatal care knowledge increased from 38.96% to 84.17% and contraceptive methods knowledge increased from 44.33% to 82.92%.[21]

In the urban school area of Bagalkot, Karnataka, an interventional study was conducted among 200 randomly selected adolescent girl students studying in school between 13 to 19 years of age. The study showed significant positive influence among the students. Results showed that their knowledge regarding menstruation increased to 94% from 71% after intervention. Knowledge regarding sanitary pad change during menses improved from 48% to 70% and disposal of sanitary pad with wrapping improved to 92.5% from 48.5%. In the pre-test, overall knowledge regarding menstrual hygiene was 1% which improved to 97% in the post-test after health education. [23]

An interventional study was done to find the effect of health education on awareness related to menstruation among 304 adolescent girls studying 8^{th}, 9^{th}, 10^{th} standard in 4 Government high schools aged 12 to 19 years in rural Bangalore with mean age of 14.27 years. 47.03% of girls told that their mother was the prime source of information related to menstruation. Results showed improvement following health education in awareness regarding menstruation. In the pre-test only 34.2% of students were aware of cause of menstruation which increased to 80.5% in the post-test. This study also showed that health education positively influenced the attitude regarding menstruation related practices among school girls.[24]

In the urban area of Belgaum, a study was conducted among 303 female students studying in a pre-university college to find the impact of health education regarding menstrual hygiene. Compared to pre-test, there was significant

improvement in all menstruation related questions in the post-test. From the results it can be seen that only 52.1% of them had knowledge regarding menstruation during pre-test which increased to 96% after health education intervention. There was also significant improvement in usage of sanitary pad from 56.4% to 90.8% and correct disposal of pads from 66.7% to 97.3% after intervention. This study also showed that health education positively influenced the attitude regarding menstruation related practices among school girls.[25]

An interventional study to assess the knowledge and attitude regarding reproductive health was done among 200 school going adolescents in Maharashtra which showed that 93% of them had poor knowledge, 7% of students had partial knowledge whereas none of them had adequate knowledge in overall reproductive health. Once the health education intervention was done only 1% of students had poor knowledge, 17% of them had partial knowledge and 82% of them gained adequate knowledge. The decision making skills regarding reproductive health also improved among students after health education intervention.[26]

In a high school in Puducherry, a quasi experimental study was done to assess the impact of planned health education among 100 adolescent girls aged 13-15 years studying 8^{th} and 9^{th} standard. Questionnaire was used to conduct the pre-test followed by health education and after 3 months, post-test was done. The overall knowledge on menstrual hygiene in the pre-test was 11.22±3.58 and 22.35±3.34 in the post-test which was statistically significant. During pre-test, 57% had poor knowledge, 43% of them had average knowledge whereas none of them had good knowledge. After health education session, 62% of students had good knowledge, 28% of them had average knowledge and only 10% of them had poor knowledge in the post-test.[27]

In Ankuli, Berhampur, an interventional study was done among 144 adolescent girls studying X standard in to assess effectiveness of planned teaching program. In the pre-test, the students knowledge regarding menstruation and menstrual hygiene was 36.1% and contraception was only 33%. This was increased to 79.1% in menstruation and menstrual hygiene and 88% in contraception after the health education intervention session. While evaluating the overall knowledge regarding reproductive health, wilcoxan paired test showed significant difference. This showed that planned teaching program was effective in improving knowledge on reproductive health among adolescent girls.[28]

A school based study was done among 200 girls aged more than 16 years studying 9^{th} -12^{th} class of Government Girls school in Dehradun, Uttarakhand. Interview was conducted using pre-designed questionnaire. Results showed that only 72.5% of girls were aware about menstruation and the overall knowledge was 55.83% in this study. Regarding the attitude, the students had positive attitude as they did not find any strict restrictions towards menstruation. These results showed that there is better developed knowledge among girl students regarding cultural beliefs.[29]

A school based health education study done among 416 adolescent female students aged 11-16 years in Bangladesh showed that after health education there was significant improvement in knowledge among adolescents from 51% in pre-test to 82.4% in post-test. The knowledge regarding usage of proper sanitary products during menstruation increased to 81.5% from 57.9% in the pre-test. 45.4% of girls reported that there was restriction in visiting relatives, friends during menstruation which reduced to 26.4% after health education intervention. These findings showed that socio-cultural beliefs and taboos are still wide-spread.[30]

A quasi-experimental study was conducted to define the effect of planned health training on reproductive health among 87 girls studying 5^{th}, 6^{th}, 7^{th}, 8^{th} standard in primary school in a village of Mugla province, Turkey. The training was based on health belief model which takes the correct knowledge as the essential of health behavior as it involves cognition. The overall score of pre-test was 7.14±2.194 and in the post-test, the score was 20.70± 3.18 with 190% of total improvement rate which was also statistically significant. The end results showed that the students knowledge level almost increased three times higher than the initial level after interventional health training.[31]

A cross sectional study was conducted among 536 female students aged 10 to 19 years from the educational institutions in urban areas of major city. Questionnaire was used to collect the data. The mean age of the study participants was 13±1.1 years. Half of the participants knew that the normal duration of menstrual blood flow was 5-6 days. Normal duration of menstrual cycle (21-35 days) was reported by 73.1% of the participants. Regarding menstrual symptoms 269(50.1%) of the participants reported tiredness and back pain was reported by 148(27.6%) study participants.[32]

From randomly selected government higher secondary schools in Pondicherry, an interventional study was conducted among 300 adolescent girls aged 12 to 18 years studying in class 8 to 12. In the initial stage, during pre-test many of the girls were hesitant to answer the questions which improved after the interactive health education session. It was observed that there was significant improvement in knowledge regarding menstruation and puberty changes following health education intervention. In the pre-test phase of the study, only 4% of students knew about family planning

methods which increased after health education session but the students found it difficult to understand contraceptive usage.[33]

A cross sectional study conducted among 300 female school and college students aged 12 to 19 years studying in Technical school and women's college with mean age of 16.7±1.13, 88% of the participants told that during menstruation, they faced restriction in their personal life. From the results it was observed that 72% of the adolescents had no idea regarding menstruation. Only 42% of girls used sanitary pads during menstruation and about 88% of girls faced different restrictions during menstruation. These differences were mainly due to variation in culture and religion across different nations.[35]

MATERIALS AND METHODS

a) **SOURCE OF DATA**: The present study was conducted in pre-university colleges in the urban area of Belagavi.

b) **STUDY DESIGN**: The present study was an interventional study conducted to know the effect of health education on knowledge and attitude of reproductive health among pre-university girls.

c) **STUDY PERIOD**:Data was collected for 1 year from 1st January 2021 to 31st December 2021.

d) STUDY POPULATION: Pre-university girls studying in I and II PUCs were randomly selected from 4 colleges (125 Girls from each college), one from each zone (North, South , East, West) for the study.

e) SAMPLE SIZE CALCULATION: Using G POWER software for statistical test by difference between 2 dependent means (matched pairs), sample size was calculated by assuming the effect size to be 0.25,

False positive (α) = 0.01

Power of the test (1-β) = 0.99

β = 0.01

Then the sample size (n) = 388

For the lost follow up by taking attrition as 1.2

n = 388 x 1.2

n = 465 = 500

Therefore, sample size = 500

SAMPLING PROCEDURE:

Sampling frame was made and each participant was selected by systematic random sampling method (125 girls from each pre-university college)

K= Total study population/Study sample size

= 1506/500

= 3.01

First participant was selected randomly and there after every 3rd student was included in the study till the sample size was met.

PUC I - 62 girls

PUC II – 63 girls

Permission from Principal of each pre-university college was obtained. Written informed consent was obtained from parents and assent was obtained from girls.

INCLUSION CRITERIA:

1. Adolescent girls who attained menarche and those who gave consent were enrolled in the study.
2. Girls who answer/attempt both pre and post-test were included.

EXCLUSION CRITERIA:

Girls who attempted pre-test questionnaire but not the post-test were excluded.

Girls who were absent during study period and during health education session.

PILOT STUDY

A pilot study was conducted on 10% of the sample population (10% of 500) which was 50 PUC students which were taken from another PUC in Belagavi. The questionnaire was validated and required changes were made.

ETHICAL CLEARANCE

Ethical clearance was obtained from Institutional Ethical Committee, J.N. medical college, KAHER, Belagavi. The Ethical committee clearance letter has been attached.

Informed written consent was taken from the study participants parents/guardian. Assent was taken from the study participants as their age was less than 18 years. Privacy and confidentiality were maintained throughout the study.

Data collection method:

The list of all the PUCs in urban area of Belagavi was obtained from the Office of the Deputy Director of Public Instructions Belagavi (DDPI) from which 4 PUCs were selected from 4 zones- North, South, East and West.

There were 46 Pre-university colleges in urban area of Belagavi. 4 PUCs were selected out of 46(one from each zone) to get representative sample.

1. KLE Independent PU College – 125 girl students (from 338 girls)
2. KLE Society's G.A.P.U college – 125 girl students (from 425 girls)
3. S.S.Composite PU College – 125 girl students (from 347 girls)
4. Govindarama Seksaria Science College - 125 girl students (from 396 girls)

A pilot study was done and required changes were made in the predesigned pretested questionnaire. Permission from each school principal was obtained before starting data collection. A good rapport was established with the students and their parent/guardian, written consent and assent regarding the purpose of study was obtained.

Data was collected regarding socio-demographic variables, knowledge and attitude about puberty and menstruation, pregnancy, antenatal care and contraception. Questionnaire was given to students to assess their knowledge and attitude regarding puberty and menstruation, pregnancy, antenatal care and contraception. Knowledge was assessed by multiple choice questions and attitude was assessed using 5 point Likert scale.

Pre-test was followed by health education session. Health education was given using audio-visual aids such as lecture videos, power point presentation and flip charts. Health education session was followed by interactive session where the students doubts were clarified. After 1 month, impact of health education on knowledge and attitude of reproductive health were assessed by administering the post-test questionnaire.

Description of health education session

Content & strategy	Educational methods	Construct
This was about reproductive health-puberty & menstruation, pregnancy & antenatal care and contraception	Power point presentation, lecture, videos, pamphlets, asking and answering questions-interactive session.	Knowledge and attitude

MATERIALS:

The questionnaire included the following components:

1. SOCIO – DEMOGRAPHIC VARIABLES.
2. PUBERTY AND MENSTRUATION
3. PREGNANCY AND ANTENATAL CARE
4. CONTRACEPTION

Definition of Study variables:

Age: Age was recorded to the nearest completed years (As on last birthday).

Class: Participant class was grouped under PUC I and PUC II

Religion: The participant's religion was grouped under "Hindus", "Muslims", "Christians" and others which include, Sikhs, Buddhists, and Jains.

Educational Qualification of Father and Mother [38]

1. Illiterate: those who cannot read or write with understanding in any language.
2. Read and write
3. Standard 1-4: those who had completed education up to 4^{th} standard.
4. Standard 5-8: those who had completed education up to 8^{th} standard.
5. 10-12/ Diploma: those who had completed education up to PUC/ Diploma
6. Degree /Post graduate: the person who has studied up to any graduation degree/ Master degree or more.

Occupation of Father and Mother

The source of their income, as self-reported by the beneficiaries, who would earn his or her living by means of it.

1. Farmer: owns his land or on a contract basis or who works at any place including agricultural fields on a daily wage basis.
2. Laborer- who works in any place on a daily wage base
3. Self-employed: a person engaged in commercial or industrial business either an owner or executive
4. Government employee: beneficiary who is a permanent or contract worker in any government agency.

5. Private employee: beneficiary who is a permanent or contract worker in any private company or factory or NGOs.

6. Retired/pensioner: beneficiary who currently is not working and is receiving pension from any means

7. Home maker/ Housewife: beneficiary who looks after the home, children and currently not working in any kind

Place of residence:

The family is residing in rural or urban area.

Type of family [39]

1. Nuclear: The family consisting of married couple along with their dependent children.

2. Joint family: It consists of number of married couples and their children who live in the same household

3. Broken family: A broken family is one where the parents have separated, or where death has occurred of one or both the parents.

4. Three generation family: The household where all the representatives of the three generation live together in the same house.

Socioeconomic class

Information regarding per capita income (in Rupees/ month) was collected and socio-economic status was classified using Modified B. G. Prasad's classification for

May 2021. It was based on per capita monthly income and the scale evolved in 1961. Considering the base of Consumer Price Index (CPI) for 1960 as 100 which was modified in 1982 and 2001 by introducing linking factors to convert CPI (1982).

All India average Consumer Price index (for Industrial workers) average for 2021(on Base 2001)-119.6[40].

Multiplication factor for March 2021 = 119.6 /Base index value in 2016 (=100) =1.196

Therefore, New income value for May 2021 = multiplication factor(1.196) × old income value × Linking factor between 1960 and 1982 series (4.93) × Linking factor between 1982 and 2001 series (4.63) × Linking factor between 2001 and 2016 series (2.88)].

Socioeconomic Class	**B. G. Prasad's classification of 1961 (monthly income in rupees)**	**Revised B. G. Prasad's classification for 2021 (monthly income in rupees)[22]**
I	100 and above	7863 and above
II	50 to 99	3931-7862
III	30 to 49	2359-3930
IV	15 to 29	1179-2358
V	Below 15	1179 and below

Definition of knowledge questions

Menstruation:

Menstruation or menses is the natural bodily process of releasing blood and associated matter from the uterus through the vagina as part of the menstrual cycle.

Menarche:

The onset of menstruation, the time when a girl has her first menstrual period.

Interval between menstrual cycle:

The normal interval between menstrual cycle ranges from 21-35 days.

Statistical analysis:

Data collected using the questionnaire was coded and entered in to Microsoft Excel. Data management was done in Microsoft Excel and analysed using SPSS (statistical package for social science) software version-20. Data was analysed using percentages for all the variables. Normality tests were used to determine the indication for parametric and non-parametric distribution. The results showed abnormal data distribution. The wilcoxon signed rank test was used. A probability value (p value) of less than 0.05 was considered as statistically significant.

Score

Knowledge regarding puberty & menstruation, pregnancy & antenatal care and contraception.

For every correct answer one mark was given and every wrong, don’t know and unanswered questions were considered as zero. Knowledge score was divided according to marks scored by the participants.

RESULTS

I. SOCIO-DEMOGRAPHIC PROFILE OF STUDY PARTICIPANTS

Table 1: Distribution of study participants according to their age (n=500)

Age group (in years)	Number (n)	Percentage (%)
<16	1	0.2
16-18	493	98.6
>18	6	1.2
Total	500	100.0

Among 500 high school students, the mean age of the study participants was 17.15± 0.7 years. 1(0.2%) were in the age group of < 16 years age, 493(98.6%) were in the 16– 18 years age group and 6(1.2%) were in >18 years age group.

Graph 1: Distribution of study participants according to their age (n=500)

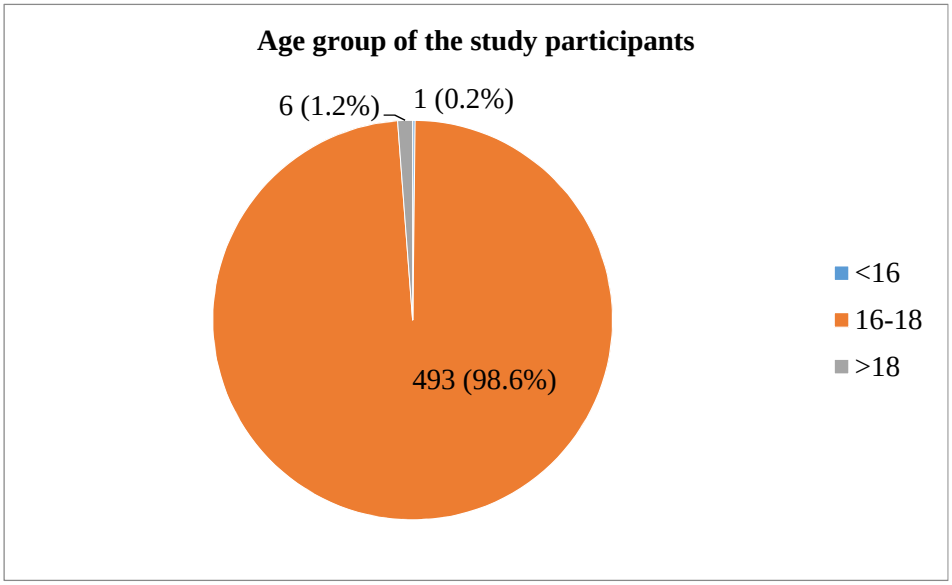


Table 2: Distribution of study participants according to their schooling (n=500).

Class	Number (n)	Percentage (%)
I PUC	264	52.8
II PUC	236	47.2
Total	500	100

In the present study, 264 (52.8%) were studying in PUC I, 236(47.2%) were studying in PUC II

Graph 2: Distribution of study participants according to their schooling (n=500)

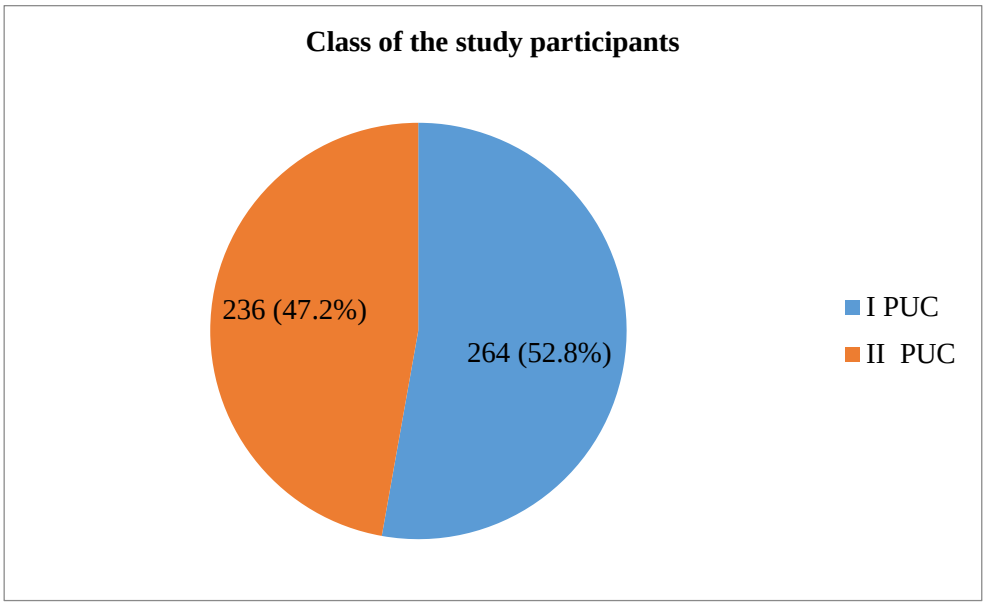


Table 3: Distribution of study participants according to their religion (n=500).

