

# **“Evaluation of Endometriosis Risk Factors, Symptoms, and Clinical Treatments in Bangladesh: A cross-sectional study”**

**Submitted By**

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A thesis submitted to the Department of Mathematics and Natural Sciences (MNS) in partial fulfillment of the requirements for the degree of Masters of Science in Biotechnology

Mathematics and Natural sciences (MNS)

BRAC University

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# Declaration

It is hereby declared that

1. The thesis submitted is my/our original work while completing my degree at BRAC University.
2. The thesis does not contain material previously published or written by a third party, except where this is appropriately cited through full and accurate referencing.
3. The thesis does not contain material which has been accepted, or submitted, for any other degree or diploma at a university or other institution.
4. I have acknowledged all main sources of help.

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# Approval

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## **Abstract**

In Bangladesh, endometriosis is one of the leading causes of infertility. Endometriosis causes infertility in 25–50% of women, and it affects one out of every ten women of reproductive age. Unfortunately, many of these women experience a delay in diagnosis of endometriosis, resulting in unnecessary suffering and a lower quality of life. The majority of Bangladeshi women acquire endometriosis due to a lack of education and information. The purpose of this study is to investigate the risk factors, symptoms for endometriosis as well as clinical treatment. This study collects data from patients with endometriosis using a well-structured questionnaire form. This cross-sectional study was conducted at BIRDEM Women and Children Hospital in Dhaka, Dhaka Central International Medical College and Hospital in Mohammadpur, and General Hospital in Kishoreganj. The overall number of participants was 100, with the majority (56%) aged between 15 to 25 years. Endometriosis was more prevalent in married (63%) and overweight (41%) women. This condition is more prevalent in women with a graduate degree (45%) and housewives (42%). This study identifies risk factors for endometriosis, including irregular menstruation (44%), normal menstrual cycles (55%), imbalanced thyroid hormone (27%), lengthier menstrual cycles (38%), infertility (45%), and overweight (41%), and all are statistically significant ( $P < 0.05$ ). Dysmenorrhea, excessive bleeding, and low back discomfort were the most frequent symptoms. 73% of endometriosis patients underwent transvaginal ultrasounds. Nonsteroidal anti-inflammatory medicines (NSAIDs) were the most generally prescribed treatment for the disease (39%). Laparoscopy was the most prevalent surgical procedure. 33% of patients have laparoscopic surgery, while 1% undergo laparotomy. Endometriosis affects 82% of patients, the majority of whom are housewives. In a developing country, the treatment reduced the prevalence of endometriosis pain in 66% of patients, and 38% of women were able to conceive after overcoming endometriosis blockage. This study will pave the way to create consciousness among women and decrease infertility in Bangladesh.

**Keywords:** Endometriosis, Laparoscopy, Bangladesh, Transvaginal ultrasound, Diabetes, Thyroid hormone, NSAID, Infertility.

# **Dedication**

This work is dedicated to one and only Allah who has blessed me with knowledge and arranged for me to study at Brac University. I would never have been able to do this alone without him. Then I would like to thank my parents who have sacrificed their lives for me in every way. Special gratitude to my grandfather, Md. Motiur Rahman, and my husband, Md. Zahidul Islam, who has made many sacrifices to make this journey easier for me.

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March, 2024

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March, 2024

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## **List of Acronyms**

- WHO- World Health Organization
- AFAB- Assigned Female at Birth
- AMH- Anti-Mullerian Hormone
- SRY- Sex-determining Region of Y gene
- CPP- Chronic Pelvic Pain
- R-ASRAM- Revised American Society for Reproductive Medicine
- WERF- World Endometriosis Research Foundation
- ASRAM- American Society for Reproductive Medicine
- SRHR- Sexual and Reproductive Health and Rights

# **Chapter 1: Introduction**

In this technological age, women's health is becoming an increasingly relevant issue of conversation. On the one hand, although discoveries are being made with the help of technology, the level of diseases among women has also increased. Infertility is the most common ailment among women, and it is becoming more prevalent all over the world. Infertility is a disorder in which women are unable to become pregnant after one year of attempting to conceive. According to Boivin et al. (2007), the global prevalence of infertility is estimated to be approximately 9%. Infertility is recognized as the fifth most significant global disability, having a detrimental influence on the self-esteem of persons affected (Borumandnia et al., 2022).

Fertility is affected by a woman's age, hormonal imbalances, weight, chemical or radiation exposure, and cigarette smoking. A study (Roupa, 2009) found that causes of Infertility Fallopian tube dysfunction accounted for 27.4% of problems, followed by menstrual abnormalities (20%), uterine issues (9.1%), and sexual disorders (2.7%). Some general factors affect ability to ovulate or conceive: these are Polycystic ovary syndrome (PCOS), Endometriosis, damage to the fallopian tubes, sexually transmitted diseases (STD), Pelvic inflammatory disease (PID).

The term "Endometriosis" was first used by Sampson in 1920 (Howard, 2009). Previous study showed that Endometriosis is six to eight times more common in infertile women than in fertile women (Incidence, Symptoms, and Signs of Endometriosis in Fertile and Infertile Women, 1987), but the prevalence of endometriosis is not exactly known. Endometriosis affects roughly 10% (190 million) of reproductive-age women and girls globally (World Health Organization: WHO & World Health Organization: WHO, 2023). After treatment for endometriosis, the disease can recur at any time; it is impossible to cure the disease. Even surgical treatment cannot ensure this. Endometriosis recurrence rates tend to be higher in young women than in older women (Tandoi et al., 2011).

A study found that Endometriosis affects 25–50% of infertile women, and 30–50% of infertile women have endometriosis (Bulletti et al., 2010). Endometrial tissue implants around the ovaries or fallopian tubes, which can also cause inflammation. Endometriosis affects gametes and embryos, the fallopian tubes and embryo transport, as well as the eutopic endometrium; all of these anomalies are likely to have an impact on fertility (Macer & Taylor, 2012). This study will collect data on endometriosis risk factors and clinical management via a well-structured questionnaire form. The trial will include patients diagnosed with endometriosis. The data may serve to expand knowledge, raise awareness, and reduce infertility.

### **Aim of the Study**

The purpose of this study is

- To identify the risk factors contributing to endometriosis
- To determine the symptoms contributing to endometriosis.
- To find the clinical treatment for endometriosis in Bangladesh
- To find out the relationship between socio-demographic variables and endometriosis risk factors.



## **Chapter 2 Female Health**

## 2.1 Introduction

When thinking about female health, there is a lot to consider. Knowing the diseases and conditions that are among the top health risks for women, such as heart disease and breast cancer, is important. But for many women, effectively managing other matters that affect daily health, such as premenstrual syndrome, birth control, fertility, menopause, and more, is also key to enjoying a vibrant life, a well-balanced diet, sufficient sleep and exercise, and regular doctor's visits are all crucial for healthy living. However, a variety of other factors also influence overall health and well-being. Socioeconomic status, genetics, sex, and gender all play a role in health. The physical manifestation of a female's healthy interior or true self –is demonstrated through bodywork as targeted exercise (Roy, 2008). Females have specific health needs, and the health systems of the world are failing them. WHO (World Health Organization) says female health has become an emerged. (Davidson et al., 2011b)

- Fundamental Indicators of Good Female Health:
  1. Restful and consistent sleeping patterns
  2. Good energy levels
  3. Healthy Urinary System
  4. Regular menstrual cycles
  5. Healthy heart
  6. Strong Immune System
  7. Healthy skin, hair, eyes, and oral system.
- Fundamental Indicators of Bad Female Health:
  1. Breast changes
  2. Discomfort or pain in your chest
  3. Heavy or irregular bleeding
  4. Bloating

5. A persistent low mood
6. Abnormal discharge
7. Pelvic pain
8. Pain during intercourse
9. An intense headache

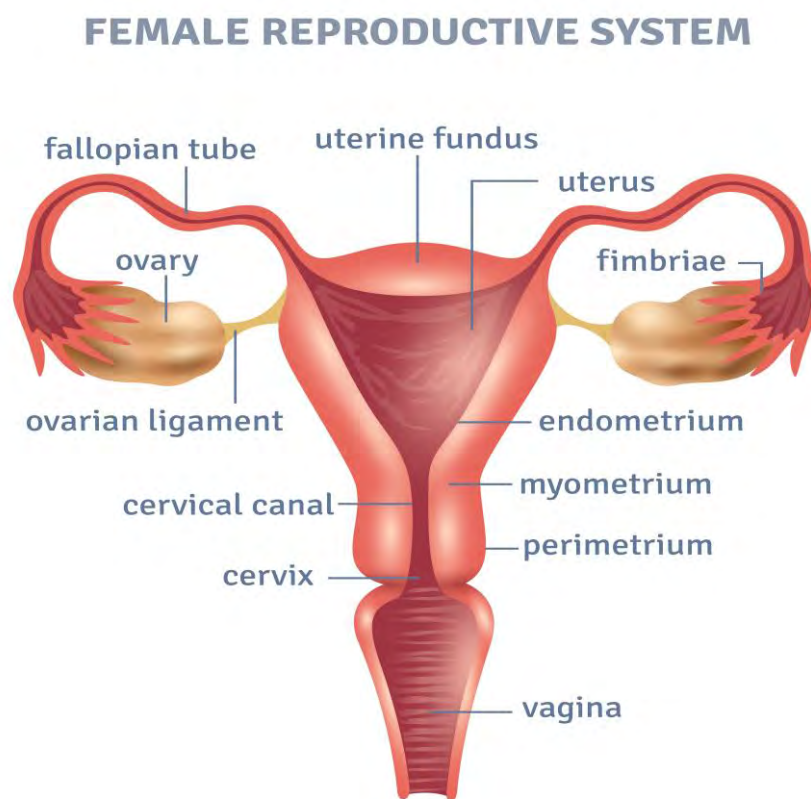
## **2.2 Female reproductive system**

There are 11 different organ systems present in the human body and the reproductive system is one of those that play an essential part in human life. The human reproductive system consists of the organs, glands, and tissues that enable the organism to generate and sustain living offspring. The female reproductive system is the body parts that help women to AFAB (Assigned female at birth). It is deeply embedded in the pelvic cavity, which is located in the lower half of the abdominal cavity. It is crucial for maintaining the good health of women as well. Around 10% of women worldwide are exposed to genital infections annually, including bacterial vaginosis and urinary tract infections, while 75% of women have a history of genital infection. In particular, the widespread risk of pregnancy and poor cleanliness, including menstruation and perineal hygiene, are risk factors for vaginal infections (Upashe et al., 2015). Other facets of health are significantly impacted by the reproductive system as well. For instance, the ovaries produce hormones that affect mood, cholesterol levels, bone density, and heart health.

The female reproductive system provides several functions. In addition to allowing a person to have sexual intercourse, it also helps a person reproduce. Ovaries produce eggs, these eggs are then transported to the fallopian tube during ovulation where fertilization by sperm may occur. The fertilized egg then moves to the uterus, where the uterine lining has thickened in response to the normal hormones of the menstrual cycle (also called the reproductive cycle). Once in the uterus, the fertilized egg can implant into the thickened uterine lining and continue to develop.

If implantation doesn't take place, the uterine lining is shed during the menstrual period. In addition, the female reproductive system produces sex hormones that maintain the menstrual cycle.

During menopause, the female reproductive system gradually stops making the female hormones necessary for the menstrual cycle to work. At this point, menstrual cycles can become irregular and eventually stop.



**Figure 1: Schematic representation of the Female Reproductive system ( Free Vector |Uterus Poster, 2019).**

### **2.3 Development of a female reproductive system**

The human fetus has the potential to be either female or male for the first 10 weeks of development. The genital system is unaffected until the fifth and sixth weeks of fetal development. The mesonephric (Wolffian duct) and paramesonephric (Mullerian duct) pairs of genital ducts are present at this period. The development of the female reproductive system requires an elaborate process. In females, reproductive organs divide into three main groups: gonads, reproductive ducts, and external genitalia. A female fetus will classically develop if there is the presence of a XX genotype. The absence of anti-Mullerian hormone (AMH) and SRY gene causes Wolff ducts to regress and Mullerian ducts to further differentiate. The paramesonephric ducts are the source of the top section of the vagina, the cervix, both fallopian tubes, and the uterus (Sajjad, 2010). Coelomic epithelium produces two paramesonephric ducts in the seventh week, and shortly afterward, Mullerian ducts develop caudally and laterally to the urogenital ridges. In the eighth week, a vertical fusion of paramesonephric ducts occurs and gives origin to the left and right parts of what will ultimately become the uterus. The unfused cranial ends of the Mullerian ducts will form into the fallopian tubes. The upper third of the vagina will be formed by the caudal end of the united ducts. In terms of uterine ligaments, the gubernaculum is the source of both the round ligament and the ovarian ligament, and in the female fetus, undifferentiated mesenchymal tissue is linked to the ovary. The ovary cannot be in place without the round ligament attaching to both the uterus and the ovary. The uterus and other tissues generated from the Mullerian ducts are fully developed by the end of the first trimester.

## **2.4 Anatomy of the female reproductive system**

The female sexual anatomy and its composite parts allow women to become pregnant and bear children. While the reproductive organs in the female anatomy perform their specific functions, they also work together as a highly complex, interrelated system.

The female reproductive system is mainly divided into internal and external genitalia.

- Internal genitalia include ovary, fallopian tube, uterus, cervix, vagina.
- The external genitalia include vulva, mons pubis, labia majora, labia minora, clitoris, urethra, hymen, perineum, vestibule, vestibular glands, vestibular bulbs

### **2.4.1 Internal genitalia**

**Uterus:** The Uterus is also known as the womb. It is an organ that is about the shape and size of a pear, located in the pelvis of a woman's body, and is made up of smooth muscle tissue. A normal uterus measures 7.6 x 4.5 x 3cm in size (Ezzedine & Norwitz, 2016). A typical uterus tilts forward at the cervix and points towards the abdomen. This is called an anteverted uterus. Most people have an anteverted uterus. If the anteverted uterus is not present, they might be:

1. Retroverted uterus: Commonly called a tipped or tilted uterus. When the uterus is tilted or tipped backward, it curves toward the spine instead of forward toward the abdomen.
2. Anteflexed uterus: Uterus is anteflexed when it's bent forward. The tilt is severe and can put pressure on the abdomen or bladder and cause painful symptoms.
3. Retroflexed uterus: Uterus is retroflexed when it is bent backward. The tilt puts pressure on the lower back.

After ovulation, the endometrium gets thicker in preparation for a fertilized egg. If not fertilized, the egg dies, and the lining of the womb sheds after around 2 weeks. The lining

breaks down into blood, which then leaves the body through the vagina. This is menstruation, also called a period. If an egg does become fertilized by sperm, it will implant into the lining of the uterus and begin to develop. The cells divide and grow, becoming an embryo. Over time, it grows into a fetus, which receives oxygen and nutrients from the placenta via the umbilical cord. When it is time for the fetus to be born, the uterus begins strong muscle contractions that dilate the cervix and push the fetus out.

The uterus consists of three layers:

1. Perimetrium: The outermost, protective layer.
2. Myometrium: The highly muscular middle layer. This is what expands during pregnancy and contracts to push your baby out.
3. Endometrium: The inner layer or lining of your uterus (uterine lining). This layer of your uterus is shed during your menstrual cycle.

**Ovary:** Ovaries are small, oval-shaped glands located on either side of the uterus. It has three layers:

1. The outer layer is similar to a capsule found in medicine.
2. The middle layer is the ovarian cortex. It's made up of connective tissue and contains the ovarian follicles.
3. The innermost layer (medulla) contains blood and lymphatic vessels.

They produce and store eggs (also called ovum) and make hormones that control menstrual cycle and pregnancy. It is around 4 centimeters. Studies show that the size of ovaries declines every decade of life after turning 30 (Gougeon & Chainy, 1987). Two ovaries, which are immature eggs, hold about 700,000 oocytes at birth. These eggs start to grow and mature inside the ovary follicles after a person reaches puberty. A developed egg is released by the ovaries around once every month. The menstrual cycle includes a process called ovulation, which enables pregnancy (Auersperg et al., 2001). Ovaries secrete estrogen and progesterone.

These hormones play an important role in reproductive development and menstruation. Estrogen production is highest in the first half of the menstrual cycle before ovulation. Progesterone rises during the second half of the cycle to prepare the uterus for a fertilized egg (if conception occurs). The hormones the ovaries produce regulate the menstrual cycle. These also:

1. influence the development of female sex traits
2. facilitate pregnancy, childbirth, and breast milk production
3. contribute to the health of the bones, heart, liver, brain, and other tissues
4. influence mood, sleep, and sex drive

**Fallopian tubes:** Fallopian tubes are a pair of hollow, muscular ducts located between the ovaries and the uterus. These play an important role in conception and pregnancy. The fallopian tubes are 11 to 12 cm long with a lumen diameter of less than 1 mm (Ezzedine & Norwitz, 2016). A fallopian tube consists of a thin mucous membrane (Mucous membrane) and layers (Muscular layers) of muscle. Four elements make up a fallopian tube:

1. **Infundibulum:** The fallopian tube's funnel-shaped section closest to the ovaries. It has fimbriae, which resemble fingers and extend toward the ovary. The fimbria ovarica, a single fimbria, is long enough to reach the ovary. When an egg is discharged from the ovary, the fimbriae grab it and gently whisk it into the fallopian tube.
2. **Ampulla:** The major channel of the Fallopian Tube, located in between the infundibulum and the isthmus. Fertilization most often takes place in the ampulla.
3. **Isthmus:** A narrow passageway that joins the ampulla to the intramural section of the fallopian tube, which is closest to the uterus.
4. **Intramural (interstitial) portion:** The part of the fallopian tube that extends into the top of the uterus. It opens into the uterine cavity, where an embryo can implant into the uterine wall and develop into a fetus.



**Vagina:** The vagina is a long hollow tube that is sometimes called the “birth canal”. The length and shape of the vagina varies between women with an average length of 6.3 cm (2.5 in) (Barnhart et al., 2006). But size depends on various factors, including your age, weight, and whether or not you have gone through menopause. It consists of several types of tissue and cells that secrete fluids that keep vaginal walls moist, elastic, and healthy. Cells in the vagina are especially responsive to the hormone estrogen. Many people confuse “vaginas” and “vulvas,” but vaginas and vulva are not the same. The vagina is a canal-like organ located inside of the body that opens outside of the body. It is a powerful passage that leads from the uterus (inside the body) to the vulva, which includes external reproductive organs, or genitals.

**Cervix:** The cervix plays a significant role in reproductive anatomy. The vaginal canal is fused circumferentially and obliquely around the distal section of the cervix, separating it into upper, supravaginal and lower, vaginal halves (Krantz & Phillips, 1962). It is situated 3 to 6 inches inside the vaginal canal in the cavity of the pelvis. The cervix consists of the following parts:

1. Internal OS: The opening that leads to the uterus.
2. Endocervical canal: A tunnel that extends from the Internal OS to the ectocervix.
3. Ectocervix: The part of the cervix that bulges onto the top of the vagina.
4. External OS: The opening that leads to the vagina.

