

# THE RELATIONSHIP BETWEEN SEXUAL KNOWLEDGE ABOUT PHYSICAL CHANGES AND ANXIETY IN FACING PUBERTY IN ADOLESCENTS AT SMPN 1 MARGOYOSO PATI

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## Abstract

Puberty is a developmental phase in which children begin to transition from asexuality to sexual maturity. This period is marked by the development of reproductive organs and the ability to reproduce. This study aims to analyze the relationship between the level of sexual knowledge regarding physical changes and the level of anxiety in facing puberty in adolescents at SMPN 1 Margoyoso Pati. The sampling technique used was simple random sampling, a method of randomly selecting samples from a population without regard to specific levels within the population. Furthermore, respondents were selected using purposive sampling. The anxiety measurement instrument used was the Hamilton Anxiety Rating Scale (HARS) questionnaire. The level of sexual knowledge regarding physical changes during puberty shows that 49 respondents (58.33%) have knowledge in the good category, 27 respondents (32.14%) are in the sufficient category, and 8 respondents (9.53%) are in the poor category. There is a significant relationship between sexual knowledge related to physical changes and anxiety in facing puberty in adolescents at SMPN 1 Margoyoso Pati. Adolescents with good sexual knowledge tend to be better able to reduce or even avoid anxiety when entering puberty.

**Keywords:** *sexual knowledge, physical changes, adolescent anxiety.*

## INTRODUCTION

Since ancient times, many traditional societies have viewed puberty as a crucial phase in a person's life. This period is often commemorated with various traditional ceremonies marking the transition from childhood to adulthood. Through these ceremonies, both boys and girls are granted new rights, status, and responsibilities as adults. According to WHO data (2016), approximately 20% of the world's population is in the adolescent age range, namely 10–19 years. In Indonesia, the Central Statistics Agency in the same year recorded that adolescents accounted for approximately 30% of the total population of 200 million people. The Indonesian Health Profile (2018) shows that there are approximately 44 million people aged 10–19 years or 21% of the total population, with the percentage of respondents showing 50.8% male and 49.2% female. Knowledge about the physical changes that occur during adolescence is crucial, as this phase is characterized by biological, physical, and social changes that can trigger psychological stress.

Ignorance about the bodily changes they experience often leads to anxiety, embarrassment, and even confusion. Adolescents often question whether these changes are normal, whether they occur in everyone, and how to cope with them (BKKBN, 2022). Adolescents are driven by their curiosity to seek information from a wide range of sources. However, inaccurate information can lead to misunderstandings and inappropriate actions (Ministry of Health, 2021). Research conducted by Dewi (2023) revealed that the majority of adolescents during puberty experience moderate levels of anxiety, namely 58%. Meanwhile, 33.8% of respondents fall into the mild anxiety category, and only a small proportion exhibit severe levels of anxiety. A lack of understanding of physical changes, both in oneself and in peers, is one contributing factor. Without explanation and support, this experience can become a potentially traumatic psychological burden. A preliminary study conducted at SMPN 1 Margoyoso Pati in April 2025 on 10 students (5 boys and 5 girls) revealed that the majority did not fully understand sexual knowledge related to physical and sexual maturation. Therefore, efforts are needed to understand the feelings and

expectations of adolescents during physical and sexual maturation so that teachers, parents, and health workers can provide appropriate insights and help reduce anxiety related to body transformation. The physical growth that occurs during physical and sexual maturation is a natural process that accompanies adolescence. However, for some children, especially those who don't yet understand these changes, puberty can be a source of anxiety and discomfort. I experienced this phenomenon firsthand when my child began experiencing physical changes such as hair growth in certain areas, a change in voice, and the appearance of acne. This personal experience sparked my interest in learning more about how teenagers my child's age navigate puberty. I realized that not all children receive sufficient information or guidance from their parents, teachers, or their environment about puberty and physical changes. Based on this, I felt it was important to conduct research on the relationship between sexual knowledge about physical changes during puberty and the level of anxiety experienced by adolescents. This research is expected to provide a clear picture of the importance of basic sexual education from an early age and the role of the environment in helping children understand and accept their changes positively.

## **LITERATURE REVIEW**

### **1. Sexual knowledge**

Sexual knowledge includes information about the anatomy and physiology of the reproductive organs, the prevention of sexually transmitted infections, and guidance to help individuals understand the meaning, function, and purpose of sexual activity, enabling them to engage in it correctly, appropriately, and in accordance with legal norms. This knowledge is acquired through the five senses, particularly sight and hearing, which are the primary channels for information acquisition ( Nelli & Ramadhan, 2021 ).

#### **a. Level of Knowledge**

The knowledge included in the cognitive domain has 6 levels: (Febriyanti and Oktaviani, 2023)

##### **1) Know**

The ability to recall information that has been learned is usually measured through direct questions.

##### **2) Understanding (comprehension)**

The ability to interpret information correctly, not just recognize or mention it.

##### **3) Application**

The ability to apply understood concepts or principles to different situations.

##### **4) Analysis**

The ability to break down problems into components, identify relationships between components, and create maps or diagrams.

##### **5) Synthesis (synthesis)**

The ability to combine various information into a new, logical idea or concept.

##### **6) Evaluation**

The ability to assess an object based on certain standards or norms.

#### **b. Factors that can influence knowledge**

##### **1) Age**

Aging generally increases maturity of thought and understanding. In society, older individuals are generally more trusted due to their experience and mental maturity (Widakdo et al., 2021). With age, independence and strength also increase, making it easier for individuals to understand and master what they learn and acquire (Apriani, 2020).

##### **2) Education**

The higher the level of education, the greater the opportunity to acquire information and knowledge. Education is a process aimed at developing a person's personality and abilities, whether acquired through learning in school or outside of school. Education plays a significant role in influencing learning. This is closely related to the level of knowledge, as higher education is expected to provide greater knowledge. However, it is important to remember that low education does not always directly correlate with low knowledge (Musa et al., 2022).

##### **3) Job**

The work environment can be a source of new experiences and information. Work is an activity undertaken to meet the needs of oneself and one's family. Work requires considerable time and can provide experience and knowledge, both directly and indirectly. (Batubara & Abadi, 2022).

##### **4) Source of information**

Mass media, family, friends, and healthcare professionals play a role in shaping knowledge. According to

Salsabila (2021), information sources are environmental factors that can influence people's behavior through classical conditioning, operant conditioning, or imitation (social learning). Information sources have two main functions: mass media can fulfill the need for fantasy and provide information. Information obtained from formal and non-formal education can change or enhance knowledge in the short term, ultimately resulting in changes or improvements in knowledge (Hartanti, 2021).