Religion	Number (n)	Percentage (%)
Hindu	446	89.2
Muslim	46	9.2
Christian	8	1.6
Total	500	100

In the present study maximum participants 446 (89.2%) were Hindus, 46 (9.2%) were Muslims and 8 (1.6%) belonged to Christians.

Graph 3: Distribution of study participants according to religion (n=500).

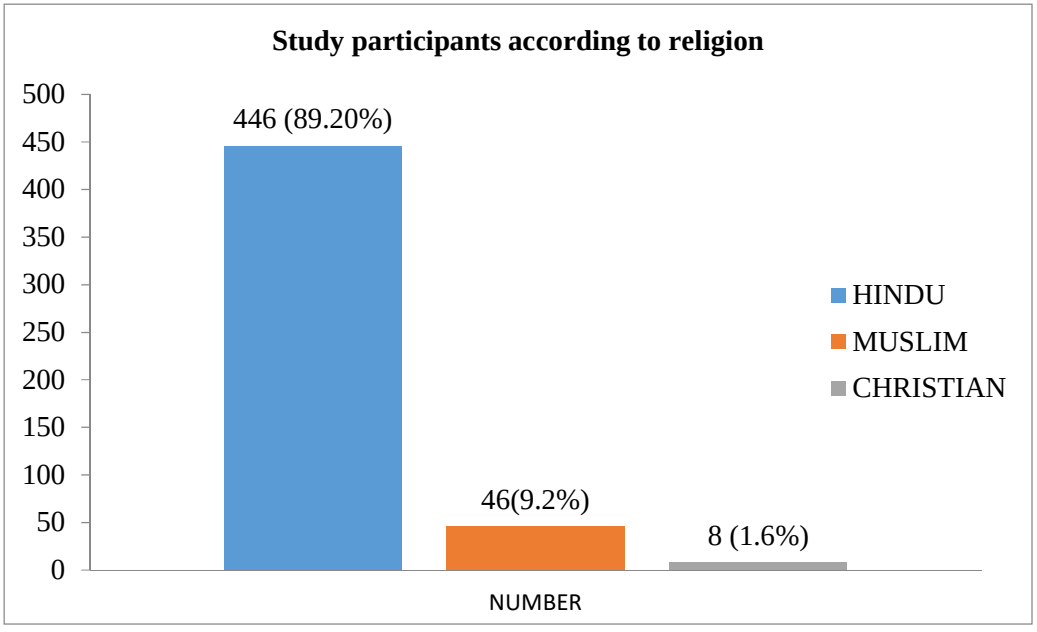


Table 4: Distribution of study participants according to education of father (n=500).

Father's education	Number (n)	Percentage (%)
Illiterate	9	1.8
Read & write	9	1.8
Standard 1-4	13	2.6
Standard 5-8	36	7.2
10-12/ Diploma	243	48.6
Degree/PG	190	38
Total	500	100

Educational qualification of the fathers of the study participants revealed that 9 (1.8%) were illiterates,9 (1.8%) could read and write, 13(2.6%) had completed primary education, 36 (7.2%) had completed secondary education,243(48.6%) had completed pre – university &190 (38%) were graduates/Postgraduates.

Graph 4: Distribution of study participants according to education of father (n=500).

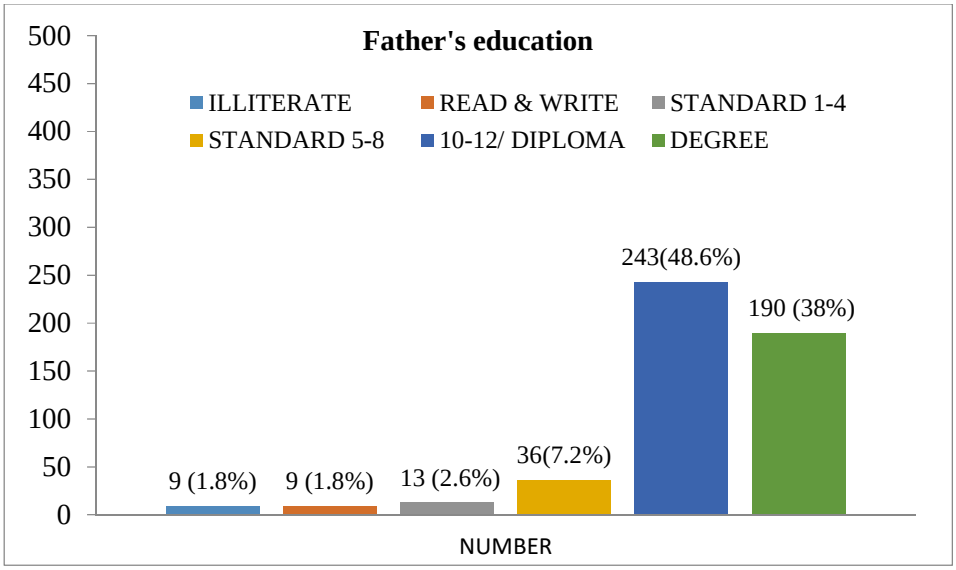


Table 5: Distribution of study participants according to education of mother (n=500).

Mother's education	Number(n)	Percentage (%)
Illiterate	17	3.4
Read & write	11	2.2
Standard 1-4	15	3
Standard 5-8	59	11.8
10-12 /diploma	280	56
Degree/ PG	118	23.6
Total	500	100

Educational qualification of the mothers of the study participants showed that 17 (3.4%) were illiterates, 11 (2.2%) could read and write, 15(3%) had completed primary education, 59 (11.8%) had completed secondary education, 280(56%) had completed pre – university & 118 (23.6%) were graduates/Postgraduates.

Graph 5: Distribution of study participants according to education of mother (n=500).

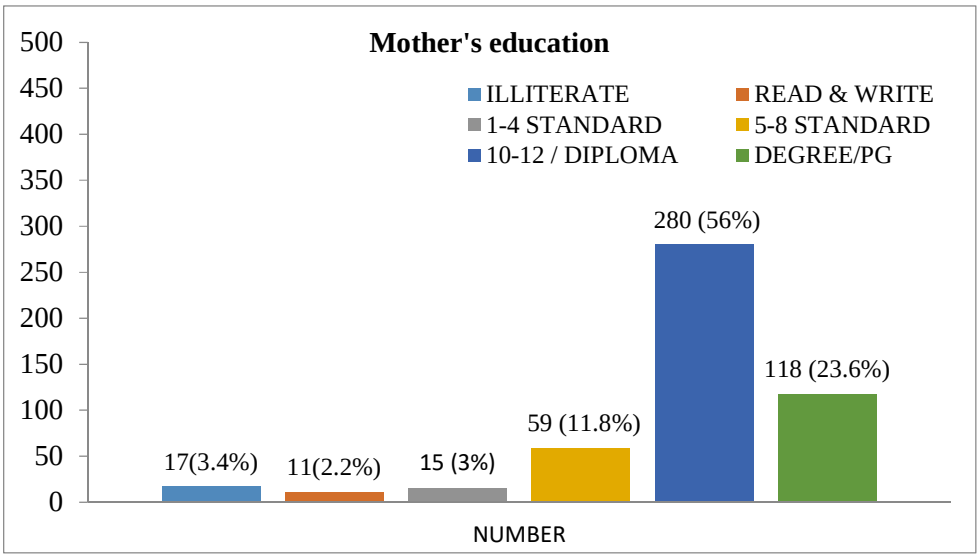


Table 6: Distribution of study participants according to occupation of father (n=500).

Father's occupation	Number(n)	Percentage (%)
Farmer	73	14.6
Laborer	38	7.6
Self-employed	166	33.2
Government employee	87	17.4
Private employee	118	23.6
Retired pensioner	18	3.6
Total	500	100.0

Occupation of the study participants fathers was assessed which revealed that 73 (14.6%) were farmers, 38 (7.6%) were labourers, 166 (33.2%) were self-employed, 87 (17.4%) were Government Employees, 118 (23.6%) were Private Employees and 18 (3.6%) were Retired.

Graph 6: Distribution of study participants according to occupation of father (n=500).

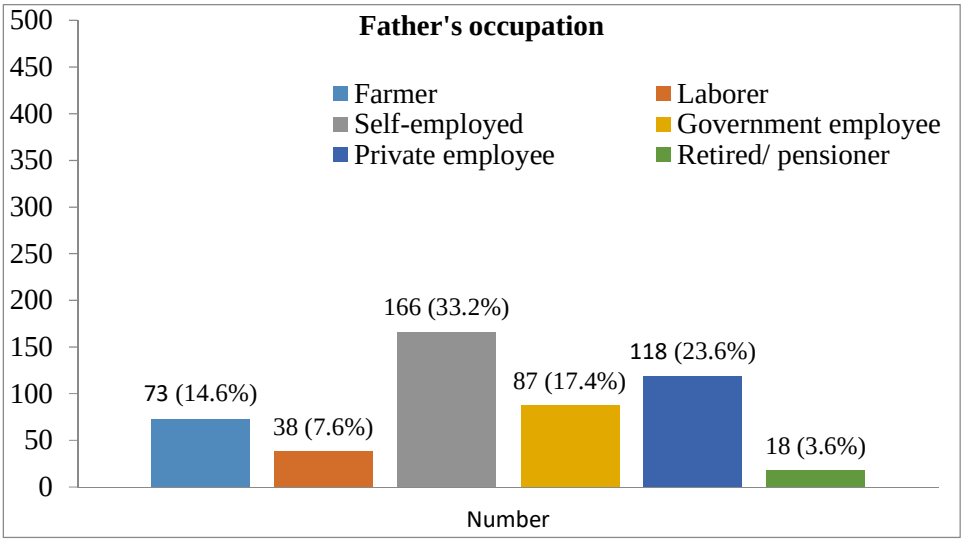


Table 7: Distribution of study participants according to occupation of mother (n=500).

Mother's occupation	Number (n)	Percentage (%)
Farmer	10	2.0
Laborer	11	2.2
Self-employed	26	5.2
Government employee	26	5.2
Private employee	23	4.6
Home-maker	404	80.8
Total	500	100.0

In the present study, out of 500 participants it was observed that 10 (2%) of the participant's mothers were farmers, 11 (2.2%) were labourers, 26 (5.2%) were self-employed, 26 (5.2 %) were Government Employees, 23 (4.6%) were Private Employees, 404 (80.8%) were home makers.

Graph 7: Distribution of study participants according to occupation of mother (n=500).

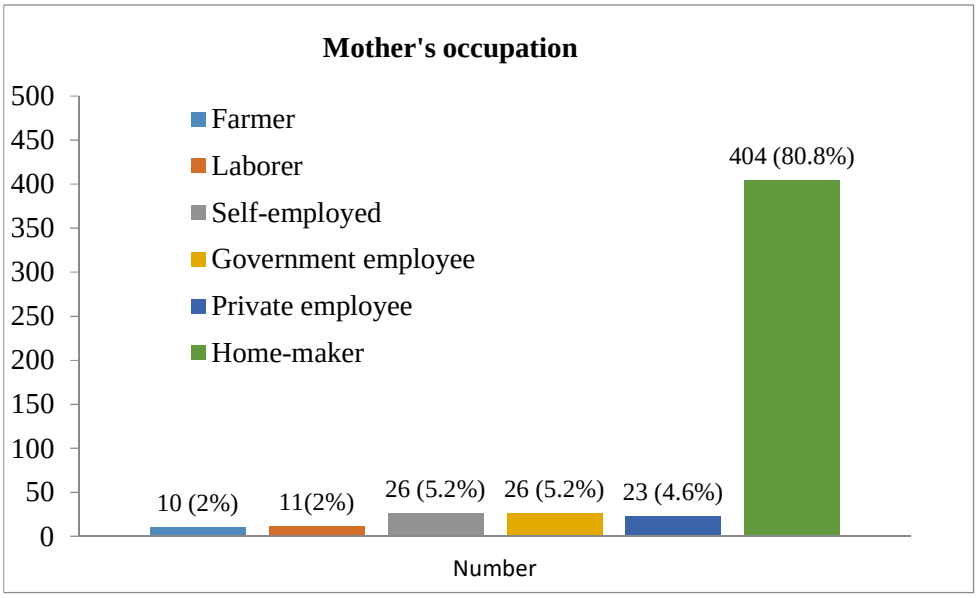


Table 8: Distribution of study participants according to type of family (n=500).

Type of family	Number (n)	Percentage (%)
Nuclear	363	72.6
Joint	131	26.2
Broken	3	0.6
3rd generation family	3	0.6
Total	500	100.0

Among the 500 study participants, 363 (72.6%) belonged to nuclear family, 131(26.2%) lived in joint family and 3 (0.6%) belonged to broken family.

Graph 8: Distribution of study participants according to type of family (n=500).

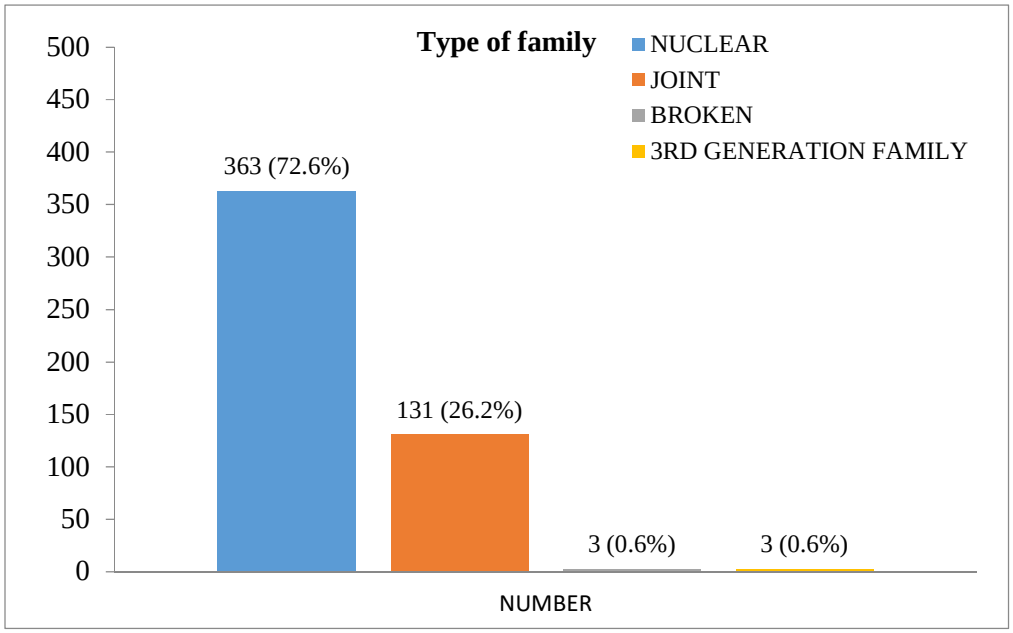


Table 9: Distribution of study participants (n=500).

a) According to Place of residence	**Number (n)**	**Percentage (%)**
Urban	304	60.8
Rural	193	38.6
Suburban	1	0.2
Hostel	2	0.4
Total	500	100.0
b) According to living arrangement	**Number (n)**	**Percentage (%)**
Both parents	453	90.6
Mothers alone	30	6.0
Father alone	3	0.6
Grand parents	14	2.8
Total	500	100.0

Out of 500 study participants, 304(60.8%) were living in urban areas, 193 (38.6%) were living in rural areas and 1 (0.2%) was living in sub urban areas and 2(0.4%) were living in hostel.

Among 500 study participants, 453 (90.6%) were living with both parents, 30 (6.0%) were living with mother alone, 3 (0.6%) were living with father alone and 14 (2.8 %) were living with their grandparents.

Table 10: Distribution of study participants according to their type of housing (n=500).

a) According to type of housing	Number (n)	Percentage (%)
Kutcha	7	1.4
Semi pucca	47	9.4
Pucca	446	89.2
Total	500	100.0
b) Overcrowding	**Number (n)**	**Percentage (%)**
Yes	231	46.2
No	269	53.8

Among 500 participants, 7(1.4%) of them were residing in kutcha house, 47(9.4%) of them were residing in semi-pucca house and 446(89.2%) were residing in Pucca house.

Out of 500 participants, overcrowding was present in 231 (46.2%) of the participant's house.

Graph 9 (Table 10) : Distribution of study participants according to their type of housing (n=500).

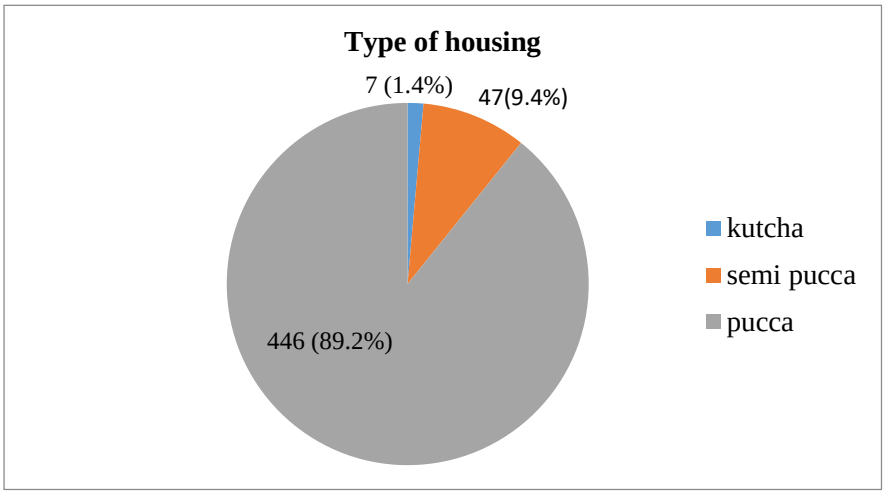


Table 11: Distribution of study participants according to availability of sanitary privy (n=500)

According to availability of sanitary privy	Number (n)	Percentage (%)
Inside the house	409	81.8
Outside the house	86	17.2
Public toilet	4	0.8
Don't have toilet	1	0.2
Total	500	100.0

Among 500 participants, 409(81.8%) of participants had toilet situated inside their house, 86(17.2%) of them had toilet outside their house, 4(0.8%) of them were using public toilet and 1(0.2%) of the participants did not have sanitary privy.