The cervix is made of robust fibromuscular tissue. There are two primary cell lines:

1. Glandular cells- The cells that line the endocervical canal, which is the cervix's innermost portion.
2. Squamous cells: These cells line the vagina and ectocervix, the cervix's outermost portion.

The cervix, sometimes known as the "neck of the uterus," is crucial in enabling fluid to move between the uterus and the vagina. It allows a baby to exit the uterus during labor so that it can pass via the vagina (birth canal). Additionally, the cervix frequently experiences cell alterations that could be cancerous.

### **2.4.2 External genitalia**

**Vulva:** The exterior portion of the female genitalia is known as the vulva. It is the focal point of much of a woman's sexual reaction and safeguards her reproductive organs, urine opening, vestibule, and vagina. The labia majora and labia minora are the outer and inner "lips" of the vulva. The urethral meatus and introitus, which are the openings of the vagina and the urethra, respectively, are encircled by the vestibule. The region between the vulva and the anus is known as the perineum.

**Mons pubis:** The pubic bone (pubis) is covered with a spherical prominence known as the mons pubis, or mons veneris. It is thought to be the most superior and anterior portion of the female external genitalia. The pubic symphysis, pubic tubercles, and superior pubic rami are all located just anterior to the mons pubis. More specifically, it is bounded inferiorly by the clitoris and superiorly by the pubic hairline and the lower border of the anterior abdominal wall. The mons pubis is a regional representation of the perineal region's external surface. It is primarily made up of fatty tissue, the amount of which varies depending on the individual and their age. Both sexes have the mons pubis, however females have a larger amount of it. When a person reaches puberty, pubic hair grows in that region.

**Clitoris:** The pleasure center of the reproductive system is the clitoris. Many people mistakenly believe that the clitoris is the little fleshy protrusion at the top of the vulva, however, this is only a portion of the entire clitoris. The clitoris is made up of an intricate network of nerves and erectile tissue that has both internal and external components. From the glans to the crura, the complete clitoris measures between 3 1/2 and 4 1/4 inches in length

and 2 1/2 inches in width. The glans have a diameter of roughly 3/4 to 1 inch. Erectile tissue makes up the clitoris, which when stimulated swells and fills with blood. There are around 8,000 nerve endings in the glans alone. The clitoris of the vulva has the most nerve endings.

**Hymen:** The hymen is a tiny, delicate piece of tissue located at the vaginal opening. It is made up of tissue leftovers from the development of the fetus. Hymens have a distinctive shape, size, and thickness that can alter over time. It serves no function in the body or reproductive system. Nobody is completely certain of what the hymen performs, unlike other organs or tissues having a known function. Some speculate that it may be related to preventing bacteria or foreign items from entering the vagina. Hymens are flesh-colored, matching the color of the skin around the vagina. It can stretch since it is an elastic tissue. Hymen can be divided into five categories:

1. Annular or crescent-shaped hymen: These are regarded as the hymen's usual forms. An annular hymen (or donut hymen) typically surrounds the vaginal opening during birth. It then assumes a crescent shape.
2. Cribriform hymen: a condition where the hymen has numerous tiny holes in it. Menstruating through the holes would be possible, but it would be difficult to put tampons through.
3. Imperforate hymen: The hymen completely encloses the vaginal entrance. One in 1,000 girls had this unusual disease. This means that during menstruation, blood cannot leave the vagina. Instead, it will create pain by backing up into the vagina.

4. Micro perforated hymen: Except for a little hole, the hymen completely encloses the vaginal opening. While period blood can pass through that little hole, it might be challenging to insert or remove a tampon.
  
5. Septate hymen: A bit of additional tissue gives the hymen the appearance of two hymens. Behind the two tissues lies the vaginal entrance. Tampon insertion and removal will be difficult for those with a septate hymen.

**Urethra:** The tube that allows urine to exit the body and bladder is called the urethra. In the pelvic area of the body, there is a channel called the urethra. Epithelial tissue, smooth muscle cells, and connective tissue make up the tube's thin walls. The female urethra measures roughly 1.5 inches (3–4 cm) in length. It is made up of a smooth muscle layer in the center, an inner epithelial lining, a spongy submucosa, and an outside layer of fibroelastic connective tissue.

**Labia majora:** This skin flap, which is referred to as having "large lips," shields the vagina from invaders. The lateral longitudinal borders of the vulval clefts will be formed by the labia majora, a noticeable pair of cutaneous skin folds. The folds covering the labia minora, clitoris, vulva vestibule, vestibular bulbs, Bartholin's glands, Skene's glands, urethra, and vaginal entrance are made by the labia majora. The pubic region contains the labia majora. This eventually protrudes from the pelvic skin, extending the mons pubis to the anus beyond the pelvic bones. Deep beneath the skin, adipose tissue maintains the labia majora and gives the pubic area flexibility and cushioning. The labia majora's main purpose is to safeguard the vulva's softer tissues. The labia majora, in contrast to the vulva's inner components, have a lot of pubic hairs that serve as a mechanical and frictional shield for the remainder of the vulva.

**Labia minora:** The smaller lips are referred to as the "labia minora". The labia minora are sagittal-oriented skin folds located beneath the labia majora and surrounding the opening of

the vagina. It begins at the clitoris and extends posteriorly. The anterior endings of both labia minora split and form two layers or two portions:

1. Lower layer: It is also called the medial portion. As it descends beneath the clitoris and is connected to the glans of the clitoris, it unites with the same layer on the opposing side to form the clitoris' frenulum.
2. Upper layer: Also known as the lateral portion. Creates the prepuce (hood) of the clitoris, which hangs over the glans of the clitoris, by joining with the top layer from the opposing labium.

The posterior endings of both labia join together and form a skin fold called the frenulum of the labia minora also known as the labia minora fourchette. The smooth muscle cells, connective tissue (which includes many elastic fibers), and venous plexuses make up the labia minora. They lack hair and are smaller than the labia majora. Additionally, they don't have any fat, in contrast to the labia majora. The labia minora are filled with blood vessels that enlarge and become more sensitive as a result of engorgement during sexual activity. A mucous membrane covers the labia minora's inner surface. The vaginal vestibule is located between both labia minora.

**Vestibule:** The vestibule, a triangle-shaped region between the labia minora, accommodates the urethral and vaginal orifices. The labia minora's vestibule has six openings: the urethral orifice, the vaginal orifice, the apertures of the two bigger vestibular glands, and the openings of the two lesser vestibular glands. Hart's lines, a border, are present between the vestibule and labia minora. Hart's lines indicate the change from the vulva vestibule to the labia minora.

**Vulva Vestibule:** The vulva vestibule is located between the labia minora. This is a smooth surface that extends inferiorly from the posterior commissure of the labia minora to the superior border of the clitoris. The urethral and vaginal openings are both located in the vulva

vestibule. The margin of the labia minora forms the perimeter of the vulva vestibule. Hart's lines are a line that divides the labia minora from the vulva vestibule. The transition from the vulva vestibule to the labia minora is described in Hart's lines. The smoother transition between the vulva vestibule and the labia minora's vulvar skin appearances demonstrates this change in skin look.

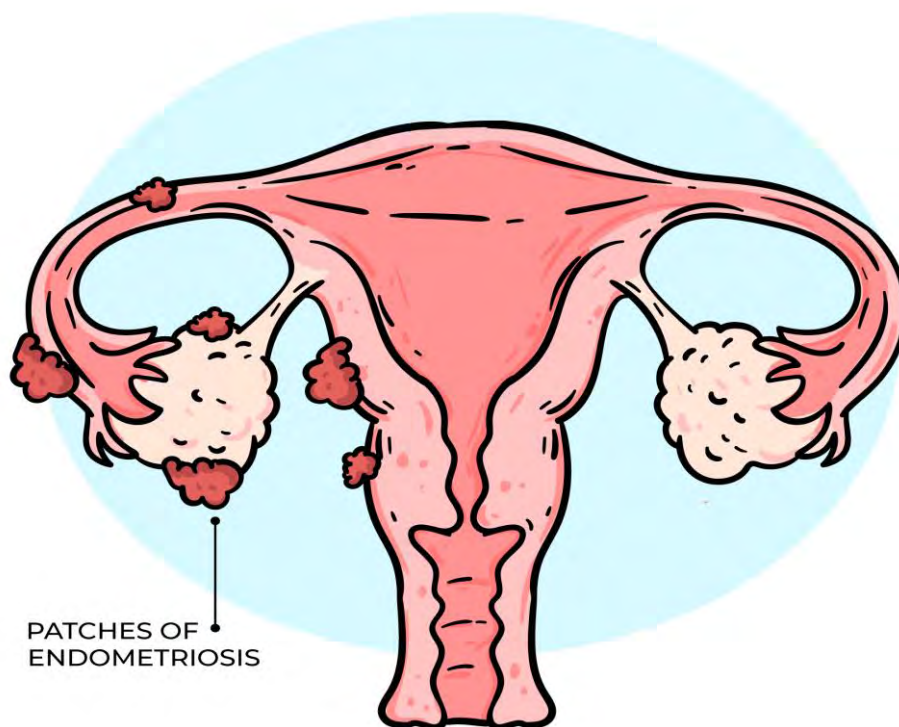
**Bartholin's Glands:** On either side of the vaginal entrance are the Bartholin's glands. They resemble peas in size. They produce fluid that maintains vaginal moisture. The Bartholin's glands (or bigger vestibular glands) are vital female reproductive organs. Caspar Bartholin Secundus, a Danish anatomist, first characterized them in 1677 (Bora & Condous, 2009). Through ducts (tubes), the fluid is transported to the vagina. The fluid might back up into them if they become clogged. This mucus-like substance also helps to maintain the vaginal pH acidic (pH 4.5 or lower). Bartholin gland's also known as “vestibular glands”.

**Skene's Glands:** The lesser vestibular glands, often referred to as the Skene's glands, are two glands that are situated on either side of the urethra. Alexander Skene discovered prostatic glandular tissue proximally placed next to two big ducts adjacent to the female urethra in 1880, demonstrating the female prostate's existence (Dagur et al., 2016). It is thought that these glands release a fluid to lubricate the urethra's opening. It is also thought that this chemical has antibacterial properties. To avoid urinary tract infections, use this antibiotic. Although Skene's gland is thought to be the source of female ejaculation during sexual stimulation, its function is not entirely understood.

## **Chapter 3: Endometriosis**

### 3.1 Introduction

Endometriosis is a painful disease in which tissue of the lining uterus grows outside of the uterus. Ovaries, fallopian tubes, and the tissue lining the pelvis are where endometriosis most frequently affects women. Rarely, tissue resembling endometrium may be seen outside the region around the pelvic organs. It can cause severe pain in the pelvis and make it harder to get pregnant. The disease is most prevalent in women between the ages of 20 and 40. It can also happen to younger people during their teenage years. Endometriosis can start at a person's first menstrual period and last until menopause. In most cases, endometriosis patients do not have any symptoms.



**Figure 2: Endometrium like tissue outside of uterus (Free Vector | Hand Drawn Endometriosis Illustration, 2024).**



However, some common clinical symptoms are irregular menstruation, Chronic pelvic pain (CPP), Dysmenorrhea, Dyspareunia and infertility (Laganà et al., 2017). The typical duration between the onset of pain and diagnosis for endometriosis is over 8 years in the UK and 12 years in the USA, earning it the moniker "the missed disease" (Moradi et al., 2014). The cause of endometriosis is unknown but there is evidence that genetic susceptibility is a risk factor in the development of the disease (Kennedy, 1999). There is no complete cure of this disease and no surety that it will not return after treatment. It has impact on women and adolescent girl's mental health and psychological wellbeing. Some people struggle with anxiety or depression also. Surgery or medication are typically used to treat endometriosis. It is treatable and can be diminished.

### **3.2 Classification of Endometriosis**

There are numerous ways to categorize endometriosis, however none of them is now regarded as an acceptable standard. The classification used by the American Society for Reproductive Medicine (ASRM) is the most popular. In this method, the sizes of the lesions of endometriosis were calculated by summing them. This classification scheme was renamed in 1996 as the revised American Society for Reproductive Medicine (rASRM). According to rASRM endometriosis can be classified as (Lee & Koo, 2021):

| <b>Stage</b> | <b>Lesions size</b> |
|--------------|---------------------|
| Mild         | 1-5                 |
| Moderate     | 6-15                |
| Sever        | 16-40               |
| Extensive    | More than 40        |

Austria adopted another classification of endometriosis in 2005 known as ENZIAN. The degree of endometriosis found during surgery determines the score, considering both the existence of the lesion and the depth of the invasion. The ENZIAN classification specifies the degree of the lesion as well as the location of foci in various anatomical compartments (Johnson et al., 2016):

| <b>location of foci</b>  | <b>Severity of the lesion:</b>          |
|--|---|
| <b>Compartment A</b> -has foci in the rectovaginal septum and vagina.                      | <b>Grade 1:</b> Invasiveness < 1 cm.    |
| <b>Compartment B</b> -contains foci in the sacro-uterine ligaments up to the pelvic walls. | <b>Grade 2:</b> Invasiveness 1 to 3 cm. |
| <b>Compartment C</b> -contains foci in the sigmoid colon and rectum.                       | <b>Grade 3:</b> Invasiveness > 3 cm.    |

### 3.3 Type of Endometriosis

There are several types of endometriosis (Smolarz et al., 2021):

1. Deep infiltrating endometriosis (DIE): In this form, the organs inside or outside of the pelvic cavity such as the bladder, ureters, large intestine, sacro-uterine ligaments or the vagina have been invaded by endometrial tissue. Rarely, but occasionally, a lot of scar tissue can bind organs together, causing them to become stuck in place. This condition is called a frozen pelvis.
2. Peritoneal endometriosis: In this form, the endometrial tissue attaches to the peritoneum. It is one of the typical types of endometriosis. This can occur in the form of intraperitoneal and sub-peritoneal. 15-50% of all women with endometriosis have foci of the disease within the peritoneum.

3. Ovarian endometriosis: Endometrium tissue occurs in the form of superficial lesions or endometrial cysts. Endometrial cysts are known as chocolate cysts. 50% of patients receiving treatment for infertility and 2-10% of women of reproductive age have ovarian endometriosis.
4. Other location: Endometrial tissue may occasionally develop on the abdominal wall. A surgical incision, such as one from a C-section, may become attached to the cells.

### **3.4 Worldwide situation of Endometriosis**

Endometriosis has substantial social, economic, and public health effects. Due to extreme pain, exhaustion, melancholy, anxiety, and infertility, it might lower the quality of life. Estimated around 176 million women worldwide suffer from endometriosis in their prime years of life (Adamson et al., 2010) and there are seven million patients with endometriosis in the USA (Bellelis et al., 2011). Endometriosis is a disabling disorder with few effective treatments and affects one in ten women worldwide. A study of Norwegian country reported that endometriosis was reported by 2.0% of women and the lifetime risk for endometriosis might be 2.2% (Moen & Schei, 1997). Not only women affected with endometriosis but also adolescent girls also affected with it. Another study found endometriosis in 66 adolescent girls undergoing laparoscopy (Goldstein et al., 1980). Adolescents may suffer melancholy, anxiety, or terror, which could lead to higher usage of medical services and associated expenses. According to reports, 45%–70% of teenagers with CPP had endometriosis (Gào et al., 2006). Women and adolescents worldwide are affected by endometriosis and their lifestyles are greatly affected. In many cases, students cannot concentrate properly on their studies because of the pain which is reducing the rate of female education. Due to severe pain, women are financially disadvantaged globally. The cost of endometriosis is significant throughout the world and is comparable to other chronic diseases like diabetes and rheumatoid arthritis so it can be called an economic burden. The average cost of

endometriosis is 9579 Euros per woman (Johnson et al., 2016). According to the World Endometriosis Research Foundation (WERF) the annual health care costs of 3113 Euro per woman suffering from endometriosis-associated symptoms (Simoens et al., 2012).

### **3.5 Symptom of Endometriosis**

The following symptoms may be present, with severity ranging from mild to moderate: Soliman et al. (2017), (Fourquet et al., 2011).

- Extreme pain during the menstrual period, is known as Dysmenorrhea.
- Dyspareunia, pain during or after sex is common with endometriosis.
- Dyschezia, experiencing pain with bowel movements during a menstrual period.
- Dysuria, experiencing pain and discomfort with urination during a menstrual period.
- Sometimes, endometriosis is first diagnosed in those seeking infertility treatment.
- Polymenorrhea, experience excessive bleeding.
- Pelvic pain.
- Cramping.
- Low back pain.
- Fatigue and Stress.

### **3.6 Risk factors of endometriosis**

Although the exact cause of endometriosis is not certain, possible explanations include:

- Retrograde menstruation: Instead of leaving the body, menstrual blood containing endometrial cells travels back to the fallopian tubes and into the pelvic cavity. These endometrial cells adhere to the surfaces of the pelvic organs and pelvic walls, where they develop throughout each menstrual cycle, thickening and bleeding. The name "chocolate cyst" comes from the fact that these cells have a hue that resembles chocolate.

- Starting one's period at an early age or going through menopause at an older age (Treloar et al., 2010).
- The length of the menstrual cycle (less than 27 days) and the duration of flow, last longer than seven days. ("Practice Bulletin No. 114: Management of Endometriosis," 2010).
- Family Infertility: Endometriosis risk is increased by a relative (mother, aunt, or sister) who has had infertility. The majority of infertile women have it. The condition tends to run in families and affects people of certain ethnic groups more than others (Peterson et al., 2013).
- Surgical scar implantation: After a surgery, such as a hysterectomy or C-section, endometrial cells may attach to a surgical incision.
- Absence of period for a long time.
- Having higher levels of estrogen in the body. High levels of estrogen increase endometrial tissue development.
- Immune system disorder: A problem with the immune system may make the body unable to recognize and destroy endometrial-like tissue that is growing outside the uterus.
- Some studies suggest that having a lean body mass or low body fat may increase a woman's risk for endometriosis (Farland et al., 2017).
- Have a mother, sister, or daughter with endometriosis

Typically, endometriosis appears several years after the start of menstruation.