**c. Knowledge Measurement**

Knowledge level assessment can be conducted through interviews or questionnaires containing questions related to the material being measured (Ananda, 2023). Questions that can be used to measure knowledge can generally be grouped into two types:

**1) Subjective questions are essay type questions.**

This is due to the element of subjectivity in the assessment process, so that the scores given can vary between one assessor and another (Rachmawati, 2021).

**2) Objective questions are multiple choice and true or false questions.**

This is because the assessment of questions can be conducted objectively without being influenced by the assessor's subjectivity. According to Rahmah (2021), knowledge measurement can be carried out by administering tests or questionnaires relevant to the topic being assessed. Each correct answer is given a score of 1, while each incorrect answer is given a score of 0. The final score is obtained by comparing the respondent's total score to the maximum possible score, then multiplying the result by 100%. The percentage of responses is then interpreted in a qualitative sentence using the following guidelines:

1) Less: <56%

2) Sufficient: 56-75%

3) Good: 76-100%

Based on the Indonesian Adolescent Reproductive Health Survey (SKRRI, 2022), of the group of adolescent girls aged 12–19 years, 17.3% knew that hair growth in the pubic and armpit areas was a sign of puberty, 53.5% understood that breast enlargement was one of the signs, 5.2% realized that increased sexual drive was a sign of puberty in girls, 75.4% knew that menstruation indicated puberty, while 13.5% were completely unaware of the signs of puberty in girls. Research by Raras Ambar Rukmi (2021) revealed that 97.05% of adolescent girls respondents had a high level of knowledge about puberty. To test for significant differences, the Chi-Square test was used with a comparison of the *p-value* and significance level ( $\alpha = 0.05$ ). The analysis results showed a *p-value* of 0.4798 which exceeded the  $\alpha$  value, so  $H_0$  was not rejected. This means there is no significant difference between the level of knowledge about puberty in adolescent boys and girls.

## **2. Physical Changes During Puberty**

Hurlock and Mighwar (2022) stated that during puberty, various physical changes occur, both internal and external, including height or body size, body weight, body proportions or shape, and the emergence of sexual characteristics.

**a. External changes according to Harlock (2022)**

**1). Changes in body size/height**

Changes in height and weight are among the major physical characteristics that appear at the onset of puberty. In girls, height gain averages 3 inches per year in the year before menstruation, and can even reach 5–6 inches. In the two years before menstruation, height gain averages about 2.5 inches, for a total increase during that period of 5.5 inches. After menstruation, the growth rate slows to about 1 inch per year and generally stops around age 18. In boys, the height growth spurt generally begins around age 13 and peaks at age 14. The greatest increase in height occurs about a year after the onset of puberty. After that, the growth rate slows until it stops around age 20–21. This longer growth period results in the average height of boys being larger than girls. Weight gain during puberty is not only caused by fat accumulation, but also by increases in bone and muscle mass. In girls, the greatest weight gain occurs before and immediately after menstruation, after which the increase slows. Meanwhile, in boys, peak weight gain usually occurs one to two years later, around age 16, and thereafter, the increase is relatively small. During puberty, both boys and girls often begin to gain weight around the ages of 10 to 12. During the early stages of growth, fat tends to accumulate in the abdomen, breasts, hips, thighs, cheeks, neck, and jawline. Generally, this fat accumulation naturally decreases towards the end of puberty as height growth accelerates.

**2). Changes in body shape**

Body shape changes are another major physical change during puberty. This occurs due to accelerated

maturation of certain body parts, causing them to enlarge from their previous relatively small size. These changes are most noticeable in the nose, feet, and hands. However, all these body parts will reach their adult size, even though the changes occur before puberty ends. The shoulders and back broaden, while the waist appears higher due to the legs growing longer than the trunk. As body length increases, waist circumference tends to decrease. It's important to note that shoulder and hip width are influenced by age at maturity; generally, boys who mature more quickly have wider hips than girls who mature more slowly.

3). Changes in sexual characteristics

a) Primary sex

These changes occur during puberty, during which the fallopian tubes, ovaries, and vagina undergo rapid growth. The development of primary sexual characteristics, namely the reproductive organs, is the third major physical change. In boys, the gonads, or testicles, located in the scrotum, reach about 10% of their adult size by age 14. Rapid growth then occurs for the next 1 to 2 years, before slowing. By age 20–21, the testicles are fully developed. Menstruation is considered an early sign that a girl's reproductive system has matured. This marks the beginning of the periodic shedding of blood, mucus, and tissue from the uterus, which continues until a woman enters menopause, around the age of 40 to 50.

b) Secondary sex

The development of secondary sexual characteristics is the fourth important physical change during puberty. This change is marked by the emergence of physical differences between males and females, which do not occur in the primary reproductive organs, which are directly involved in reproduction. Before secondary sexual characteristics develop, the body still appears childlike and does not generate sexual attraction. However, when these characteristics begin to emerge, attraction to the opposite sex and increased sexual desire usually arise.

(1) Secondary sex characteristics in women include:

The hips enlarge and round out due to the growth of the hip bones and the accumulation of subcutaneous fat. The breasts and nipples become more prominent, and as the mammary glands develop, the breasts become larger and rounder. Hair begins to grow in the pubic area, underarms, arms, legs, and face. Initially, hair, except on the face, is straight and light in color, but then becomes thicker, denser, and paler, accompanied by enlarged pores. The voice changes from a typical child's voice to a deeper and clearer one, with hoarseness or cracking becoming rare. Sweat production also increases, and the skin surface becomes thicker and rougher than in childhood. Blocked oil glands can potentially lead to acne. Sweat glands in the underarm area produce more sweat with a strong odor, especially before and during menstruation. Muscle mass increases in strength and size, especially in mid- to late puberty, shaping the shape of the shoulders, arms, and legs.

(2) Secondary sex characteristics in men include:

Muscles in the trunk, chest, arms, thighs, and legs develop and become stronger. Hair begins to grow in the pubic area, initially thin, fine, and light in color, then becomes darker, coarser, and slightly curly. Hair also appears on the calves and chest. Skin becomes rougher, less clear, and paler in color, and pores appear larger. Oil glands in the skin increase in activity, which can lead to acne. Sweat glands in the armpits begin to function, causing increased sweat production as puberty progresses. Voice changes occur, and small lumps around the mammary glands may appear at ages 12–14; these usually last for a few weeks before decreasing in size and number.