Graph 10 (Table 11): Distribution of study participants according to availability of sanitary privy (n=500)

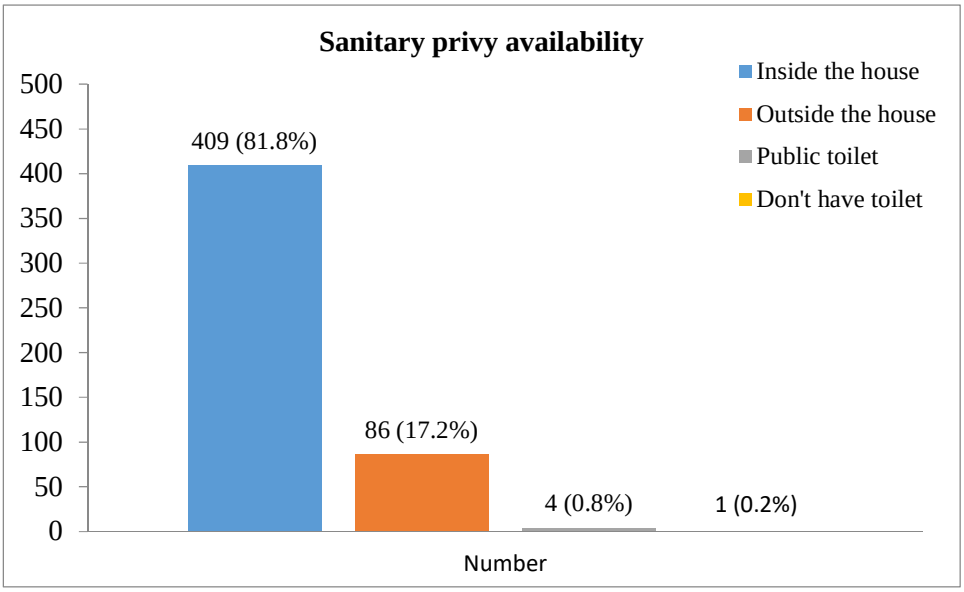


Table 12: Distribution of study participants according to socio economic status (According to modified B.G. Prasad classification, 2021) (n=500).

SOCIO-ECONOMIC STATUS	Number(n)	Percentage (%)
CLASS I	11	2.2
CLASS II	187	37.4
CLASS III	279	55.8
CLASS IV	22	4.4
CLASS V	1	0.2
Total	500	100.0

According to Modified B. G. Prasad's Classification of socio – economic status, 11 (2.2%) participants belonged to Class I, 187 (37.4%) belonged to Class II, 279(55.8 %) belonged to Class III, 22 (4.4 %) belonged to Class IV and 1 (0.2%) belonged to Class V.

Graph 11 (Table 12): Distribution of study participants according to socio economic status (According to modified B.G. Prasad classification, 2021) (n=500).

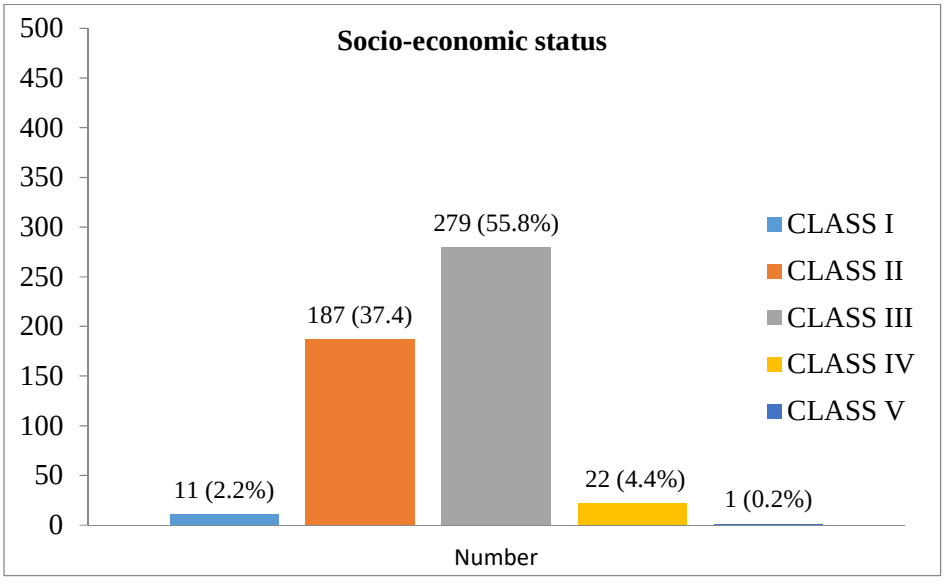


Table 13: Distribution of study participants according to their source of information regarding menstruation (n=500)

Source of information	Number(n)	Percentage (%)
Mother	352	70.40
Teacher	14	2.80
Friends	42	8.40
Books	1	0.20
Media	-	-
Others (multiple)	91	18.20

Graph 12 (Table 13): Distribution of study participants according to their source of information regarding menstruation (n=500)

The pie chart represents the information regarding menstruation: 352 (70.4%) of students got information from mothers, 14 (2.8%) from their teachers,42(8.4%) from their friends, 91 (18.2%) from others, and 1 (0.2%) from the books.

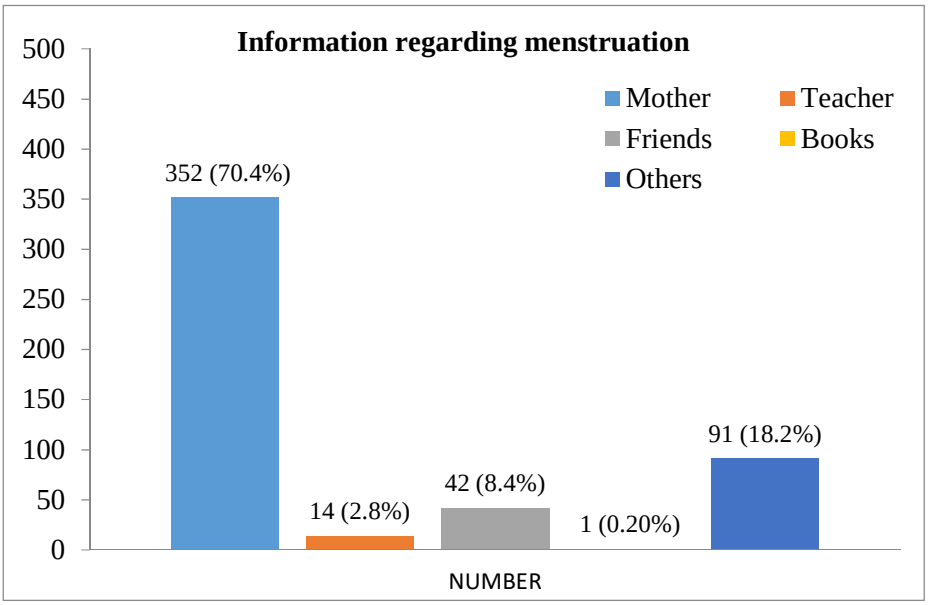
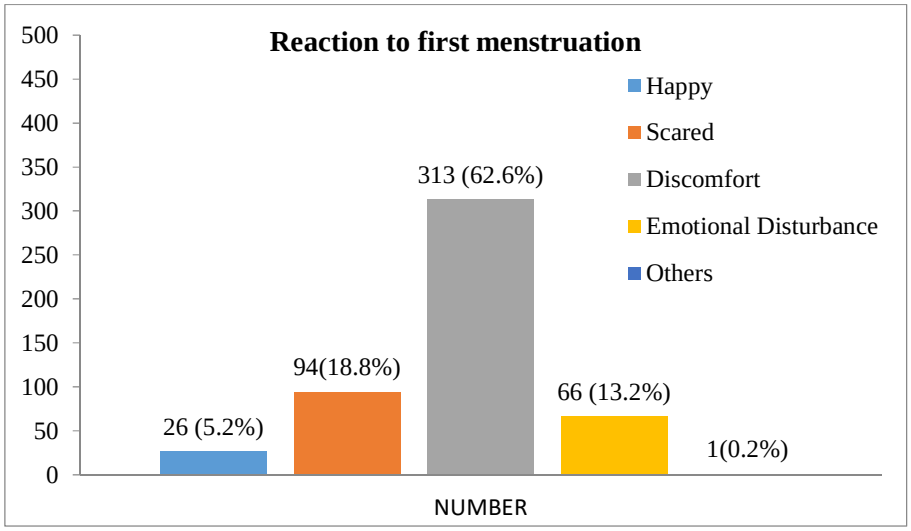


Table 14: Distribution of study participants according to their age at menarche (n=500)

Menarche age	Number(n)	Percentage (%)
Don't know	82	16.4
10-15	330	66.0
15-20	88	17.6
Total	500	100.0

Among 500 participants, 82(16.4%) did not remember their age of menarche. 330(66%) of the participants attained their menarche between 10-15 years and 88(17.6%) of them attained menarche between 15-20 years.

Graph 12 (Table 15): Distribution of study participants according to their reaction to first menstruation (n=500)



The above bar graph shows the students reaction to first menstruation: 313 (62.6%) students felt discomfort during first menstruation, 94 (18.8%) students felt scared, 66 (13.2%) had emotional disturbance and 26 (5.2%) students were happy during the first menstruation

Table 16: Distribution of study participants according to their physical symptoms during their first menstrual period (n=500)

Physical symptoms	Number(n)	Percentage (%)
Abdominal & back pain	307	61.4
Sleeplessness	96	19.2
Heavy bleeding	94	18.8
Others	3	0.6
Total	500	100.0

Out of 500 participants, 307(61.4%) experienced abdominal and back pain during their first menstruation whereas 96(19.2%) of them had sleeplessness, 94(18.8%) had heavy bleeding.

Graph 14 (Table 16): Distribution of study participants according to physical symptoms during their first menstrual period (n=500)

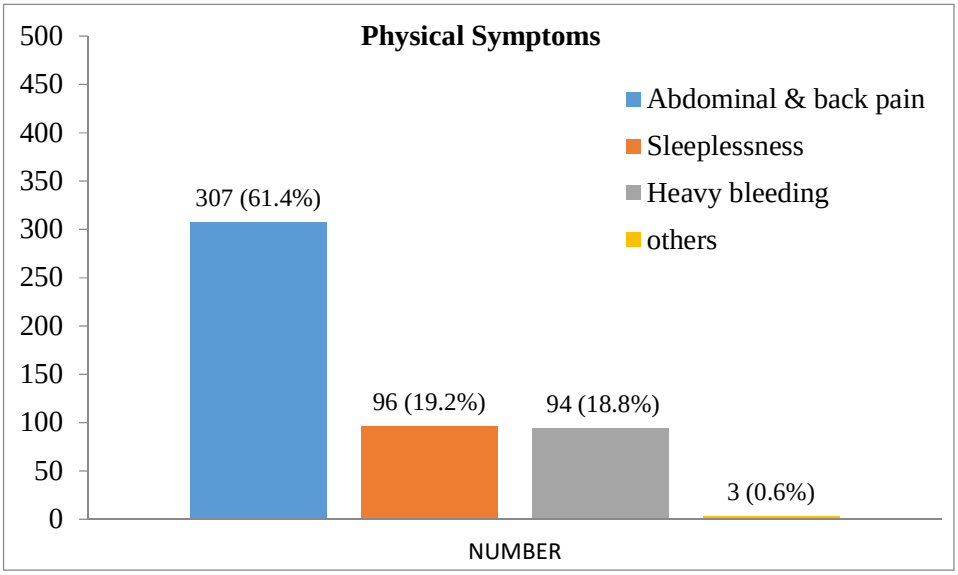


Table 17: Distribution of study participants according to knowledge regarding puberty and menstruation in pre-test and post-test

	Knowledge regarding menstruation		Pre-test		Post-test	
			Number (n)	Percentage (%)	Number (n)	Percentage (%)
a.	Menstruation	Physiological process	248	49.60	405	81.00
		Pathological process	12	2.40	12	2.40
		Curse	5	1.00	2	0.40
		Don't know	235	47.00	79	15.80
b		Blood comes out through vagina during menstruation	316	63.20	432	86.40
		Blood comes out through urinary opening during menstruation	65	13.00	53	10.60
		Don't know	119	23.80	15	3.00
c	Most girls get their period	<10 years	77	15.4	44	8.8
		10-16 years	423	84.6	456	91.2

a. During pre-test, 248(49.6%) participants answered that menstruation is a physiological process which increased to 405(81%) in the post-test after health education.

b. 316(63.2%) girls had knowledge that blood comes out through vagina during menstruation in the pre-test whereas 432(86.4%) students in the post-test had this knowledge.

c. In the pre-test, 77(15.4%) participants told that most girls attain menarche before 10 years, 423(84.6%) of them mentioned it as between 10-16 years. After health education in the post-test, 456 (91.2%) of them answered that girls attain menarche between 10-16 years

			Pre-test		Post-test	
			Number (n)	**Percentage (%)**	**Number (n)**	**Percentage (%)**
d.	There was session in school regarding information on menstruation	Yes	416	83.20	465	93.00
		No	84	16.80	35	7.00
e.	Students are comfortable in talking about menstruation related queries	To any teacher	75	15.00	122	24.40
		To teacher of same gender	242	48.40	291	58.20
		Uncomfortable in asking queries	183	36.60	87	17.40

d. In the present study, during pre-test 416(83.2%) girls told that there was session in school regarding information on menstruation. In the pre-test, only 75(45%) students were comfortable in talking about menstruation related queries to any teacher, 242(48.4%) were comfortable with teacher of same gender and 183(36.6%) were uncomfortable in asking menstruation related queries to any teacher.

After health education intervention, 122(24.4%) students were comfortable in talking about menstruation related queries to any teacher,291(58.2%) were comfortable with teacher of same gender and 87(17.4%) were uncomfortable in asking menstruation related queries to any teacher.

			Pre-test		**Post-test**	
			Number (n)	**Percentage (%)**	**Number (n)**	**Percentage (%)**
f.	Duration of blood flow in days	< 2 days	42	8.40	17	3.40
		2-7 days	441	88.2	468	93.6
		>7 days	17	3.40	15	3
g.	Interval between two menstrual cycles	<21 days	132	26.4	59	11.80
		21-35 days	348	69.6	426	85.2
		>35 days	20	4	15	3

e. In the present study during pre-test, 441(88.2%) girls had knowledge that normal duration of menstrual blood flow was between 2-7 days which increased to 468(93.6%) in the post-test.

f. Knowledge regarding normal interval between two menstrual cycles (21-35 days) improved from 348(69.6%) to 426(85.2%) after health education intervention.

			Pre-test		Post-test	
			Number (n)	**Percentage (%)**	**Number (n)**	**Percentage (%)**
h.	Type of absorbent used	Commercially made sanitary pad	399	79.80	470	94
		Napkin (soft paper)	41	8.20	19	3.80
		Rag made pad	14	2.80	1	0.20
		Cloth	42	8.40	10	2
		Don't know	4	0.80	-	-
i.	Frequency of change of absorbent per day	2-4 hours once	163	32.60	103	20.60
		4-6 hours once	201	40.20	303	60.60
		6-8 hours once	102	20.40	78	15.60
		8-12 hours once	17	3.40	8	1.60
		12 hours once	17	3.40	8	1.60
j.	Method of disposal of absorbent used during menstruation	Dustbin	446	89.20	477	95.40
		Drain	14	2.80	13	2.60
		Toilet	19	3.80	3	0.60
		Open field	18	3.60	6	1.20
		Don't know	3	0.60	1	0.20
k.	Pad wraps used	Paper	321	64.20	406	81.20
		Plastic bag	166	33.20	91	18.20
		No wrap	12	2.40	2	0.40
		Others	1	0.20	1	0.20
l.	Cleaning of genitalia at every visit to toilet during menstruation	Yes	456	91.20	489	97.80
		No	44	8.80	11	2.20
m.	Clean with	Water and soap	175	35	412	82.40
		Only water	300	59.60	88	17.60
		Tissue paper	6	1.20	-	-
		Towels	1	0.20	-	-
		Did not answer	18	3.60	-	-

g. Regarding the absorbent used during menstruation, 399(79.8%) study participants mentioned that commercially made sanitary pad should be used during menstruation which increased to 470(94%) after health education intervention.

h. Frequency of changing absorbent (4-6 hours once) was mentioned by 201(40.2%) participants in the pre-test which increased to 303(60.6%) in the post-test.

i. In the pre-test, 446(89.20%) participants were aware that dustbin should be used for the disposal of absorbents which increased to 477(95.4%) in the post-test.

j. For the disposal of absorbent, 321(64.2%) girls told that paper should be used as pad wrap which increased to 406(81.2%) after health education.

k. 456(91.2%) participants were aware that they should clean the genitalia at every visit to toilet during menstruation which increased to 489(97.8%) in the post-test.

l. In the pre-test, 175(35%) participants answered that they should use water and soap to clean the genitalia which increased to 412(82.4%) after health education intervention.

Table 18: Distribution of study participants according to their knowledge regarding pregnancy & Antenatal care in pre-test and post-test

			Pre-test		Post-test	
			Number (n)	**Percentage (%)**	**Number (n)**	**Percentage (%)**
a.	Recommended age of marriage for girls	18 years	195	39	332	66.40
b.	First sign of pregnancy is missed period	Yes	421	84.20	434	86.80
		No	78	15.60	62	12.40
		Don't know	1	0.20	4	0.80

a. During pre-test, only 195(39%) participants were aware that 18 years is the recommended age of marriage for girls in India which improved to 332(66.4%) after health education intervention.

b. In the pre-test, 421(84.2%) of the participants had knowledge that missed period is the first sign of pregnancy which increased to 434(86.8%) in the post-test, whereas 78(15.6%) of the participants had no knowledge regarding the same.

