

# An Investigation into the Efficacy of a Structured Teaching Program on Understanding Pubertal Changes and Menarche Among Adolescent Girls Enrolled at a Designated PU College in Gadag

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## Abstract

**Background of the Study:** Adolescence pertains to the phase of physical and physiological maturation occurring between childhood and adulthood. The commencement of adolescence, often linked to the initiation of puberty, introduces significant shifts in hormone levels and various ensuing physical transformations. The onset of puberty is also connected to substantial changes in drives, motivations, psychology, and social interactions, which persist throughout the adolescent period. A growing body of neuroimaging research is dedicated to examining the structural and functional evolution of the brain during adolescence. **Objectives of the Study:** (1) To appraise the understanding of pubertal changes and menarche among adolescent girls both prior to and following a structured teaching program. (2) To assess the impact of a structured teaching program on enhancing knowledge about pubertal changes and menarche among adolescent girls. (3) To explore the correlation between post-test knowledge scores and specific demographic variables. **Method:** A quasi-experimental in which pre-test, and post-test design without the control group were adopted for the present study. The planned knowledge questionnaire was developed based on the expert's suggestions. The structured knowledge questionnaire was used to collect the data. After receiving permission from the college students, samples were selected by using a simple random sampling technique. **Results:** In the pre-test majority of the respondents (students) had inadequate knowledge (36%), moderate knowledge (54%), and adequate knowledge regarding pubertal changes and menarches. After the structured teaching program, knowledge increased adequate knowledge (74%). The mean difference between the pre-test and post-test is 2.63 and SD is 5.07. The Chi-square value of demographic value reviews only age and education are significant associations. Religion, type of family, and source of information are not significant associations. **Conclusion:** Based on the result we conclude that a structured teaching programme is effective in enhancing the knowledge of the PU students regarding pubertal changes and menarche.

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Received date: July 25, 2024

Accepted date: September 28, 2024

Published date: October 21, 2024

**Citation:** Ramesh Kamalappanawar, Ashwini, Shruti Hoogar, Jyoti Angadi, Heeru Jadhav, Shivaraj Kumbar, Sanjiv Haralayya. An Investigation into the Efficacy of a Structured Teaching Program on Understanding Pubertal Changes and Menarche Among Adolescent Girls Enrolled at a Designated PU College in Gadag. International Journal of Women's Health Nursing and Practices. 2024; 2(2): 20–39p.

## INTRODUCTION

Derived from the Latin word *pubertal* (meaning “adult”), puberty refers to the period of transition between childhood and adulthood. Puberty begins in late childhood and extends into the early stages of adolescence [1].

## Puberty

Puberty encompasses the changes that children undergo as they transition into sexually mature adults. Typically, boys experience puberty a bit later

than girls, starting around the ages of 11 to 15 years, although it can begin anywhere from 9 to 17 years. This process involves a significant physical transformation that enables sexual reproduction. In boys, puberty triggers the testes to produce hormones, which in turn promote growth and development in various parts of the body, including the brain, bones, muscles, blood, skin, hair, breasts, and reproductive organs. The first half of puberty is characterized by increases in height and weight, culminating in the development of a fully mature adult body.

### Menarche

Menarche refers to the first occurrence of menstrual period in female adolescents. Menstruation involves monthly shedding of the uterine endometrial lining when ovulation does not lead to fertilization. Typically, menstrual cycles occur every 28 days, although they range from 21 days to 45 days. The average age of onset of menarche is approximately 12 years, with most menstrual periods lasting between three and seven days. If menstruation extended beyond 10 days, the patient's condition was considered abnormal.

### Objectives

This article addresses the articulation of the problem, objectives, operational definitions, assumptions, hypotheses, variables, and conceptual framework of the study.

### Operational Definitions

- *Effectiveness*: Effectiveness refers to the acquisition of knowledge among adolescent girls regarding physiological and emotional changes during puberty and menarche.
- *Knowledge*: Knowledge refers to adolescent girls' awareness of pubertal changes and menarche assessed using a knowledge questionnaire.
- *Pubertal changes*: Puberty is the period of time during adolescence when a child's body (height, weight, voice, etc.) to that of an adult, and the reproductive system starts to work.
- *Menstruation*: A woman's first menstruation typically occurs around the age of 12 years; its occurrence depends on overall health and diet.
- *PU students*: Adolescent girls pursuing education in studying at selected PU Science College Gadag.
- *Adolescence*: Adolescence is the phase of life between childhood and adulthood, from 16 to 18 years of age. Adolescents experience rapid physical, physiological, and psychological growth.

### Assumptions

Adolescent girl students may have limited knowledge regarding pubertal changes and menarche.

1. Teaching programs may increase the level of knowledge.
2. It provides opportunities for teaching and better understanding.
  - a. *Pubertal changes in girls*
    - Menstruation (or periods) usually happens.
    - The hair grows in the pubic area and armpits.
    - The sign of puberty is usually breast development.
    - Excessive sweating.
    - Change in body shape.
    - Increase in height.
    - Weight gain.
    - Mood swings become more frequent due to hormone production.

### Research Hypothesis

*H<sub>0</sub>*: There is no notable correlation between knowledge scores before and after the structured teaching programs among adolescent girls.

*H<sub>1</sub>*: A significant correlation is expected between knowledge scores before and after the structured teaching programs among adolescent girls.

**Limitations**

This study is limited to adolescent girls studying at PU College, Gadag.

**Delimitations**

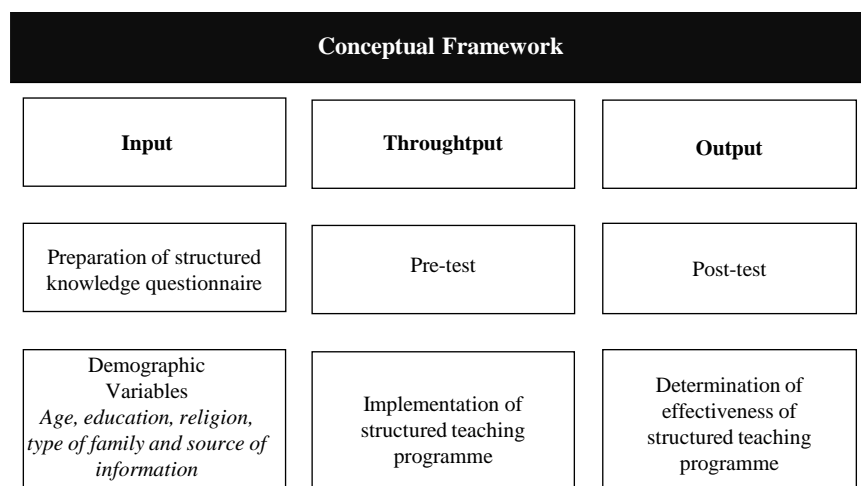
- Assessment of knowledge in a correct response taken as a knowledge questionnaire.
- Students at selected PU College at Gadag.

**Conceptual Framework**

- The conceptual framework for this study draws upon Kenny's open system model, which emphasizes the continuous exchange of matter, energy, and information within a system. The open system exhibited varying degrees of interaction with external events. This model involves an ongoing review of inputs and the provision of feedback in the form of matter, energy, and information (Figure 1).
- Kenny's open system method was deemed suitable for examining the effectiveness of the teaching program on knowledge related to pubertal changes and menarche in this study. It illustrates the connections between these concepts and their relevance to research inquiry. Conceptual frameworks are commonly employed in qualitative research within social and behavioral sciences because a single theory often may not comprehensively address the phenomena under investigation [2].