## **Reproductive Organs and Their Roles**

### **a) Female Reproductive Organs**

The female reproductive organs consist of two parts: external reproductive organs and internal reproductive organs. According to Prawiroharjo (2021), the functions of the female reproductive organs are as follows:

(1). *External reproductive organs*

(a) Mons Veneris

Apart from playing a role in protecting the genital organs from exposure to dirt, this part also functions in an aesthetic aspect.

(b) Labia Majora

Functions to cover the genital organs inside.

(c) Labia Minora

Functions to cover the genital organs inside and is a sensitive area rich in blood and nerves.

(d) Clitoris

It is the main erotic area in women which will experience enlargement and hardening when receiving sexual stimulation.

(e) Vestibule

Functions to release fluid when sexual stimulation occurs, which plays a role in lubricating the vagina during the intercourse process.

(f) Hymen

It is a thin layer that covers most of the vaginal introitus, forming a thumb-sized hole so that menstrual blood and secretions and fluids from the internal genitalia can flow out.

(2). *Internal reproductive organs*

(a). Vagina

Functions as an outlet for menstrual blood and secretions from the uterus. It is used for sexual intercourse. It is also the birth canal for babies during childbirth.

(b). Uterus

It functions as a nesting place for the fetus to grow in the uterus during pregnancy. It provides nourishment to the fetus through the placenta, which is attached to the uterine wall.

(c). Fallopian tubes

Functions as a channel that carries the ovum released by the ovary into the uterus.

(d). Ovaries

Functions to produce ovum.

(e). Ligamentum

Functions to bind or hold the female reproductive organs so that they are properly fixed in place, do not move and are connected to the surrounding organs.

**b) Male reproductive organs**

The function of the male reproductive organs (Hurlock, 2022) is:

(1). *External reproductive organs*

(a). Penis

Functions to channel and spray sperm during ejaculation.

(b). Scrotum

Functions to protect the testicles from trauma or temperature.

(2). *Internal reproductive organs*

(a). Testicles

Functions to produce sperm, a place to produce testosterone which plays an important role in secondary sexual characteristics and masculinity.

(b). Epididymis

Its function is to connect the testicles with the vas deferens, producing fluid that contains many enzymes and nutrients whose function is to mature/perfect the shape of the sperm.

(c). vas deferens

Functions to transport sperm from the epididymis to the seminal vesicles. It stores some of the sperm before it is released.

(d). Seminal vesicles

It plays a role in producing a mildly alkaline fluid containing fructose and nutrients as an energy source for sperm. This fluid helps keep sperm fresh, strong, and mobile toward the ovum, and also serves as a temporary storage area before being released during sexual activity.

(e). Prostate gland

Functions to remove a thin, alkaline liquid that is milk-colored and contains citric acid, calcium and several other substances.

(f). Bulbourethral glands

Functions to secrete fluid that helps sperm survive longer and move more easily, making fertilization easier.



**b. Internal changes According to Mighwar (2022)**

Internal changes that occur during puberty include:

1). Digestive system.

In general, the stomach becomes longer and less like a long, wide-open intestinal tube. The muscles in the stomach and intestinal walls become thicker and stronger, the liver becomes heavier, and the esophagus becomes longer.

2). Bloodstream system.

During adolescence, the heart grows rapidly. By age 17 or 18, it weighs 12 pounds from birth. The length and thickness of blood vessels increase and reach maturity by the time the heart dies.

3). Respiratory system.

Approaching the age of 17, girls' lung capacity is nearly mature, while boys only reach this level of maturity several years later.

4). Endocrine system.

The increased gonadal activity of puberty results in a temporary imbalance of the entire endocrine system at the onset of puberty. The sex glands develop rapidly and function, although they do not reach their mature size until late adolescence or early adulthood.

5). Body tissue.

At age 18, skeletal development generally stops. Tissues other than bone continue to develop until the bones reach maturity, particularly muscle development. Regarding the physical growth and development of adolescents, there are general factors that can occur and are important to know and understand: various physical changes, the impact of physical changes, concerning physical changes, the role of sex, the influence of sex classification, and potential physical hazards.

**c. Various physical changes**

The physical growth process of boys is indeed slower when compared to the physical growth process of girls, however, the physical growth process of boys has a longer duration when compared to girls, so that boys tend to be taller than girls when they enter the age of maturity.

**d. Worrying physical changes**

While physical changes can be enjoyable, they can also sometimes be worrying. Many teenagers experience dissatisfaction with their bodies. Satisfaction with physical changes occurs as a child's body transitions into adulthood. The concerns about body shape that teenagers face are a continuation of the various concerns experienced during adolescence and early teenage years.

Social reactions to various body shapes cause adolescents to worry about their growth not matching that of their peers. Most girls perceive menstruation as a serious problem, as it causes symptoms such as cramps, headaches, backaches, swollen knees, breast tenderness, and emotional changes such as sadness, anxiety, and a tendency to cry for no apparent reason.

Another source of concern is the development of acne, especially if it is prevalent, and other skin conditions, in both boys and girls. In early adolescence, both boys and girls worry about gaining weight. However, with increasing height and a concerted effort to control their appetite, they begin to take better care of themselves.

**e. Sex roles**

A common issue in sex is how to play sex roles. Sex role assignments, or learning to perform them, are easier for boys than for girls. Sex education in middle and high school is crucial for shaping concepts about male and female roles. Before the end of adolescence, most girls accept female roles as models for their own behavior and pretend to be very feminine, even though they prefer equivalent roles that combine characteristics of both male and female roles. They maintain that this is a family pattern of behavior, a result of the process by which parents instruct their daughters on behavior and attitudes appropriate to their sex.

**f. The influence of sex classification**

For both boys and girls, sex classification influences behavior and attitudes, albeit in different ways. According to Harlock, in America, and perhaps also generally in other countries, there are at least four symptoms that arise from this influence:

- 1). Men feel superior.
- 2). Men are sexually prejudiced.
- 3). Low achiever.
- 4). Fear of success.

**g. *Physical hazards that may arise***

Harlock, detailed at least five dangers that might arise, including:

- a). Death..
- b). Suicide.
- c). Physical disability.
- d). Awkwardness and strength.
- e). Body shape that does not match one's sex.