		Pre-test		Post-test	
		Number (n)	**Percentage (%)**	**Number (n)**	**Percentage (%)**
c.	It is regular medical and nursing care recommended for women during pregnancy	147	29.40	352	70.40
d.	It is to treat and prevent potential health problems throughout the course of pregnancy.	43	8.60	292	58.40
e.	It helps in promoting healthy lifestyles that benefit both mother and child	151	30.2	332	66.40
f.	Proper diet, rest, and mild exercise are essential during pregnancy.	461	92.20	472	94.41
g.	Eating nutritious foods is a good for health of pregnant women and baby.	480	96.00	497	99.40

c. In the present study, during pre-test, 147(29.4%) girls were aware of regular antenatal care during pregnancy which improved to 352(70.40%) in the post-test after health education.

d. To treat and prevent potential health problems during pregnancy, antenatal care is essential, this knowledge improved from 43(8.60%) to 292(58.40%) in the post-test.

e. During pre-test, 151(30.2%) girls answered that antenatal care helps in promoting healthy lifestyles that benefit both mother and child which increased to 332(66.40%) after health education intervention.

f. 461(92.2%) study participants told that during pregnancy, proper diet, rest, and mild exercise are essential which improved to 472(94.41%) in the post-test..

g. In the pre-test, 480(96%) participants answered that eating nutritious foods is good for health of the pregnant women and baby which increased to 497(99.4%) after health education.

Table 19 Distribution of study participants according to their knowledge regarding contraception in pre-test and post-test

			Pre-test		Post-test	
			Number (n)	**Percentage (%)**	**Number (n)**	**Percentage (%)**
a.	It is necessary to know about contraception		303	60.60	392	78.40
b.	Responsible for contraception	Husband	42	8.40	30	6
		Wife	4	0.80	2	0.40
		Both of them	413	82.60	466	93.40
		Not both of them	41	8.20	2	0.40
c.	Contraception- to avoid unwanted pregnancy		287	57.40	429	85.80
d.	Contraception- helps to maintain regular interval between pregnancy		36	7.20	228	45.60
e.	Permanent method of female contraception	Copper T	65	13	60	12.00
		oral pills	12	2.40	16	3.20
		Condoms	16	3.20	16	3.20
		Tubectomy	126	25.2	303	60.60
		Vasectomy	57	11.40	24	4.80
		Don’t know	224	44.80	81	16.20
f.	Permanent method of male contraception	Copper T	7	1.40	2	0.40
		oral pills	5	1.00	-	-
		Condoms	61	12.20	51	10.20
		Tubectomy	70	14	29	5.80
		Vasectomy	120	24	336	67.2
		Don’t know	237	47.40	82	16.4

a. In the present study during pre-test, 303(60.6%) girls said that it is essential to know about contraception which increased to 392(78.4%) in the post-test after health education intervention.

b. In the pre-test, 42(8.40%) participants answered that only husband is responsible for contraception, 4(0.80%) of them answered its wife's responsibility, 413(82.60%) of them answered both husband and wife are responsible.

   After health education session, 30(6%) participants told that husband is responsible for contraception, 2(0.40%) of them answered its wife's responsibility, 466(93.20%) of them answered both husband and wife are responsible.

c. 287(57.40%) participants were aware that contraception is essential to avoid unwanted pregnancy in the pre-test which improved to 429(85.80%) after health education.

d. During pre-test, 36(7.20%) participants said that contraception helps to maintain regular interval between pregnancy which increased to 228(45.60%) in the post-test after health education.

e. Knowledge regarding tubectomy as permanent method of female contraception after intervention increased from 126(25.20%) to 303(60.60%).

f. Knowledge regarding vasectomy as permanent method of male contraception after intervention increased from 120(24%) to 336(67.20%).

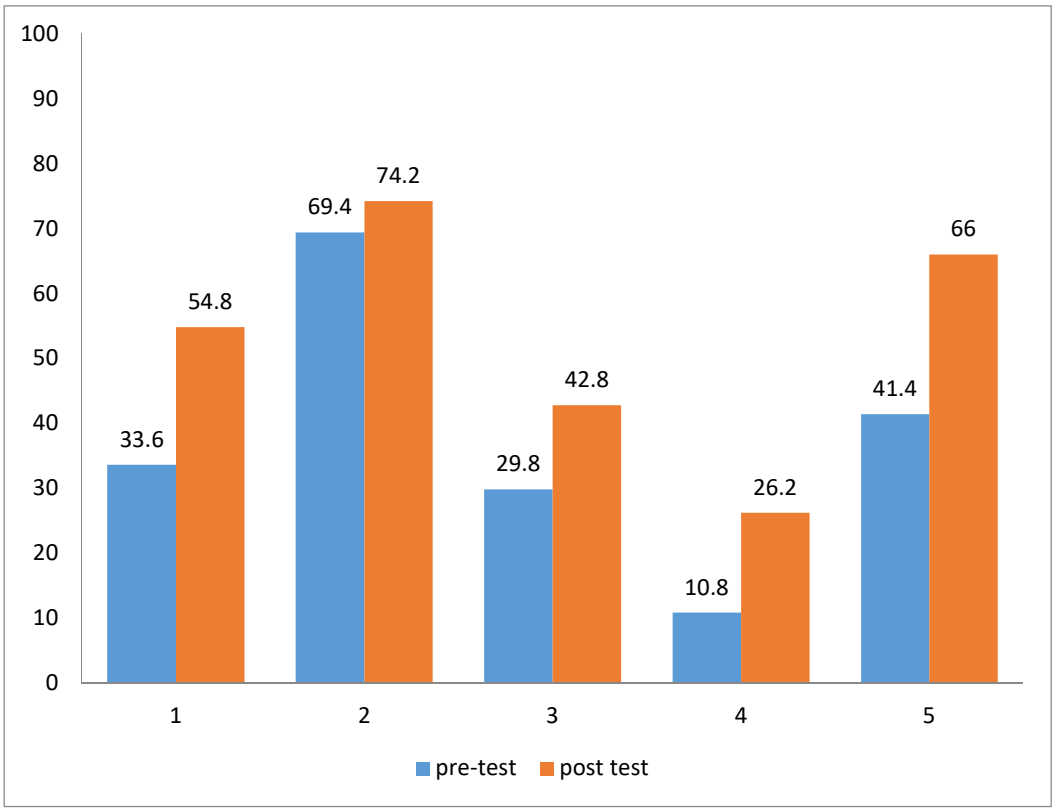
Table 20 Distribution of study participants according to their attitude regarding puberty and menstruation

s.no		**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**	**Did not answer**
1	Parents / Teachers should be consulted on the matters of reproductive health education.	8 (1.60%)	4 (0.80%)	50 (10%)	220 (44%)	168 (33.6%)	50 (10%)
2	Do you agree that all girls need to learn about menstrual hygiene.	4 (0.80%)	5 (1%)	7 (1.40%)	116 (23.2%)	347 (69.4%)	21 (4.20%)
3	Poor menstrual hygiene predisposes to infection.	1 (0.20%)	14 (2.8%)	87 (17.40 %)	212 (42.4%)	149 (29.8%)	37 (7.4%)
4	Does menstrual problems interfere with academic performance	19 (3.8%)	74 (14.8%)	143 (28.6%)	163 (32.6%)	54 (10.8%)	47 (9.4%)
5	Do you think that cultural and social taboos(not entering kitchen, do not sit in same place as others in house) during menstrual period should be eliminated.	73 (14.6%)	60 (12%)	57 (11.4%)	71 (14.2%)	207 (41.4%)	32 (6.4%)

Table 21 Distribution of study participants according to their attitude regarding puberty and menstruation after intervention

s.no		**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**	**Did not answer**
1	Parents / Teachers should be consulted on the matters of reproductive health education.	8 (1.60%)	-	25 (5%)	169 (33.8%)	274 (54.8%)	24 (4.80%)
2	Do you agree that all girls need to learn about menstrual hygiene.	3 (0.60%)	-	12 (2.40%)	99 (19.80%)	371 (74.20%)	15 (3%)
3	Poor menstrual hygiene predisposes to infection.	-	2 (0.40%)	61 (12.20%)	202 (40.4%)	214 (42.8%)	21 (4.20%)
4	Does menstrual problems interfere with academic performance.	12 (2.40%)	45 (9%)	134 (26.80%)	167 (33.4%)	131 (26.2%)	11 (2.20%)
5	Do you think that cultural and social taboos(not entering kitchen, do not sit in same place as others in house) during menstrual period should be eliminated.	32 (6.4%)	19 (3.80%)	43 (8.60%)	71 (14.20%)	330 (66%)	5 (1%)

Graph 15 (Table 20 and 21): Distribution of study participants according to their improvement in attitude regarding puberty and menstruation after health education intervention



In the pre-test, 33.6% study participants strongly agreed that parents/Teachers should be consulted regarding reproductive health. 74.2% girls strongly agreed that all girls should learn about menstrual hygiene in the post-test.

Initially 29.8% girls said poor menstrual hygiene predisposes to infection which improved to 42.% after health education. 41.4% study participants felt cultural and social taboos during menstruation should be eliminated which increased to 66% in the post-test.

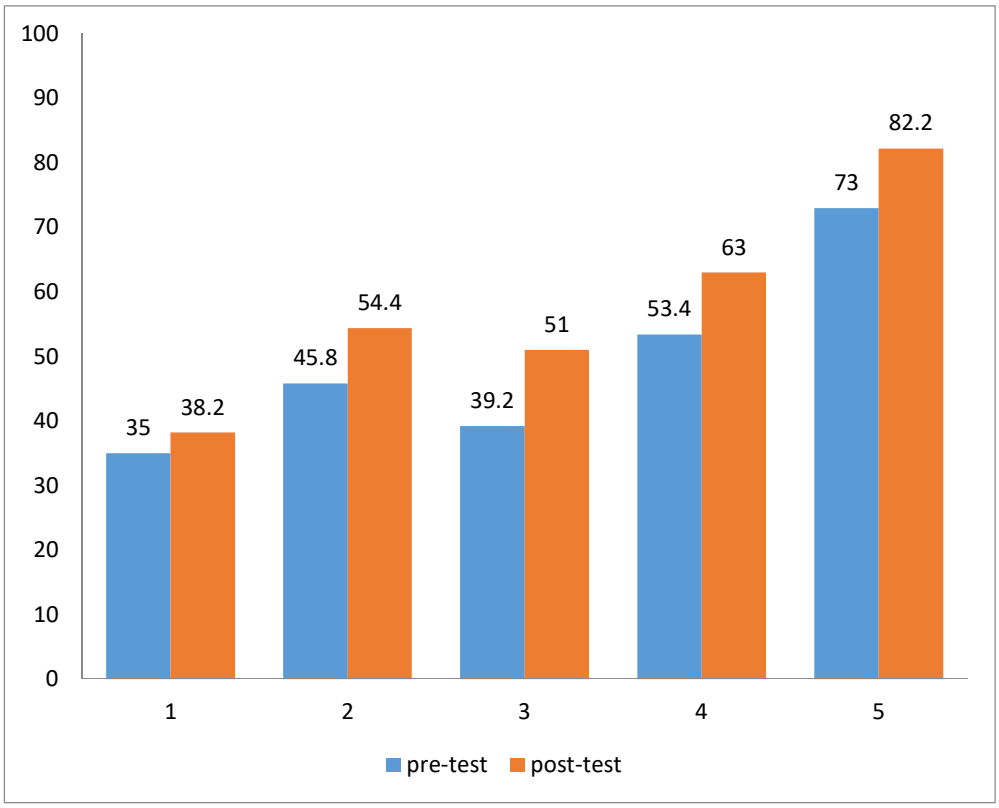
Table 22 Distribution of study participants according to their attitude regarding pregnancy and Antenatal care

s.no		**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**	**Did not answer**
1	Do you agree that marriage within close relatives should be avoided	32 (6.40%)	50 (10%)	87 (17.4%)	144 (28.8%)	175 (35%)	12 (2.40%)
2	Regular antenatal checkup and followup is essential during pregnancy	1 (0.20%)	6 (1.20%)	38 (7.60%)	189 (37.8%)	229 (45.8%)	37 (7.40%)
3	Pregnant women should change dietary habit as advised by doctor	-	5 (1%)	30 (6%)	238 (47.6%)	196 (39.2%)	31 (6.20%)
4	Do you agree that taking medicine without prescription of doctors during pregnancy is harmful	36 (7.20%)	27 (5.4%)	11 (2.20%)	138 (27.6%)	267 (53.4%)	21 (4.20%)
5	Smoking during pregnancy is harmful to baby	24 (4.80%)	6 (1.20%)	7 (1.40%)	77 (15.40%)	365 (73%)	21 (4.20%)

Table 23 Distribution of study participants according to their attitude regarding pregnancy and Antenatal care after intervention

s.no		**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**	**Did not answer**
1	Do you agree that marriage within close relatives should be avoided	13 (2.60%)	28 (5.60%)	108 (21.6%)	155 (31%)	191 (38.2%)	5 (1%)
2	Regular antenatal checkup and followup is essential during pregnancy	5 (1%)	2 (0.40%)	26 (5.20%)	189 (37.8%)	272 (54.4%)	6 (1.20%)
3	Pregnant women should change dietary habit as advised by doctor	1 (0.20%)	2 (0.40%)	14 (2.80%)	218 (43.6%)	255 (51%)	10 (2%)
4	Do you agree that taking medicine without prescription of doctors during pregnancy is harmful	8 (1.60%)	25 (5%)	8 (1.60%)	139 (27.8%)	315 (63%)	5 (1%)
5	Smoking during pregnancy is harmful to baby	9 (1.80%)	5 (1%)	1 (0.20%)	68 (13.60%)	411 (82.2%)	6 (1.20%)

Graph 16 (Table 22 and 23): Distribution of study participants according to their improvement in attitude regarding pregnancy & antenatal care after health education intervention



Before the health education, 35% study participants strongly agreed that marriage within close relatives should be avoided which improved to 38.2% in post-test. 45.8% girls felt that during pregnancy, regular antenatal check-up and follow up is essential which increased to 54.4% in post-test.

39.2% participants strongly agreed that pregnant women should change dietary habit according to Doctor's advise whereas after health education it improved to 51%. 73% girls strongly agreed that smoking is harmful to baby which increased to 82.2% in post-test.

Table 24: Test of normality of variables using Shapiro-Wilk test

Variable	Pre - test		Post – test	
	Statistics	p-value	Statistics	p-value
Knowledge				
Puberty and Menstruation	0.952	<0.001***	0.877	<0.001***
Pregnancy & Antenatal care	0.884	<0.001***	0.904	<0.001***
Contraception	0.917	<0.001***	0.892	<0.001***
Total Knowledge Score	0.967	<0.001***	0.959	<0.001***
ATTITUDE				
Puberty and Menstruation	0.892	<0.001***	0.842	<0.001***
Pregnancy & Antenatal care	0.788	<0.001***	0.763	<0.001***
Total Attitude Score	0.841	<0.001***	0.802	<0.001***

All the variables in the study were not normally distributed, since sample size is larger than 50, Shapiro- Wilk test results were considered. Shapiro-Wilk test has revealed significant outcome indicating violation of normality assumption. Thus wilcoxon signed rank test was carried out for comparisons between pre-test and post-test scores.

Table 25: Comparison of pre-test and post-test knowledge scores regarding puberty and menstruation using wilcoxon signed rank test

Puberty and Menstruation	Mean	Median	Minimum	Maximum
Pre- test	9 ± 2.191	9	1	13
Post-test	11.24 ± 1.624	12	3	13

		N	Mean Rank	Sum of Ranks	Z-value	p-value
Post-test – pre-test	Negative Ranks	71	157.13	11156.0	-14.367	<0.001***
	Positive Ranks	378	237.75	89869.0		
	Ties	51				
	Total	500				

There was significant difference in knowledge scores on questions related to puberty and menstruation between the post-test and pre-test.

Wilcoxon signed rank test revealed that knowledge scores on puberty and menstruation were significantly higher after the education intervention with median of differences in scores being + 2 , Z = -14.367, p<0.001*** and r = 0.45

Table 26: Comparison of pre-test and post-test knowledge scores regarding pregnancy & antenatal care using wilcoxon signed rank test

Pregnancy and antenatal care	Mean ± SD	Median	Minimum	Maximum
Pre-test	3.8 ± 1.045	4	0	7
Post -test	5.42 ± 1.186	5	2	7

		N	Mean Rank	Sum of Ranks	Z	p-value
Post-test – Pre-test	Negative Ranks	46	118.16	5479	-15.965	<0.001***
	Positive Ranks	382	226.10	86370.5		
	Ties	72				

There was significant difference in knowledge scores on questions related to pregnancy and antenatal care between the two time points.

Wilcoxon signed rank test revealed that knowledge scores on pregnancy and antenatal care were significantly higher after the education intervention with median of differences in scores being + 2, Z = -15.965, p<0.001*** and r = 0.504

Table 27: Comparison of pre-test and post-test knowledge scores regarding contraception using wilcoxon signed rank test

	Mean ± SD	Median	Minimum	Maximum
Pre-test	2.57 ± 1.68	3	0	6
Post-test	4.30 ± 1.423	5	0	6

		N	Mean Rank	Sum of Ranks	Z-value	p-value
Post-test – Pre-test	Negative Ranks	81	163.43	13238	= -13.17	<0.001***
	Positive Ranks	356	231.64	82465.0		
	Ties	63				
	Total	500				

There was significant difference in knowledge scores on questions related to contraception between the two time points.