**Main Concepts of the System Theory**

1. *Input:* As per Kenny's model, input involves the continual exchange of substances, interactions, and information. In this study, the input comprised a teaching program that focused on knowledge of pubertal changes and menarche.
2. *Throughput:* Throughput pertains to the implementation of a teaching program for pubertal change and menarche.
3. *Output:* Output is the post-test knowledge and practice by questionnaire
4. *Feedback:* The aim was to assess adolescent girls' knowledge regarding pubertal changes and menarche and to educate the students through teaching programs on pubertal changes and menarche to improve their knowledge and practice in the future.



**Figure 1.** Conceptual framework.

**REVIEW OF LITERATURE**

1. A random controlled study was conducted on the impact of pubertal changes among adolescent girls. This study was conducted from January and June 2006 in the Northeastern US, INC Institutional, and the total samples were used as a demographic questionnaire. The results showed that the number of students was 256, and the sample consisted of 82 boys (43%) and 108 girls (57%). The mean age of the sample was 4.7 years (8D=0.6), and 81% were caused to release the

- level of pre-test knowledge with selected demographic variables such as gender and age. The study concluded that the literature has the best knowledge to assess pubertal status [3].
2. A quasi-experimental study was conducted on the impact of pubertal changes among schoolgirls in Iranian girls in Mazandaran schools of 14 to 18 years of age, the total samples were 698, and the instruments are used “questionnaire”. The research indicated that within these two subgroups, 61.6% of the experimental group, as opposed to 49.3% of the control group, adopted regular bathing practices during menstruation after participating in educational sessions on bathing and genital hygiene ( $P=0.002$ ). This study’s conclusion underscores the efficacy of educational interventions, such as health promotion projects, in significantly enhancing menstrual health. An experimental study was conducted among pre-test control group design carried out in selected four schools at Dhahran town of Nepal total sample is included, All the subjects were divided into two groups experimental and control each comprising two subgroups of 50 boys and 50 girls the instruments are used reproductive system as investigation. The study included 200 adolescent students. The mean pre-test score for knowledge of reproductive health in the experimental group was 39.47 (+1-16.89), and in the control group, it was 39.47 (+1-0.08). Similarly, post-test scores were assessed for knowledge of responsible sexual behavior and attitudes toward reproductive health in both groups. The findings of this study lead to the conclusion that structured teaching programs on reproductive health knowledge for adolescent school students are insufficient.
  3. A quasi-experimental study was conducted using a pre-test and post-test design without a control group, employing an evaluative research approach. This study involved a total sample of 100 female nursing students, and the instruments employed were a proportionate stratified sampling technique. The study showed that by implementing the structured teaching program, nursing students had moderate knowledge, attitudes, and practices, whereas, after the implementation of the structured teaching program, nursing students’ knowledge and ability to perform breast self-examinations was significantly improved, with a difference in the mean percentage revealing the effectiveness of the structured teaching program. The study concluded that a structured teaching program for female nursing students’ knowledge could be improved [4].
  4. This study was conducted to assess the effectiveness of a planned teaching intervention on the knowledge and practice of breast self-examinations among first-year midwifery students. Using a pre-experimental one-group pre-test and post-test design, 61 students were selected through systematic random sampling. Data entry was performed using Epi-info and the analysis was conducted using SPSS version 20. The mean age of the study participants was 20.13 ( $\pm 2.27$ ), with 77% of them being single. Following the intervention, both knowledge and practical competency scores exhibited highly significant increases, confirming acceptance of the research hypotheses. The planned teaching intervention on knowledge and breast self-examination demonstrated a notable enhancement in both knowledge and practice of self-examination among students.
  5. This study was conducted to examine cancer nursing care education programs and assess the effectiveness of diverse teaching methods. The study employed a quasi-experimental design and involved ward nurses from a medical center in northern Taiwan. The participants were divided into experimental and control groups. Researchers assessed the learning effectiveness of each group using a questionnaire based on the Quality of Cancer Nursing Care Learning Effectiveness Scale. Post-test scores for “knowledge” significantly increased for both groups and “attitude” scores showed a significant increase in the control group, whereas the experimental group reported no significant change. The study findings underscore the significance of incorporating various teaching methods when instructing clinical nursing staff [5].
  6. An educational intervention study was conducted to assess the impact of health education on the knowledge, attitudes, and practices of teachers regarding the reproductive health of adolescents in Amritsar, Punjab. The study involved 155 teachers teaching classes from 9th to 12th who willingly participated in 50 senior secondary schools in the Amritsar district. This study was comprised of three phases. In the first phase, after obtaining informed consent, the teachers completed a pre-tested questionnaire. The second phase involved an interactive session on reproductive health. In the third phase, to evaluate the impact and sustainability of the knowledge

gained, the same questionnaire was administered to teachers after three months. A total of 74 teachers were found to be aware of adolescents' psychosocial problems. The majority (110) of teachers had only partial knowledge of pubertal changes, and 117 (76.5%) teachers were unaware of genital hygiene. Despite the initially low baseline knowledge of teachers regarding various aspects of adolescent reproductive health, significant favorable changes were observed after health education.

7. A cross-sectional study was undertaken to explore the age at menarche and assess knowledge regarding menstrual hygiene management among adolescent schoolgirls in the Amhara province, Ethiopia, with implications for healthcare workers and schoolteachers. This school-based, cross-sectional study was conducted between Nov 2012 and June 2013. A multi-stage sampling technique was used in this study. The school was first clustered into grades and sections, and the participants were included, making a response rate of 100%. The mean age at menarche was  $14.1 \pm 1.4$  years. The main source of information about menstrual hygiene management were teachers of 212 (43%) and 446(90.7%) respondents who had high-level knowledge about menstrual hygiene management. Respondents' knowledge of menstrual hygiene management was very high. Schoolteachers were the primary sources of information. The place of residence and the mother's educational status were independent predictors of menstrual hygiene management [6].
8. A pre-experimental study was conducted on the impact of pubertal changes among pre-test, and post-test designs used among adolescents in selected high schools in the Udipi district, this study was conducted on 28 Jan to 2014 to 4th Feb 2014, total of 100 samples was used, the instruments are used questionnaire this data collection is done through "ICE" The study shows that mean knowledge score of the group intervention was  $16.96 \pm 3.816$  After intervention mean knowledge score was  $24.05 \pm 3.036$ . The research findings indicated that organized teaching was effective in enhancing knowledge about pubertal changes among adolescent boys, suggesting its potential benefits in addressing both the physical and psychological challenges associated with puberty.
9. A pre-experimental study was conducted on the impact of pubertal changes among pre-adolescent girls in KNR Government High School, Nellore, a total sample are 60 was included in this study the instruments used a standard "questionnaire". This study demonstrated the efficacy of a structured teaching program in enhancing knowledge about pubertal changes among 60 pre-adolescent girls, with a notable correlation between the source of health information and knowledge regarding pubertal changes. The study concluded that the structured teaching program is effective in improving knowledge regarding pubertal changes in pre-adolescent girls [7].
10. An evaluative study was conducted to assess the impact of pubertal changes on students at a selected PU College, specifically Chaldean Syrian Higher Secondary School, beginning in June 2017. The study included a sample of 80 participants, with data collected using a questionnaire based on the WHO guidelines. The findings revealed that the video-assisted teaching program significantly improved knowledge, demonstrated by a 't' value of 12.13, which surpassed the critical value at a significance level of 0.05. This test also revealed pre-test knowledge levels concerning selected demographic variables such as age, education, father's occupation, place of residence, and menarche attainment. The conclusion was that the video-assisted teaching program was effective in elevating knowledge related to pubertal changes.
11. A descriptive study was conducted to assess the impact of pubertal changes on girls in a rural community in Kanchipuram, with 50 samples included in the study. The data collection involved demographic variables using structured questionnaires. The findings revealed the need for additional teaching programs to enhance knowledge and hygiene among adolescent girls. This study is anticipated to contribute to elevating the knowledge levels of adolescent girls, subsequently improving the quality of care, and potentially reducing the mortality rate associated with reproductive tract infections. A study to determine the effectiveness of a teaching program on pubertal knowledge changes and menarche in selected PU Colleges in Gadag [8].
12. A cross-sectional study was conducted to evaluate the knowledge of pubertal changes and menarche among adolescent girls with a sample size of 50. In this study, a random cluster sampling technique was used. The data were collected using self-administered questionnaires. The results indicated that most teenage girls exhibited a lower level of knowledge than pubertal girls.