### 3.7 Diagnosis of Endometriosis

There are several different clinical indications and symptoms associated with endometriosis, and none of them are essential to diagnose the condition. Endometriosis is always detected in women's reproductive age range from 25 to 29 years. In the USA and the UK, women with endometriosis experienced an average delay of 11.7 years and 8.0 years, respectively, between the onset of pain symptoms and the time of diagnosis (Husby et al., 2003). Diagnosis should ideally be done while patients are at least partially symptomatic, preferably during menstruation. Most of the women show normal results in physical examination for this reason some advanced diagnosis processes are used, such as:

- **Ultrasound:** The most frequent imaging technique used to assess women suspected of having endometriosis is an ultrasonography test. When evaluating endometriotic cysts, ultrasound is especially beneficial. It has very high sensitivity and specificity rates of 92-99% respectively in the detection of endometriosis (Bulent Berker, 2015). Transvaginal ultrasound is utilized to better see the endometrium and uterine cavity and find ovarian endometriotic cysts, although it does not completely rule out peritoneal endometriosis, endometriosis-associated adhesions, and deep infiltrating endometriosis. Transvaginal ultrasound should be performed preferably using high-frequency probes (6–7.5 MHz). Diagnostic precision can be improved by imaging pericyclic, which is more obvious in the hilar region and can be seen in regularly spaced vessels by color Doppler. It has resulted in 99% in both sensitivity and specificity in a scoring system based on clinical parameters (Dulęba, 1997).
- **Magnetic Resonance Imaging (MRI):** An MRI is an exam that uses a magnetic field and radio waves to create detailed images of the organs and tissues within the body. Endometrial implants are often small, and their signal intensity is variable. MRI is particularly helpful in the identification of endometriomas. It may also visualize solid

endometriotic implants and adhesions. It is a complementary noninvasive test that is helpful in a group with a high-risk profile. MRI allows for comprehensive lesion mapping before to surgery and has demonstrated great accuracy for both anterior and posterior endometriosis (Kinkel et al., 2005)

- **CA-125 Test:** This test measures the amount of the protein CA 125 (cancer antigen) in the blood. It is expressed by derivatives of mullerian epithelia and coelomic including endometrium, fallopian tube and peritoneum. Initially, individuals with invasive epithelial ovarian cancer had higher serum levels of CA-125 found in their blood. However, higher CA-125 levels have also been seen in the peritoneal fluid, menstrual effluent, and serum of endometriosis-affected women. Elevated level of CA-125 found in deep endometriosis (Robert Spaczynski, 2003), Early-stage endometriosis cannot be accurately diagnosed with CA-125 (Bedaiwy & Falcone, 2004).
- **Pelvic exam:** A pelvic exam manually feels (palpates) areas in the pelvis for abnormalities, such as cysts on reproductive organs or scars behind the uterus. The exam is used to look into the uterus, fallopian tube, cervix, vagina, ovaries. Often, it is not possible to feel small areas of endometriosis by this unless they've caused a cyst to form.

### 3.8 Treatment of Endometriosis

The most common way to measure the effectiveness of treatment for endometriosis in women has been to measure pain and infertility (Olive & Pritts, 2001). The symptoms of endometriosis can be managed with a variety of modern medical interventions. The primary goal of medical care is to lessen symptoms and avoid recurrence to avoid the need for additional surgery or to extend the interval between procedures.

**Non-steroidal anti-inflammatory drugs (NSAID):** The most often prescribed first-line medications for the treatment of pain associated with endometriosis are NSAIDs. It functions by preventing the formation of COX, an enzyme essential for the synthesis of inflammatory mediators. Research has demonstrated that the proliferation of endometrial tissue can be inhibited by selective COX-2 inhibitors (Doğan et al., 2004). A review with randomized control trial (n = 24) which compared naproxen with placebo showed that there was no difference in pain relief between naproxen and placebo, and there was no evidence that one NSAID is superior (Brown et al., 2017).

**Danazol:** Endometriosis-related pelvic pain can be effectively treated with androgen which is known as Danazol. However, its use is frequently restricted by androgenic side effects such as acne, hirsutism, and male pattern baldness. Danazol is generally used for six months in divided doses of 400–800 mg/d. In comparison to placebo or no medication, a meta-analysis revealed that patients receiving danazol experienced reduced pain sensations and improved laparoscopic scores (Farquhar et al., 2007).

**Progesterone:** The application of progesterone in endometriosis is based on several pathophysiologic factors. It is available in different forms oral, injectable or intrauterine device, they have gained popularity and are a great option for women with contraindications to estrogens. Some of the progestins used in the treatment of endometriosis include cyproterone acetate, dienogest, dydrogesterone, gestrinone, lynesterole and



medroxyprogesterone acetate. Studies contrasting GnRH analogs with dienogest have also shown a similar reduction in pain (Strowitzki et al., 2010).

**Gonadotropin releasing hormone (GnRH):** When NSAIDs and hormonal contraceptives are ineffective, the next line of action is treatment with a GnRH analogue, such as leuprolide or goserelin (Zoladex). GnRH analogue therapy has been demonstrated to reduce pain in endometriosis-affected women and downregulate the pituitary, leading in "medical menopause." (De Ziegler et al., 2010). However, many women experience side effects from the medication, including hot flashes, nocturnal sweats, and potential bone loss. Restarting hormone therapy with low-dose progestin and estrogen is typical to reduce menopausal symptoms.

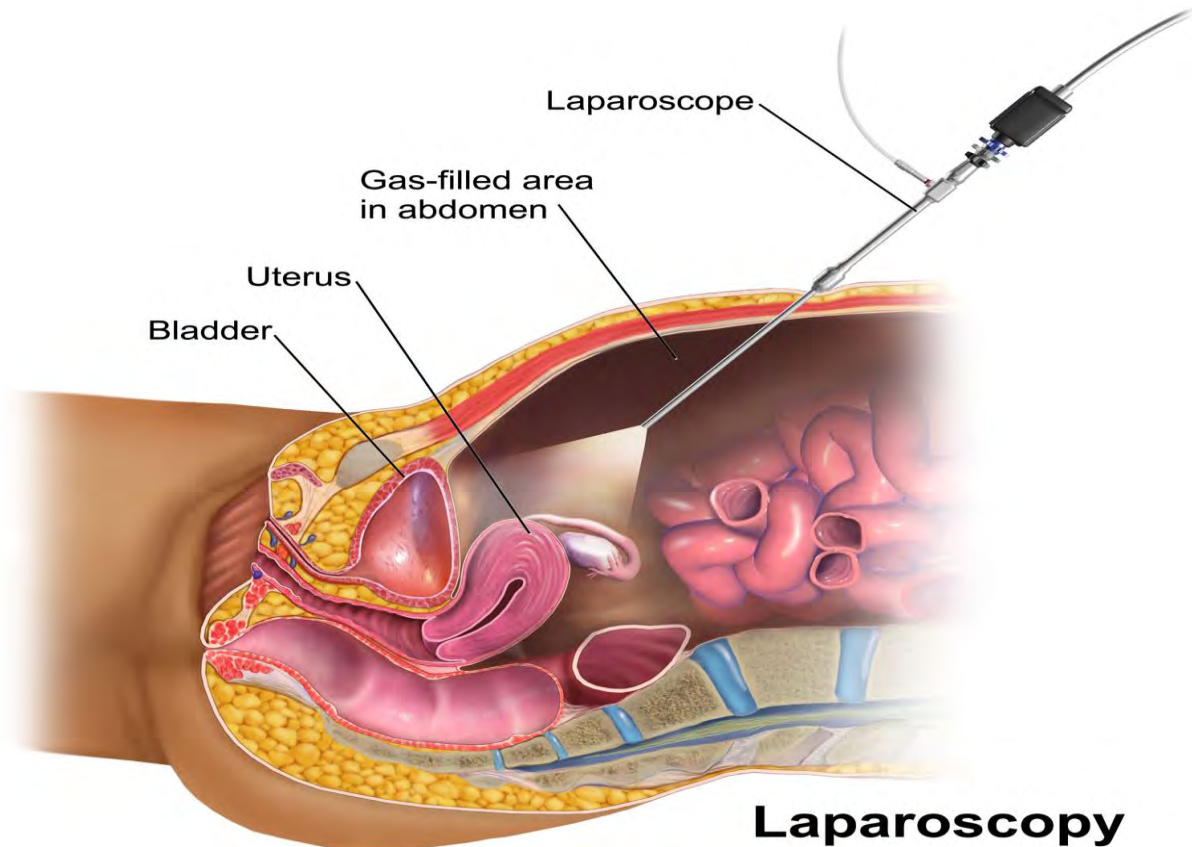
**Combined hormonal contraceptives:** For women with endometriosis, combination oral contraceptives are more effective than placebo in reducing dysmenorrhea. It has significantly fewer adverse effects than GnRH analogues. Continuous therapy with COC has been demonstrated to provide superior pain control when compared to cyclic delivery (Zorbas et al., 2015). Presently, COCs with a lower dose of ethinyl estradiol (20 mg) than a higher dose (30 mg) is advised since they reduce the risk of venous thromboembolism (Lidegaard et al., 2011).

**Surgical option:** Patients with deep infiltrating endometriosis and those with pelvic pain who do not get relief from medication should consider surgical surgery (Kennedy et al., 2005). There are two ways to gain access to the abdomen and pelvis: laparotomy and laparoscopy. Four cohort studies involving several hundred women have compared the two procedures. There was no difference in the effectiveness of the open and endoscopic methods in any of the studies (Busacca et al., 1998). However, there was a trend toward a higher pregnancy rate and a lower dyspareunia recurrence rate after surgery for severe endometriosis conducted via laparotomy than laparoscopy (Crosignani et al., 1996). Open surgery can be replaced with

laparoscopic surgery. Laparoscopic surgery works by inserting a laparoscope, a tiny, illuminated camera, through a small "keyhole" incision in the belly, rather than opening up the abdomen to expose organs. In contrast, a laparotomy is performed during an open operation. Laparoscopy is less intrusive and simpler to recuperate from, resulting in fewer wounds and scarring. Laparotomy, on the other hand, involves particular training and equipment, and it takes longer, which may not be feasible in an emergency.

1. **Laparoscopy:** Laparoscopic surgery aims to cure the structural causes of endometriosis discomfort, infertility, and other symptoms by restoring normal anatomy by eliminating or removing all visible endometriotic lesions, performing adhesiolysis, and mending damaged organs and other sites (Berlanda et al., 2013). In this procedure, a thin tube-like tool called a laparoscope is put into the abdomen. This tool can be used to see inside the body and identify endometriosis with a high-definition camera. Laparoscopy is not practical as a first-line diagnostic tool. It can provide information about the location, extent and size of endometrial implants. Endometriosis laparoscopic treatment is useful for lowering discomfort and enhancing fertility (Yeung et al., 2009). According to the study, laparoscopy pregnancy rates among infertile women were at least equivalent to all other treatments and were significantly higher in some comparisons. Unless a woman has significant tubal and/or fimbrial disease, surgical laparoscopy is the therapy of choice for infertile women with endometriosis (Adamson et al., 1993). When compared to diagnostic laparoscopy alone, laparoscopic surgery for endometriosis significantly reduced overall discomfort after 6 and 12 months, according to a recent Cochrane review (Falcone & Flyckt, 2018). When all endometriotic lesions are removed during a single surgical treatment, profound endometriosis patients benefit from good long-term

functional outcomes from the entire process (Dousset et al., 2010). For women who are infertile, laparoscopic excision or ablation of mild to moderate endometriosis improves fertility (Marcoux et al., 1997).



**Figure 3: Endometriosis treatment with Laparoscopy ( Medical Gallery of Blausen, 2014 ).**

2. **Laparotomy:** The phrase "laparotomy" refers to the incision through the abdominal wall that opens up the peritoneal cavity, which includes the abdomen and pelvis. It is a surgical treatment that exposes organs by opening up the abdomen. Doctors

typically utilize it when a patient has severe endometriosis that laparoscopy cannot manage.

### **3.9 Complications of Endometriosis**

Like every disease endometriosis also has complications. Infertility, commonly known as difficulty becoming pregnant, is the primary consequence of endometriosis. Those who have endometriosis may struggle to conceive in up to 50% of cases. According to a study, endometriosis was projected to increase the chance of infertility by about 20 times (Strathy et al., 1982). For pregnancy to happen, an egg must be released from an ovary. Then the egg has to travel through the Fallopian tube and become fertilized by a sperm cell. The fertilized egg then needs to attach itself to the wall of the uterus to start developing. Endometriosis may block the tube and keep the egg and sperm from uniting. Based on the observation that endometriosis is more common in subfertile women (up to 50%) than in women with established fertility (5–10%), a causal relationship between the condition and infertility has long been postulated (D’Hooghe et al., 2003).

Sometimes endometriosis may raise the risk of ovarian cancer. Clinical evidence indicates that 0.3% to 0.8% of patients with ovarian endometriosis will develop a malignant ovarian tumor (Malignant Neoplasms Arising in Endometriosis: Obstetrics & Gynecology, n.d.). However, it is unclear how frequently patients with pelvic endometriosis develop ovarian or other malignancies (Hitti et al., 1990). A study found that after hospital discharge the risk of ovarian cancer was particularly elevated and cervical cancer risk was slightly reduced, whereas no association was observed for cancer of the endometrium (Brinton et al., 1997).

### **3.10 Prevention of endometriosis**

After surgery, all women should have the prevention of recurrences in mind. It is reasonable to believe that reducing oxidative stress by avoiding retrograde menstruation or altering the microbiota of the peritoneum and upper vaginal tract will lessen the likelihood of

endometriosis beginning, even if this theory has not yet been validated (Amro et al., 2022). Foods high in antioxidants, such as citrus (Harris et al., 2018), omega 3, vitamin E, and vitamin C, may reduce the incidence of endometriosis, according to preliminary research (Afrin et al., 2021). It is yet too early to fully understand how vitamins affect immunological response and inflammation in endometriosis (Halpern et al., 2015), or how to stop the disease from starting or spreading by altering the gut microbiota through diet and exercise.

### **3.11 Epidemiology of endometriosis**

According to epidemiology, there are identifiable causes and preventive factors for human disease, and it is assumed that these factors do not occur randomly. It is quite difficult to apply an epidemiologic approach to endometriosis as a disease (McLeod & Retzlaff, 2010). It is challenging to determine with precision the prevalence of endometriosis in the general population because a few female patients possess few or no symptoms. Between 21 and 40 percent of infertile women and between 70 and 90 percent of women with chronic pelvic pain had endometriosis identified. Research indicates that every year, 51,000 women between the ages of 15 and 64 are admitted to hospitals because of endometriosis, and at least 5.5 million women in the US and Canada are afflicted at any given moment (Matalliotakis et al., 2007). Endometriosis is the third most common reason for gynecologic hospitalizations in the US (Velebil et al., 1995). Each patient is predicted to incur \$2,801 in medical expenses and \$1,023 in lost work productivity annually as a result of the disease (Simoens et al., 2007). In a national study, half of the endometriosis-affected women said they had spent whole days in bed during the preceding 12 months as a result of the illness, with an average of 17.8 days spent in bed (Kjerulff et al., 1996).

### **3.12 Endometriosis Diagnosis Cost in Bangladesh**

In Bangladesh, Gynecological Surgery has been practiced for a while. Gynecological surgery services manage surgical procedures involving the female genital tract. It also addresses breast and pelvic surgery, as well as uterine, appendage, and urinary incontinence repair (Coelho et al., 2015). The most common gynecological operation is hysterectomy; others include tubal ligation, curettage, cystectomy, and salpingectomy (R & R, 2015). Since endometriosis is a female disease, its treatment should be done by a gynecologist. A physician who specializes in diagnosing and treating diseases of the female reproductive system is known as a gynecologist. The number of people diagnosed with Endometriosis in Bangladesh is steadily increasing. A study found that there was no correlation between the frequency and severity of pain complaints and the endometriosis disease stage (Chowdhury et al., 2017). Below are some examples of hospitals in Bangladesh both private and government-owned with well-known gynecology & obstructive surgeon:

private owned:

- Bangladesh Specialized Hospital (Dhaka)
- Square Hospital (Dhaka)
- United Hospital (Dhaka)
- CSCR Hospital (Chittagong)
- Impulse Hospital (Dhaka)
- Popular Diagnostic Centre Ltd (Around Bangladesh)
- Evercare Hospital (Dhaka)
- Ibn Sina Hospital (Around Bangladesh)
- Bangladesh Specialized Hospital (Dhaka)
- Evercare Hospital (Chittagong)
- Mount Adora Hospital (Sylhet)
- BIRDEM General Hospital (Dhaka)

- Dhaka Central International Medical College Hospital (Dhaka)
- BACC Women's and Children Hospital (Dhaka)
- Green Life Hospital (Dhaka)

Government-owned:

- Dhaka Medical College Hospital (Dhaka)
- Shaheed Suhrawardy Medical College and Hospital - Dhaka
- Bangabandhu Sheikh Mujib Medical University Hospital (Dhaka)
- Chittagong Medical College (Chittagong)
- Mymensingh Medical College Hospital
- Rajshahi Medical College Hospital
- Rangpur Medical College Hospital
- Khulna Medical College Hospital

Hospitals in Bangladesh have a wide range of diagnostic tools and tests available as well as treatment facilities for endometriosis. Some of which include the following diagnoses:

|                                  |                              |
|----------------------------------|------------------------------|
| Ultrasonography of pelvic (USG)  | Transvaginal ultrasound(TVS) |
| Magnetic Resonance Imaging (MRI) | Laparoscopy                  |
| Blood Test                       | CA-125                       |
| THS                              | Estrogenic hormone tests     |

Rates for diagnostic tests for endometriosis provided by privately owned hospitals (Square Hospital, Dhaka and Anwar Khan Modern Medical College Hospital, Dhaka, Dhaka) in Bangladesh: (Dr. Mohammed Nusrat Mahmud, Personal Communications).

**Table 1:**Price list for diagnosis of brain tumor in private hospital in Bangladesh.

| <b>No.</b> | <b>Diagnostic test</b>           | <b>Price range in Taka (ট)</b> |
|------------|----------------------------------|--------------------------------|
| 1.         | Ultrasonography (TVS)            | 1500-5000 /-                   |
| 2.         | Magnetic Resonance Imaging (MRI) | 9000-30,000 /-                 |
| 3.         | Laparoscopy                      | 50,000-2,00000 /-              |
| 4.         | CA-125                           | 1500-3500 /-                   |
| 5.         | THS                              | 1050-3000 /-                   |

Prices for diagnostic tests for the head provided by government-owned hospitals in Bangladesh (Dhaka Medical College):

*Table 2: Price list for diagnosis of endometriosis in government hospital in Bangladesh.*

| <b>No.</b> | <b>Diagnostic test</b>           | <b>Price range in Taka (ট)</b> |
|------------|----------------------------------|--------------------------------|
| 1.         | Ultrasonography (TVS)            | 500-2500/-                     |
| 2.         | Magnetic Resonance Imaging (MRI) | 4000- 16,000/-                 |
| 3.         | Laparoscopy                      | 30,000-70,000/-                |
| 4.         | CA-125                           | 1200-2000/-                    |
| 5.         | THS                              | 800-1000/-                     |

For the treatment of endometriosis, the cost will depend on the type of surgery being done and the surgeons who are doing it, and location.



## **Chapter 4: Literature Review**

## 4.1 Introduction

The objective of this literature review is to provide context for the research publications linked to the topic of this study. Endometriosis is a common condition among women all over the world.

It can be difficult to diagnose and carries several complications. As an added note, the following academic publications serve as secondary references and provide recommendations for the methods used in the research. These sources also helped with the development of data gathering strategies, the selection of focus groups, and the formulation of questionnaire questions. Also, the research papers increased my comprehension of the topic of my thesis. Each paper's summary review is provided below:

## 4.2 Association of Endometriosis with different factors

### (1)

The article named “**Evaluation of risk factors associated with endometriosis, in Canada 2004**” is a study done by Robert Hemmings et al. This study investigates the association between several factors such as demographics, personal habits, reproductive factors, menstrual characteristics, contraception, and clinical profile and the probability of having endometriosis.