Wilcoxon signed rank test revealed that knowledge scores on contraception were significantly higher after the education intervention with median of differences in scores being **+ 2 ,** Z = -13.17, p<0.001*** and r = 0.41

Table 28: Comparison of pre-test and post-test knowledge scores (on total knowledge using wilcoxon signed rank test)

Time Frame	Mean	Median	Minimum	Maximum
Pre-test Total knowledge	15.38 ± 3.827	16	3	23
Post-test total knowledge score	20.97 ± 2.89	21	11	26

Post-test Total – Pre-test Total Knowledge		Frequency	Mean Rank	Sum Rank	Z-value	p- value
	Negative	56	114.69	6422.5	- 16.93	<0.001***
	Positive	426	258.17	109980		
	Ties	18				

There was significant difference in total knowledge scores between the two time points.

Wilcoxon signed rank test revealed that knowledge scores were significantly higher after the education intervention with median of differences in scores being + 6 , Z = -16.93, p<0.001*** and r = 0.53

Table 29: Comparison of pre-test and post-test attitude scores regarding puberty and menstruation using wilcoxon signed rank test

Puberty and Menstruation	Mean ± SD	Median	Minimum	Maximum
Pre-test	18.41 ± 4.697	19	0	25
Post-test	20.89 ± 3.416	22	7	25

		N	Mean Rank	Sum of Ranks	Z-value	p-value
Post-test-Pre-test	Negative Ranks	139	193.08	26838.5	- 9.038	<0.001***
	Positive Ranks	318	244.70	77814.5		
	Ties	43				

There was significant difference in attitude scores on questions related to puberty and menstruation between the two time points.

Wilcoxon signed rank test revealed that attitude scores were significantly higher after the education intervention with median of differences in scores being **+ 2** and $Z = -9.038$, $p<0.001$*** and $r = 0.285$

Table 30: Comparison of pre-test and post-test attitude scores regarding pregnancy & antenatal care using wilcoxon signed rank test

Pregnancy & Antenatal care	Mean	Median	Minimum	Maximum
Pre-test	20.21 ± 4.818	21.5	0	25
Post-test	21.85 ± 3.171	23	2	25

Attitude Score		N	Mean Rank	Sum of Ranks	Z	p-value
Post-test - Pre-test	Negative Ranks	167	193.49	32312.5	-6.576	<0.001***
	Positive Ranks	281	242.93	68263.5		
	Ties	52				
	Total	500				

There was significant difference in attitude scores on pregnancy and antenatal care between pre-test and post-test.

A wilcoxon signed rank test revealed that attitude scores regarding pregnancy and antenatal care were significantly higher after the education intervention with median of differences in scores being **+ 1 ,** Z = -6.576, p<0.001*** and effect size(r)= 0.207

Table 31: Comparison of pre-test and post-test attitude total scores using wilcoxon signed rank test

Attitude total	Mean	Median	Minimum	Maximum
Pre-test total	38.62 ± 8.50	40	0	50
Post-test total	42.74 ± 5.89	44	11	50

		N	Mean Rank	Sum of Ranks	z-value	p-value
Post-test Total – Pre-test Total	Negative Ranks	156	192.92	30095	-9.09	<0.001***
	Positive Ranks	324	263.41	85345		
	Ties	20				

There was significant difference in total attitude scores between the two time points.

Wilcoxon signed rank test revealed that total attitude scores were significantly higher after the education intervention with median of differences in scores being **+ 4,** Z = -9.09, p<0.001*** and r = 0.287

DISCUSSION

I. SOCIO-DEMOGRAPHIC PROFILE OF STUDY PARTICIPANTS

Table 1: Distribution of study participants according to their age (n=500)

In our study done among 500 high school students, the mean age of the study participants was 17.15± 0.7 years. 0.2% were in the age group of < 16 years age, 98.6% were in the 16– 18 years age group and 1.2% were in >18 years age group.

A similarly study conducted in Belgaum showed that mean age of the participants was 17 ± 0.752 years and majority of the participants were belonging to age group of 17 years.[25] Another study conducted in Udupi taluk, Karnataka showed that majority of the participants (87%) belonged to age group of 16- 17 years. [15]

Table 2: Distribution of study participants according to their schooling (n=500)

In the present study, 52.8% were studying in PUC I, 47.2% were studying in PUC II Similarly, a study conducted in Bangladesh showed that majority of the students (41%) were studying class HSC I year and 17 were studying class HSC II year. [35]

Table 3: Distribution of study participants according to their religion (n=500)

In the present study maximum participants (89.2%) were Hindus, 9.2% were Muslims and 1.6% belonged to Christians.

This is similar to a study conducted in Ankuli, Berhampur where the maximum participants (94.4%) were Hindus followed by 2.7% Christians and 1.3% Muslims. [28]

Table 4 and 5: Distribution of study participants according to education of the father & mother (n=500)

Educational qualification of the fathers of the study participants was assessed which revealed that 1.8% were illiterates, 1.8% could read and write, 2.6% had completed primary education, 7.2% had completed secondary education, 48.6% had completed pre – university & 38% were graduates/Postgraduates.

Similar observation conducted in Bhopal, Madhya Pradesh in the year 2015 revealed that majority (51.26%) of the father of participants were educated upto high school and were college graduates, 22.84% had completed primary education, 25.88% were illiterates. [19]

Educational qualification of the mother of the study participants showed that 3.4% were illiterates, 2.2% could read and write, 3% had completed primary education, 11.8% had completed secondary education, 56% had completed pre – university & 23.6% were graduates/Postgraduates.

A study conducted in Bhopal, Madhya Pradesh in the year 2015 revealed that majority (53.29%) of the mother's of participants were illiterates, 30.45% had completed primary education and only 16.24% had completed high school and college. [19]

The difference in the results might be due the variation in the literacy rate between each state and majority of the participants were from public schools in the study conducted in Bhopal.

Table 6: Distribution of study participants according to occupation of the father (n=500).

In our study, 14.6% of fathers were farmers, 7.6% were labourers, 33.2% were self-employed, 17.4% were Government Employees, 23.6% were Private Employees and 3.6% were retired.

This is similar to a study conducted in Belgaum where the majority of the fathers of study participants (49.5%) were working in private jobs, 30.7% in government service, 16.5% were farmers and 1% worked as labourer. [25]

Table 7: Distribution of study participants according to occupation of the mother (n=500).

In the present study, out of 500 participants it was observed that 2% of the mothers were farmers, 2.2% were labourers, 5.2% were self-employed, 5.2 % were Government Employees, 4.6% were Private Employees, 80.8% were home makers.

This is comparable to the study conducted in Srinagar, Jammu Kashmir where the majority of the mothers of study participants (96.66%) were home makers. [21]

Table 8 & 9: Distribution of study participants according to type of family & place of residence (n=500)

In our study among the 500 study participants, 72.6% belonged to nuclear family, 26.2% lived in joint family and 0.6% belonged to broken family.

Out of 500 study participants, 60.8% were living in urban areas, 38.6% were living in rural areas and 0.2% was living in sub urban areas and 0.4% were living in

hostel. 90.6% were living with both parents, 6% were living with mother alone, 0.6% were living with father alone and 2.8 % were living with their grandparents.

A study conducted in urban area of Bagalkot city showed that 44.5% of participants were from nuclear family and 52% were from joint family. [23]

Another study conducted in Warangal city revealed that almost 85.5% of participants belonged to nuclear families. [34]

Table 10: Distribution of study participants according to the type of housing (n=500).

In the present study, 89.2% were residing in pucca house, 9.4% of them were residing in semi-pucca house and 1.4% of them were residing in kutcha house and overcrowding was present in 46.2% of the participant's house. As our study was conducted in an urban area, most of the participants were residing in pucca house.

A study conducted in Warangal city revealed that 73.2% of participants resided in pucca house, 23.4% resided in semi-pucca house and 3.4% resided in kutcha house. [34]

Table 11: Distribution of study participants according to availability of sanitary privy (n=500)

Among 500 participants, 81.8% of participants had toilet situated inside their house, 17.2% of them had toilet outside their house, 0.8% of them were using public toilet and 0.2% of the participants did not have sanitary privy.

Similarly, a study conducted in Bangladesh showed majority of the participants (51.7% of them) revealed that their toilets were sufficient to maintain privacy. [35]

The difference in the results might be due to the variation in the people's living standards in the different countries.

Table 12: Distribution of study participants according to socio economic status (According to modified B.G. Prasad classification, 2021).

According to modified B. G. Prasad's classification of socio – economic status, 2.2% participants belonged to class I, 37.4% belonged to class II, 55.8 % belonged to class III, 4.4 % belonged to class IV and 0.2% belonged to class V.

Similarly, a study conducted in Pondicherry showed majority of the participants (57%) belonged to class IV. [33]

Table 13: Distribution of study participants according to their source of information regarding menstruation (n=500)

In the present study, 70.4% of students got information from mothers, 2.8% from the teachers, 8.4% from their friends and 0.2% from the books.

A similar study conducted in Bengaluru, Karnataka showed that their mother was the prime source of information regarding menstruation in 47.03% of participants followed by their sister (25.65%) and friends (15.46%).[24]

A similar study conducted in Bhopal, Madhya Pradesh showed that 77.7% girls obtained knowledge regarding menstruation from their mothers followed by friends (11.6%).[19]

Most of the students feel comfortable to discuss the issues regarding menstruation with their mother and she can be a key person in imparting knowledge regarding the same.

Table 14: Distribution of study participants according to their age at menarche (n=500)

Among 500 participants, 16.4% did not remember their age of menarche. 66% of the participants attained their menarche by 10-15 years and 17.6% of them attained menarche by 15-20 years.

In a study done in Bangladesh, 55.7% of the participants attained menarche below 14 years of age. [35]

Table 15: Distribution of study participants according to their reaction to first menstruation (n=500)

Among 500 study participants, the students reaction to first menstruation: 62.6% students felt discomfort during first menstruation, 18.8% students felt scared, 13.2% had emotional disturbances and 5.2% students were happy during the first menstruation.

A study conducted in Dehradun, Uttarakhand showed that during their first menstruation, 24.24% of the study participants were scared, 28% felt discomfort whereas 48.48% of the participants had no reaction. [29]

Table 16: Distribution of study participants according to physical symptoms during their first menstrual period (n=500)

Out of 500 participants, 61.4% experienced abdominal and back pain during their first menstruation whereas 19.2% of them had sleeplessness, 18.8% had heavy bleeding.

Similarly, a study conducted in Bangladesh showed that majority of the respondents (46.7%) complained of lower abdominal pain, 0.3%of them had generalized discomfort. [35]

Table 17: Distribution of study participants according to their knowledge regarding puberty and menstruation (in pre-test and post-test).

1. During pre-test, 49.6% participants answered that menstruation is a physiological process which increased to 81% in the post-test after health education.

   In a similar study conducted in Bengaluru, Karnataka, it was observed that only 34.2% of participants were aware that menstruation is a physiological process which increased to 60.5% in the post-test. [24]
2. 63.2% girls had knowledge that blood comes out through vagina during menstruation in the pre-test whereas 86.4% students in the post-test had this knowledge.

   A similar study conducted in Bagalkot, Karnataka revealed that in the pre-test only 18.5% of the study participants were aware that blood comes out through vagina during menstruation which increased to 96% in the post-test after health education intervention. [23]

3. In the pre-test, 15.4% participants told that most girls attain menarche before 10 years, 84.6% of them mentioned it as between 10-16 years. After health

education in the post-test, 91.2% of them answered that girls attain menarche between 10-16 years.

A similar study done in Udupi taluk, Karnataka showed that in the pre-test, 99.6% of girls answered that 9-16 years is the usual age when the girls get their first menses which improved to 100% in the post-test after health education. [15]

4. In the present study, during pre-test 83.2% girls told that there was session in school regarding information on menstruation.

5. In the pre-test, only 15% students were comfortable in talking about menstruation related queries to any teacher, 48.4% were comfortable with teacher of same gender and 36.6% were uncomfortable in asking menstruation related queries to any teacher.

   After health education intervention, 24.4% students were comfortable in talking about menstruation related queries to any teacher,58.2% were comfortable with teacher of same gender and 17.4% were uncomfortable in asking menstruation related queries to any teacher.

6. In the present study during pre-test, 88.2% girls had knowledge that normal duration of menstrual blood flow was between 2-7 days which increased to 93.6% in the post-test.

7. Knowledge regarding normal interval between two menstrual cycles (21-35 days) improved from 69.6% to 85.2% after health education intervention.

Similar study done among adolescent girls in Bangladesh showed that Knowledge regarding duration of normal menstrual cycle(21-35 days) improved from 77.4% in the pre-test to 93.5% in the post-test. [30]

8. Regarding the absorbent used during menstruation, 79.8% study participants mentioned that commercially made sanitary pad should be used during menstruation which increased to 94% after health education intervention.

9. Frequency of changing absorbent (4-6 hours once) was mentioned by 40.2% participants in the pre-test which increased to 60.6% in the post-test.

   A similar study conducted in Bhopal, Madhya Pradesh showed that the usage of sanitary pads during menstruation increased from 58.3% to 69.5% and the number of participants changing sanitary pads more than three times a day increased from 40.10% to 94.41%.[19]

   Another study conducted in Bengaluru, Karnataka revealed that only 38.5% of participants changed sanitary pads thrice a day which increased to 76.3% in the post-test. [24]

10. In the pre-test, 89.20% participants were aware that dustbin should be used for the disposal of absorbents which increased to 95.4% in the post-test.

    Regarding the disposal of sanitary pads, a study conducted in Hoskote, Karnataka showed that knowledge regarding proper disposal method increased from 50.7% to 87.3%.[17]

11. For the disposal of absorbent, 64.2% girls told that paper should be used as pad wrap which increased to 81.2% after health education.

12. 91.2% participants were aware that they should clean the genitalia at every visit to toilet during menstruation which increased to 97.8% in the post-test.

    A similar study conducted in Bagalkot, Karnataka revealed that in the pre-test only 48.5% of the study participants prefer wrapping the pad before disposal which increased to 92.5% in the post-test. 62.5% of the girls had knowledge that they should wash their genitalia more often during menstruation which improved to 97% in the post-test. [23]

13. In the pre-test, 35% participants answered that they should use water and soap to clean the genitalia which increased to 82.4% after health education intervention.

    A similar study conducted in Bengaluru, Karnataka showed that the number of study participants who practised cleaning of genitalia with soap & water increased from 49% to 80.6%.[24]

    In another study conducted in Bangladesh, it was found that 66% of the respondents used soap & water to clean their genitalia. [35]

Table 18 Distribution of study participants according to their knowledge regarding pregnancy & Antenatal care in pre-test and post-test.

1. During pre-test, only 39% participants were aware that 18 years is the recommended age of marriage for girls in India which improved to 66.4% after health education intervention.

In a study done in Bagalkot, Karnataka, 92% of the participants answered correctly about the ideal age of marriage which increased to 100% in the post-test after health education intervention. [20]

2. In the pre-test, 84.2% of the participants had knowledge that missed period is the first sign of pregnancy which increased to 86.8% in the post-test, whereas 15.6% of the participants had no knowledge regarding the same.

   A similar study conducted in Hoskote, Karnataka revealed that only 36.7% of participants knew that the first sign of pregnancy is missed period which increased to 87.3% in the post-test after health education intervention. [17]

3. In the present study, during pre-test, 29.4% girls were aware of regular antenatal care during pregnancy which improved to 70.40% in the post-test after health education.

4. To treat and prevent potential health problems during pregnancy, antenatal care is essential, this knowledge improved from 8.60% to 58.40% in the post-test.

5. During pre-test, 30.2% girls answered that antenatal care helps in promoting healthy lifestyles that benefit both mother and child which increased to 66.40% after health education intervention.

   A similar study conducted among school going adolescents in Udupi taluk, Karnataka showed that 98.1% of the students told that regular antenatal checkup is essential during pregnancy which increased to 99.2% in the post-test. [15]

Another similar study conducted in Saudi Arabia showed that in the pretest 82.8% of the study participants were aware of regular antenatal care during pregnancy which improved to 93.2% in the post-test. [4]

6. 92.2% study participants told that during pregnancy, proper diet, rest, and mild exercise are essential which improved to 94.41% in the post-test..

7. In the pre-test, 96% participants answered that eating nutritious foods is good for health of the pregnant women and baby which increased to 99.4% after health education.

   A similar study conducted in Bagalkot, Karnataka showed that 56.9% of participants answered correctly regarding the importance of nutrition during pregnancy in pre-test which increased to 95.9% in the post-test. [20]

   Another study conducted in Hoskote, Karnataka showed that 84% of participants were aware that eating nutritious food is good for health during pregnancy which increased to 98% after intervention. [17]

Table 19 Distribution of study participants according to their knowledge regarding contraception in pre-test and post-test.

1. In the present study during pre-test, 60.6% girls said that it is essential to know about contraception which increased to 78.4% in the post-test after health education intervention.

   In a study conducted among school going children in Wardha district, Maharashtra it was observed that only 49% of the students had heard about contraception. [37]

Another study conducted among school going adolescents in Vadodara,

Gujarat revealed that only 33% of the girls mentioned that they had heard about contraception. [36]

2. In the pre-test, 8.40% participants answered that only husband is responsible for contraception, 0.80% of them answered its wife's responsibility, 82.60% of them answered both husband and wife are responsible.

3. After health education session, 6% participants told that husband is responsible for contraception, 0.40% of them answered its wife's responsibility, 93.20% of them answered both husband and wife are responsible.

4. 57.40% participants were aware that contraception is essential to avoid unwanted pregnancy in the pre-test which improved to 85.80% after health education.

5. During pre-test, 7.20% participants said that contraception helps to maintain regular interval between pregnancy which increased to 45.60% in the post-test after health education.

6. An intervention study conducted in Hoskote, Karnataka revealed that the contraceptives were used to prevent unwanted pregnancy and child spacing were 32% to 80.7% and 29.3% to 85.3% in the pre-test and post-test respectively. [17]

7. Knowledge regarding tubectomy as permanent method of female contraception after intervention increased from 25.20% to 60.60%.

8. Knowledge regarding vasectomy as permanent method of male contraception after intervention increased from 24% to 67.20%.

   A similar study conducted in Hoskote, rural Bangalore revealed that only 21.3% of the study participants had knowledge regarding female sterilization which improved to 80% in the post-test. Regarding male sterilization only 14% had knowledge in the pre-test which increased to 56.7% after health education intervention. [17] Hence health education can play a key role in improving the knowledge.