13. This study aimed at a prevalence study to assess knowledge regarding pubertal changes and menarche among adolescent girls. This study used a purposive sampling technique with a sample size of 50 using the purposive sampling technique. The pubertal staging was performed using Tanner's method. The results revealed that girls experiencing early puberty demonstrated a greater increase in pubertal height [9].
14. A cross-sectional study was conducted to evaluate knowledge about pubertal changes and menarche among adolescent girls with a sample size of 50. The study employed a systematic sampling technique and data collection was facilitated using a pre-coded questionnaire. The study's results indicated that 66% of the participants were knowledgeable about the names of the reproductive system, while 67% were informed about pubertal changes and menarche among adolescent girls.
15. An experimental study with a sample size of 50 was conducted to evaluate knowledge about pubertal changes and menarche among adolescent girls, with a sample size of 50. This study used a purposive sampling used in this study. A pre-tested questionnaire method was used. The findings of the study were the majority of the (78.5%) attained menarche age of 10 to 12 years. Regarding menstruation, 82 girls (63.1%) perceived it to be a normal process, whereas 48 girls (36.9%) felt that it was abnormal. Only seven girls claimed to know the physiological reason for menstruation; the majority of the girls (80.7%) felt embarrassed and anxious [10].
16. This study was conducted to investigate the primary sources of information for adolescent girls concerning pubertal changes and menarches, with a sample size of 50. This study focused on the physical and sexual development of girls during the pubertal period, including the examination of hormone levels that regulate growth and characterization of the hypophyseal-gonad relationship. The research emphasized a staged pattern of the pubertal period, highlighting critical periods, such as the onset of menarche and the establishment of the ovulation cycle [11].
17. This study was conducted to evaluate the primary sources of information for adolescent girls concerning pubertal changes and menarche, with a sample size of 50. Variations in the genetic impact on disordered eating were observed throughout puberty in girls, with heritability being absent (0%) before pubertal development. These observed differences may be attributed to an increase in ovarian hormone levels during puberty. Disordered eating and pubertal development were assessed using the Minnesota Eating Behavior Survey, and pubertal development was assessed using pubertal development. No significant difference in genetic influence on disordered eating was observed in females across any developmental stage.
18. A study was conducted to assess the major source of information for adolescent girls regarding pubertal changes, and a menarche sample size of 50. The adolescent phase of puberty represents a crucial period with a heightened risk of the initiation of eating pathology initiation in teenage girls. This review focuses on alterations in reproductive hormones during puberty as a distinct psychopathic mechanism. Research articles exploring the connection between puberty and eating disorder-related traits were identified using database searches and literature references. Evidence from studies involving adult women and experiments with animals supports the notion that reproductive hormones have an impact on symptoms associated with eating disorders.
19. A study was conducted to evaluate the primary channels of information for adolescent girls concerning pubertal changes and menarche. Major sources of information were television (73.1) followed by radio (37.7%), parents (36.1%), friends (22.3%), posters (16.9%), teachers (6.9%), and health professionals (6.9%). Responding to a question regarding people intending to seek advice on having pubertal changes and menarche, parents were preferred by 49.2%, doctors by 44.6%, friends by 14.6%, teachers (10.1%), and 13.1% did not wish to consult anyone for their problems. The importance of Educating adolescent girls about their pubertal changes and menarche in our country is necessary due to 13.4% of adolescent girls. The investigator felt that it is important to provide education and knowledge regarding pubertal changes and menarche [12].
20. This cross-sectional study was conducted to explore the awareness of pubertal changes and menarche among adolescent girls in an urban area of Belagavi. The sample size was 50. A systemic sampling technique was used to collect data using pre-test and post-test questionnaires.

The results of the study showed that knowledge regarding pubertal changes and menarche among adolescent girls varied between fair and poor sources.

21. A study with a sample size of 50 was conducted to assess the impact of a structured teaching program on adolescent girls' knowledge of pubertal changes and menarche. Information was collected using a pre-tested, semi-structured questionnaire, and direct interviews. The study's findings revealed that only 335 (22.33%) of the students had assessed the effectiveness of the structured teaching program on knowledge regarding pubertal changes and menarche among adolescent girls [13].
22. A descriptive study was conducted to assess the knowledge of pubertal changes and menarche among adolescent girls in low-income and middle-income countries, including India (17), Iran (7), Kenya (4), Nigeria (4), Bangladesh (3), Mexico (2), Nepal (2), Pakistan (1), and Turkey (1). The total sample size for this study was 50, with the majority (40 out of 44) of studies utilizing school-based samples, and 15 studies providing information on interventions. In this study, a multi-stage cluster sampling technique was employed. The results indicated that adolescent girls exhibited insufficient knowledge of pubertal changes and menarches.
23. This study was undertaken to explore the knowledge, beliefs, and practices concerning pubertal changes and menarche among adolescent girls in junior colleges in Kuppam, Andhra Pradesh, using a sample size of 50. The study employed a simple random technique, and data collection was facilitated using a pre-designed, pre-tested questionnaire. The study findings revealed that approximately 24.7% of the participants were informed about pubertal changes and menarche in adolescent girls.
24. This cross-sectional study was conducted to assess knowledge regarding pubertal changes and menarche among adolescent girls. A sample size of 50 was selected using a systematic sampling technique for this study. Data was collected using a pre-coded questionnaire. The study's results indicated that 66% of the participants were aware of the names of the reproductive system. Sixty-seven (67%) of the participants knew about pubertal changes and menarches among adolescent girls.
25. This study was undertaken to examine the primary channels of information available to adolescent girls regarding pubertal changes and menarche, with a sample size of 50. This study emphasizes the physical and sexual development of girls during the pubertal period, including the blood hormone levels that regulate growth. Additionally, this study highlights the characterization of hypophyseal-gonad relationships, emphasizing a staged pattern of the pubertal period. Critical periods, specifically the onset of the menarche and the establishment of the ovulation cycle, are singled out for special attention.