In 10 clinical institutions in the Montreal area, a total of 2,777 subjects underwent surgery for diagnostic laparoscopy, tubal ligation, or hysterectomy between January 1998 and July 2002. Eight hundred ninety subjects were classified as cases based on of the presence of endometriotic lesions found at the time of surgery, whereas 1,881 controls had no surgical evidence of endometriosis.

The association between potential risk factors and endometriosis was estimated by Pearson  $\chi^2$  and by crude and adjusted odds ratios.

From that study results indicated a positive association between endometriosis and education level for subjects who underwent hysterectomy. An inverse relation between gravidity and endometriosis was also found within a subgroup of subjects who had diagnostic laparoscopy. Furthermore, the proportion of uterine leiomyoma was significantly higher in cases compared with in controls, among subjects who underwent surgery for diagnostic laparoscopy or hysterectomy but not for tubal ligation.

## (2)

The article named **“Management of Endometriosis in General Practice: The pathway to Diagnosis, in England 2007”** is a study done by Zoë Pugsley et al. This study investigates women's experiences of endometriosis from first presentation to diagnosis, The study is designed as a Retrospective analysis of data collected from primary care records in four general practices.

women with a Read Code diagnosis of endometriosis were recruited to the study. Details of consultations, investigations, and referrals related to endometriosis were recorded from the notes. Data were analyzed using descriptive statistics.

A total of 17740 women from all the practices were aged over 16 years. Computer searches identified 256 women as having a diagnosis of endometriosis, giving a prevalence of 1.44%. A third of women had consulted their GP six or more times before being diagnosed. Ultrasound was frequently requested by GPs but helped diagnose endometriosis in only 10.6% of women who underwent a scan. Thirty-nine percent of women were referred to gynecologists two or more times before a positive diagnosis was made. The median time

from first presentation with symptoms to diagnosis was 9.0 years (interquartile range = 4.5–13.5 years).

From that study, it was found that repeated consultations and negative investigations contribute to a median delay of 9.0 years before diagnosis of endometriosis. Further research into GPs' interpretation of symptoms and patients' experiences of negative investigations and consultations may lead to a more positive outcome for women with this condition.

### (3)

The article **“Risk Factors, Clinical Presentation, and Outcomes for Abdominal Wall Endometriosis, in Canada 2004”** is a study done by Zaraq Khan et al. This study evaluates the risk factors, presentation, and outcomes in cases of abdominal wall endometriosis, in an academic medical center.

In this study, cases underwent surgical excision for abdominal wall endometriosis at Mayo Clinic from January 1, 2000, through December 31, 2013. In 14 years, 2539 women had surgery for endometriosis at Mayo Clinic.

The study found that of these, only 34 (1.34%) had abdominal wall endometriosis. The mean age was  $35.2 \pm 5.9$  years, and the median parity was 2 (range, 0–5). Clinical examination diagnosed abdominal wall endometriosis in 41% of cases, with the cesarean delivery scar being the most common site (59%). There was a strong correlation between the size of the lesion on clinical examination compared with the size of the pathology specimen ( $r^2 = 0.74$ ,  $p < .001$ ). When compared with controls, cases had significantly higher parity and body mass index, more cyclic localized abdominal pain, less dysmenorrhea, longer duration from the start of symptoms to surgery, and more gynecologic surgeries for symptoms without cure. In the final multivariable model, cyclic localized abdominal pain, absence of dysmenorrhea, and previous laparotomy were independently associated with abdominal wall endometriosis with adjusted odds ratios of 10.6 (95% CI 1.85–104.4,  $p < .001$ ), 12.4 (95% CI 1.64–147.1,  $p <$

.001), and 70.1 (95% CI 14.8–597.7,  $p < .001$ ), respectively, with an area under the curve for the receiver operating characteristic of 0.94 (95% CI, 0.87–0.98). After excision of the disease, repeat surgery was needed in 2 (5.9%) patients with a median time to recurrence of 50.5 (range, 36–65) months.

This study demonstrated Abdominal wall endometriosis is a rare but unique form of endometriosis. Careful history and clinical examination can provide accurate diagnosis and avoid unnecessary delay before surgical intervention. Localized cyclic abdominal pain with the absence of dysmenorrhea and a history of prior laparotomy are independent risk factors with very high accuracy for diagnosis.

## **Chapter 5: Methodology**

## **5.1 Introduction**

"Research methodology" refers to the process of collecting data, evaluating it, and drawing conclusions about the subject being studied. A research technique is an essential component of any study plan. Developing and refining a methodology is crucial in achieving a study's objectives.

A valid and reliable research technique ensures that the conclusions drawn are based on solid scientific evidence. Furthermore, the specific details of the plan help researchers stay on track, resulting in a more efficient and less overwhelming process overall. The methodology used by a researcher provides insight into the thought process and procedures that led to the study's findings.

## **5.2 Aim of the study**

The objective set for this research are:

- To identify the risk factors contributing to endometriosis
- To determine the symptoms contributing to endometriosis.
- To find the clinical treatment for endometriosis in Bangladesh
- To find out the relationship between socio-demographic variables and endometriosis risk factors

## **5.3 Research Methodology**

A cross-sectional methodology to analyze the data, which is a form of descriptive study. For a cross-sectional study, a sizable sample of participants is collected at a specific time and location. These studies are non-invasive, gathering information without any attempt at modifying observable variables.

## **5.4 Ethical Statement**

Patients and/or their legal guardians gave their verbal agreement to participate in the study (in the case of minors). They were given a thorough background on the research and its purpose. The responders' names were also concealed.

## **5.5 Area of Study and Participants**

A cross-sectional descriptive study was done in three tertiary care hospitals in Bangladesh from February 2023 to February 2024. The hospitals were BIRDEM Women and Children Hospital, Shegunbagicha, Dhaka, Dhaka Central International Medical College & Hospital (DCIMCH), Mohammadpur & Kishorganj General Hospital, Kishorganj. Ethical committee clearance has been taken from the concerned authority. The research team was provided access to patient records and authorization to speak with the attending physician and other hospital staff. A total of 100 patients enrolled in this study. Most of the patients were enrolled during their outdoor consultation; in some cases, hospitalized patients have been enrolled in this study. The inclusion criteria of the study were reproductive-age women from 15- 45 years, diagnosed with endometriosis by clinical presentation and confirmed by ultrasonography/ laparoscopy. The patients clinically presented with dysmenorrhea but not confirmed by laparoscopy or ultrasound were excluded from the study.

## **5.6 Questionnaire**

For collecting data, a questionnaire was prepared where the participant's age, marital status, socioeconomic background, educational background, menstruation-related information, symptoms, complications, and risk factors were included. Participants who could read and write were given copies of the questionnaires to answer and return immediately, while those who could not write and their replies documented.

## **5.7 Statistical Analysis**

For the data analysis, Microsoft Excel and IBM SPSS 26 version were used. Descriptive statistics were used to assess the data gathered for this study. Descriptive statistics is the process of analyzing and using statistics that summarize information. A descriptive statistic is a summary statistic that describes features from a collection of information.



## **Chapter 6: Result**

Data from patient interviews was summarized and analyzed. The goal of this data analysis is to identify the prevalence of certain features among patients and to compare these frequencies among patients with different factors.

The total number of participants was 100 and patients who tested negative for Endometriosis were excluded from the study.

## 6.1 Association of Endometriosis with Socio-Demographic Factor:

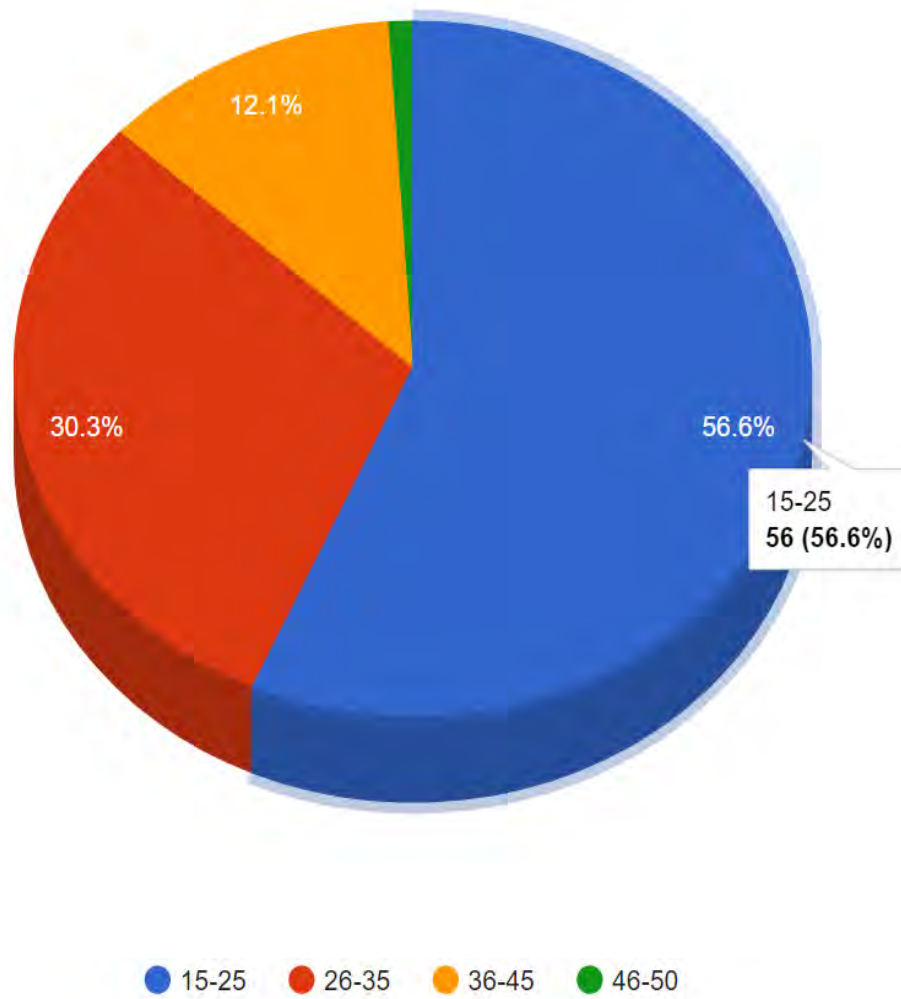
In this study, the prevalence of endometriosis was observed among various socio-demographic factors such as age, marital status, education, occupation, habitation, social status.

### 6.1.1 Distribution of Endometriosis Patient Based on Age:

**Table 3: Frequency Table Distribution of Age Among Endometriosis patient**

|              |              | Age        |              |               | Cumulative   |
|--------------|--------------|------------|--------------|---------------|--------------|
|              |              | Frequency  | Percent      | Valid Percent | Percent      |
| <b>Valid</b> | <b>15-25</b> | <b>56</b>  | <b>56.0</b>  | <b>56.0</b>   | <b>56.0</b>  |
|              | <b>26-35</b> | <b>30</b>  | <b>30.0</b>  | <b>30.0</b>   | <b>86.0</b>  |
|              | <b>36-45</b> | <b>12</b>  | <b>12.0</b>  | <b>12.0</b>   | <b>98.0</b>  |
|              | <b>46-50</b> | <b>2</b>   | <b>2.0</b>   | <b>2.0</b>    | <b>100.0</b> |
|              | <b>Total</b> | <b>100</b> | <b>100.0</b> | <b>100.0</b>  |              |

As visible in Table 3, this table contains the age variation among Endometriosis patients. Out of the 100 patients, 56 patients age range between 15-25 have Endometriosis which is 56% out of 100. 30% of patients aged between 26-35 have Endometriosis. 12 patients aged between 36-45 have Endometriosis which is 12 percent. and only 2 people out of 100, ages between 46 and 50 have Endometriosis which is only 2% of the total. Most women who were Endometriosis patients were in their early 15s.



**Figure 4: Distribution of Age Among Endometriosis patient**

### 6.1.2 Distribution of Endometriosis Patient Based on marital status:

Table 4: Frequency Table Distribution of marital status Among Endometriosis patient

|       |           | Marital status |         |               | Cumulative |
|-------|-----------|----------------|---------|---------------|------------|
|       |           | Frequency      | Percent | Valid Percent | Percent    |
| Valid | Married   | 63             | 63.0    | 63.0          | 63.0       |
|       | Unmarried | 37             | 37.0    | 37.0          | 100.0      |
|       | Total     | 100            | 100.0   | 100.0         |            |

As illustrated in Table 4, 63% diagnosed Endometriosis patients were married and trying to conceive and 37% diagnosed Endometriosis patients were unmarried

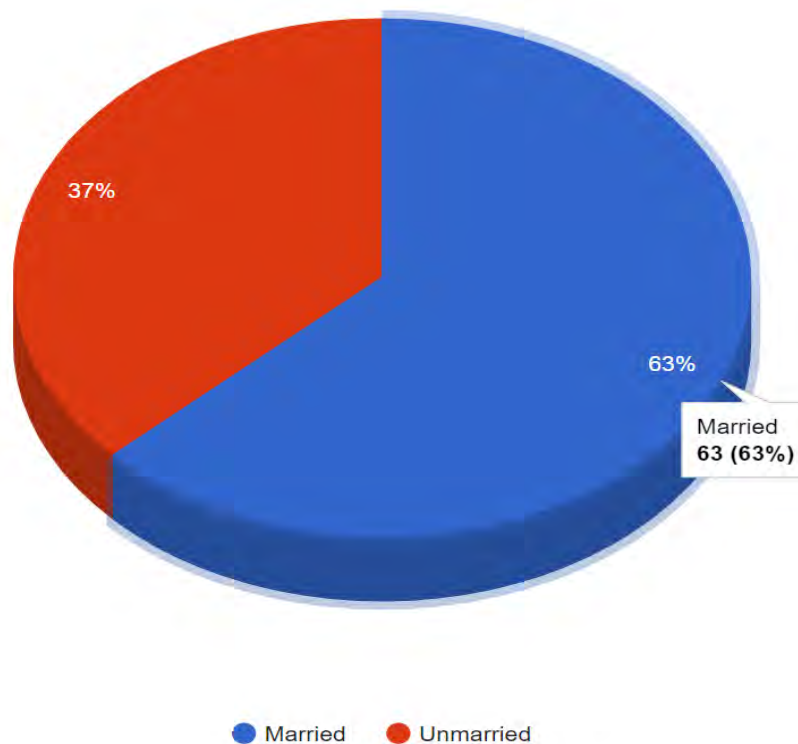


Figure 5: Distribution of Endometriosis Patient Based on marital status

### 6.1.3 Distribution of Endometriosis Patient Based on Occupation:

Table 5: Frequency Table Distribution of occupation Among Endometriosis patient

|       |                | Occupation |         |               | Cumulative Percent |
|-------|----------------|------------|---------|---------------|--------------------|
|       |                | Frequency  | Percent | Valid Percent |                    |
| Valid | House wife     | 42         | 42.0    | 42.0          | 42.0               |
|       | Service holder | 29         | 29.0    | 29.0          | 71.0               |
|       | Student        | 29         | 29.0    | 29.0          | 100.0              |
| Total |                | 100        | 100.0   | 100.0         |                    |

Table 5 contains distribution according to the Occupation of the Endometriosis patients, it was found that around 42% were housewives, followed by 29% being service holders and only 29 % were students. so, from the analysis, we can see a maximum of the patients were housewives and the minimum were students.

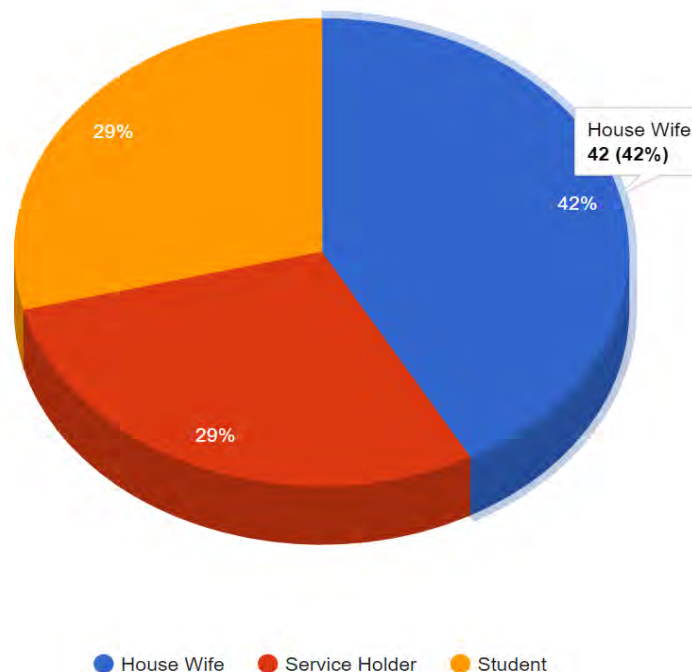


Figure 6: Distribution of Endometriosis Patient Based on Occupation

### 6.1.4 Distribution of Endometriosis Patient Based on Habitation:

Table 6: Frequency Table Distribution of habitation Among Endometriosis patient

|       |       | Habitation |         |               | Cumulative Percent |
|-------|-------|------------|---------|---------------|--------------------|
|       |       | Frequency  | Percent | Valid Percent |                    |
| Valid | Urban | 59         | 59.0    | 59.0          | 59.0               |
|       | Rural | 41         | 41.0    | 41.0          | 100.0              |
|       | Total | 100        | 100.0   | 100.0         |                    |

Table 6 contains distribution of habitation among Endometriosis patients. Out of the 100 patients 59 used to live in urban areas with a percentage of 59 out of 100. And 41 out 100 used to live in rural areas with a percentage of 41. So, from this analysis we see that the number of patients living in cities is the highest.