Table 20,21 Distribution of study participants according to their attitude regarding puberty and menstruation in pre-test and post-test.

In the pre-test, 33.6% study participants strongly agreed that parents/Teachers should be consulted regarding reproductive health. 74.2% girls strongly agreed that all girls should learn about menstrual hygiene in the post-test.

Initially 29.8% girls said poor menstrual hygiene predisposes to infection which improved to 42% after health education. 41.4% study participants felt cultural and social taboos during menstruation should be eliminated which increased to 66% in the post-test. Cultural and social taboos can lead to misconceptions and hence should be avoided.

Table 22,23 Distribution of study participants according to their attitude regarding pregnancy and antenatal care in pre-test and post-test.

Before the health education, 35% study participants strongly agreed that marriage within close relatives should be avoided which improved to 38.2% in post-

test. 45.8% girls felt that during pregnancy, regular antenatal check-up and follow up is essential which increased to 54.4% in post-test.

39.2% participants strongly agreed that pregnant women should change dietary habit according to Doctor's advise whereas after health education it improved to 51%. 73% girls strongly agreed that smoking is harmful to baby which increased to 82.2% in post-test.

Table 24,25,26,27,28: Test of normality of variables using Shapiro-Wilk test & comparison of pre-test and post-test knowledge scores on using Wilcoxon signed rank test

In this study, all the variables were not normally distributed, since sample size is larger than 50, Shapiro- Wilk test results were considered. Shapiro-Wilk test has revealed significant outcome indicating violation of normality assumption. Thus wilcoxon signed rank test was carried out for comparisons between pre-test and post-test scores

A wilcoxon signed rank test revealed that knowledge scores on puberty and menstruation were significantly higher after the education intervention with median of differences in scores being + 2 , Z = -14.367, $p<0.001$*** and r = 0.45

Regarding pregnancy and antenatal care, the knowledge scores of post-test showed that there was significant difference after the education intervention with median of differences in scores being + 2, Z = -15.965, $p<0.001$*** and r = 0.504

Wilcoxon signed rank test revealed that knowledge scores on contraception were significantly higher in the post-test compared to pre-test with median of differences in scores being **+ 2 ,** Z = -13.17, $p<0.001$*** and r = 0.41

Regarding the overall knowledge regarding reproductive health, there was significant difference in total knowledge scores between the two time points (post-test > pre-test) after the Education Intervention with median of differences in scores being + 6 , Z = -16.93, p<0.001*** and r = 0.53

In a similar study done among adolescent girls in Saudi Arabia, wilcoxan signed rank test was used to find the effect of health education. Regarding puberty and menstruation, the knowledge scores were significantly higher in the post-test than the pre-test with Z value of -4.026 and p value < 0.05

The knowledge regarding pregnancy and antenatal care also showed significant difference in post-test compared to pre-test with Z= -1.081 and p value <0.05.

The knowledge scores on contraception were significantly higher in the post-test compared to pre-test with Z value of -0.911 and p value < 0.05. [4]

Table 29: Comparison of pre-test and post-test attitude scores on puberty and menstruation using wilcoxon signed rank test

There was significant difference in attitude scores on questions related to puberty and menstruation between the two time points.

Wilcoxon signed rank test revealed that attitude scores were significantly higher after the education intervention with median of differences in scores being **+ 2** and Z = -9.038, p<0.001*** and r = 0.285

Table 30: Comparison of pre-test and post-test attitude scores on pregnancy & antenatal care using wilcoxon signed rank test

There was significant difference in attitude scores on pregnancy and antenatal care.

Wilcoxon signed rank test revealed in attitude scores on pregnancy and antenatal care were significantly higher after the education intervention with median of differences in scores being **+ 1 ,** Z = -6.576, p<0.001*** and effect size(r)= 0.207

Table 31: Comparison of pre-test and post-test attitude total scores using wilcoxon signed rank test

There was significant difference in total attitude scores between the two time points.

Wilcoxon signed rank test revealed that total attitude scores were significantly higher after the education intervention with median of differences in scores being **+ 4 ,** Z = -9.09, p<0.001*** and r = 0.287

CONCLUSION

The present interventional study showed significant improvement in knowledge and attitude regarding reproductive health among pre-university college girls in urban area of Belagavi, Karnataka. Among the 500 participants 70.5% of the study participants gained knowledge regarding menstruation from their mothers. 66% of the participants attained menarche between 10-15 years. As menstruation and child birth are normal physiological process, mother can play a pivotal role in imparting knowledge regarding reproductive health. Therefore more emphasis should be given to health education and peer education programmes in young age to improve the quality of reproductive health in adolescents.

RECOMMENDATIONS

Based on the findings of our study, following recommendations are suggested to improve reproductive health.

1. Health education to parents, teachers and community is essential to eliminate the stigma and avoid misconceptions among adolescents.
2. Initiation of peer educational programs will influence positive knowledge and attitude regarding adolescent health which may enable them to make right decisions.
3. Counsellors can play a vital role by clearing the doubts through regular counselling. Counselling by a professional should be made available at all schools for promotion of overall reproductive health.
4. Studies similar to our study are essential for school-based intervention which might help students with inadequate knowledge to improve their knowledge.
5. Political interest and policies should be necessitated to address the need of reproductive health at school and community level.

STRENGTHS

1. The current study shows positive effect of health education intervention regarding reproductive health among pre-university college girls in an urban area.

2. Efforts were made to collect data in the difficult period of the pandemic with appropriate measures.

3. Our study gives an opportunity for further evaluation with quantitative and qualitative studies.

LIMITATIONS

1. The present study was conducted in urban area; hence it reflects the knowledge and attitude of girls in urban pre-university college girls. Similar studies can be conducted in rural areas to assess their knowledge regarding the same.

2. Majority of the high school students were from upper and middle socioeconomic class and inclusion of participants from lower socioeconomic class could have led to more comprehensive conclusion.

3. In the same age group, some of the girls discontinued their PUC education. Hence data cannot be collected from non-school going adolescent girls(drop-outs).

SUMMARY

The present study was an interventional study undertaken to assess the effect of health education on knowledge and attitude of reproductive health among pre-university college girls.

The study included 500 girls studying in pre-university colleges in the urban area of Belagavi. The duration of the study was one year from 1st January to 31st December 2021.

Pre-university girls studying in I and II PUCs were randomly selected from 4 colleges (125 Girls from each college), one from each zone (North, South , East, West) for the study.

Sample size was calculated using G POWER software for statistical test by difference between 2 dependent means (matched pairs), assuming the effect size to be 0.25. The sample size came out as 500. Sampling frame was made and each participant was selected by systematic random sampling method (125 girls from each pre-university college). First participant was selected randomly and there after every 3rd student was included in the study till the sample size was met.

A pilot study was conducted on 10% of the sample population (10% of 500) which was 50 PUC students which were taken from another PUC in Belagavi. The questionnaire was validated and required changes were made.

Permission from Principal of each pre-university college was obtained. After obtaining informed consent and assent, pre-test data was collected using pre-designed and pre-tested questionnaire.

Data was collected regarding socio-demographic variables, knowledge and attitude about puberty and menstruation, pregnancy, antenatal care and contraception. Questionnaire was given to students to assess their knowledge and attitude regarding puberty and menstruation, pregnancy, antenatal care and contraception. Knowledge was assessed by multiple choice questions and attitude was assessed using 5 point Likert scale.

Pre-test was followed by health education session. Health education was given using audio-visual aids such as lecture videos, power point presentation and flip charts. Health education session was followed by interactive session where the studentsdoubts were clarified. After 1 month, impact of health education on knowledge and attitude of reproductive health were assessed by administering the post-test questionnaire.

The mean age (±SD) of the study participants was 17.15± 0.7 years. 52.8% were studying in PUC I, 47.2% were studying in PUC II. Maximum participants 89.2% were Hindus and 72.6% of them belonged to nuclear family. Majority of the father and mother of the participants completed pre-university college (48.6%) and (56%) respectively. Majority of the father of the participants were self-employed (33.2%) and majority of the mothers were home makers (80.8%).

Out of 500 study participants, 60.8% were living in urban areas, 38.6% were living in rural areas and 90.6% were living with both parents, 6% were living with mother alone, 0.6% were living with father alone and 2.8 % were living with their grandparents.

Among the study participants, 89.2% of them were residing in Pucca house and overcrowding was present in 46.2% of the participant's house. 81.8% of participants had toilet situated inside their house, 17.2% of them had toilet outside their house, 0.8% of them were using public toilet and 0.2% of the participant did not have sanitary privy.

According to modified B. G. Prasad's classification of socio – economic status, 55.8 % were in class III followed by class II (37.4%).

In the present study, 70.4% of students got information regarding menstruation from their mothers followed by friends (8.4%). 66% of the participants attained their menarche by 10-15 years and 62.6% students felt discomfort during first menstruation.

During pre-test, 49.6% participants answered that menstruation is a physiological process which increased to 81% in the post-test after health education. 63.2% girls had knowledge that blood comes out through vagina during menstruation in the pre-test whereas 86.4% students in the post-test had this knowledge.

In the pre-test, 15.4% participants told that most girls attain menarche before 10 years, 84.6% of them mentioned it as between 10-16 years. After health education in the post-test, 91.2% of them answered that girls attain menarche between 10-16 years.

In the present study, during pre-test 83.2% girls told that there was session in school regarding information on menstruation and only 15% students were comfortable in talking about menstruation related queries to any teacher, 48.4% were

comfortable with teacher of same gender and 36.6% were uncomfortable in asking menstruation related queries to any teacher.

After health education intervention, 24.4% students were comfortable in talking about menstruation related queries to any teacher, 58.2% were comfortable with teacher of same gender and 17.4% were uncomfortable in asking menstruation related queries to any teacher.

In the present study during pre-test, 88.2% girls had knowledge that normal duration of menstrual blood flow was between 2-7 days which increased to 93.6% in the post-test. Knowledge regarding normal interval between two menstrual cycles (21-35 days) improved from 69.6% to 85.2% after health education intervention.

Regarding the absorbent used during menstruation, 79.8% study participants mentioned that commercially made sanitary pad should be used during menstruation which increased to 94% after health education intervention. Frequency of changing absorbent (4-6 hours once) was mentioned by 40.2% participants in the pre-test which increased to 60.6% in the post-test.

In the pre-test, 89.20% participants were aware that dustbin should be used for the disposal of absorbents which increased to 95.4% in the post-test. 64.2% girls told that paper should be used as pad wrap for the disposal of absorbent which increased to 81.2% after health education.

91.2% participants were aware that they should clean the genitalia at every visit to toilet during menstruation which increased to 97.8% in the post-test. In the pre-test, 35% participants answered that they should use water and soap to clean the genitalia which increased to 82.4% after health education intervention.

During pre-test, only 39% participants were aware that 18 years is the recommended age of marriage for girls in India which improved to 66.4% after health education intervention. In the pre-test, 84.2% of the participants had knowledge that missed period is the first sign of pregnancy which increased to 86.8% in the post-test, whereas 15.6% of the participants had no knowledge regarding the same.

In the present study, during pre-test, 29.4% girls were aware of regular antenatal care during pregnancy which improved to 70.40% in the post-test after health education.To treat and prevent potential health problems during pregnancy, antenatal care is essential, this knowledge improved from 8.60% to 58.40% in the post-test and 30.2% girls answered that antenatal care helps in promoting healthy lifestyles that benefit both mother and child which increased to 66.40% after health education intervention.

92.2% study participants told that during pregnancy, proper diet, rest, and mild exercise are essential which improved to 94.41% in the post-test.In the pre-test, 96% participants answered that eating nutritious foods is good for health of the pregnant women and baby which increased to 99.4% after health education.

In the present study during pre-test, 60.6% girls said that it is essential to know about contraception which increased to 78.4% in the post-test after health education intervention and 8.40% participants answered that only husband is responsible for contraception, 0.80% of them answered its wife's responsibility, 82.60% of them answered both husband and wife are responsible.

After health education session, 6% participants told that husband is responsible for contraception, 0.40% of them answered its wife's responsibility, 93.20% of them answered both husband and wife are responsible.

57.40% participants were aware that contraception is essential to avoid unwanted pregnancy in the pre-test which improved to 85.80% after health education. During pre-test, 7.20% participants said that contraception helps to maintain regular interval between pregnancy which increased to 45.60% in the post-test after health education.

Knowledge regarding tubectomy as permanent method of female contraception after intervention increased from 25.20% to 60.60% and vasectomy as permanent method of male contraception after intervention increased from 24% to 67.20%.

In the pre-test, 33.6% study participants strongly agreed that parents/Teachers should be consulted regarding reproductive health. 74.2% girls strongly agreed that all girls should learn about menstrual hygiene in the post-test.

Initially 29.8% girls said poor menstrual hygiene predisposes to infection which improved to 42% after health education. 41.4% study participants felt cultural and social taboos during menstruation should be eliminated which increased to 66% in the post-test.

Before the health education, 35% study participants strongly agreed that marriage within close relatives should be avoided which improved to 38.2% in post-test. 45.8% girls felt that during pregnancy, regular antenatal check-up and follow up is essential which increased to 54.4% in post-test.

39.2% participants strongly agreed that pregnant women should change dietary habit according to Doctor's advise whereas after health education it improved to 51%. 73% girls strongly agreed that smoking is harmful to baby which increased to 82.2% in post-test.

All the variables in the study were not normally distributed, since sample size is larger than 50, Shapiro- Wilk test results were considered. Shapiro-Wilk test has revealed significant outcome indicating violation of normality assumption. Thus wilcoxon signed rank test was carried out for comparisons between pre-test and post-test scores.

Wilcoxon signed rank test also revealed that overall knowledge and attitude scores on reproductive health were significantly higher in the post-test compared to pre-test. Both knowledge and attitude showed positive median of differences which is the desired outcome and $p<0.001^{***}$ which is statistically significant.

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ANNEXURES

ANNEXURE I – ETHICAL CLEARANCE LETTER

K.L.E. ACADEMY OF HIGHER EDUCATION AND RESEARCH
(Deemed – to- be- University)
Accredited 'A' Grade by NAAC (2nd Cycle) Placed in Category 'A' by MHRD (GoI)
JAWAHARLAL NEHRU MEDICAL COLLEGE,
NEHRU NAGAR, BELAGAVI-590010 (KARNATAKA-INDIA)
Website: http//www.jnmc.edu
E-Mail : dome@jnmc.edu
Phone: (+ 91-(0)831 Office : 2472550
Principal: 2471701
Fax No. +91 (0)831 – 2470759

Ref: MDC/DOME/ 73 **Date: 25/01/2021**

To.
(REG. NO. BD0120009)
PG student in Community Medicine,
J.N.Medical College,
BELAGAVI.

Sub: Institutional Ethical Clearance for the study.

With reference to the above, we wish to inform you that your proposed research project titled **"EFFECT OF HEALTH EDUCATION ON KNOWLEDGE AND ATTITUDE OF REPRODUCTIVE HEALTH AMONG PRE-UNIVERSITY GIRLS IN AN URBAN AREA"**, is ethical and justifiable. The proposed research project has been cleared by the JNMC Institutional Ethics Committee on Human Subjects Research.

(Dr. Smita Sonoli)
Member Secretary
JNMC Institutional Ethics Committee
on Human Subjects Research,
J.N.Medical College, Belagavi.

(Dr. Harsha Hegde)
Chairman,
JNMC Institutional Ethics Committee
on Human Subjects Research,
J.N.Medical College, Belagavi.

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ANNEXURE II- INFORMED CONSENT

INFORMED CONSENT

"EFFECT OF HEALTH EDUCATION ON KNOWLEDGE AND ATTITUDE OF REPRODUCTIVE HEALTH AMONG PRE-UNIVERSITY GIRLS IN AN URBAN AREA" .

Investigator : _____

Guide : _____

Introduction:

Adolescence is an important period of transition in human life. Girls of adolescent age group have a very little understanding of puberty, menstrual hygiene , pregnancy, antenatal care and contraception. Hence the present study will be undertaken to assess the effect of health education on knowledge and attitude of reproductive health among pre-university girls.

Methodology:

Pre-university girls in the urban area of Belagavi will be interviewed personally by the investigator by using a predesigned and pretested questionnaire.

Possible benefits:

The investigator does not promise or guarantee you any direct benefits or services from this study. This study is going to help in detecting the effect of health education on knowledge and attitude of reproductive health among pre-university girls.

Possible risks:

There are no risks involved in this study.

Cost of participation:

The cost of the study will be entirely borne by the researcher. There will be no cost to you for your participation in this study.

Legal rights:

By signing this consent form, you are not waiving off any of your legal rights.

Privacy and Confidentiality:

Your identity will not be revealed and all information collected will be coded so that, no one other than the investigator will know your identity.

Withdrawal from the study:

You can withdraw from the study at any point of time.

Authorization to publish the results:

The researcher may use the information gathered from this study for presentation or publication in scientific journals. However, your personal identity will not be revealed.

Questions:

If you still have any queries, you can contact **Dr. Roopa M Bellad** Chairperson, Institutional Ethics Committee for Human Subjects' Research, J.N. Medical College, Belagavi – 590010, Ph no: or **Dr.(Mrs) N.S. Mahantshetti**, Principal, J.N. Medical College, Belagavi-590010, Ph no: 0831-2471350.

CONSENT STATEMENT

"I have been explained in my own understandable language about the contents in this form and my queries have been clarified by the investigator and I have been told that I have the right to withdraw from participating in this study at any point of time. I have been assured that confidentiality will be maintained and will be used only for this study and my identity shall never be revealed in future".

I hereby give my consent for participation in the study **"EFFECT OF HEALTH EDUCATION ON KNOWLEDGE AND ATTITUDE OF REPRODUCTIVE HEALTH AMONG PRE-UNIVERSITY GIRLS IN AN URBAN AREA"** voluntarily and not under the influence of the investigator or any other influence.

Name of the parents/guardian _____

Signature of the parents/guardian _____

Date: __/__/_____

Place: _____.