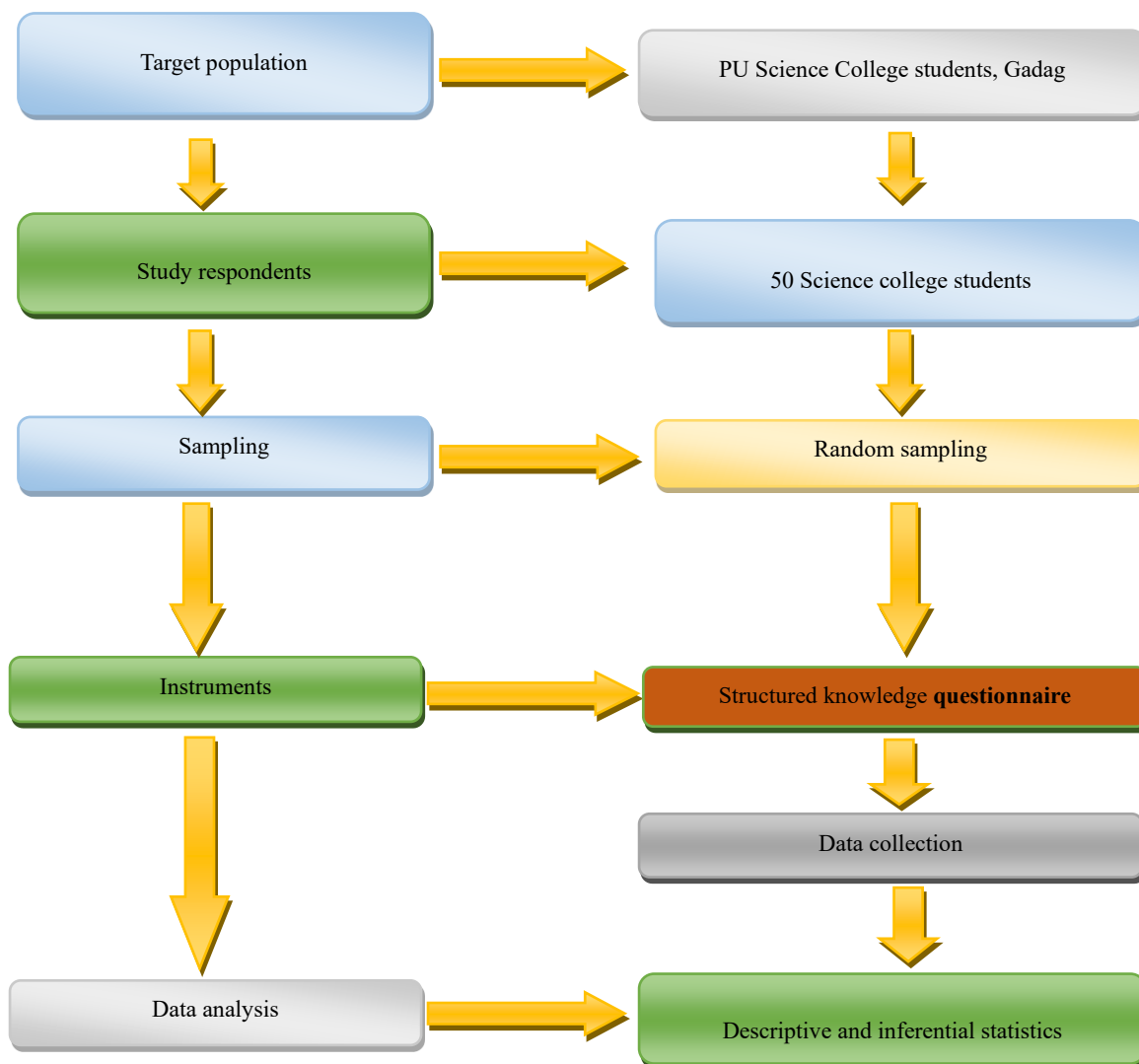
## METHODOLOGY

The research methodology outlines the systematic approach employed to address and collect reliable data for the specific problem at hand. It serves as a structured method for solving research problems, encompassing a series of steps, procedures, and strategies for data collection and analysis in research inquiry. This chapter provides a comprehensive overview of the methodology, details of the approach, research design, and steps involved in tool development and describes the research setting, sample, sampling technique, sampling criteria, pilot study, and planned data analysis.

The selection of the research approach is a fundamental step in conducting research studies. Considering the nature of the chosen problem and the objectives to be achieved, an evaluative research approach was deemed suitable for this study. Evaluative research is an applied form of research that involves assessing the performance of a program, practice, procedure, or policy. It entails collecting and analyzing information related to a program, to evaluate its effectiveness. The current study adopted a quasi-experimental design to assess the effectiveness of a teaching program on knowledge of pubertal changes and menarche among students in selected PU Colleges in Gadag, with a focus on measuring knowledge gain.

**RESEARCH DESIGN**

The concept of research design pertains to a blueprint for scientific research. Research design aids in choosing subjects, identifying variables, manipulating and controlling them, determining the observations to be conducted, and selecting the types of statistical analyses required to interpret the data. This study employed a quasi-experimental research design, in which pre-test and post-test observations were conducted on different days. The experimental variable was introduced after the pre-test, and it is presumed that events, such as planned interventions between the pre-test and post-test, might have contributed to the difference. (Campbell and Stanley).



**Figure 2.** Schematic outline of research plan.

The research design selected for the study was a quasi-experimental design without a control group; it was a pre-test and post-test design (Table 1 and Figure 2). In this study, a pre-test was conducted for a teaching program on the knowledge of pubertal changes and menarche in selected PU science Colleges in Gadag. Knowledge of pubertal changes and menarche was examined, and a post-test was conducted after 7 days (one week).

**Table 1.** Tabular representation of research design.

| <i>Pre-test</i> | <i>Intervention</i> | <i>Post-test</i> |
|-----------------|---------------------|------------------|
| O1              | X                   | O2               |

### **Variables Under Study**

- *Dependent variable:* Level of knowledge of pubertal changes and menarche among PU science college students.
- *Independent variable:* Structured Teaching Programme regarding pubertal changes and menarche.
- *Demographic variables*
  1. Age
  2. Education
  3. Religion
  4. Type of family
  5. Source of information

### **Setting of the Study**

The current study was conducted at the PU College Gadag because of the feasibility of implementing the program and the accessibility of the samples.

### **Population**

The study's target population consisted of students from PU Colleges in Gadag.

### **Sample**

According to Polit and Hungler, a sample constitutes a subset of the population chosen for a research study. Sampling involves choosing a segment of the population to represent the entire population.

### **Sample Size**

The present study includes a sample size of 50 students from PU College Gadag.

### **Sampling Technique**

In this study, a questioning sampling method was employed to select samples. A lottery method was used to select 50 samples from each frame.

### **Criteria for Selecting the Sample**

The samples were selected with the following pre-determined criteria.

### ***Inclusion Criteria***

The study includes:

- PU College Students in Gadag.
- 2nd PUC students who have given consent for the study.

### ***Exclusive Criteria***

The study excludes:

- Who are not willing to participate in the study.
- Who are not able to understand, read, and write English.

### **Tool**

A data collection instrument is a formal document used to collect and record information such as questionnaires (Polit and Hungler 1999).

### **Development of the Study**

In this study, a questionnaire was developed to assess the knowledge of pubertal changes and menarche.

The tool presentation was based on the following key points

- Review of literature.
- Consultation with the guide.

- Based on expert opinions.
- Educational Material.