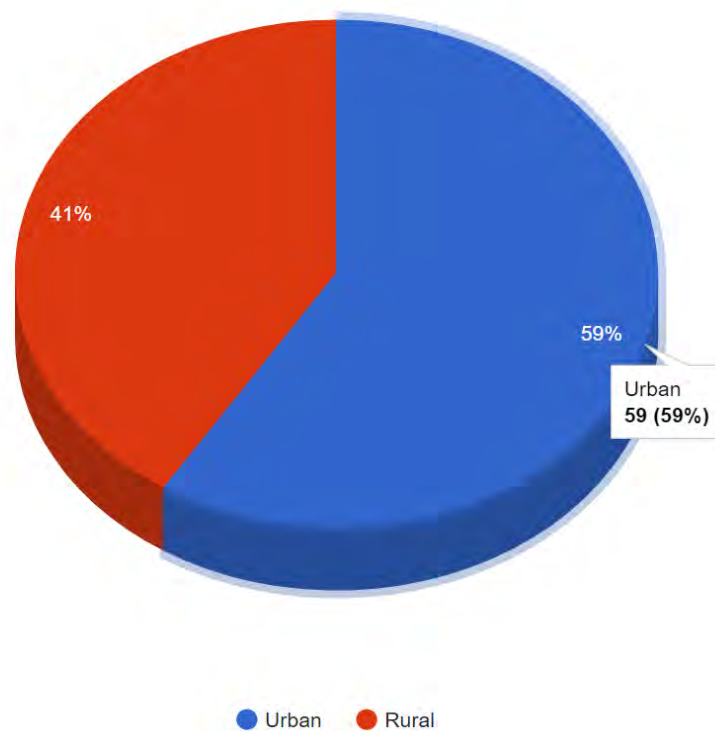


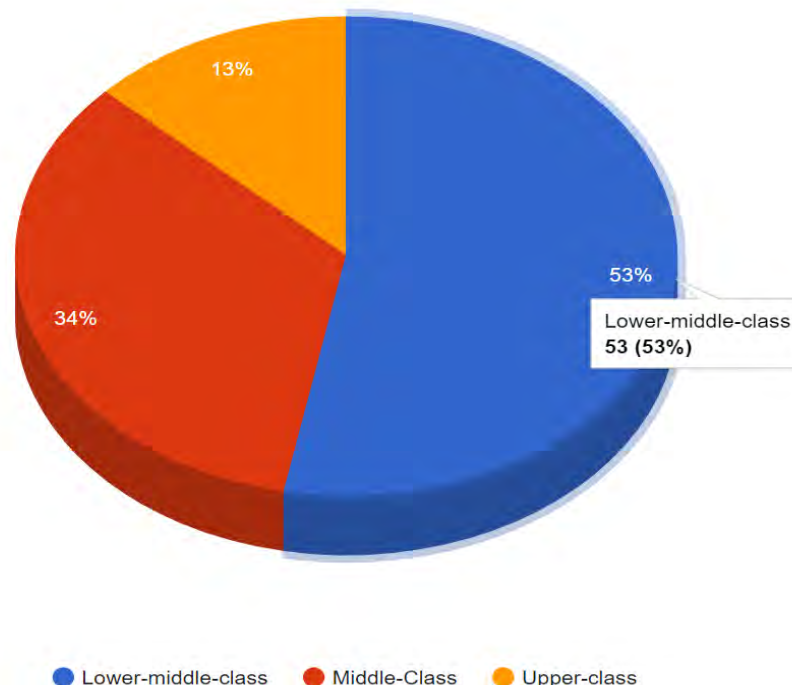
Figure 7: Distribution of Endometriosis Patient Based on Habitation.

### 6.1.5 Distribution of Endometriosis Patient Based on Social status

**Table 7: Frequency Table Distribution of Social Status Among Endometriosis patient**

|       |                    | Social status |         |               | Cumulative Percent |
|-------|--------------------|---------------|---------|---------------|--------------------|
|       |                    | Frequency     | Percent | Valid Percent |                    |
| Valid | Lower Middle Class | 53            | 53.0    | 53.0          | 53.0               |
|       | Middle Class       | 34            | 34.0    | 34.0          | 87.0               |
|       | Upper Class        | 13            | 13.0    | 13.0          | 100.0              |
| Total |                    | 100           | 100.0   | 100.0         |                    |

Table 7 is the distribution of Social status among Endometriosis patients. Here, 53 percent which is 53 patients out of 100 were from lower middle class. 34 percent which is 34 out of 100 people were from middle class. 13 percent which is only 13 people out of 100 were from upper class. So, from this analysis we see that the number of patients from lower middle class is the highest.



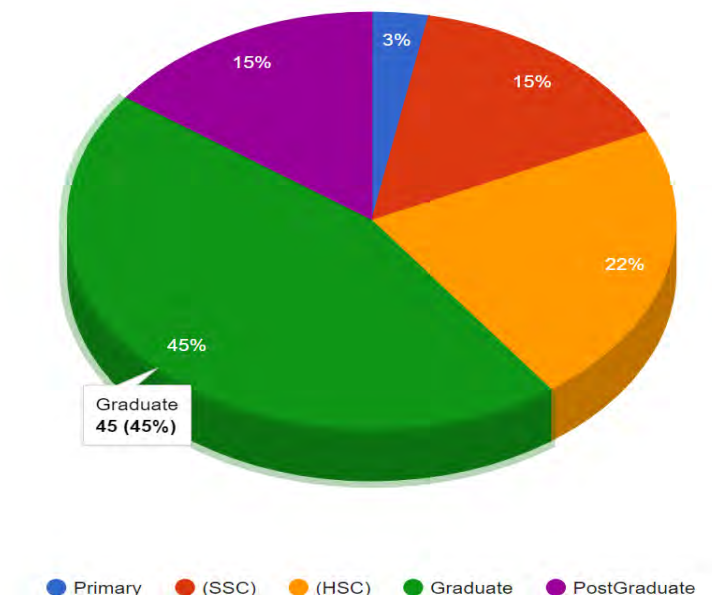
**Figure 8: Distribution of Endometriosis Patient Based on Social status.**

### 6.1.6 Distribution of Endometriosis Patient Based on Education

**Table 8: Frequency Table Distribution of Education Among Endometriosis patient**

|       |                       | Educational Background |            |               | Cumulative Percent |
|-------|-----------------------|------------------------|------------|---------------|--------------------|
|       |                       | Frequency              | Percent    | Valid Percent |                    |
| Valid | Primary               | 3                      | 3.0        | 3.0           | 3.0                |
|       | Secondary(SSC)        | 15                     | 15.0       | 15.0          | 18.0               |
|       | Higher Secondary(HSC) | 22                     | 22.0       | 22.0          | 40.0               |
|       | Graduate              | 45                     | 45.0       | 45.0          | 85.0               |
|       | Post Graduate         | 15                     | 15.0       | 15.0          | 100.0              |
|       | <b>Total</b>          |                        | <b>100</b> | <b>100.0</b>  | <b>100.0</b>       |

From Table 8, the Education distribution of Endometriosis patients was depicted where 3% of patients studied till class 5. 15% of patients studied secondary class 6 to 10. 22% studied till college. 45% of patients were graduates and only 15% of patients were postgraduates. So, the highest percentage of patients having Endometriosis were graduated.



**Figure 9: Distribution of Endometriosis Patient Based on Education.**



## 6.2 Distribution of study Population according to Socio-demographic variables:

**Table 9: Frequency Table Distribution according to Socio-demographic variables**

|                |                | <b>Statistics</b>             |                   |                      |                       |                   |             |
|----------------|----------------|-------------------------------|-------------------|----------------------|-----------------------|-------------------|-------------|
|                |                | <b>Educational Background</b> | <b>Habitation</b> | <b>Social status</b> | <b>Marital status</b> | <b>Occupation</b> | <b>Age</b>  |
| <b>N</b>       | <b>Valid</b>   | <b>100</b>                    | <b>100</b>        | <b>100</b>           | <b>100</b>            | <b>100</b>        | <b>100</b>  |
|                | <b>Missing</b> | <b>0</b>                      | <b>0</b>          | <b>0</b>             | <b>0</b>              | <b>0</b>          | <b>0</b>    |
| <b>Mean</b>    |                | <b>3.54</b>                   | <b>1.41</b>       | <b>2.60</b>          | <b>1.37</b>           | <b>1.87</b>       | <b>1.60</b> |
| <b>Mode</b>    |                | <b>4</b>                      | <b>1</b>          | <b>2</b>             | <b>1</b>              | <b>1</b>          | <b>1</b>    |
| <b>Minimum</b> |                | <b>1</b>                      | <b>1</b>          | <b>2</b>             | <b>1</b>              | <b>1</b>          | <b>1</b>    |
| <b>Maximum</b> |                | <b>5</b>                      | <b>2</b>          | <b>4</b>             | <b>2</b>              | <b>3</b>          | <b>4</b>    |

According to Table 9, it summarizes the distribution according to Socio-demographic variables such as age, education, occupation, habitation, etc. Moreover, for each socio-demographic factor, respective mean, range, maximum and minimum are given here.

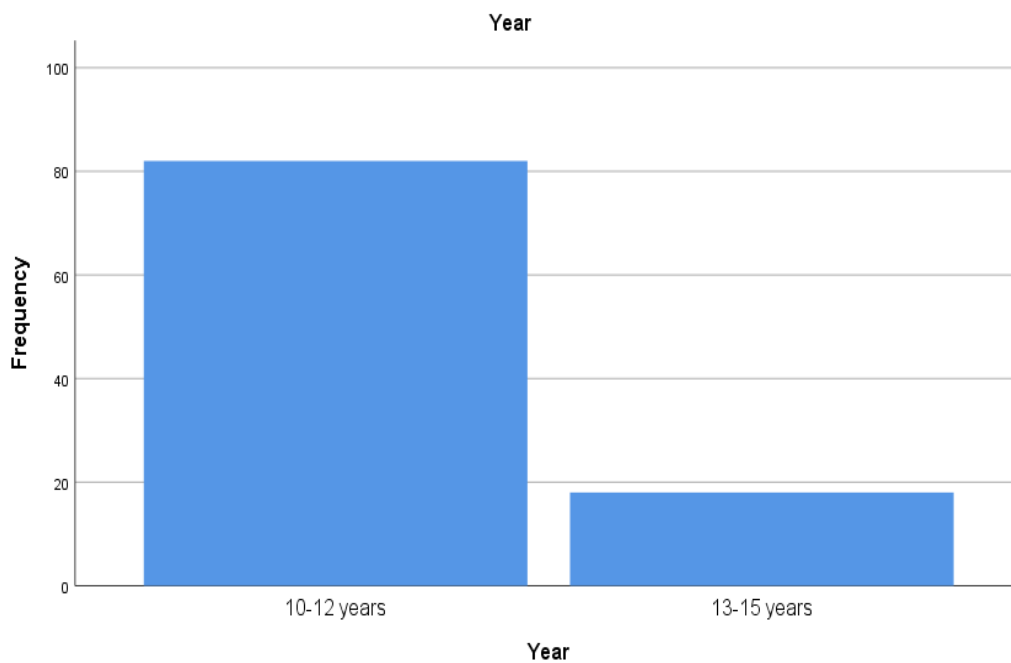
### 6.3 Association of Endometriosis with Risk Factors:

#### 6.3.1 Distribution of Endometriosis Patient Based on Early age at menarche:

**Table 10: Frequency Table Distribution of Endometriosis Patient Based on Early Age at Menarche**

|       |              | Early age at menarche |              |               | Cumulative Percent |
|-------|--------------|-----------------------|--------------|---------------|--------------------|
|       |              | Frequency             | Percent      | Valid Percent |                    |
| Valid | 10-12 years  | 82                    | 82.0         | 82.0          | 82.0               |
|       | 13-15 years  | 18                    | 18.0         | 18.0          | 100.0              |
|       | <b>Total</b> | <b>100</b>            | <b>100.0</b> | <b>100.0</b>  |                    |

Table 10 distribution of endometriosis patients based in early age at menarche showed that among 100 participants 82% have menarche at the age between 10 to 12. Whereas 18% have menarche at the age between 13 to 15. So we can say that no patients have an early age menarche



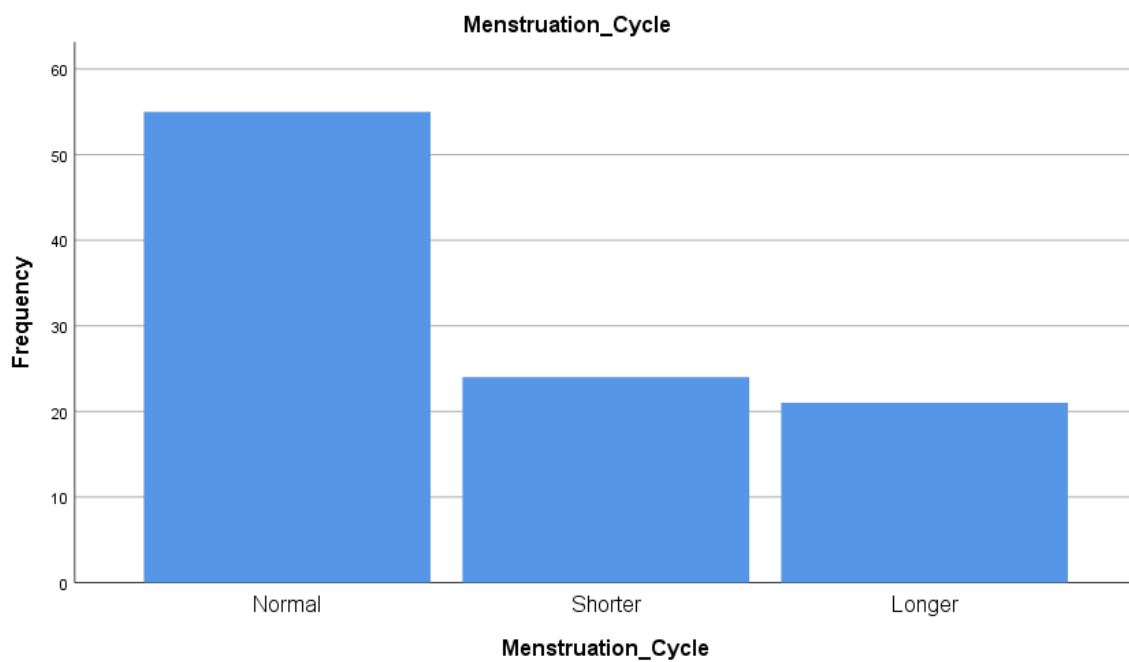
**Figure 10: Distribution of Endometriosis Patient Based on Early age at menarche**

### 6.3.2 Distribution of Endometriosis Patient Based on Menstruation cycle

**Table 11: Frequency Table Distribution of Endometriosis Patient Based on menstruation cycle**

|       |         | Menstruation Cycle |         |               | Cumulative |
|-------|---------|--------------------|---------|---------------|------------|
|       |         | Frequency          | Percent | Valid Percent | Percent    |
| Valid | Normal  | 55                 | 55.0    | 55.0          | 55.0       |
|       | Shorter | 24                 | 24.0    | 24.0          | 79.0       |
|       | Longer  | 21                 | 21.0    | 21.0          | 100.0      |
|       | Total   | 100                | 100.0   | 100.0         |            |

Table 11 Distribution of Endometriosis Patient Based on menstruation cycle showed that 55% of patients have normal menstruation cycle, 24% of patients have shorter menstruation cycle, 21% of patients have longer menstruation cycle. so we can say that prevalence of endometriosis is higher in women with normal menstruation cycle.



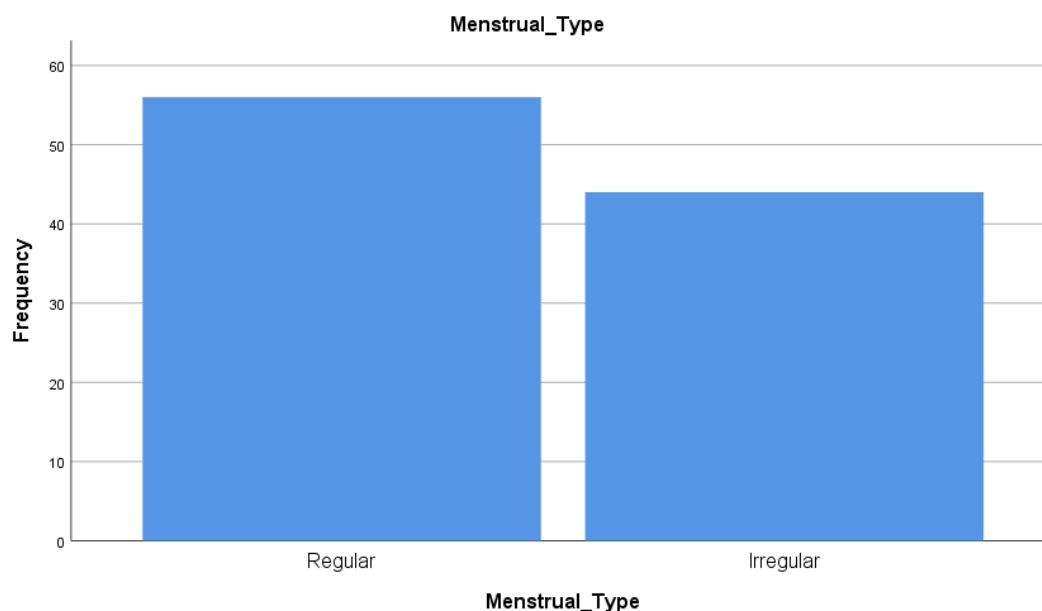
**Figure 11: Distribution of Endometriosis Patient Based on Menstruation cycle**

### 6.3.3 Distribution of Endometriosis Patient Based on Menstruation Type

**Table 12: Frequency Table Distribution of Endometriosis Patient Based on Menstruation Type**

|       |           | Menstrual Type |         |               | Cumulative Percent |
|-------|-----------|----------------|---------|---------------|--------------------|
|       |           | Frequency      | Percent | Valid Percent |                    |
| Valid | Regular   | 56             | 56.0    | 56.0          | 56.0               |
|       | Irregular | 44             | 44.0    | 44.0          | 100.0              |
|       | Total     | 100            | 100.0   | 100.0         |                    |

Table 12 distribution of endometriosis patient based on menstruation type showed that 56% of women have regular menstruation and 44% of women have irregular menstruation. So we can that prevalence of endometriosis is higher in both regular and irregular menstruation.



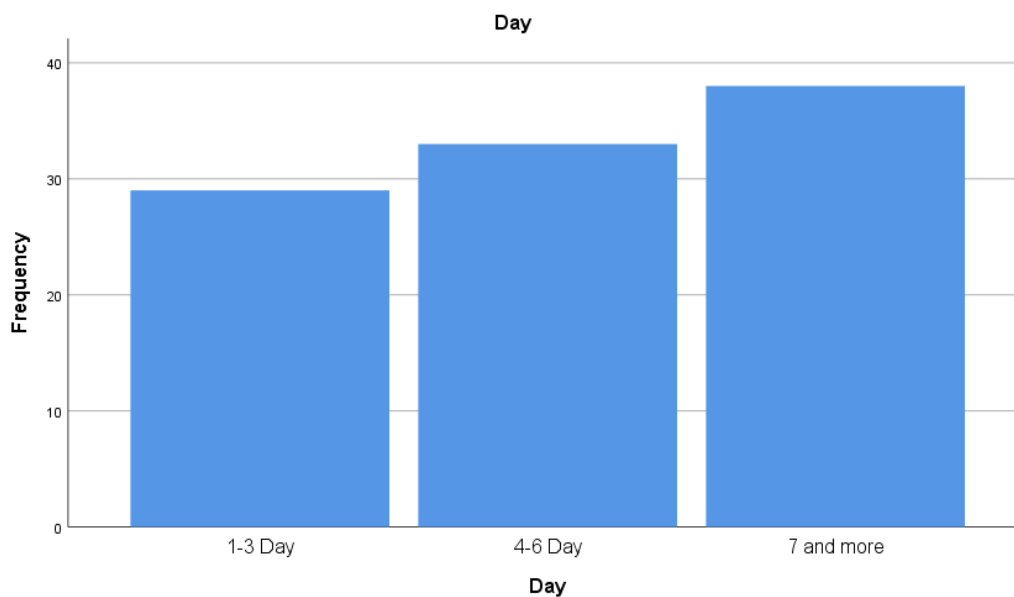
**Figure 12: Distribution of Endometriosis Patient Based on Menstruation Type**

### 6.3.4 Distribution of Endometriosis Patient Based on Menstrual Flow

**Table 13: Frequency Table Distribution of Endometriosis Patient Based on Menstrual Flow**

|       |              | Menstrual Flow |              |               | Cumulative Percent |
|-------|--------------|----------------|--------------|---------------|--------------------|
|       |              | Frequency      | Percent      | Valid Percent |                    |
| Valid | 1-3 Day      | 29             | 29.0         | 29.0          | 29.0               |
|       | 4-6 Day      | 33             | 33.0         | 33.0          | 62.0               |
|       | 7 and more   | 38             | 38.0         | 38.0          | 100.0              |
|       | <b>Total</b> | <b>100</b>     | <b>100.0</b> | <b>100.0</b>  |                    |

Table 13 distribution of endometriosis patient based on heavy period that last longer than seven days showed that 38% of women have period seven days and longer than seven days, 33% of women have period 4 to 6 day, and 29% women have period 1 to 3 day. So we can say that prevalence of endometriosis is higher with women who have period last longer than seven days.