Signature of the guide. Signature of the interviewer

ASSENT FORM

"I have been explained in my own understandable language about the contents in this form and my queries have been clarified by the investigator and I have been told that I have the right to withdraw from participating in this study at any point of time. I have been assured that confidentiality will be maintained and will be used only for this study and my identity shall never be revealed in future".

I hereby give my assent for participation in the study **"EFFECT OF HEALTH EDUCATION ON KNOWLEDGE AND ATTITUDE OF REPRODUCTIVE HEALTH AMONG PRE-UNIVERSITY GIRLS IN AN URBAN AREA"** voluntarily and not under the influence of the investigator or any other influence.

Name of the participant _____

Signature of the participant _____

Date: __/__/_____

Place: _____.

Signature of the guide. Signature of the interviewer

.

ANNEXURE III

QUESTIONNAIRE

"EFFECT OF HEALTH EDUCATION ON KNOWLEDGE AND ATTITUDE OF REPRODUCTIVE HEALTH AMONG PRE-UNIVERSITY GIRLS IN AN URBAN AREA"

SL.NO : _____ ROLL NO :____ DATE OF INTERVIEW :_____

NAME OF THE PU COLLEGE: NAME OF THE STUDENT:

ADDRESS:

PART I -SOCIO DEMOGRAPHIC DETAILS:

1) Age : ____ years

2) Class : 1. PUC 1 2.PUC 2

3) Religion :1. Hindu 2. Muslim 3. Christian 4. others, specify_____

4) Educational qualifications of Father

1. Illiterate
2. Read and write
3. Standard 1-4
4. Standard 5-8
5. 10-12 / Diploma
6. Degree/ Post graduate

5) Educational qualification of Mother

1. Illiterate
2. Read and write
3. Standard 1-4
4. Standard 5-8
5. 10-12 / Diploma
6 . Degree /Post graduate

6) Occupation of the Father 1. Farmer 2. laborer

3. self employed 4. Government employee

7) Occupation of the Mother 1.Farmer 2. laborer

3. self employed 4. Government employee

5. Private employee 6. Retired / pensioner

7. Home maker

5. Private employee 6. Retired / pensioner

8) Place of residence : 1. Urban 2. Rural 3. Suburban

4. Hostel

9) Type of the family : 1. Nuclear 2. Joint

3. Broken 4. Three generation family.

10) Living with : 1. Both parents 2. Mother alone 3. Father alone

4. Grand parents 5. If others, (specify) _____

11) What kind of house do you have ?

1. Kutcha house (Made from grass or hay or mud)
2. Semi- pucca (combination of mud, hay and bricks)
3. Pucca (Built of cement/bricks with walls and roof)

12) What kind of toilet facility do you have?

1. We have a toilet inside our house
2. We have a toilet built outside our house
3. We use public toilet
4. Don't have a toilet. We practice open defecation.

13) How many rooms does your house have? (apart from bathroom and toilet)

1 .One 2 .Two 3 .Three or more

14) Total monthly income : Rs _____

15) Number of family members : ___

16) Per capita income : Rs. _____/ month

17) Socio economic status : (modified B.G. Prasad's classification)

1. Class I 2. Class II 3. Class III 4. Class IV 5. Class V

18) When did you attain your menarche? ____ Years / Don't Know

19) What was the reaction to your first menstruation?

1. Happy 2. Scared 3. Discomfort

4. Emotional disturbance 5. Others,(specify) :_____

20) What were your physical symptoms when the first time you had menstruation?

1. Abdominal and back pain 2. Sleeplessness 3. Heavy bleeding 4. Others,(specify)

21) From whom did you get information regarding menstruation? (multiple responses)

1. Mother 2. Teacher 3. Friends

4. Books 5. Media (TV, Radio) 6. Others, specify_____

PART II – PUBERTY AND MENSTRUATION :

1) What is menstruation? 1. Physiological 2. Pathological 3. Curse

4. Others,(Specify) _____ 5. Don't know

2) What do you think happens in menstruation or periods?

1. Blood comes out through vagina among women
2. Blood comes out through urinary opening among women
3. Don't know

3) At what age, do you think most girls usually get their first period? ___years / Don't know

4) Was there any session in your school where you were given information on menstruation? YES / NO

5) Do you find comfortable talking about menstruation-related queries to your teacher?

1. Yes, I can ask my queries to any teacher
2. Yes but only to a teacher of same gender
3. No, I feel uncomfortable to ask my queries to any teacher

6) What is the duration of normal menstruation? ___Days / Don't know

7) What is the interval between two menstrual cycles? (How long is it between one menstrual cycle to the next?) ___Days / Don't know

8) How often should the pads be changed per day? 1 .2-4 hrs once 2. 4-6 hrs once 3. 6-8 hrs once 4. 8-12 hrs once 5.12 hrs once

9) what absorbent material should be used during menstruation?(More than one response)	1. Commercially made sanitary pad 2. Napkin (soft paper) 3. Rag made pad 4. Cloth 5.Others,(specify)_____
10) Where do you think you should dispose your pads?	1. Dustbin 2. Drain 3. Toilet 4. Open field 5. Other _____
11) What types of pad wraps should be used for disposing it?	1. Papers 2. Plastic bag 3. Not wrap 4.others _____
12) Do you think you should clean your genitalia at every visit to toilet during menstruation?	YES / NO
13) If YES, by what? (More than one response)	1. Water and soap 2. Only with water 3. Tissue paper 4. Towel 5. Others,(Specify) _____

		Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
1	Parents / Teachers should be consulted on the matters of reproductive health education.	☐	☐	☐	☐	☐
2	Do you agree that all girls need to learn about menstrual hygiene.	☐	☐	☐	☐	☐
3	Poor menstrual hygiene predisposes to infection.	☐	☐	☐	☐	☐
4	Does menstrual problems interfere with academic performance.	☐	☐	☐	☐	☐
5	Do you think that cultural and social taboos(not entering kitchen, do not sit in same place as others in house) during menstrual period should be eliminated.	☐	☐	☐	☐	☐

PART III -PREGNANCY AND ANTENATAL CARE:

1)Recommended age of marriage for girls in India.	_____Years.
2) First sign of pregnancy is missed period .	YES / NO
3)What do you understand by Antenatal care?	
3a) It is regular medical and nursing care recommended for women during pregnancy	YES / NO/ DON'T KNOW
3b) It is to treat and prevent potential health problems throughout the course of pregnancy.	YES / NO /DON'T KNOW
3c) It helps in promoting healthy lifestyles that benefit both mother and child	YES / NO /DON'T KNOW
4) Proper diet, rest, and mild exercise are essential during pregnancy.	YES / NO
5) Eating nutritious foods is a good for health of pregnant women and baby.	YES / NO

		Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
1.	Do you agree that marriage with in close relatives should be avoided.	☐	☐	☐	☐	☐
2.	Regular antenatal checkup and follow-up is essential during pregnancy.	☐	☐	☐	☐	☐
3.	Pregnant women should change dietary habit as advised by doctor.	☐	☐	☐	☐	☐
4.	Do you agree that taking medicine without prescription of doctors during pregnancy is harmful.	☐	☐	☐	☐	☐
5.	Smoking during pregnancy is harmful to baby.	☐	☐	☐	☐	☐

PART IV - CONTRACEPTION

1) Do you think it is necessary to know about contraception? YES / NO /DON'T KNOW

2) Who should be responsible for contraception?

1. Husband
2. Wife
3. Both of them have responsibility
4. Both of them don't have responsibility

3a) Contraception means to Avoid unwanted pregnancy

YES / NO /DON'T KNOW

3b) Contraception helps to maintain Regular interval between pregnancy

YES / NO /DON'T KNOW

4) Permanent method of female contraception ?

A. copper T B. oral pills C. Condoms
D. Tubectomy E. Vasectomy F. Don't know

5) Permanent method of male contraception ?

A. copper T B. oral pills C. Condoms
D. Tubectomy E. Vasectomy F. Don't know

ANNEXURE IV- KEY TO MASTER CHART

PRE-TEST

A. SL. NO

B. Age

C. Class

PUC-I – 1

PUC-II – 2

D. Religion:

Hindu- 1

Muslim- 2

Christian- 3

Others - 4

E. Educational qualification of Father

Illiterate- 1

Read & write- 2

1-4 standard- 3

5-8 standard- 4

10-12/ Diploma- 5

Degree/ PG- 6

F. Educational qualification of Mother

Illiterate- 1

Read & write- 2

1-4 standard- 3

5-8 standard- 4

10-12/ Diploma- 5

Degree/ PG- 6

G. Occupation of Father:

Farmer-1

Labourer- 2

Self-employed- 3

Government employee- 4

Private Employee- 5

Retired/Pensioner- 6

H. Occupation of Mother:

Farmer-1

Labourer- 2

Self-employed- 3

Government employee- 4

Private Employee- 5

Retired/Pensioner- 6

Home maker- 7

I. Place of residence

Urban- 1

Rural-2

Hostel-3

J. Type of the family:

Nuclear- 1

Joint- 2

Broken-3

3rd Generation - 4

K. Living with

Both parents- 1

Mother alone- 2

Father alone- 3

Grandparents- 4

L. Type of House

Kutcha house- 1

Semi-pucca house- 2

Pucca house- 3

M. Sanitary privy availability

Inside the house- 1

Outside the house- 2

Public toilet- 3

No toilet- 4

N. Overcrowding

Yes- 1

No- 2

O. Socio economic status (modified B.G. Prasad's classification)

Class I- 1

Class II- 2

Class III- 3

Class IV- 4

Class V- 5

P. When did you attain menarche ___years , 0- Don't know

Q. Reaction to first menstruation

Happy -1

Scared -2

Discomfort -3

Emotional disturbance - 4

R. Physical symptoms during first menstruation

Abdominal and back pain - 1

Sleeplessness - 2

Heavy bleeding- 3

S. From whom did you get information regarding menstruation?

Mother- 1

Teacher- 2

Friends - 3

Books - 4

Media (TV, Radio) - 5

Multiple-6

PUBERTY AND MENSTRUATION

T. What is Menstruation?

Physiological-1

Pathological -2

Curse - 3

Don't know – 4

U. Knowledge score- correct response- 1

wrong response-0

V. What do you think happens in menstruation?

Blood comes out through vagina among women - 1

Blood comes out through urinary opening among women - 2

Don't know - 3

W. Knowledge score- correct response- 1

wrong response-0

X. At what age, girls get their 1st period ___years / 0- Don't know

Y. Knowledge score - correct response- 1

wrong response-0

Z. Any session in school where information regarding menstruation was given

YES - 1

NO - 2

AA. Knowledge score- correct response- 1

wrong response-0

AB. Do you find comfortable talking about menstruation-related queries to your teacher?

Yes, I can ask my queries to any teacher - 1

Yes but only to a teacher of same gender - 2

No, I feel uncomfortable to ask my queries to any teacher - 3

AC. Knowledge score- correct response- 1

wrong response-0

AD. Duration of normal menstruation ___Days / 0- Don't know

AE. Knowledge score- correct response- 1

wrong response-0

AF. Interval between two menstrual cycles ___Days / 0- Don't know

AG. Knowledge score- correct response- 1

wrong response-0

AH. How often pads should be changed per day

2-4 hrs once - 1

4-6 hrs once - 2

6-8 hrs once - 3

8-12 hrs once - 4

12 hrs once - 5

AI. Knowledge score- correct response- 1

wrong response-0

AJ. What absorbent material should be used during menstruation

Commercially made sanitary pad - 1

Napkin (soft paper) - 2

Rag made pad - 3

Cloth - 4

AK. Knowledge score- correct response- 1
wrong response-0

AL. Disposal of absorbents

Dustbin - 1
Drain - 2
Toilet - 3
Open field - 4

AM. Knowledge score- correct response- 1
wrong response-0

AN. Types of pad wraps should be used for disposal of absorbents?

Papers - 1
Plastic bag - 2
Not wrap - 3
Don't know - 4

AO. Knowledge score- correct response- 1
wrong response-0

AP. Do you think you should clean your genitalia at every visit to toilet during menstruation?

YES- 1
NO - 2

AQ. Knowledge score- correct response- 1
wrong response-0

AR. If YES, by what?

Water and soap - 1
Only with water - 2
Tissue paper - 3
Towel - 4
Don't know- 5

AS. Knowledge score- correct response- 1
wrong response-0

ATTITUDE

AT. Parents / Teachers should be consulted on the matters of reproductive health education.

Strongly disagree – 1

Disagree - 2

Neutral - 3

Agree - 4

Strongly agree – 5

Did not answer - 0

AU. Do you agree that all girls need to learn about menstrual hygiene.

Strongly disagree – 1

Disagree - 2

Neutral - 3

Agree - 4

Strongly agree – 5

Did not answer - 0

AV. Poor menstrual hygiene predisposes to infection

Strongly disagree – 1

Disagree - 2

Neutral - 3

Agree - 4

Strongly agree – 5

Didnot answer - 0

AW. Does menstrual problems interfere with academic performance

Strongly disagree – 1

Disagree - 2

Neutral - 3

Agree - 4

Strongly agree – 5

Didnot answer - 0

AX. Do you think that cultural and social taboos(not entering kitchen, do not sit in same place as others in house) during menstrual period should be eliminated

Strongly disagree – 1

Disagree - 2

Neutral - 3

Agree - 4

Strongly agree – 5

Didnot answer - 0

PREGNANCY AND ANTENATAL CARE

AY. Recommended age of marriage for girls in India. ____years/ 0- Don't know

AZ. Knowledge score- correct response- 1
wrong response-0

BA. First sign of pregnancy is missed period

YES - 1

NO - 2

BB. Knowledge score- correct response- 1
wrong response-0

BC. Antenatal care is regular medical and nursing care recommended for women during pregnancy

Yes - 1

No - 2

Don't know - 3

BD. Knowledge score- correct response- 1
wrong response-0

BE. Antenatal care is to treat and prevent potential health problems throughout the course of pregnancy

Yes - 1

No - 2

Don't know - 3

BF. Knowledge score- correct response- 1

wrong response-0

BG. Antenatal care helps in promoting healthy lifestyles that benefit both mother and child

Yes - 1

No - 2

Don't know - 3

BH. Knowledge score- correct response- 1

wrong response-0

BI. Proper diet, rest, and mild exercise are essential during pregnancy.

Yes - 1

No - 2

Don't know - 3

BJ. Knowledge score- correct response- 1

wrong response-0

BK. Eating nutritious foods is a good for health of pregnant women and baby

Yes - 1

No - 2

Don't know - 3

BL. Knowledge score- correct response- 1

wrong response-0

ATTITUDE

BM. Do you agree that marriage with in close relatives should be avoided.

Strongly disagree – 1

Disagree - 2

Neutral - 3

Agree - 4

Strongly agree – 5

Didnot answer - 0

BN. Regular antenatal checkup and follow-up is essential during pregnancy

Strongly disagree – 1

Disagree - 2

Neutral - 3

Agree - 4

Strongly agree – 5

Didnot answer - 0

BO. Pregnant women should change dietary habit as advised by doctor

Strongly disagree – 1

Disagree - 2

Neutral - 3

Agree - 4

Strongly agree – 5

Didnot answer - 0

BP. Do you agree that taking medicine without prescription of doctors during pregnancy is harmful.

Strongly disagree – 1

Disagree - 2

Neutral - 3

Agree - 4

Strongly agree – 5

Didnot answer - 0

BQ. Smoking during pregnancy is harmful to baby.

Strongly disagree – 1

Disagree - 2

Neutral - 3

Agree - 4

Strongly agree – 5

Didnot answer - 0

CONTRACEPTION

BR. Do you think it is necessary to know about contraception?

Yes - 1

No - 2

Don't know - 3

BS. Knowledge score- correct response- 1

wrong response-0

BT. Who should be responsible for contraception?

1. Husband
2. Wife
3. Both of them have responsibility
4. Both of them don't have responsibility

BU. Knowledge score- correct response- 1

wrong response-0

BV. Contraception means to Avoid unwanted pregnancy

Yes - 1

No - 2

Don't know - 3

BW. Knowledge score- correct response- 1

wrong response-0

BX. Contraception helps to maintain Regular interval between pregnancy

Yes - 1

No - 2

Don't know - 3

BY. Knowledge score- correct response- 1

wrong response-0

BZ. Permanent method of female contraception ?

Copper T - 1

Oral pills - 2

Condoms - 3

Tubectomy - 4

Vasectomy - 5

Don't know - 6

CA. Knowledge score- correct response- 1

wrong response-0

CB. Permanent method of male contraception ?

Copper T - 1

Oral pills - 2

Condoms - 3

Tubectomy - 4

Vasectomy - 5

Don't know - 6

CC. Knowledge score- correct response- 1

wrong response-0

POST-TEST

A. S.NO

PUBERTY AND MENSTRUATION

B. What is Menstruation?

Physiological-1

Pathological -2

Curse - 3

Don't know – 4

C. Knowledge score- correct response- 1

wrong response-0

D. What do you think happens in menstruation?

Blood comes out through vagina among women - 1

Blood comes out through urinary opening among women - 2

Don't know - 3

E. Knowledge score- correct response- 1

wrong response-0

F. At what age, girls get their 1st period ___years / 0- Don't know

G. Knowledge score - correct response- 1

wrong response-0

H. Any session in school where information regarding menstruation was given

YES - 1

NO - 2

I. Knowledge score- correct response- 1

wrong response-0

J. Do you find comfortable talking about menstruation-related queries to your teacher?

Yes, I can ask my queries to any teacher - 1

Yes but only to a teacher of same gender - 2

No, I feel uncomfortable to ask my queries to any teacher - 3

K. Knowledge score- correct response- 1

wrong response-0

L. Duration of normal menstruation ___Days / 0- Don't know

M. Knowledge score- correct response- 1

wrong response-0

N. Interval between two menstrual cycles ___Days / 0- Don't know

O. Knowledge score- correct response- 1

wrong response-0

P. How often pads should be changed per day

2-4 hrs once - 1

4-6 hrs once - 2

6-8 hrs once - 3

8-12 hrs once - 4

12 hrs once - 5

Q. Knowledge score- correct response- 1

wrong response-0

R. What absorbent material should be used during menstruation

Commercially made sanitary pad - 1

Napkin (soft paper) - 2

Rag made pad - 3

Cloth - 4

S. Knowledge score- correct response- 1
wrong response-0

T. Disposal of absorbents

Dustbin - 1
Drain - 2
Toilet - 3
Open field - 4

U. Knowledge score- correct response- 1
wrong response-0

V. Types of pad wraps should be used for disposal of absorbents?

Papers - 1
Plastic bag - 2
Not wrap - 3
Don't know - 4

W. Knowledge score- correct response- 1
wrong response-0

X. Do you think you should clean your genitalia at every visit to toilet during menstruation?

YES- 1
NO - 2

Y. Knowledge score- correct response- 1
wrong response-0

Z. If YES, by what?

Water and soap - 1
Only with water - 2
Tissue paper - 3
Towel - 4
Don't know- 5

AA. Knowledge score- correct response- 1
wrong response-0

ATTITUDE

AB. Parents / Teachers should be consulted on the matters of reproductive health education.