### Description of the Tool

The structural questionnaires consist of two sections.

*Section A:* It consists of demographic variables such as age, education, religion, course, residential background, and part of the study.

*Section B:* Comprises 30 multiple-choice questions, which include the points mentioned in Table 2.

**Table 2.** Knowledge aspects.

| No. | Knowledge aspects            | No. of items |
|-----|------------------------------|--------------|
| 1   | Puberty                      | 5            |
| 2   | Menarche                     | 15           |
| 3   | Female reproductive system   | 5            |
| 4   | Hormone                      | 2            |
| 5   | Secondary sexual development | 1            |
| 6   | Abnormal uterine bleeding    | 2            |

### Scoring Key

A scoring key was developed for Section A by encoding demographic variables. In Section B, a correct response received a score of “1,” while an incorrect response was assigned a score of “0” for all items. Thus, a total score of 30 was obtained. To interpret the level of knowledge, the scores were distributed as follows.

- Inadequate knowledge <18 scores.
- Moderate knowledge 18–25 score.
- Adequate knowledge 25–30 score.

### Validity of the Tool and Content

The tool and its content were submitted to experts specializing in medical-surgical nursing, medicine, and biostatistics for content validity. Seven experts reviewed and provided feedback on the tool within a designated timeframe. Following their suggestions and recommendations, the tool underwent modifications, leading to the creation of a final draft of both the tool and its contents.

### Reliability of the Tool

The reliability of a research instrument refers to the degree to which it produces consistent results in repeated measures. It encompasses attributes, such as consistency, accuracy, precision, stability, equivalence, and homogeneity. Polit and Hungler (1999) emphasize that instrument reliability is the extent to which it consistently measures the intended attribute. In this study, the reliability of the tool was determined using the split-half method as outlined by Brown Prophecy.

$$r' = 2r / 1 + r$$

r = Co-efficient of co-relation.

r' = Reliability of the tool.

The reliability of the found to be

r = 0.98 thus the developed tool was found reliable for the study

### Data Collection Process

Formal authorization was secured from the principal of the Morarji Desai Residential PU College Gadag. The primary study involved 50 PU College students, chosen through a simple random sampling

technique. Before commencing the data collection, the researchers introduced themselves and elucidated the objectives of the study. Informed consent was obtained from the participants, with assurance of anonymity and confidentiality of the information provided.

*Phase 1:* Pre-test was conducted using a structured questionnaire.

*Phase 2:* The samples were Conducted simulation on pubertal changes and menarche.

*Phase 3:* One week later, a post-test was administered to the same individuals using an identically structured knowledge questionnaire.

### **Plan for Data Analysis**

The collected data were analyzed in accordance with the study's objectives and hypotheses, employing both descriptive and inferential statistics. The investigator compiled a master dataset for the data computation.

### **Descriptive Statistics**

Frequency and percentage were used to study the demographic variables of students. The mean standard deviation pre-test and post-test scores were used to determine the student's level of knowledge.

### **Inferential Statistics**

The effectiveness of the simulation on knowledge of pubertal changes and menarche was assessed using a paired t-test. Chi-square analysis was used to examine the relationship between post-test knowledge levels and the selected demographic variables. Data is presented in the form of tables and graphs. The details of the analysis and presentation of the data are explained in the next section.

### **Ethical Consideration**

Permission was secured from the principal of Morarji Desai Residential PU College. After clarifying the study objectives, the investigator assured the participants that their anonymity and confidentiality would be maintained and informed consent was obtained. Participants were informed of the voluntary nature of their participation and their right to withdraw from the study at any point. No ethical concerns were raised during the study.

## **RESULT**

The analysis aimed to transform the data into understandable and interpretable formats, allowing the examination and testing of the relationships between problems. Interpreting the tabulated data revealed the significance of these findings. The analysis and interpretation of the data in the current study were based on information gathered from 50 adolescent girls enrolled in selected PU Colleges in Gadag. The collected data were tabulated, analyzed, and subjected to inferential statistics. The data alone did not provide answers to the research question. Given the substantial amount of data collected, a review is insufficient to provide a reliable description. To meaningfully address the research questions, the data must be processed and analyzed in alignment with the objectives and hypotheses of the study.

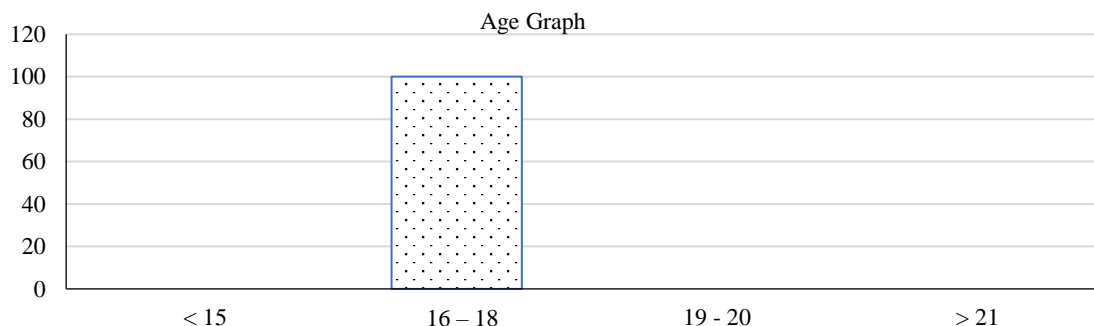
### **Organization of Findings**

The information collected was organized and presented in four sections as follows:

1. *Section 1:* Description of socio-demographic characteristics of the sample.
2. *Section 2:* Assessment of knowledge of adolescent girls regarding pubertal changes and menarche.
3. *Section 3:* Assessment of the effectiveness of a structured teaching program on knowledge regarding pubertal changes and menarche among adolescent girls studying at a selected PU College Gadag.
4. *Section 4:* Association between post-test knowledge scores of mothers regarding pubertal changes and menarche with selected socio-demographic variables.

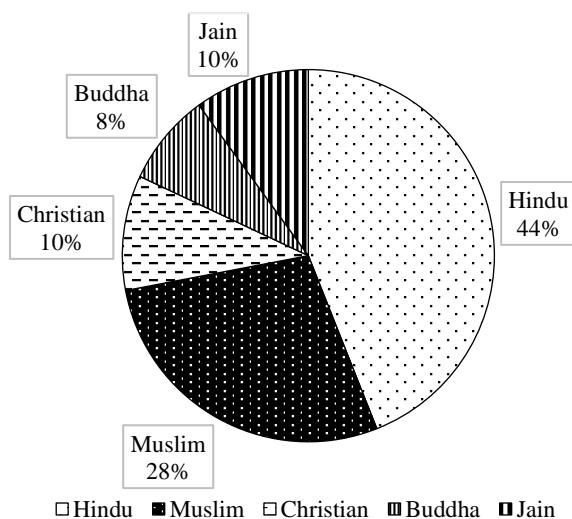
**Section 1. Description of socio-demographic characteristics of the sample.**

The percentage-wise distribution of students according to their age group revealed that all students belonged to the age of 16–18 years (100%). This shows that the students belonged to the age group 16–18 years (Figure 3).