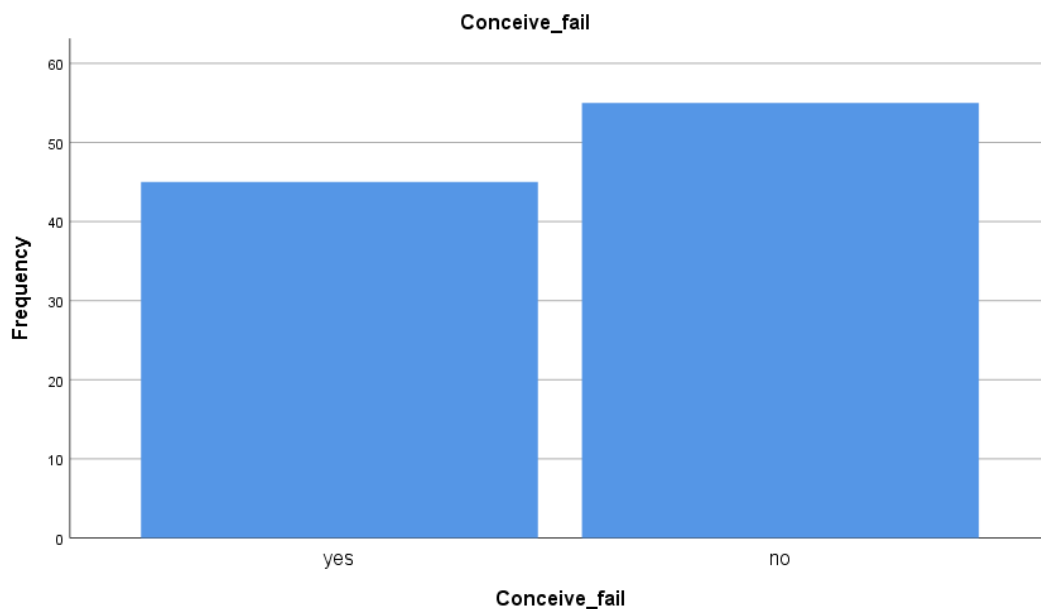
**Figure 13: Distribution of Endometriosis Patient Based on Menstrual Flow**

### 6.3.5 Distribution of Endometriosis Patient Based on Infertility

**Table 14: Frequency Table Distribution of Endometriosis Patient Based on Infertility**

|       |       | Infertility |         |               | Cumulative Percent |
|-------|-------|-------------|---------|---------------|--------------------|
|       |       | Frequency   | Percent | Valid Percent |                    |
| Valid | yes   | 45          | 45.0    | 45.0          | 45.0               |
|       | no    | 55          | 55.0    | 55.0          | 100.0              |
|       | Total | 100         | 100.0   | 100.0         |                    |

Table 14 distribution of endometriosis patient based on infertility showed that 45% of patients experienced infertility, whereas 55% do not. So we can say that endometriosis has a relationship with infertility as a risk factor.



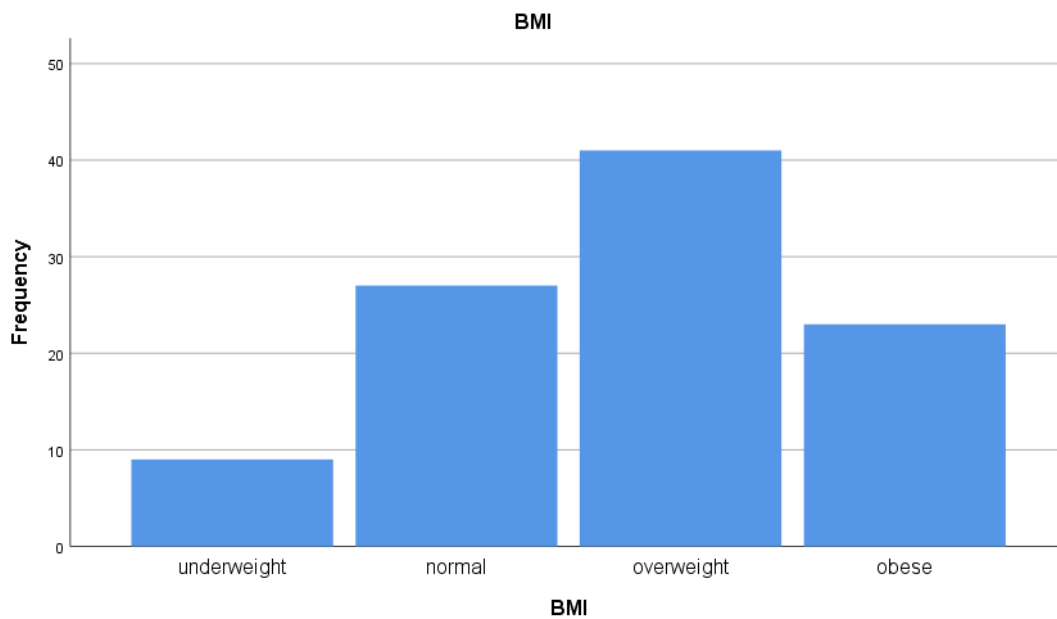
**Figure 14: Distribution of Endometriosis Patient Based on Infertility**

### 6.3.6 Distribution of Endometriosis Patient Based on Body Mass Index (BMI)

**Table 15: Frequency Table Distribution of Endometriosis Patient Based on Body Mass Index (BMI)**

| Valid |              | BMI        |              |               | Cumulative Percent |
|-------|--------------|------------|--------------|---------------|--------------------|
|       |              | Frequency  | Percent      | Valid Percent |                    |
|       | underweight  | 9          | 9.0          | 9.0           | 9.0                |
|       | normal       | 27         | 27.0         | 27.0          | 36.0               |
|       | overweight   | 41         | 41.0         | 41.0          | 77.0               |
|       | obese        | 23         | 23.0         | 23.0          | 100.0              |
|       | <b>Total</b> | <b>100</b> | <b>100.0</b> | <b>100.0</b>  |                    |

Table 14 distribution of endometriosis patients based on Body Mass Index Shows that 9% of women are underweight, 27% of women have normal weight, 41% of women are overweight and 23% of women are obese. So we can say that the prevalence of endometrioses is higher in overweight women.



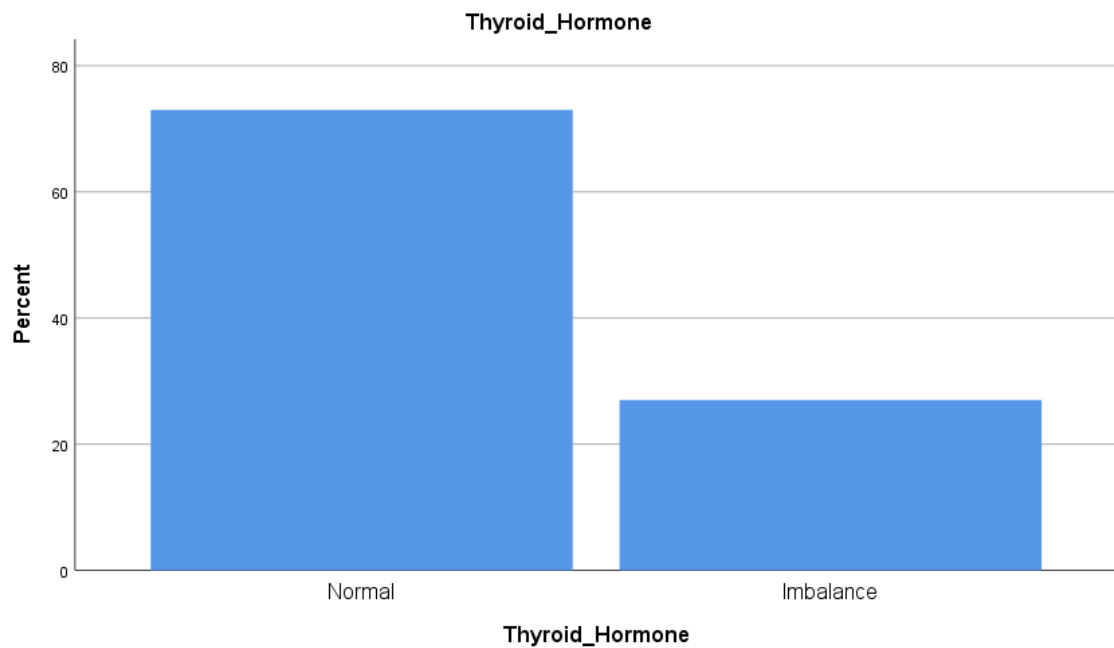
**Figure 15 : Distribution of Endometriosis Patient Based on Body Mass Index (BMI)**

### 6.3.7 Distribution of Endometriosis Patient Based on Thyroid Hormone

**Table 16: Frequency Table Distribution of Endometriosis Patient Based on thyroid hormone**

|       |           | Thyroid Hormone |         |               | Cumulative Percent |
|-------|-----------|-----------------|---------|---------------|--------------------|
|       |           | Frequency       | Percent | Valid Percent |                    |
| Valid | Normal    | 73              | 73.0    | 73.0          | 73.0               |
|       | Imbalance | 27              | 27.0    | 27.0          | 100.0              |
| Total |           | 100             | 100.0   | 100.0         |                    |

Table 14 distribution of endometriosis patients based on thyroid hormone showed that 73% of women have normal thyroid hormone. Whereas 27% women have imbalance thyroid hormone.



**Figure 16: Distribution of Endometriosis Patient Based on Thyroid Hormone**



### 6.3.8 Distribution of Endometriosis according to the Risk Factors

**Table 17: Frequency Table Distribution of Endometriosis Patient Based on Their Risk Factors**

| <b>Variable</b>       | <b>Group</b>   | <b>N(%)</b> |
|-----------------------|----------------|-------------|
| Menstruation Flow     | 1-3 day        | 29%         |
|                       | 4-6 day        | 33%         |
|                       | 7 and more     | 38%         |
| Menstruation Type     | Regular        | 56%         |
|                       | Irregular      | 44%         |
| Infertility           | Yes            | 45%         |
|                       | No             | 55%         |
| BMI                   | Underweight    | 9%          |
|                       | Normal         | 27%         |
|                       | Overweight     | 41%         |
|                       | Obese          | 23%         |
| Thyroid Hormone       | Normal         | 73%         |
|                       | Hypothyroidism | 10%         |
|                       | Hypothyroidism | 17%         |
| Early age at menarche | 10- 12 years   | 82%         |
|                       | 13-15 years    | 18%         |
| Menstruation Cycle    | Normal         | 55%         |
|                       | Shorter        | 24%         |
|                       | Longer         | 21%         |

Table 17 summarizes the distribution of the Risk factors among the Endometriosis patients and displays the percentages in which they are present.

### 6.3.9 Statistical Distribution of Endometriosis according to the Risk Factors

**Table 18: Statistical Distribution of Endometriosis according to the Risk Factors**

|  | <b>t</b>       | <b>df</b> | <b>P value<br/>Sig. (2-<br/>tailed)</b> | <b>Mean<br/>Difference</b> | <b>95% Confidence Interval<br/>of the Difference</b> |              |
|--|----------------|-----------|---|----------------------------|--|--------------|
|  |                |           |   |                            | <b>Lower</b>   | <b>Upper</b> |
| <b>Normal<br/>Menstruation<br/>Cycle</b> | <b>8.181</b>   | <b>99</b> | <b>.000</b>                             | <b>.66000</b>              | <b>.4999</b>   | <b>.8201</b> |
| <b>Irregular<br/>Menstruation</b>        | <b>-11.225</b> | <b>99</b> | <b>.000</b>                             | <b>-.560</b>               | <b>-.66</b>  | <b>-.46</b>  |
| <b>Linger<br/>Menstruation<br/>Flow</b>  | <b>-11.129</b> | <b>99</b> | <b>.000</b>                             | <b>-.910</b>               | <b>-1.07</b>   | <b>-.75</b>  |
| <b>Infertility</b>                       | <b>11.000</b>  | <b>99</b> | <b>.000</b>                             | <b>.550</b>                | <b>.45</b>   | <b>.65</b>   |
| <b>Imbalance<br/>Thyroid<br/>Hormone</b> | <b>-16.361</b> | <b>99</b> | <b>.000</b>                             | <b>-.730</b>               | <b>-.82</b>  | <b>-.64</b>  |
| <b>Over weight</b>                       | <b>-2.430</b>  | <b>99</b> | <b>.017</b>                             | <b>-.220</b>               | <b>-.40</b>  | <b>-.04</b>  |

Table 18 show the statistical significant of all risk factors that find by this study. Table 18 show the statistical significant of all risk factors that find by this study. we find that all risk factors are significant.

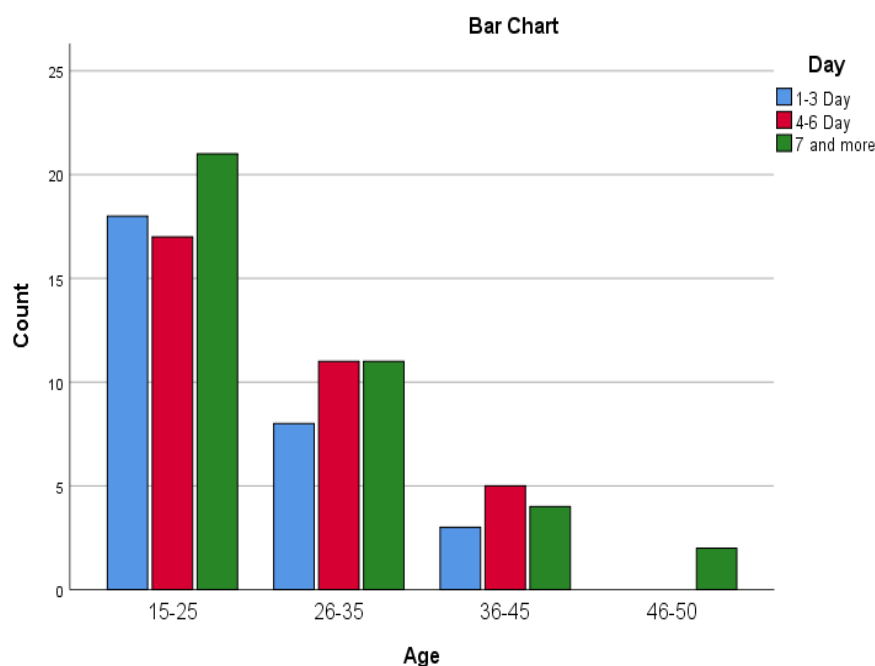
## 6.4 Crosstab analysis of Endometriosis patient's age with the risk factors

**Table 19: Crosstab Distribution of Endometriosis Patient Age Early Menstruation Flow**

**Age \* Menstruation Flow Day Cross tabulation**

|       |       | Day     |         |            | Total  |
|-------|-------|---------|---------|------------|--------|
|       |       | 1-3 Day | 4-6 Day | 7 and more |        |
| Age   | 15-25 | 18.0%   | 17.0%   | 21.0%      | 56.0%  |
|       | 26-35 | 8.0%    | 11.0%   | 11.0%      | 30.0%  |
|       | 36-45 | 3.0%    | 5.0%    | 4.0%       | 12.0%  |
|       | 46-50 |         |         | 2.0%       | 2.0%   |
| Total |       | 29.0%   | 33.0%   | 38.0%      | 100.0% |

Table 18 show the crosstab distribution of Endometriosis patients based on menstrual Flow. 1-3 days' menstrual flow is 18%,8%, 3% of endometriosis patients aged 15-25,25-36, 36-45. Four to six days of menstruation flow are present in 17%,11%, and 5% of women with endometriosis and those aged between 15-25, 26-35, and 36-45 respectively. Menstrual flow of seven days or more occurred in 21%, 11%, 4%, and 2% of women with endometriosis who's aged between 15 to 25, 26 to 35, 36 to 45, and 46 to 5, respectively.

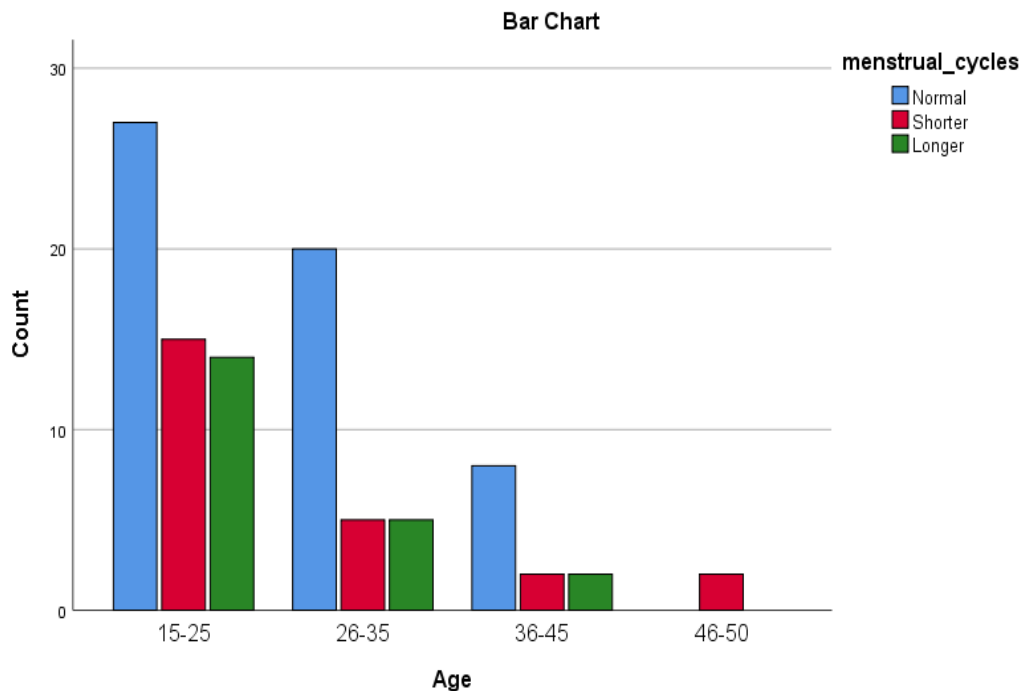


**Figure 17: Crosstab Distribution of Endometriosis Patient Age Early Menstruation Flow**

**Table 20: Crosstab Distribution of Endometriosis Patient Age with Menstruation cycle**

|       |       | Menstruation cycle |         |        | Total  |
|-------|-------|--------------------|---------|--------|--------|
|       |       | Normal             | Shorter | Longer |        |
| Age   | 15-25 | 27.0%              | 15.0%   | 14.0%  | 56.0%  |
|       | 26-35 | 20.0%              | 5.0%    | 5.0%   | 30.0%  |
|       | 36-45 | 8.0%               | 2.0%    | 2.0%   | 12.0%  |
|       | 46-50 |                    | 2.0%    |        | 2.0%   |
| Total |       | 55.0%              | 24.0%   | 21.0%  | 100.0% |

Table 19 showed that normal menstruation Flow is 27%, 20%, and 8% respectively at the ages of 15-25, 26-35, and 36-45. Shorter menstruation cycle 15%, 5%, 2%, 2% respectively at the age of 15-25, 26-35, 36-45, 46-50. Longer menstruation cycle of 14%, 5%, and 2% respectively at ages of 15-25, 26-35, and 36-45.