Strongly disagree – 1

Disagree - 2

Neutral - 3

Agree - 4

Strongly agree – 5

Didnot answer - 0

AC. Do you agree that all girls need to learn about menstrual hygiene.

Strongly disagree – 1

Disagree - 2

Neutral - 3

Agree - 4

Strongly agree – 5

Didnot answer - 0

AD. Poor menstrual hygiene predisposes to infection

Strongly disagree – 1

Disagree - 2

Neutral - 3

Agree - 4

Strongly agree – 5

Didnot answer - 0

AE. Does menstrual problems interfere with academic performance

Strongly disagree – 1

Disagree - 2

Neutral - 3

Agree - 4

Strongly agree – 5

Didnot answer - 0

AF. Do you think that cultural and social taboos(not entering kitchen, do not sit in same place as others in house) during menstrual period should be eliminated

Strongly disagree – 1

Disagree - 2

Neutral - 3

Agree - 4

Strongly agree – 5

Didnot answer - 0

PREGNANCY AND ANTENATAL CARE

AG. Recommended age of marriage for girls in India. ____years/ 0- Don't know

AH. Knowledge score- correct response- 1

wrong response-0

AI. First sign of pregnancy is missed period

YES - 1

NO - 2

AJ. Knowledge score- correct response- 1

wrong response-0

AK. Antenatal care is regular medical and nursing care recommended for women during pregnancy

Yes - 1

No - 2

Don't know - 3

AL. Knowledge score- correct response- 1

wrong response-0

AM. Antenatal care is to treat and prevent potential health problems throughout the course of pregnancy

Yes - 1

No - 2

Don't know - 3

AN. Knowledge score- correct response- 1

wrong response-0

AO. Antenatal care helps in promoting healthy lifestyles that benefit both mother and child

Yes - 1

No - 2

Don't know - 3

AP. Knowledge score- correct response- 1

wrong response-0

AQ. Proper diet, rest, and mild exercise are essential during pregnancy.

Yes - 1

No - 2

Don't know - 3

AR. Knowledge score- correct response- 1

wrong response-0

AS. Eating nutritious foods is a good for health of pregnant women and baby

Yes - 1

No - 2

Don't know - 3

AT. Knowledge score- correct response- 1

wrong response-0

ATTITUDE

AU. Do you agree that marriage with in close relatives should be avoided.

Strongly disagree – 1

Disagree - 2

Neutral - 3

Agree - 4

Strongly agree – 5

Didnot answer - 0

AV. Regular antenatal checkup and follow-up is essential during pregnancy

Strongly disagree – 1

Disagree - 2

Neutral - 3

Agree - 4

Strongly agree – 5

Didnot answer - 0

AW. Pregnant women should change dietary habit as advised by doctor

Strongly disagree – 1

Disagree - 2

Neutral - 3

Agree - 4

Strongly agree – 5

Didnot answer - 0

AX. Do you agree that taking medicine without prescription of doctors during pregnancy is harmful.

Strongly disagree – 1

Disagree - 2

Neutral - 3

Agree - 4

Strongly agree – 5

Didnot answer - 0

AY. Smoking during pregnancy is harmful to baby.

Strongly disagree – 1

Disagree - 2

Neutral - 3

Agree - 4

Strongly agree – 5

Didnot answer - 0

CONTRACEPTION

AZ. Do you think it is necessary to know about contraception?

Yes - 1

No - 2

Don't know - 3

BA. Knowledge score- correct response- 1

wrong response-0

BB. Who should be responsible for contraception?

1. Husband
2. Wife
3. Both of them have responsibility
4. Both of them don't have responsibility

BC. Knowledge score- correct response- 1

wrong response-0

BD. Contraception means to Avoid unwanted pregnancy

Yes - 1

No - 2

Don't know - 3

BE. Knowledge score- correct response- 1

wrong response-0

BF. Contraception helps to maintain Regular interval between pregnancy

Yes - 1

No - 2

Don't know - 3

BG. Knowledge score- correct response- 1

wrong response-0

BH. Permanent method of female contraception ?

Copper T - 1

Oral pills - 2

Condoms - 3

Tubectomy - 4

Vasectomy - 5

Don't know - 6

BI. Knowledge score- correct response- 1

wrong response-0

BJ. Permanent method of male contraception ?

Copper T - 1

Oral pills - 2

Condoms - 3

Tubectomy - 4

Vasectomy - 5

Don't know - 6

BK. Knowledge score- correct response- 1

wrong response-0

ANNEXURE IV- KEY TO MASTER CHART

PRE-TEST

| S.NO | AGE | CLASS | RELIGION | FATHER EDUCATION | MOTHER EDUCATION | FATHER OCCUPATION | MOTHER OCCUPATION | RESIDENCE | FAMILY TYPE | LIVING WITH | HOUSE TYPE | TOILET FACILITY | OVERCROWDING | SES | MENARCHE AGE | REACTION TO FIRST MENSTRUATION | PHYSICAL SYMPTOMS | INFORMATION - MENSTRUATION | MENSTRUATION | KNOWLEDGE SCORE | WHAT HAPPENS IN MENSTRUATION | KNOWLEDGE SCORE | WHEN DO GIRLS GET THEIR FIRST PERIOD | KNOWLEDGE SCORE | ANY SCHOOL SESSION ON MENSTRUATION | KNOWLEDGE SCORE | COMFORTABLE TALKING TO TEACHER | KNOWLEDGE SCORE | NORMAL DURATION OF MENSTRUATION | KNOWLEDGE SCORE | INTERVAL B/W 2 CYCLES | KNOWLEDGE SCORE | HOW OFTEN PADS CHANGE | KNOWLEDGE SCORE | ABSORBENT MATERIAL | KNOWLEDGE SCORE | PADS DISPOSAL | KNOWLEDGE SCORE | PAD WRAPS | KNOWLEDGE SCORE | GENITALIA CLEANING | KNOWLEDGE SCORE | CLEANING BY WHAT | KNOWLEDGE SCORE | Parents / Teachers should be consulted | All girls need to learn about menstrual hygiene. | Poor menstrual hygiene predisposes to infection. | Menstrual problems interfere with academic performance | Cultural and social taboos should be eliminated. | AGE FOR MARRIAGE | KNOWLEDGE SCORE | FIRST SIGN OF PREGNANCY | KNOWLEDGE SCORE | 3A- ANTENATAL | KNOWLEDGE SCORE | 3B. ANTENATAL | KNOWLEDGE SCORE | 3C. ANTENATAL | KNOWLEDGE SCORE | Proper diet, rest, and mild exercise are essential | KNOWLEDGE SCORE | Eating nutritious foods is a good | KNOWLEDGE SCORE | Marriage with in close relatives should be avoided. | Regular antenatal checkup and follow-up is essential | Pregnant women should change dietary habit as advised by doctor. | Medicine without prescription of doctors during pregnancy is harmful | Smoking during pregnancy is harmful | CONTRACEPTION | KNOWLEDGE SCORE | RESPONSIBLE FOR CONTRACEPTION | KNOWLEDGE SCORE | TO AVOID UNWANTED PREGNANCY | KNOWLEDGE SCORE | MAINTAIN INTERVAL B/W PREGNANCY | KNOWLEDGE SCORE | PERMANENT METHOD- FEMALE | KNOWLEDGE SCORE | PERMANENT METHOD- MALE | KNOWLEDGE SCORE |
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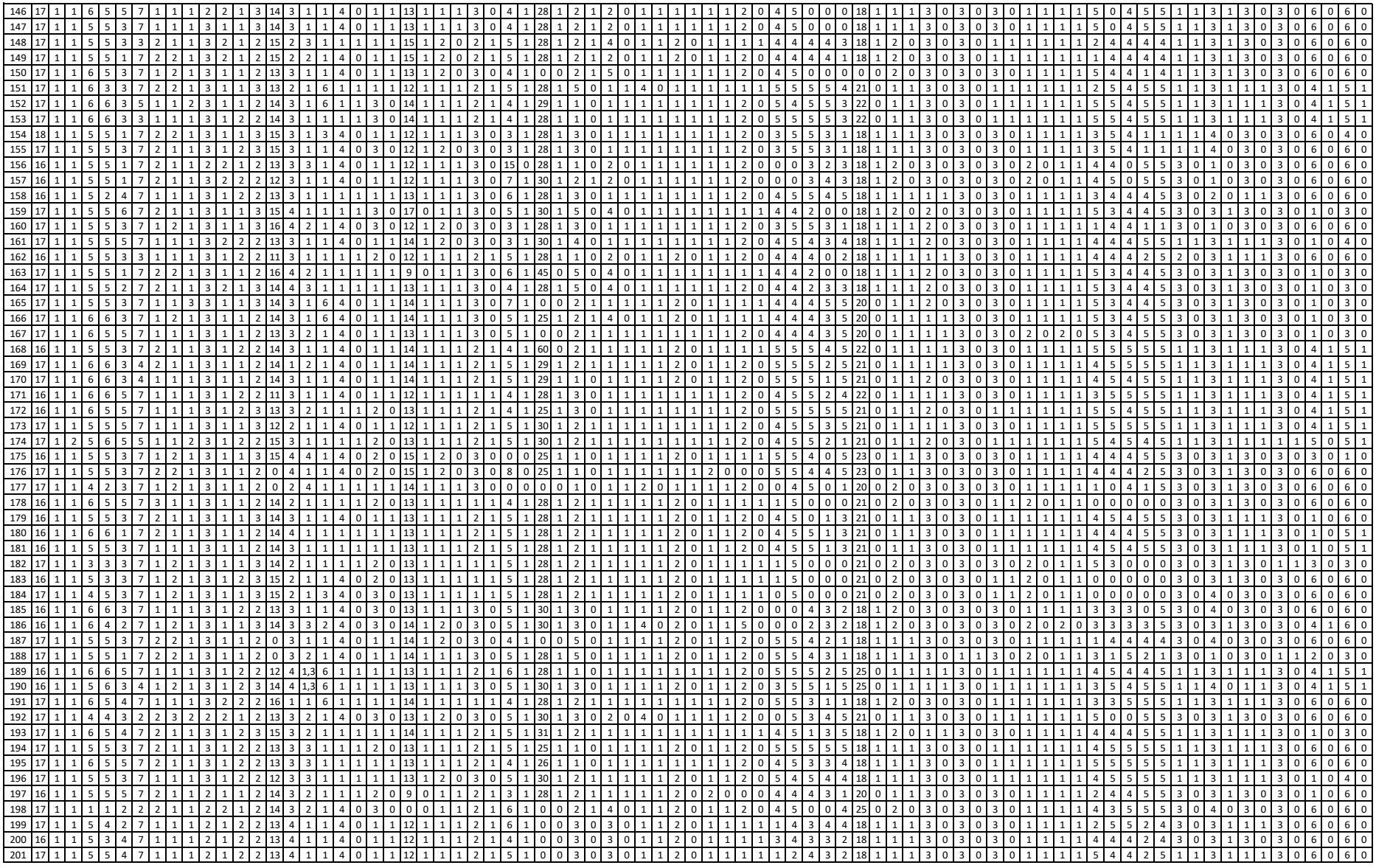

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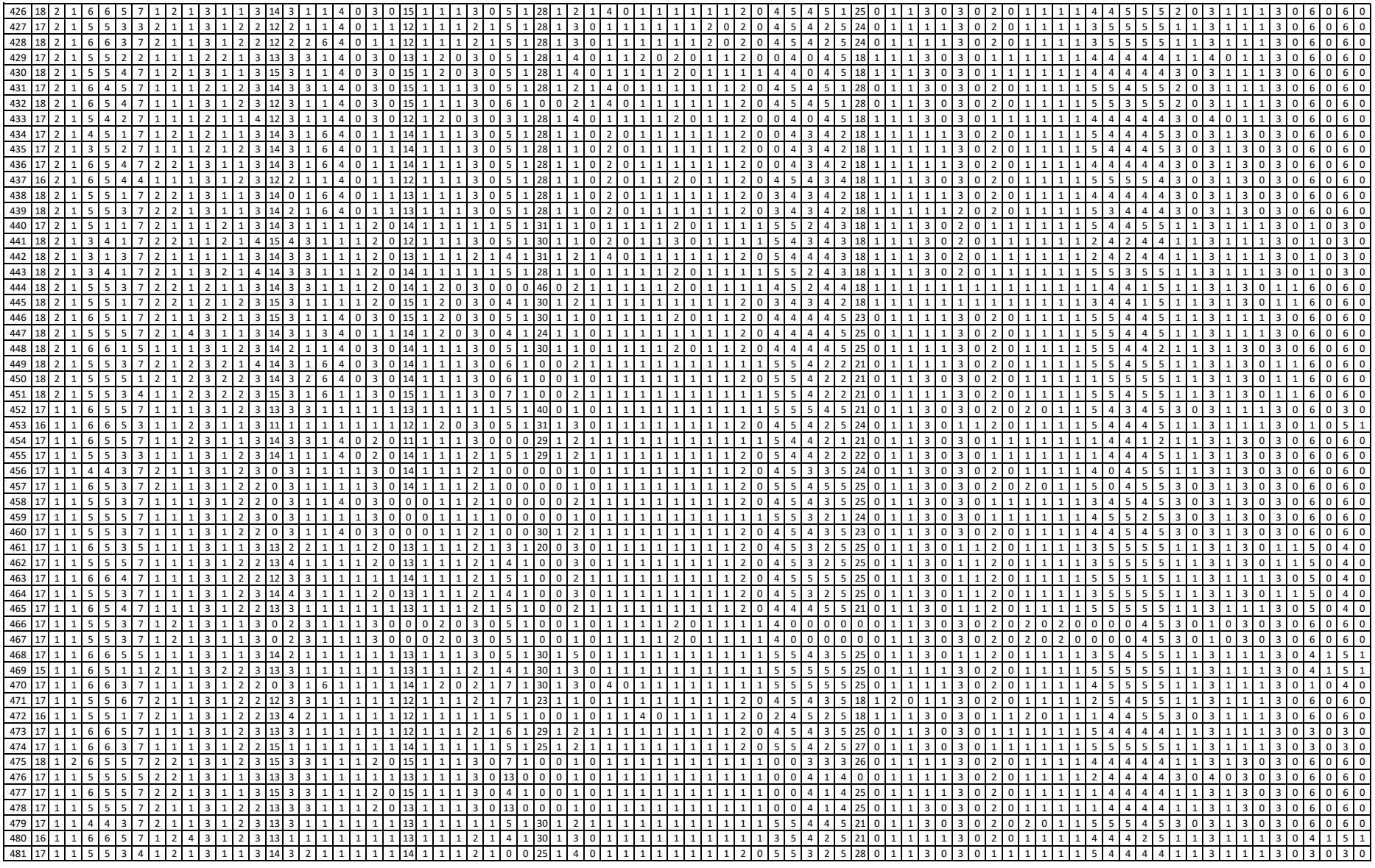

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POST-TEST

| S.NO | MENSTRUATION | KNOWLEDGE SCORE | WHAT HAPPENS IN MENSTRUATION | KNOWLEDGE SCORE | WHEN DO GIRLS GET THEIR FIRST PERIOD | KNOWLEDGE SCORE | ANY SCHOOL SESSION ON MENSTRUATION | KNOWLEDGE SCORE | COMFORTABLE TALKING TO TEACHER | KNOWLEDGE SCORE | NORMAL DURATION OF MENSTRUATION | KNOWLEDGE SCORE | INTERVAL B/W 2 CYCLES | KNOWLEDGE SCORE | HOW OFTEN PADS CHANGE | KNOWLEDGE SCORE | ABSORBENT MATERIAL | KNOWLEDGE SCORE | PADS DISPOSAL | KNOWLEDGE SCORE | PAD WRAPS | KNOWLEDGE SCORE | GENITALIA CLEANING | KNOWLEDGE SCORE | CLEANING BY WHAT | KNOWLEDGE SCORE | Parents / Teachers should be consulted | All girls need to learn about menstrual hygiene. | Poor menstrual hygiene predisposes to infection. | Menstrual problems interfere with academic performance | Cultural and social taboos should be eliminated. | AGE FOR MARRIAGE | KNOWLEDGE SCORE | FIRST SIGN OF PREGNANCY | KNOWLEDGE SCORE | 3A. ANTENATAL | KNOWLEDGE SCORE | 3B. ANTENATAL | KNOWLEDGE SCORE | 3C. ANTENATAL | KNOWLEDGE SCORE | Proper diet, rest, and mild exercise are essential | KNOWLEDGE SCORE | Eating nutritious foods is a good | KNOWLEDGE SCORE | Marriage with in close relatives should be avoided. | Regular antenatal checkup and follow-up is essential | Pregnant women should change dietary habit as advised by doctor. | Medicine without prescription of doctors during pregnancy is harmful | Smoking during pregnancy is harmful | CONTRACEPTION | KNOWLEDGE SCORE | RESPONSIBLE FOR CONTRACEPTION | KNOWLEDGE SCORE | TO AVOID UNWANTED PREGNANCY | KNOWLEDGE SCORE | MAINTAIN INTERVAL B/W PREGNANCY | KNOWLEDGE SCORE | PERMANENT METHOD- FEMALE | KNOWLEDGE SCORE | PERMANENT METHOD- MALE | KNOWLEDGE SCORE |
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