**3. Teenager**

**a. Understanding**

The term adolescence comes from the Latin word *adolescere* (a different word, *adolentia*, meaning "teenager"), meaning "body" or growing into adulthood. In English, "mutaqoh" is adolescence, which means *at-tadaruj* (gradually). So, it means gradually moving towards physical, intellectual, psychological, social, and emotional maturity (Ratna Dewi Pudiastuti, 2023). Adolescence also has a broader meaning, encompassing mental, emotional, social, and physical maturity, a view expressed by Piaget. Adolescence is the bridge from childhood to adulthood. During this period, various changes occur within individuals, including physical, psychological, and social changes. The most prominent physical changes are changes in behavior, social relationships, the environment, and the development of secondary sex characteristics. Early adolescence is from 11 to 14 years old, middle adolescence is from 15 to 17 years old, and late adolescence is from 18 to 20 years old (Wong, 2021).

**b. Teenage boundaries**

The WHO defines early adolescence as 10-14 years, and late adolescence as 15-20 years. In 2022, the number of adolescents aged 10-19 years was approximately 64 million, or 28.64% of the Indonesian population, according to the National Population and Family Planning Agency (BKKBN, 2022).

According to WHO, adolescence is a period where:

- a. An individual develops from the time he first shows his secondary sexual characteristics until he reaches sexual maturity.
- b. Individuals experience psychological development and identification patterns from childhood to adulthood.
- c. There is a shift from complete socio-economic dependence on:
  - 1). Biological development
  - 2) Psychosocial development.
  - 3). Cognitive development
  - 4). Moral development
  - 5). Spiritual development
  - 6). Social development

**4. Anxiety**

**a. Understanding**

Anxiety is a vague and diffuse worry associated with feelings of uncertainty and helplessness. It is an emotional state that lacks a specific object (Stuart, 2021 in Hermawan, 2022).

**b. Anxiety Trigger Stressors**

According to Stuart (2021) in Hermawan (2022), stressors that trigger anxiety may come from internal and external sources, namely:

- 1) Internal sources, threats to physical integrity include impending physiological disability or decreased ability to perform activities of daily living.
- 2) External sources originate from outside the individual, namely the environment. The environment continuously sends impulses throughout human life that require adjustment.

c. Anxiety Level

According to Stuart (2021) in Hermawan (2022), anxiety is an emotional response to judgment. There are four levels of anxiety:

1). Mild anxiety

Associated with the tensions of everyday life, this anxiety makes individuals alert and increases their perceptual field. This encourages learning, fostering growth and creativity. Mild anxiety responses include occasional shortness of breath and increased blood pressure, mild stomach symptoms, facial wrinkles, and lip quivering. Perception expands, concentration is impaired, problem-solving is impaired, and the individual struggles to sit still and experience hand tremors.

2). Moderate Anxiety

At this level, the individual's perception of the problem decreases. The individual focuses more on the important things at that moment and ignores other things. Moderate anxiety responses include: frequent shortness of breath, increased pulse and blood pressure, dry mouth, anorexia, restlessness, a narrowed visual field, and an inability to absorb external stimuli. Excessive talking, difficulty sleeping, and feelings of discomfort are common.

3). Severe Anxiety

In severe anxiety, the perceptual field is very narrow. Individuals tend to focus on small details and ignore everything else. They are unable to think deeply and require more guidance and direction. Responses to severe anxiety include: shortness of breath, increased pulse, increased blood pressure, sweating, headaches, blurred vision, tension, a very narrow field of vision, an inability to solve problems, *blocking*, rapid verbalization, and an increased sense of threat.

4). Panic

At this stage the field of perception has been disturbed so that the individual can no longer be alone and cannot do anything even though he has been given direction.

d. Factors Influencing Anxiety

According to Isaac, the factors that influence an individual's response to anxiety between individuals can differ, depending on the following factors, namely:

1). Age

2). Stages of development

3). Personality type

4). Education

5). Health status

6). Perceived meaning

7). Cultural and spiritual values

8). Social and environmental support

9). Coping mechanisms

To measure a person's level of anxiety, whether mild, moderate, severe, or very severe, an instrument known as the Hamilton Rating Scale for Anxiety (HRS-A) is used. This measurement tool consists of 14 symptom groups, each with more specific symptom details. A person's level of anxiety can be determined based on the sum of the scores across these 14 symptom groups, as follows:

Total Score :

Less than 14 = no anxiety

14 – 20 = mild anxiety

21 – 27 = moderate anxiety

28 – 41 = severe anxiety

42 – 56 = very severe anxiety

## 5. Puberty

a. Understanding

Puberty is a developmental period during which children transition from an asexual state to a sexual being. Puberty is the stage during which the reproductive organs mature and reproductive capacity is achieved. This stage is also accompanied by changes in physical (somatic) growth and psychological aspects. The term "puberty" comes from Latin, meaning "age of maturity," emphasizing physical rather than



behavioral changes as individuals reach sexual maturity and reproductive capacity (Hurlock, 2021 in Hermawan, 2022). In ancient Greece, puberty was recognized as a period of physical and behavioral changes. Aristotle, in *his Historia Animalium*, explained that most males begin producing sperm after the age of 14, coinciding with the growth of pubic hair. In females, breasts begin to enlarge and menstruation begins, with menstrual blood resembling fresh blood. Menstruation typically occurs when the breasts have grown to the height of two fingers. In addition to physical changes, Aristotle emphasized behavioral changes, such as adolescent girls experiencing puberty tending to be irritable, energetic, highly industrious, and requiring supervision due to their developing sexual urges (Hurlock, 2021 in Hermawan, 2022).

Based on current understanding, social expectations have evolved into developmental tasks that serve as a guide for parents and teachers to recognize expectations for children entering this period of change. Children also recognize that they are entering a new stage in life, and just as they adjust to new social expectations, most find puberty a challenging period in their lives (Hurlock, 2021 in Hermawan, 2022). Puberty is a time when a child experiences rapid physical, psychological, and emotional development. This period is marked by the sudden onset of sensuality (genitalia) at the beginning of adolescence. During this period, a child experiences various bodily changes, including changes in appearance, clothing, possessions, range of choices, and changes in attitudes toward sex and the opposite sex. The rapid changes that occur during puberty give rise to doubts, feelings of inadequacy, and insecurity, and in many cases, lead to inappropriate behavior. These changes often lead to anxiety (Dewi, 2021).