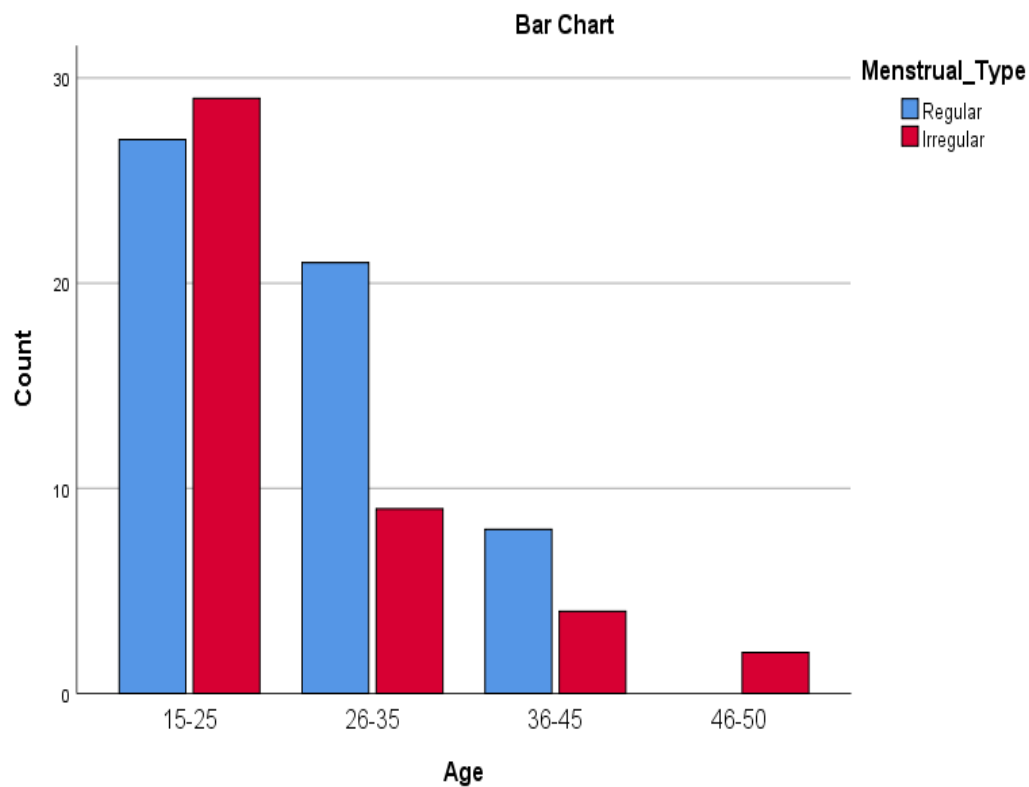


**Figure 18: Crosstab Distribution of Endometriosis Patients age with Menstruation Cycle.**

**Table 21: Crosstab Distribution of Endometriosis Patient Age with Menstruation Type**

| Age          | Menstrual Type |              | Total         |
|--------------|----------------|--------------|---------------|
|              | Regular        | Irregular    |               |
| 15-25        | 27.0%          | 29.0%        | 56.0%         |
| 26-35        | 21.0%          | 9.0%         | 30.0%         |
| 36-45        | 8.0%           | 4.0%         | 12.0%         |
| 46-50        |                | 2.0%         | 2.0%          |
| <b>Total</b> | <b>56.0%</b>   | <b>44.0%</b> | <b>100.0%</b> |

Table 20 showed that regular menstruation rates are 27%, 21%, and 8%, respectively, for ages 15-25, 26-25, and 36-45. Irregular menstruation occurs in 29%, 9%, 4%, and 2% of women aged 15-25, 26-25, 36-45, and 46-50, respectively.

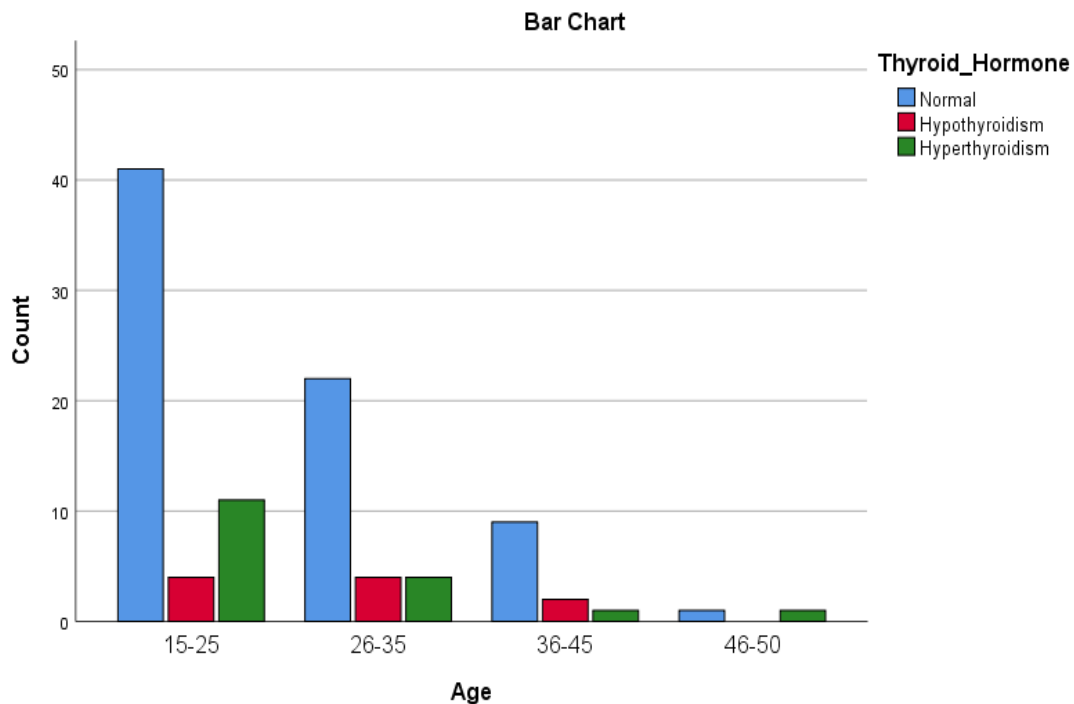


**Figure 19: Crosstab Distribution of Endometriosis Patients age with Menstruation Type.**

**Table 22: Crosstab Distribution of Endometriosis Patient Age with Thyroid Hormone**

| Age          | Thyroid Hormone |                |                 | Total         |
|--------------|-----------------|----------------|-----------------|---------------|
|              | Normal          | Hypothyroidism | Hyperthyroidism |               |
| 15-25        | 41.0%           | 4.0%           | 11.0%           | 56.0%         |
| 26-35        | 22.0%           | 4.0%           | 4.0%            | 30.0%         |
| 36-45        | 9.0%            | 2.0%           | 1.0%            | 12.0%         |
| 46-50        | 1.0%            |                | 1.0%            | 2.0%          |
| <b>Total</b> | <b>73.0%</b>    | <b>10.0%</b>   | <b>17.0%</b>    | <b>100.0%</b> |

Normal thyroid hormone has 41%, 22%, 9%, and 1% respectively at ages of 15-25, 26-35, 36-45, and 46-50. Hypothyroidism has 4%, 4%, and 2%, respectively at ages of 15-25, 26-35, and 36-45. Hyperthyroidism has 11%, 4%, 1%, and 1% respectively at ages of 15-25, 26-35, 36-45 & 46-50



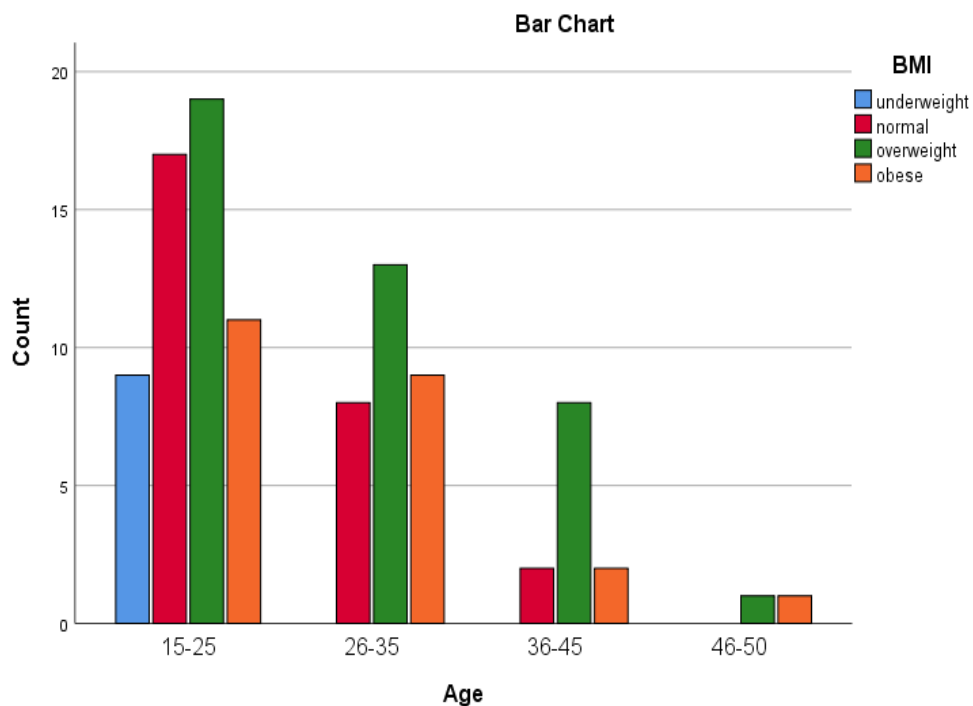
**Figure 20: Crosstab Distribution of Endometriosis Patients age with Thyroid Hormone**

**Table 23: Crosstab Distribution of Endometriosis Patient Based on Age with BMI**

**Age \* BMI Cross tabulation**

|       |       | BMI         |        |            |       | Total  |
|-------|-------|-------------|--------|------------|-------|--------|
|       |       | underweight | normal | overweight | obese |        |
| Age   | 15-25 | 9.0%        | 17.0%  | 19.0%      | 11.0% | 56.0%  |
|       | 26-35 |             | 8.0%   | 13.0%      | 9.0%  | 30.0%  |
|       | 36-45 |             | 2.0%   | 8.0%       | 2.0%  | 12.0%  |
|       | 46-50 |             |        | 1.0%       | 1.0%  | 2.0%   |
| Total |       | 9.0%        | 27.0%  | 41.0%      | 23.0% | 100.0% |

Table 23 showed that only 9 percent of people between 15-25 were underweight. 17%, 8% and 2% of patients between 15-25, 26-35, 36-45 were of normal weight. 19%, 13%, 8% and 1% of patients between 15-25, 26-35, 36-45 and 46-50 were overweight. And only 11 %, 9%, 2%, and 1% patients age between 15-25, 26-35 and 36-45 were obese.



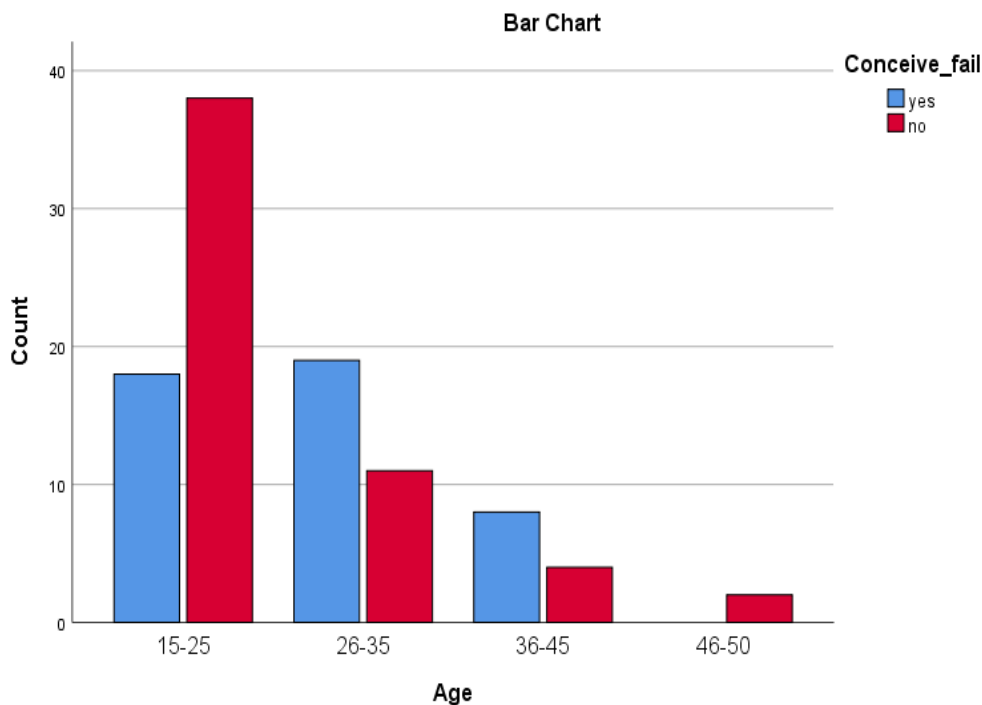
**Figure 21: Crosstab Distribution of Endometriosis Patients age with BMI**

**Table 24: Crosstab Distribution of Endometriosis Patient Based on Age with Infertility**

**Age \* Infertility Cross tabulation**

|       |       | Infertility |       | Total  |
|-------|-------|-------------|-------|--------|
|       |       | yes         | no    |        |
| Age   | 15-25 | 18.0%       | 38.0% | 56.0%  |
|       | 26-35 | 19.0%       | 11.0% | 30.0%  |
|       | 36-45 | 8.0%        | 4.0%  | 12.0%  |
|       | 46-50 |             | 2.0%  | 2.0%   |
| Total |       | 45.0%       | 55.0% | 100.0% |

Table 23 showed that 19% of patients who experience infertility are in the age range of 26 to 35 which is the peak and 18% of patients who are experiencing infertility are in the age group of 15 to 25. At least 8% of patients with infertility were between the ages of 36 to 45. The study also found that patients between 46 and 50 had no problems.



**Figure 22: Crosstab Distribution of Endometriosis Patient Based on Age with Infertility**

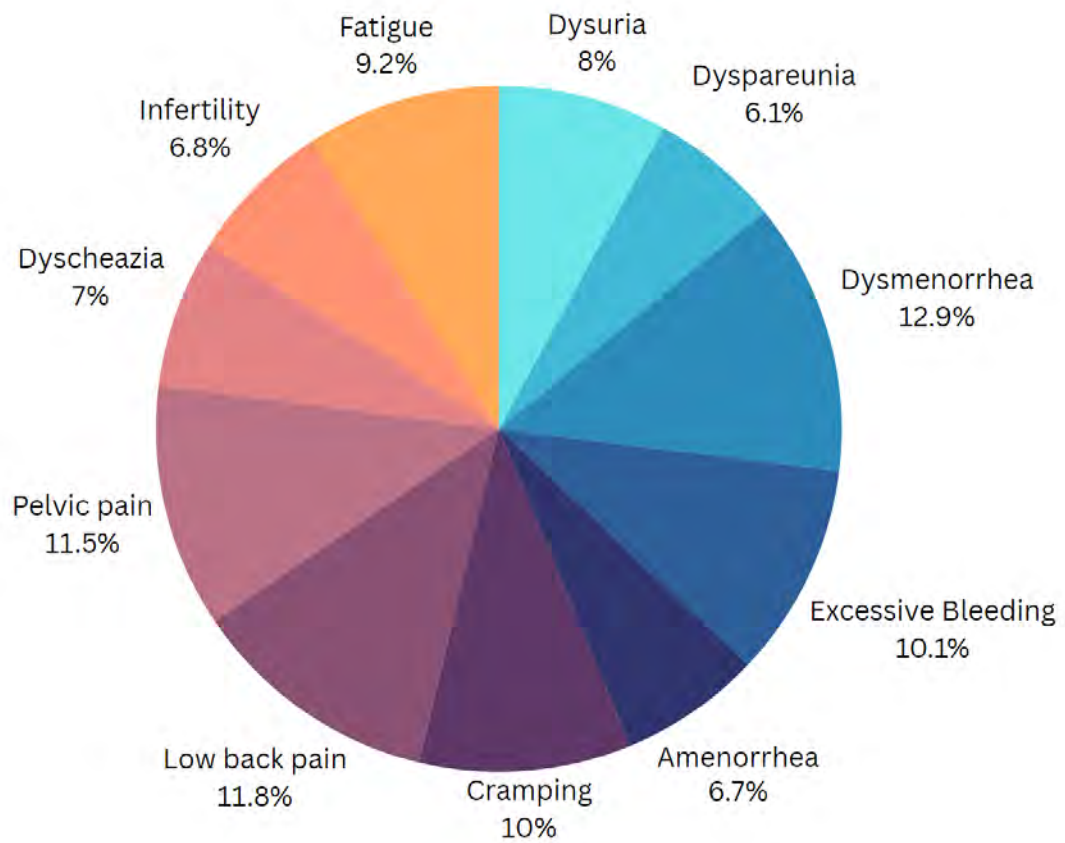


## 6.5 Association of Endometriosis with Symptom

**Table 25: Frequency Table Distribution of Endometriosis Patient Based on Symptom**

|                    | Symptom Frequencies |               | Percent of Cases |
|--------------------|---------------------|---------------|------------------|
|                    | N                   | Percent       |                  |
| Dysuria            | 53                  | 8.0%          | 53.0%            |
| Dyspareunia        | 40                  | 6.1%          | 40.0%            |
| Dysmenorrhea       | 85                  | 12.9%         | 85.0%            |
| Excessive Bleeding | 67                  | 10.1%         | 67.0%            |
| Amenorrhea         | 44                  | 6.7%          | 44.0%            |
| Cramping           | 66                  | 10.0%         | 66.0%            |
| Low back pain      | 78                  | 11.8%         | 78.0%            |
| Pelvic pain        | 76                  | 11.5%         | 76.0%            |
| Dyscheazia         | 46                  | 7.0%          | 46.0%            |
| Infertility        | 45                  | 6.8%          | 45.0%            |
| Fatigue            | 61                  | 9.2%          | 61.0%            |
| <b>Total</b>       | <b>661</b>          | <b>100.0%</b> | <b>661.0%</b>    |

Table 25, Frequency Table Distribution of Endometriosis Patient Based on Symptom shows that, among 100 participants, 6.1% have Dyspareunia, 12.9% have Dysmenorrhea, 10.1% have Excessive Bleeding, 6.7% Amenorrhea, 10.0% have Cramping, 11.8% have low back pain, 11.5% have pelvic pain, 7% have Dyscheazia, 9.2% have fatigue, 8% have dysuria, 6.8% have Infertility as symptom.