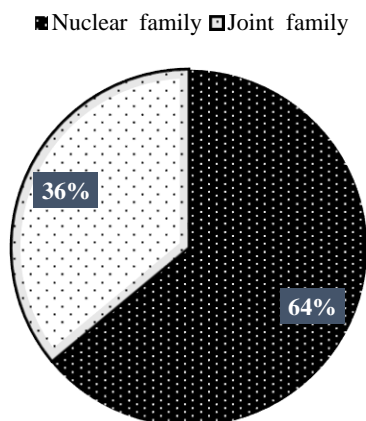


**Figure 3.** Percentage-wise distribution of students according to their age.

The percentage-wise distribution of students according to their religion reveals that out of 50 students, highest percentage (44%) of the students belonged to Hindu, (28%) of the students belonged to Muslim, (10%) of the students belonged to Christian and Jain, lowest percentage (8%) of the students belonged to Buddhists. This shows that most of the students belonged to the Hindu religion (Figure 4).



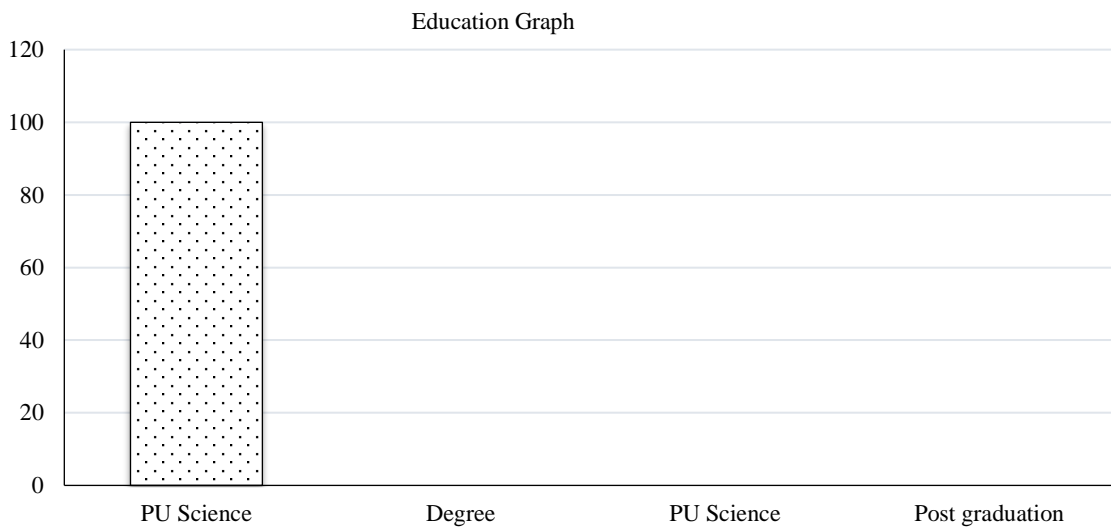
**Figure 4.** Percentage-wise distribution of students according to their religion.



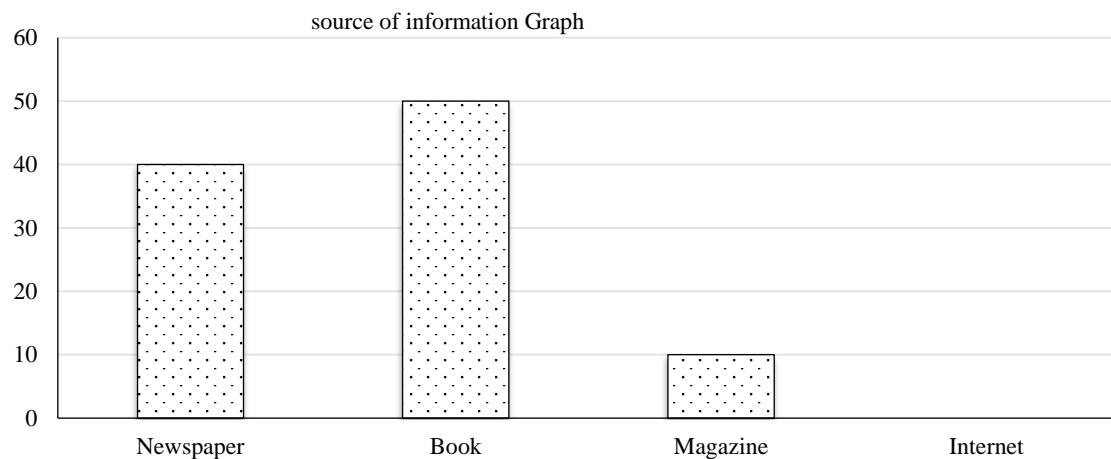
**Figure 5.** Percentage-wise distribution of students according to their type of family

The percentage-wise distribution of students according to their type of family revealed that out of 50 students, the highest percentage (64%) of students belonged to the nuclear family and the lowest percentage (36%) of students belonged to the joint family. This shows that most students lived in nuclear families (Figure 5).

The percentage-wise distribution of students according to their education revealed that all 50 students belonged to PU College (100%). This shows that all students belonged to PU College (Figure 6).



**Figure 6.** Percentage-wise distribution of students according to their education.



**Figure 7.** Percentage-wise distribution of students according to their using source of information.

The percentage-wise distribution of students according to their source of information revealed that out of 50 students, the highest percentage (50%) of students belonged to use books, 40% of students belonged to use newspapers, and the lowest percentage (10%) of students belonged to use magazines, 0% not one of the students using the internet. This shows that most students used books (Figure 7).

**Section 2. Assessment of knowledge of adolescent girls regarding pubertal changes and menarche**

The percentage-wise distribution of study students in the pre-test revealed that out of 50 students the highest percentage (54%) of students had moderate knowledge, followed by (36%) of students who had inadequate knowledge, the lowest percentage (10%) of students were having adequate knowledge regarding pubertal changes and menarche. This shows that most of the students had moderate knowledge (Table 3).

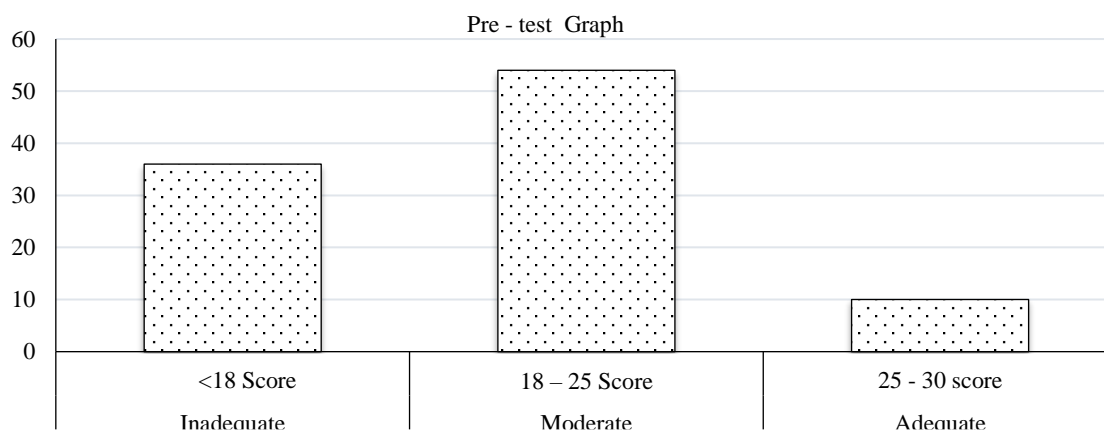
**Table 3.** Percentage-wise distribution of study students according to the level of knowledge in the pre-test.