Rapid social change resulting from modernization, industrialization, and advances in science and technology has impacted people's moral value systems, ethics, and lifestyles. Not all individuals are able to adapt to these changes, which can ultimately lead to health problems or adjustment disorders (Hawari, 2021). A child's unpreparedness for puberty can pose significant psychological risks, stemming from a lack of parental knowledge or barriers related to manners and shame. Furthermore, the communication gap that often occurs between pubertal children and their parents can prevent children from asking questions about the changes they are experiencing. To avoid embarrassment, children during puberty often pretend to understand things they actually need to know. Children going through puberty, seeking greater independence and preferring to socialize with peers, often seek information from friends or various media such as television, magazines, the internet, and so on.

During puberty, adolescents who have limited knowledge about changes in their bodies tend to experience situational anxiety in response to changes they don't yet understand. Respondents with low puberty readiness generally feel they don't fully understand the physical and emotional changes that occur during this period. This lack of understanding leads to feelings of confusion, discomfort, and even anxiety related to the changes their bodies are experiencing. This condition leaves them feeling unprepared and struggling to adjust to their own bodily development. Furthermore, a lack of understanding about emotional changes, such as mood swings and increased sensitivity, makes them more susceptible to anxiety and stress. These findings align with research by Harlia, Reynita, and Fujiana (2023), which suggests that anxiety in adolescents can be influenced by a lack of knowledge about the physical and emotional changes that occur during puberty. Gender characteristics play a significant role in determining adolescents' readiness for puberty. Traditionally, girls have received more guidance on the physical and emotional changes associated with puberty, both from their parents and at school, making them more prepared for the transition. Meanwhile, boys tend not to receive sufficient information or open discussions about reproductive health issues, leading to feelings of underpreparation for puberty.

## **METHOD**

### **A. Types and Design of Research**

This quantitative study, using an associative method, aims to determine the relationship between sexual knowledge regarding physical changes and anxiety in adolescents entering puberty at SMPN 1 Margoyoso Pati. The approach used was a cross-sectional model, where each research subject was observed only once and measurements were taken during the examination.

### **B. Population and Sample**

#### **1. Population**

A population is a generalization consisting of objects or subjects with specific characteristics that have been determined by the researcher to be the object of study and from which conclusions will be drawn

(Sugiono, 2021). The population in this study was 540 students of SMPN 1 Margoyoso Pati in grades VII and VIII, consisting of 18 classes. Class VII a = 30 people, class VII b = 30 people, class VII c = 30 people, class VII d = 30 people, class VII e = 30 people, class VII f = 30 people, class VII g = 30 people, class VII h = 30 people, class VII i = 30 people, the number in each class VIII is Class VIII a = 30 people, class VIII b = 30 people, class VIII c = 30 people, class VIII d = 30 people, class VIII e = 30 people, class VIII f = 30 people, class VIII g = 30 people, class VIII h = 30 people, class VIII i = 30 people (stratified population).

## 2. Sample

A sample is a subset of the total number and characteristics of a population (Sugiyono, 2021). The sampling technique used in this study was Simple Random Sampling, a method of randomly selecting samples from a population without considering the strata within the population (Sugiyono, 2021). According to Hidayat (2022), the sample size used in this study was calculated using the following formula:

$$n = \frac{N}{1 + Ne^2}$$

Information :

**n** = Sample size

**N** = Population size

**e** = 10% error rate

Based on the formula above, the samples in this study are:

$$n = \frac{540}{1 + 540 (0,1)^2}$$

**n** = 84 rounded result of 84.4

So the number of samples in this study was 84 respondents.

For sampling, researchers determined the inclusion and exclusion criteria as follows:

### a. Inclusion Criteria

It is a criterion that the research subjects can represent a research sample that meets the requirements as a sample (Nursalam, 2022). The inclusion criteria for this research are:

- 1) Students aged 12-15 years at SMPN 1 Margoyoso Pati.
- 2) Students who attend SMPN 1 Margoyoso Pati.
- 3) Willing to be a respondent and sign the consent form.

### b. Exclusion Criteria

This is a criterion whereby a research subject cannot be used as a representative sample because they do not meet the established sample requirements (Nursalam, 2022). The exclusion criteria in this study are:

- 1) Not present at the location when the research was conducted
- 2) Not willing to be a respondent
- 3) The student is sick

## C. Place and Time of Research

This research will be conducted at SMPN 1 Margoyoso in July 2025.

## D. Research Variables

A variable is defined as a measure or characteristic possessed by members of a group that differs from those possessed by other groups. The variables to be examined in this research are:

1. Sexual knowledge about physical changes uses *independent variables*, often referred to as *stimulus, predictor, and antecedent variables*. In Indonesian, they are often referred to as independent variables.
2. The anxiety of adolescents entering puberty uses *the Dependent Variable*, this variable is often referred to as the *output variable*, criteria, consequences. In Indonesian, it is often referred to as the bound variable.

## E. Operational Definition

Table 3.1 Operational Definitions

No	Variables	Definition Operational	Tool Measuring	Results measuring	Scale Measuring
1.	<i>Independent</i> variable sexual knowledge about changes physique	Respondents' awareness of physical changes in the body during pregnancy puberty	Questionnaire, meng use the Gutman scale with the alternative correct answers scoring 1, wrong score 0	Good = 76% – 100% Enough = 56% – 75% Less ≤ 56%	Ordinal
2.	<i>Dependent</i> variable of anxiety of adolescents entering adulthood puberty	vague and diffuse concerns, which associated with feeling of uncertainty	Questionnaire, by using HRS-A	< 14 = none anxiety 14 -20 = mild anxiety 21- 27 = moderate anxiety 28 - 41 = anxiety heavy 42 - 56 = anxiety very heavy	Ordinal

## F. Tools and materials

1. Sexual knowledge about physical changes was measured using a questionnaire sheet.
2. Anxiety was measured using *the HRS-A*.

## G. Research Instruments

Research instruments are tools used to measure the variables being studied. The instruments used in this study are two questionnaires, including:

1. Sexual Knowledge Instrument about physical changes.

The instrument that will be used to measure sexual knowledge about physical changes is a questionnaire with yes and no answer alternatives.

2. Anxiety Instrument for adolescents entering puberty.

The instrument that will be used to measure anxiety is using *HRS-A*.

The steps for compiling a questionnaire in this research are as follows:

- a. The purpose of compiling the questionnaire is to obtain data on sexual knowledge about physical changes when entering puberty.
- b. Developing a questionnaire outline, which is used to clarify the issues outlined in the questionnaire. This outline contains the question numbers, variables, indicators, and number of questions.