| Knowledge level | Category    | Respondent number | Percentage |
|-----------------|-------------|-------------------|------------|
| Inadequate      | <18 score   | 18                | 36         |
| Moderate        | 18–25 score | 27                | 54         |
| Adequate        | 25–30 score | 05                | 10         |
| Total           |             | 50                | 100        |

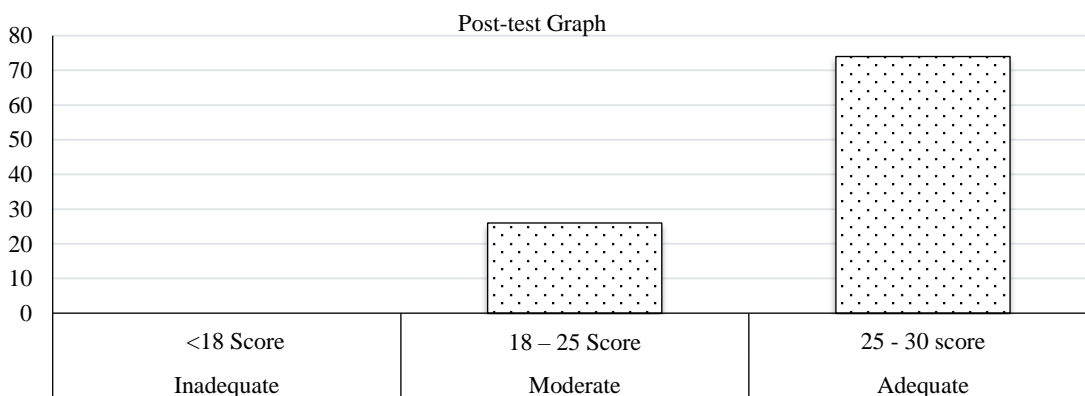
**Table 4.** Percentage-wise distribution of study students according to their level of knowledge in post-test.

| Knowledge level | Category    | Respondent |            |
|-----------------|-------------|------------|------------|
|                 |             | Number     | Percentage |
| Inadequate      | <18 score   | 0          | 0          |
| Moderate        | 18–25 score | 13         | 26         |
| Adequate        | 25–30 score | 37         | 74         |
| Total           |             | 50         | 100        |

The percentage-wise distribution of study students in the post-test revealed that out of 50 students, the highest percentage (74%) of students had adequate knowledge, the lowest percentage (26%) of students had moderate knowledge, (0%) no one of the students was having inadequate knowledge regarding pubertal changes and menarche. This shows that the majority of students had adequate knowledge in the post-test regarding pubertal changes and menarche (Table 4 and Figures 8 and 9).



**Figure 8.** Graphical representation of pre-test.



**Figure 9.** Graphical representation of post-test.

**Table 5.** Significance difference between the pre-test knowledge and post-test knowledge scores of students.

| Test      | Mean  | Mean difference | SD   | T-test | Table value |
|-----------|-------|-----------------|------|--------|-------------|
| Pre-test  | 19    | 2.63            | 5.07 | 1.82   | 1.67        |
| Post-test | 25.54 |                 |      |        |             |

n= 50; DF = 49

*H1*: There is a significant difference between the pre-test and post-test knowledge scores of adolescent girls regarding pubertal changes and menarches.

As the calculated value (1.82) is higher than the table t-value (1.67) for the degree of freedom (49) and 5% level of significance, hypothesis(*H1*) is accepted.

The findings indicated a notable disparity between the pre-test and post-test knowledge scores, confirming the effectiveness of the structured teaching program (Table 5).

### ***Section 3. Evaluation of the effectiveness of STP on knowledge of students regarding pubertal changes and menarche.***

**Table 6.** Percentage-wise distribution of study students according to their knowledge in pre-test and post-test.

| Level of knowledge | Pre-test           | Percentage | Post-test          |            |
|--------------------|--------------------|------------|--------------------|------------|
|                    | No. of respondents |            | No. of respondents | Percentage |
| Inadequate         | 10                 | 36         | 0                  | 0          |
| Moderate           | 27                 | 54         | 13                 | 26         |
| Adequate           | 05                 | 10         | 37                 | 74         |
| Total              |                    | 100        | 50                 | 100        |

#### ***Assessment of Knowledge Level of Students in Pre-test and Post-test Regarding Pubertal Changes and Menarche***

A comparison of knowledge levels between the pre-test and post-test phases yielded the following results: in the pre-test, out of 50 students, the highest percentage (54%) of students had moderate knowledge, followed by 36% of students who had inadequate knowledge, and lowest percentage (10%) of students were with adequate knowledge regarding pubertal changes and menarche.

However, after the administration of STP (post-test) the highest percentage (74%) of students had adequate knowledge, (26%) of students had moderate knowledge, and (0%) of students had inadequate knowledge (Table 6).

### ***Section 4. Association between post-test knowledge scores and the selected socio-demographic variables.***

Chi-square analysis was conducted to explore the relationship between students' post-test knowledge scores and their selected socio-demographic variables, using a contingency table. The results indicated no significant association between post-test knowledge scores and socio-demographic variables such as religion, type of family, and source of information regarding pubertal changes and menarches. However, a significant association was observed between post-test knowledge scores and socio-demographic variables such as age and education (Table 7).

**Table 7.** Percentage-wise association between post-knowledge scores and selected socio-demographic variables (N = 50)

| S.N. | Socio-demographic variables | DF | Chi-square value | Table value | Level of significance | Association     |
|------|-----------------------------|----|------------------|-------------|-----------------------|-----------------|
| 1    | Age                         | 2  | 13.52*           | 5.99        | 0.05                  | Significant     |
| 2    | Religion                    | 1  | 0.73 NS          | 3.84        | 0.05                  | Not significant |
| 3    | Education                   | 2  | 13.52*           | 5.99        | 0.05                  | Significant     |
| 4    | Type of Family              | 1  | 1.65 NS          | 3.84        | 0.05                  | Not significant |
| 5    | Source of Information       | 1  | 0.29 NS          | 3.84        | 0.05                  | Not significant |

$P < 0.05$

\* = Significant

NS = Not Significant

DF = Degree of freedom

Hence, H1 was rejected for society's demographic variables like religion, type of family, and source of information about pubertal changes and menarche at a 5% level of significance.

H1 is accepted for socio-demographic variables like age and education, at a 5% level of significance.

## DISCUSSION

The current investigation aimed to assess the impact of a structured teaching program on the understanding of pubertal changes and menarche among adolescent girls enrolled in a specific PU College in Gadag. The research problem is framed as “an examination of the effectiveness of a structured teaching program on knowledge regarding pubertal changes and menarche among adolescent girls attending a designated PU College in Gadag.” To fulfill the study objectives, a quasi-experimental design with a one-group pre-test and post-test approach was employed, utilizing a Randomized Sampling Technique for sample selection. The study was conducted at Morarji Desai Residential PU College, Malla Samudra Gadag, and data were collected from 50 samples of 1st and 2nd year PU students using a structured knowledge questionnaire.

*The findings of the study have been discussed with reference to the objectives, hypothesis, and findings of other studies.*

The major findings of the study

### I. Regarding demographic variables

- Maximum number of respondents was 50 samples (100%) belonging to the 16–18 years of age group.
- The majority of the respondents, (100%) were females.
- The majority of 50 (100%) samples had basic educational status in the 1st and 2nd years.
- The majority of the samples were 22 students (44%) who were Hindu.
- The majority of the participants were 32 students (64%) who stayed in nuclear families.
- The majority of the participants were 18 students (36%) who stayed in a joint family.
- The majority of the samples were 50% of students who belonged to used Books, 40% of students belonged to newspapers, and the lowest 10% belonged to use magazines.

### Regarding Objectives

**Objective 1. To assess the level of knowledge regarding pubertal changes and menarche before and after structured teaching programs among adolescent girls.**

In the pre-test, the majority of the respondents had 18–25 scores, 54% had moderate knowledge, <18 scores, 36% had inadequate knowledge, and 25–30 scores, 10% had adequate knowledge regarding pubertal changes and menarche.

In the pre-test, the overall mean percentage of knowledge was 19, with a mean and SD of 4.17.

Following the post-test, a significant majority of respondents, accounting for 74% demonstrated adequate knowledge, with a score range of 25–30. Meanwhile, 26% of respondents exhibited moderate knowledge within the score range of 18–25, and none of the participants displayed inadequate knowledge regarding pubertal changes and menarches.

The overall mean percentage of knowledge after the post-test was 25.54, accompanied by a mean and standard deviation of 5.07.

***Objective 2. To evaluate the effectiveness of a structured teaching program on pubertal changes and menarche among adolescent girls.***

In the pre-test, the majority of the respondents had 18–25 scores, 54% had moderate knowledge, <18 scores, 36% had inadequate knowledge, and 25–30 scores, 10% had adequate knowledge regarding pubertal changes and menarche.

After implantation of the pubertal changes and menarche, the post-test results showed that most of the respondents' 25–30 score (74%) had adequate knowledge, and none of the respondents showed inadequate knowledge regarding pubertal changes and menarche.

In the pre-test, the mean percentage of knowledge regarding pubertal changes and mean menarche of 19 with SD was 4.17.

During post-test, the mean post-test the mean percentage of knowledge regarding pubertal changes and menarche was mean 25.54 with an SD was 5.07

Enhancement in the mean score percentage of knowledge regarding pubertal changes and menarche. The paired 't'-test was measured to be 1.82 to be effective and the table value will be 1.67 and DF (Degree of freedom was 49) than a n=50.

H1 = A noteworthy disparity exists between the pre-test and post-test knowledge scores of adolescent girls concerning pubertal changes and menarche. This is substantiated by the calculated paired 't'-test value (1.82), surpassing the critical table 't' value (1.67) for 49 degrees of freedom of 49 and a 5% level of significance. Consequently, hypothesis (H1) was affirmed, indicating a substantial difference between the pre-test and post-test knowledge scores. This underscores the effectiveness of the structured teaching programs.

***Objective 3. To find out the association between post-test knowledge scores with selected demographic variables.***

The results of the Chi-square analysis showed that there was a significant difference between the post-test knowledge score and age ( $\chi^2= 13.52^*$ ,  $P<0.05$ ,  $df=2$ ), religion ( $\chi^2=13.5^*$   $P<0.05$ ,  $df=2$ ), type of family ( $\chi^2= 1.65$  [ns],  $P<0.05$ ,  $df=1$ ), and source of information ( $\chi^2=0.29$  [ns],  $P<0.05$ ,  $df=1$ ).

*Note*

NS = Not significant

Df = Degree of freedom

$P<0.05$

\* = significant

**Implications of the Study**

The results of this study are significant for the domains of nursing practice, nursing education, nursing administration, and nursing research.

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### **Nursing Practice**

Adolescent girls play a vital role in providing care for their pubertal changes and menarche through health education programs, and structured teaching programs on knowledge regarding pubertal changes and menarche among awareness campaigns can be conducted to improve their knowledge of pubertal changes and menarche, among which in-term helps them to provide better day-to-day care. This helps family members provide psychosocial and emotional support to their coronavirus disease client.

### **Nursing Education**

The diploma and B.Sc. The nursing curriculum should consist of vast knowledge related to structured teaching programs on knowledge regarding pubertal changes and menarche, and care for pubertal changes and menarche. Information using different methods of conducting health education, pubertal changes, and menarche among awareness campaigns in various community settings. While training the nursing personnel emphasis should be on management of pubertal changes and misconceptions about the disease and counseling of family members along with PUC adolescent girls.

### **Nursing Administration**

The nurses administered should be interested in providing information-structured teaching programs on knowledge regarding pubertal changes and menarche. Nurses should plan and organize structured teaching programs on knowledge regarding pubertal changes and menarche awareness pains, and workshops for family members regarding pubertal changes and menarche during their follow-up visits. She should coordinate efforts to ensure the adequate allocation of manpower, funds, and resources for the dissemination of information through a structured teaching program on knowledge regarding pubertal changes and menarche. The nurse administrator plays a vital role in supervising and motivating the nursing staff to conduct periodic health education programs regarding structured teaching programs on knowledge regarding pubertal changes and menarche.

### **Nursing Research**

- Therefore, extensive research is required regarding pubertal changes and menarche. Research should focus on modifying the knowledge of adolescent girls with PUC regarding pubertal changes and menarche in PU colleges.
- Further research should be conducted on practicing new methods of structured teaching programs on knowledge of pubertal changes and menarche.
- Awareness is programmed to enable college girls to improve their knowledge.
- Research should also focus on the care of pubertal changes and menarche to enable patients to undergo treatment with minimum discomfort and a better quality of life in college.
- Thus, the present investigation offers an infinite scope and potential implications for nursing practice, training, and research on pubertal changes and menarche.

### **Limitations**

The present study is a preliminary study to compare knowledge regarding pubertal changes and menarche among adolescent girls with PUC studying at the selected PU College in Gadag.

A small number of subjects and convenient sampling limits the generalization of the study.

1. Long-term follow-up was not feasible within specified time constraints. The study was confined to a limited sample of 50 adolescent girls with PUCs enrolled at the selected PU College in Gadag.
2. The researcher designed the data collection instrument used in this study. The tool should be standardized and subjected to reliability testing in a larger student population.

### **Recommendations**

Based on the study's findings, the following recommendations are suggested:

1. A similar investigation could be undertaken among PUC adolescent girls.

2. The efficacy of a teaching program aimed at instructing adolescent girls with PUC on basic knowledge of pubertal changes and menarche should be assessed.
3. A follow-up study is advisable to assess the impact of the effectiveness of the information guide sheet.
4. There is a need and opportunity to provide counseling services to adolescent girls with PUCs concerning pubertal changes and menarche.

## CONCLUSION

The findings of the study demonstrate that a structured teaching program significantly enhances the knowledge of adolescent girls regarding pubertal changes and menarche. Before the program, the majority of the participants had inadequate or moderate knowledge, with only a small percentage having adequate knowledge. However, after the structured teaching program, there was a marked improvement in the knowledge levels, with 74% of participants achieving adequate knowledge. The mean difference between pre-test and post-test scores was 2.63, indicating a notable improvement, and the standard deviation was 5.07, reflecting the range of improvement across the participants.

Furthermore, the study found a significant association between the demographic variables of age and education level with post-test knowledge scores, while other variables such as religion, family type, and source of information did not show a significant correlation. These results suggest that structured educational interventions can effectively increase awareness and understanding among adolescent girls about the physiological and psychological changes that accompany puberty. Therefore, implementing similar teaching programs could be beneficial in improving adolescents' health education and preparedness for pubertal transitions.

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