## H. Validity and Reliability Test

1. Validity Test

"product-moment" correlation formula, which is as follows:

$$r_{count} = \frac{n(\sum XY) - (\sum X)(\sum Y)}{\sqrt{\{n\sum X^2 - (\sum X)^2\}\{n\sum Y^2 - (\sum Y)^2\}}}$$

Information :

- $r_{xy}$  = Correlation coefficient (validity or relationship value)
- $X$  = Item score (e.g. 1 questionnaire item)
- $Y$  = Total score (sum of all items or total variable score)
- $n$  = Number of respondents
- $\sum XY$  = The sum of the results of multiplying the scores  $X$  and  $Y$
- $\sum X^2$  = Sum of squares of  $X$
- $\sum Y^2$  = Sum of squares of  $Y$

In the validity test using the product moment method, the statement about knowledge of physical changes during puberty obtained an rcount value of 0.567, while the rtable value (n=30,  $\alpha=0.05$ ) was 0.361. For the statement about knowledge of reproductive organ function, the rcount value obtained was 0.632 with the same rtable value, namely 0.361. The statement related to feelings of fear when experiencing body changes has an rcount value of 0.405, while the rtable value remains at 0.361. Meanwhile, the statement related to feelings of shame when discussing body changes has an rcount value of 0.278, which is below the rtable value of 0.361. Items that do not meet these validity requirements can be revised or removed. Based on the results of the validity test using the Pearson Product Moment formula on 30 trial respondents, most statements have an rcount value greater than rtable (0.361), so they are declared valid.

The questionnaire trial was conducted in Ujung Menteng Village involving 30 respondents in September 2022. The results of the validity test using the SPSS version 16.0 program, for the sexual knowledge questionnaire about physical changes, out of 20 questions, there were two invalid questions, while for the anxiety level questionnaire facing puberty, out of 14 questions, there was one invalid question where the r count was less than 0.3. The researcher made changes to the invalid questions to make the questions easier for respondents to understand.

## 2. Reliability Test

Reliability is an index that indicates the extent to which a measuring instrument can be trusted or relied upon. In measuring reliability, the *Spearman-Brown formula* is used .

$$r_{ii} = \frac{2 \cdot rb}{1 + rb}$$

Information :

$r_{ii}$  = Instrument reliability index

$rb$  = *Product moment* correlation between the first and second halves

The Spearman-Brown reliability test is used to assess the internal consistency of an instrument, particularly in the split *-half reliability method* . In this test, the questionnaire items are divided into two parts (for example, odd and even items), then their correlation is analyzed. The Spearman-Brown formula estimates the overall reliability of the test based on the correlation between the two parts.

Steps for the *Spearman-Brown Reliability Test* , namely:

Divide the instrument items into two groups, calculate the total score of each group for each respondent, calculate the ***rb correlation*** between the two groups of scores (using the *Spearman formula* ), Enter it into the *Spearman-Brown formula*.

- < 0.70 : Less Reliable
- 0.70 – 0.79 : Quite Reliable
- 0.80 – 0.89 : Reliable
- $\geq 0.90$  : Very reliable

In this study, the correlation results were obtained from the preliminary study calculations of the total score for each respondent.  $rb = 0.72$  so that it can be obtained for the assessment of  $r_{ii}$  is 0.837. From these results, it can be confirmed that the anxiety instrument is reliable, because the r value is  $> 0.80$ .

A measuring instrument is considered reliable if it has a Cronbach's Alpha value between 0 and 1, with good reliability if it is greater than 0.8 (Dharma, 2021). Based on the results of the reliability test using SPSS version 16.0, the sexual knowledge questionnaire about physical changes obtained a Cronbach's Alpha value of 0.872, while the anxiety questionnaire about puberty obtained a value of 0.899.

## I. Research Steps

### 1. Preparation Stage

- a) Meetings and consultations with supervisors regarding the technical implementation of research and problems encountered.
- b) Manage permits for making preliminary study letters to educational institutions.
- c) Conducting a preliminary study at SMPN 1 Margoyoso Pati.

### 2. Implementation stage

- a) Take care of permits with the relevant agencies
  - b) Expressing the intent and purpose to the research location or related parties
  - c) Determination of respondent samples and research sample criteria.
  - d) Conducting case studies.
  - e) Submit a letter requesting research permission to conduct research.
  - f) The researcher explained about the questionnaire and how to fill it out.
  - g) Provide a letter of consent for participation for potential respondents to sign, along with a questionnaire to be filled out according to the researcher's directions.
  - h) The completed questionnaires were collected and checked for completeness in filling out the questionnaire sheets, then data analysis was carried out.
3. Final Stage
- a) Summarizing research results
  - b) Making a research report
  - c) Holding a research results seminar

## J. Data Processing Techniques

The data analysis steps that will be carried out in this research include:

### a. *Editing*

The editing process involves double-checking to ensure the accuracy of the data obtained. This activity can be done either during data collection or after the data is complete.

### b. *Coding*

Assigning numerical codes to data that has multiple categories is called *coding*. This process becomes essential when processing data on a computer. To facilitate the search for the meaning and location of codes within variables, a codebook is typically created, containing a list of codes and their explanations.

### c. *Data entry*

Data *entry* is the process of entering collected data into a *master table* or database on a computer, then continuing with the creation of a simple frequency distribution or contingency table.

### d. Performing analysis techniques

Research data processing is carried out using applied statistics, with adjustments to the intended analysis objectives.

This research will use univariate and bivariate analysis methods to process data analytically.

#### 1). Univariate Analysis

Univariate analysis serves to illustrate the frequency distribution and percentages related to respondent characteristics, knowledge levels, and anxiety. Results are presented using a frequency distribution table, which can be supplemented with a bar chart or pie chart if necessary.

#### 2). Bivariate Analysis

Bivariate analysis in this study was conducted using a statistical test, namely the Chi-Square Test ( $\chi^2$ ). This test is used to estimate or evaluate observed frequencies and analyze observation results to determine whether or not there are significant relationships or differences in the study.

Formula *Test Chi-Square* ( $X^2$ )

$$X^2 = \sum \frac{(f_o - f_h)^2}{f_h}$$

Information :

$X^2$  : *Chi-Square*

$f_o$  : Frequency observed

$f_h$  : Frequency Which expected

## K. Research Ethics

Before conducting research, researchers first apply for permission from the relevant institution or agency.



After obtaining approval, the research is conducted with due regard to ethical aspects of research, namely:

**1. Informed consent**

*Consent* is a form of agreement between the researcher and the respondent, outlined in a consent form. *Informed consent* is provided before the research is conducted, by handing the consent form to the prospective respondent. The goal is to ensure the subject understands the intent and purpose of the research before participating.

**2. Anonymity**

The ethical principles of nursing ensure the confidentiality of respondents by not writing their names on the instrument sheet, and instead using codes on the data sheet and publication of research results.

**3. Confidentiality**

This issue falls under the ethical aspect of research, which emphasizes ensuring the confidentiality of research results, both regarding information and other matters. All data collected is guaranteed confidentiality by the researcher, and only information from specific groups will be presented in the research report.

## RESULTS AND DISCUSSION

### 1. Description of the Research Location

This research was conducted at SMP N 1 Margoyoso Pati, located at Jalan Kiai Cebolang 17 Margoyoso, Pati Regency, Central Java Province.

### 2. Sexual knowledge about physical changes at SMPN 1 Margoyoso Pati .

To determine the level of knowledge of adolescents entering puberty, researchers examined respondents' sexual knowledge regarding physical changes, the results of which are presented in table 4.1 below.

**Table 4.1 : Frequency distribution of sexual knowledge about physical changes at SMPN 1**

<b>Margoyoso Pati</b>		
<b>Sexual knowledge</b>	<b>Mark</b>	
	<b>Frequency</b>	<b>%</b>
1. Good	49	58.33
2. Enough	27	32.14
3. Less	8	9.53
<i>Amount</i>	84	100.00

The data in table 4.1 shows that the majority of respondents (58.33%) have a good level of sexual knowledge about physical changes, while a small number, namely 9.53%, are in the poor knowledge category.

### 3. Level of anxiety at the age of puberty at SMPN 1 Margoyoso Pati

To identify the level of anxiety of adolescents during puberty, researchers conducted observations of respondents' anxiety, the results of which are presented in table 4.2 below.

**Table 4.2 : Frequency distribution of adolescent anxiety at the age of puberty at SMPN 1**

<b>Margoyoso Pati</b>		
<b>Anxiety</b>	<b>Mark</b>	
	<b>Frequency</b>	<b>Percentage (%)</b>
1. no anxiety	42	50.00
2. mild anxiety	13	15.48
3. moderate anxiety	20	23.81
4. severe anxiety	9	10.71
5. very severe anxiety	0	0.00
<i>Amount</i>	84	100.00

The data in table 4.2 shows that half of the respondents (50.00%) did not experience anxiety, and only 10.71% experienced severe anxiety.

4. The relationship between sexual knowledge about physical changes with anxiety facing puberty in adolescents at SMPN 1 Margoyoso Pati

**Table 4.3: Crosstabulation of Sexual Knowledge with Anxiety**

		Anxiety				
		no worries	mild anxiety	moderate anxiety	very anxious	Total
Sexual knowledge	Good	41	8	0	0	49
	Enough	1	5	19	2	27
	not enough	0	0	1	7	8
	Total	42	13	20	9	84

**Table 4.4: Chi-Square Test Results**

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.143E2	6	.000
Likelihood Ratio	107,483	6	.000
Linear-by-Linear Association	67,017	1	.000
N of Valid Cases	84		

- a. As many as 50.0% or 6 cells have an expected count of less than 5, while the minimum expected count is 0.86.

Based on table 4.4, the *p-value of significance* is 0.000, which is smaller than 0.05 ( $0.000 < 0.05$ ), so  $H_0$  is rejected. With a significance level of 0.05 and a confidence level of 95%, it can be concluded that there is a significant relationship between sexual knowledge about physical changes and anxiety in facing puberty in adolescents at SMPN 1 Margoyoso Pati. In addition, in table 4.3 it can be seen that the “very severe” anxiety category has no frequency or respondents, so in the analysis of the anxiety variable data only four categories were used. The results of the analysis show that with  $df = 6$  and  $\alpha = 5\%$ , the table chi-square value is 12.592, while the calculated chi-square value is 107.483. Based on the calculation results, the calculated  $X^2$  value (107.483) is greater than the  $X^2$  table (12.592). Thus,  $H_0$  is rejected and  $H_a$  is accepted, so it can be concluded that there is a significant relationship between sexual knowledge regarding physical changes and adolescent anxiety in facing puberty at SMPN 1 Margoyoso Pati.

## DISCUSSION

The data in Table 4.1 shows that more than half of respondents (58.33%) had good sexual knowledge regarding physical changes. Age and experience were the main factors contributing to this. Maturity of mindset and breadth of experience were found to be more prevalent among older respondents compared to younger respondents (Isac, 2024). This maturity of mindset and experience also contributed to high levels of sexual knowledge. This finding aligns with data showing that all respondents had personally experienced physical changes, both internal and external, in themselves (Hurlock, 2022). Direct experience of an event tends to improve a person's comprehension and memory compared to only receiving information indirectly. Sexual knowledge encompasses an understanding of various aspects, such as sexuality, disease, physical changes, secondary sex characteristics, and reproductive health. Most respondents, 83, were aware of internal and external physical changes, one of which was an increase in height. Of these, 69 respondents acknowledged that height and weight increases were the initial changes that occur during puberty. Nearly all respondents were also aware of other signs of physical changes (Hurlock, 2022). Based on the above discussion, students at SMPN 1 Margoyoso Pati who are entering puberty need to be equipped with adequate knowledge and understanding of physical changes to reduce the potential for excessive anxiety. Students' sexual knowledge reflects their understanding of the physical changes during puberty. Therefore, the school needs to organize outreach or counseling activities to support this understanding. Table 4.2 shows that 50.00% of respondents did not experience anxiety during puberty. A questionnaire score below 14 supports this finding, indicating the absence of anxiety symptoms. Furthermore, most respondents did not exhibit

any signs of anxiety, such as tension, fear, feelings of gloom or depression, or difficulty breathing. This finding aligns with the respondents' level of sexual knowledge regarding physical changes, which was generally considered good. Respondents' anxiety levels varied (Hawari, 2021). Respondents' anxiety levels can vary due to various factors, such as age, development, personality, education, health status, perceived meaning, cultural and spiritual values, socio-environmental support, and coping strategies (Isaac, 2024). Lack of confidence in the physical changes they experience can trigger anxiety, especially because adolescents, both boys and girls, are more focused on their appearance during puberty. This is supported by the finding that 75 respondents gave incorrect answers when stating that they did not pay attention to their appearance.

The data in Table 4.3 shows that 49 respondents were categorized as having good sexual knowledge. Of these, 41 respondents did not experience anxiety, while 8 respondents experienced mild anxiety. This finding suggests a relationship between the level of sexual knowledge regarding physical changes and the level of anxiety felt. Respondents with good sexual knowledge tended to experience only mild anxiety or even no anxiety at all. Meanwhile, there were 27 respondents with adequate sexual knowledge. Of this group, only 1 respondent experienced no anxiety, 5 respondents experienced mild anxiety, 19 respondents experienced moderate anxiety, and 2 respondents experienced severe anxiety. This condition indicates that respondents with adequate sexual knowledge have the potential to experience mild, moderate, or severe anxiety.

Differences in respondents' anxiety levels were influenced by their ability to cope with the situations they encountered. Among respondents with low sexual knowledge (8), one experienced moderate anxiety and seven experienced severe anxiety. This study shows that limited sexual knowledge can increase the risk of developing moderate or severe anxiety. Overall, the findings confirm that good sexual knowledge plays a role in reducing respondents' anxiety levels. This is possible because adequate sexual insight fosters increasingly mature thought patterns as they age. Respondents' mental health can be improved through positive thinking, which makes them more prepared for change. Therefore, anxiety during puberty should not be an excessive burden, as anxiety is essentially a form of vague fear accompanied by uncertainty and weakness (Stuart, 2023). Adolescents entering puberty will go through a complex developmental period, encompassing physical changes as well as progress in the cognitive, moral, psychological, and emotional domains (Dewi, 2022).

This condition is influenced by the significant role of adequate sexual knowledge in determining a person's level of anxiety. The anxiety experienced by respondents is a result of their level of sexual knowledge. This anxiety is associated with vague worries and feelings of uncertainty, reflecting respondents' unpreparedness and helplessness in dealing with their current situation (Stuart, 2023). Adolescents who are unprepared for puberty are at risk of experiencing serious psychological disorders. The anxiety that arises from a lack of preparedness and feelings of helplessness can stem from two factors: internal and external. Perspectives or thought patterns are internal factors, which are closely related to knowledge levels. Sexual knowledge itself is the ability to understand matters related to sex, including sexually transmitted infections and reproductive health, after the information is obtained and remembered (Sudijono, 2021). Sexual knowledge regarding physical changes includes an understanding of secondary sex characteristics that can be observed from various perspectives. If someone has a good understanding of the physical changes during puberty, their development will be more positive and anxiety levels can be reduced. This condition is important to note because during puberty, adolescents generally experience a phase of rejection, a time when they attempt to break away from parental influence and assert their identity (Setiono, 2022).

During the period of secondary sexual changes, adolescents tend to be highly sensitive to the opinions of others because they feel that their environment is constantly criticizing them. This perception makes them more self-centered, feel capable of anything, and often act impulsively (Setiono, 2022). Therefore, if adolescents lack adequate sexual knowledge regarding the physical changes during puberty, they are at risk of experiencing psychological distress and embarrassment about the changes that occur, such as weight gain that lowers self-confidence or menstruation in adolescent girls. However, all of these changes are a normal process of puberty. Support from various stakeholders, particularly students with health backgrounds, plays a crucial role in helping students manage anxiety related to the physical changes that occur during puberty. Students are expected to be able to practice nursing care in the community, focusing on the physical changes in adolescents during puberty and their relationship to anxiety. Furthermore, research can be enriched by adding variables such as environmental factors, thus not only enhancing understanding but also providing experience in writing scientific papers that can serve as references for future research. This study is consistent with the research results of Listianawati (2021), who found a relationship between knowledge and anxiety in adolescent girls. Based on the results of the Spearman Rank Correlation statistical test, the value of  $p = 0.017$  was obtained, indicating that  $H_0$  was rejected because the value of

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$p$  was smaller than  $\alpha$ . Similar results were obtained from the study of Rini HN (2024), which revealed a relationship between self-concept and acceptance of physical changes in adolescent girls during puberty, as shown through Chi-square analysis with  $p = 0.008$  at SMPN 2 Padangsidempuan.

## RESEARCH LIMITATIONS

In this study, researchers still faced limitations in the data collection process. Limited time was an obstacle to obtaining more comprehensive data.

## CONCLUSION

According to the data obtained from the study entitled "The Relationship between Sexual Knowledge About Physical Changes and Anxiety Facing Puberty in Adolescents at SMPN 1 Margoyoso Pati" and based on a series of discussions, the following conclusions can be formulated:

1. This study involved 84 respondents with a distribution of 49 females and 35 males, consisting of teenagers aged 13-14 years.
2. The level of anxiety of adolescents at SMPN 1 Margoyoso Pati is low, this was obtained from data from respondents who did not experience anxiety, as many as 42 people (50.00%),
3. The level of sexual knowledge about physical changes in adolescents at SMPN1 Margoyoso Pati is high, this is obtained from data containing respondents with a good level of sexual knowledge of 49 people (58.33%).
4. There is a significant relationship between sexual knowledge about physical changes and anxiety in facing puberty in adolescents at SMPN 1 Margoyoso Pati, namely that with good sexual knowledge it will reduce or even eliminate anxiety experienced by adolescents entering puberty. This is proven by the results of the study, namely: a  $p$  value of 0.000 which means ( $0.000 < 0.05$ ).

## B. Suggestions

1. For Respondents  
Students should know and understand the physical changes experienced by teenagers entering puberty, by seeking lots of information about it. physical changes experienced by teenagers entering puberty so as not to cause excessive anxiety.
2. For SMPN 1 Margoyoso Pati  
It is advisable to provide socialization or sexual knowledge, especially regarding the physical changes experienced by teenagers when facing puberty, regarding the level of anxiety of teenagers entering puberty.
3. For Safin Pati University  
The research should be used as a reference and study material for students in the health sector and can improve the quality of education.
4. For Further Researchers  
Future researchers are expected to be able to apply nursing care to the community regarding the physical changes experienced by adolescents during puberty and their relationship to anxiety levels. Research can be enriched by adding variables such as environmental factors, developmental stage, education, coping mechanisms, personality type, cultural and spiritual values, and social and environmental support. Furthermore, this follow-up research can also provide a means to gain experience in compiling scientific papers that can serve as a basis for future research.

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