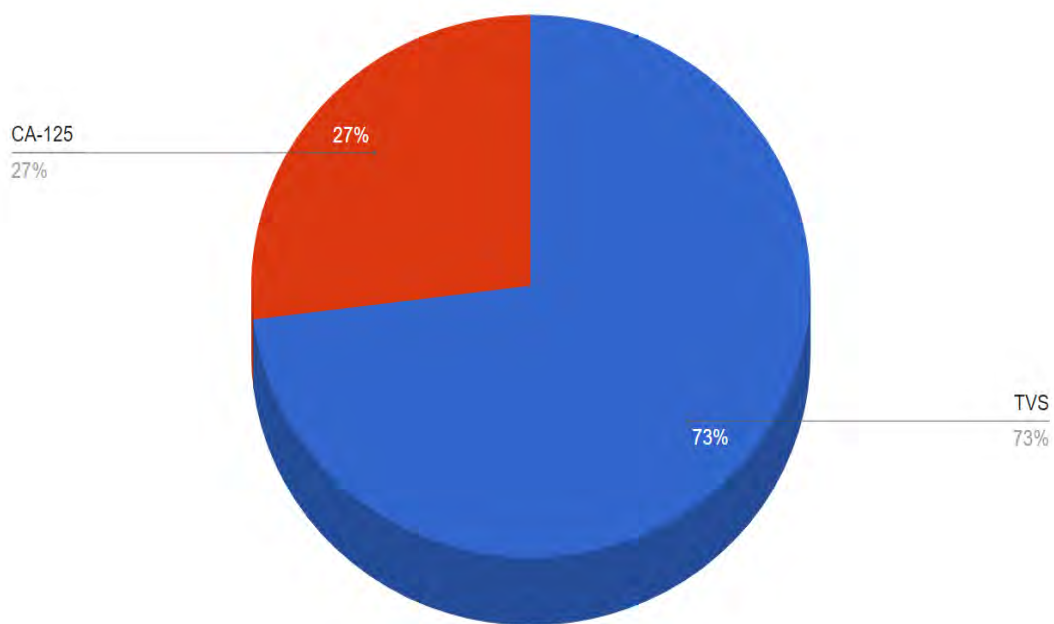
**Figure 23: Distribution of Endometriosis Patient Based on Symptom**

## 6.6 Investigation of Endometriosis

**Table 26: Frequency Table Distribution of Endometriosis Patient Based on Investigation**

|       |        | Investigation |         |               | Cumulative Percent |
|-------|--------|---------------|---------|---------------|--------------------|
|       |        | Frequency     | Percent | Valid Percent |                    |
| Valid | TVS    | 73            | 73.0    | 73.0          | 73.0               |
|       | CA-125 | 27            | 27.0    | 27.0          | 100.0              |
|       | Total  | 100           | 100.0   | 100.0         |                    |

Frequency table distribution of endometriosis patients based on disease investigation shows that, among 100 participants, 73% of women have TVS (Transvaginal Ultrasound) and 27% have CA-125 (Blood Test).



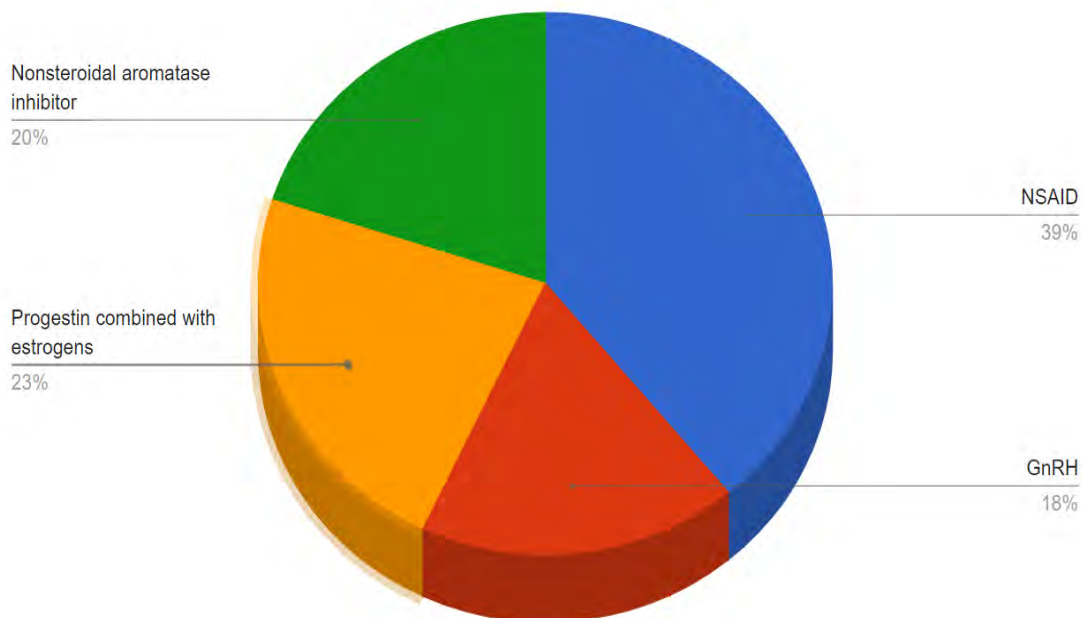
**Figure 24: Distribution of Endometriosis Patient Based on Investigation**

## 6.7 Medication of Endometriosis

**Table 27: Frequency Table Distribution of Endometriosis Patient Based Medication**

|       |                                   | Medication |              | Valid Percent | Cumulative Percent |
|-------|-----------------------------------|------------|--------------|---------------|--------------------|
| Valid |                                   | Frequency  | Percent      |               |                    |
|       | GnRH                              | 18         | 18.0         | 18.0          | 18.0               |
|       | NSAID                             | 39         | 39.0         | 39.0          | 57.0               |
|       | Progestin combined with estrogens | 23         | 23.0         | 23.0          | 80.0               |
|       | Nonsteroidal aromatase inhibitor  | 20         | 20.0         | 20.0          | 100.0              |
|       | <b>Total</b>                      | <b>100</b> | <b>100.0</b> | <b>100.0</b>  |                    |

Frequency table distribution of endometriosis patients based on medication shows that, among 100 participants, 39% of patients medicated with NSAID (Non-steroidal anti-inflammatory drugs), 23% of patients medicated with Progestin combined with estrogens, 20% of patients medicated with a nonsteroidal aromatase inhibitor and 18% patients medicated with GnRH (Gonadotropin hormone-releasing hormone).



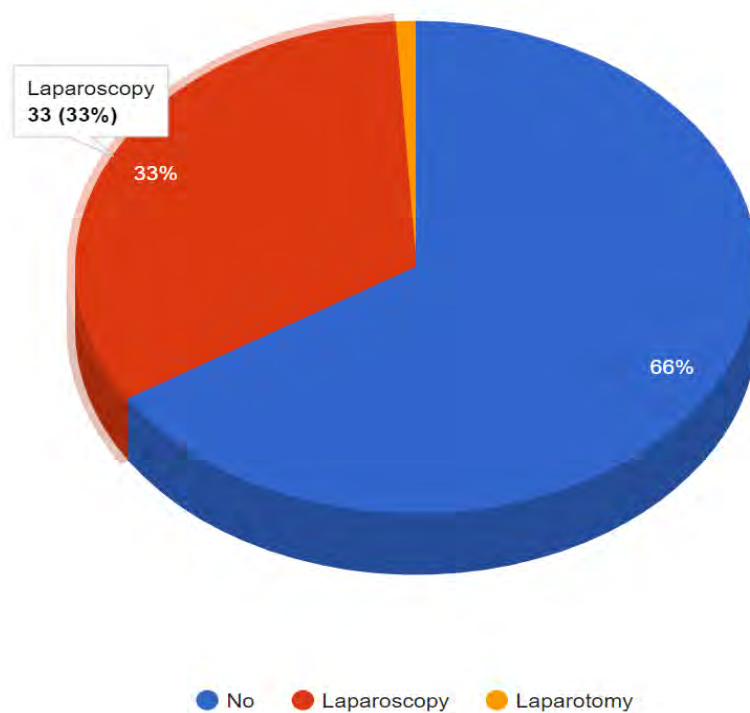
**Figure 25: Distribution of Endometriosis Patient Based on Medication**

## 6.8 Surgical Treatment of Endometriosis

**Table 28: Frequency Table Distribution of Endometriosis Patient Based on Surgical Treatment**

|       |             | Surgical treatment |         |               | Cumulative Percent |
|-------|-------------|--------------------|---------|---------------|--------------------|
|       |             | Frequency          | Percent | Valid Percent |                    |
| Valid | No          | 66                 | 66.0    | 66.0          | 66.0               |
|       | Laparoscopy | 33                 | 33.0    | 33.0          | 99.0               |
|       | Laparotomy  | 1                  | 1.0     | 1.0           | 100.0              |
|       | Total       | 100                | 100.0   | 100.0         |                    |

The frequency table distribution of endometriosis patients depending on surgical treatment reveals that, among 100 participants, 66% of patients do not have any surgical treatment. Whereas 33% of patients have a laparoscopy and 1% of patients have a laparotomy.



**Figure 26: Distribution of Endometriosis Patient Based on Surgical Treatment**

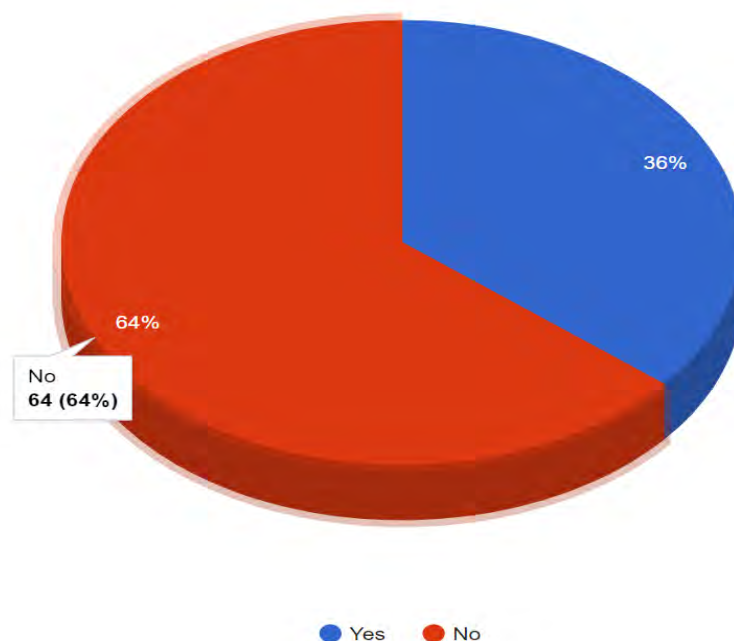
## 6.9 During Treatment Observation of Endometriosis

### 6.9.1 Distribution of Endometriosis Patient Based on Consultation with a Doctor from the Start of the Symptom

**Table 29: Frequency Table Distribution of Endometriosis Patient Based on Consultation with a Doctor from the Start of the Symptom**

|       |       | Consultation with a Doctor from the Start of the Symptom |         |               |                    |
|-------|-------|--|---------|---------------|--------------------|
|       |       | Frequency  | Percent | Valid Percent | Cumulative Percent |
| Valid | Yes   | 36   | 36.0    | 36.0          | 36.0               |
|       | No    | 64   | 64.0    | 64.0          | 100.0              |
|       | Total | 100  | 100.0   | 100.0         |                    |

The frequency table distribution of endometriosis patients depending on consultation with a doctor from the start of the symptom reveals that, among 100 participants 64% of patients do not have consultation with a doctor from the start of the symptom. Whereas 36% of participants have consultation with a doctor from the start of the symptom.



**Figure 27: Distribution of Endometriosis Patient Based on Consultation with a Doctor from the Start of the Symptom**

**Table 30: Crosstab Distribution of Endometriosis Patient Based on Consultation with a Doctor from the Start of the Symptom with Habitation & Education**

**consult with doctor start with symptoms \* Habitation Cross tabulation**

|   |     | Habitation |       | Total |
|---|-----|------------|-------|-------|
|   |     | Urban      | Rural |       |
| consult with doctor start with symptoms | Yes | 22%        | 14%   | 36%   |
|   | No  | 37%        | 27%   | 64%   |
| Total                                   |     | 59%        | 41%   | 100%  |

**consult to doctor start with pain \* Educational Background Cross tabulation**

|   |     | Educational Background |                 |                        |          |               | Total |
|---|-----|------------------------|-----------------|------------------------|----------|---------------|-------|
|   |     | Primary                | Secondary (SSC) | Higher Secondary (HSC) | Graduate | Post Graduate |       |
| consult with doctor start with symptoms | Yes | 1%                     | 5%              | 6%                     | 21%      | 3%            | 36%   |
|   | No  | 2%                     | 10%             | 16%                    | 24%      | 12%           | 64%   |
| Total                                   |     | 3%                     | 15%             | 22%                    | 45%      | 15%           | 100%  |

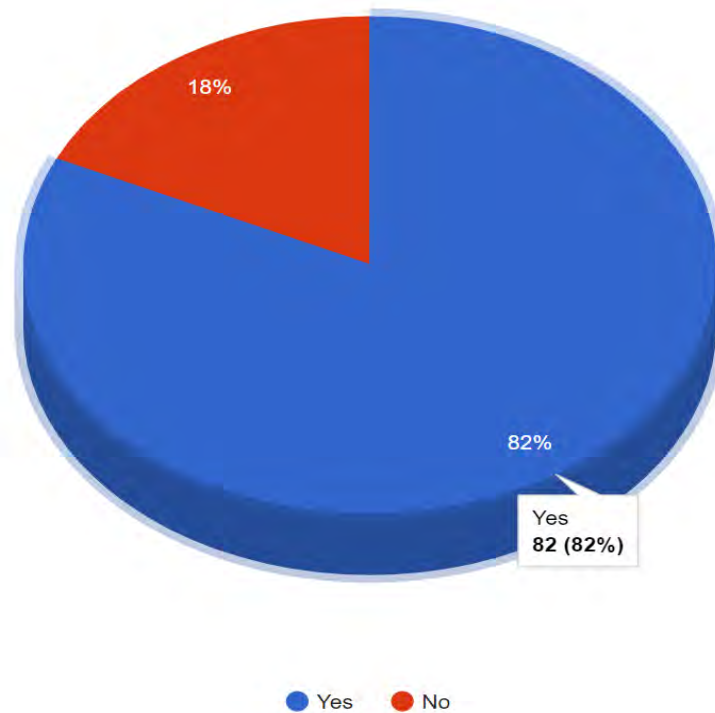
Table 34 shows that 64% of women with endometriosis who do not consult a doctor at the onset of symptoms are 37% urban and 27% in rural areas. At the same time, it can be seen that most of the patients who do not consult a doctor at the onset of symptoms have completed graduation (24%).

### 6.9.2 Distribution of Endometriosis Patient Based on Impact of Pain in daily activity

**Table 31: Frequency Table Distribution of Endometriosis Patient Based on Impact of Pain in daily activity**

|       |     | Impact of Pain in daily activity |         |               | Cumulative Percent |
|-------|-----|----------------------------------|---------|---------------|--------------------|
|       |     | Frequency                        | Percent | Valid Percent |                    |
| Valid | Yes | 82                               | 82.0    | 82.0          | 82.0               |
|       | No  | 18                               | 18.0    | 18.0          | 100.0              |
| Total |     | 100                              | 100.0   | 100.0         |                    |

The frequency table distribution of endometriosis patients depending on the impact of life reveals that among 100 participants 82% of patients have an impact on life and 18% of patients do not have an impact on life.



**Figure 28: Distribution of Endometriosis Patient Based on Consultation Impact of Pain in daily activity.**

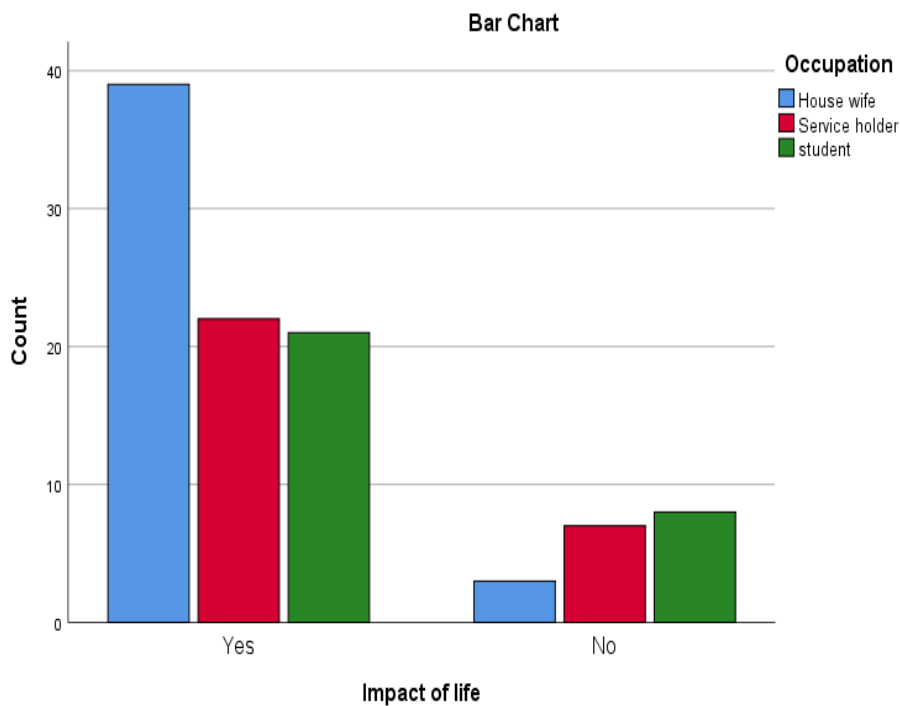


**Table 32: Crosstab Distribution of Endometriosis Patient Based on Impact of Pain in daily activity with occupation**

**Impact of Pain in daily activity \* Occupation Cross tabulation**

|                  |     | Occupation |                |         | Total |
|------------------|-----|------------|----------------|---------|-------|
|                  |     | House wife | Service holder | student |       |
| pain impact life | Yes | 39%        | 22%            | 21%     | 82%   |
|                  | No  | 3%         | 7%             | 8%      | 18%   |
| Total            |     | 42%        | 29%            | 29%     | 100%  |

A cross-table analysis of occupations with impact on life shows that 82% of women have an impact on their lives out of which 39% are housewives, 2% are service holders and 21% are students.



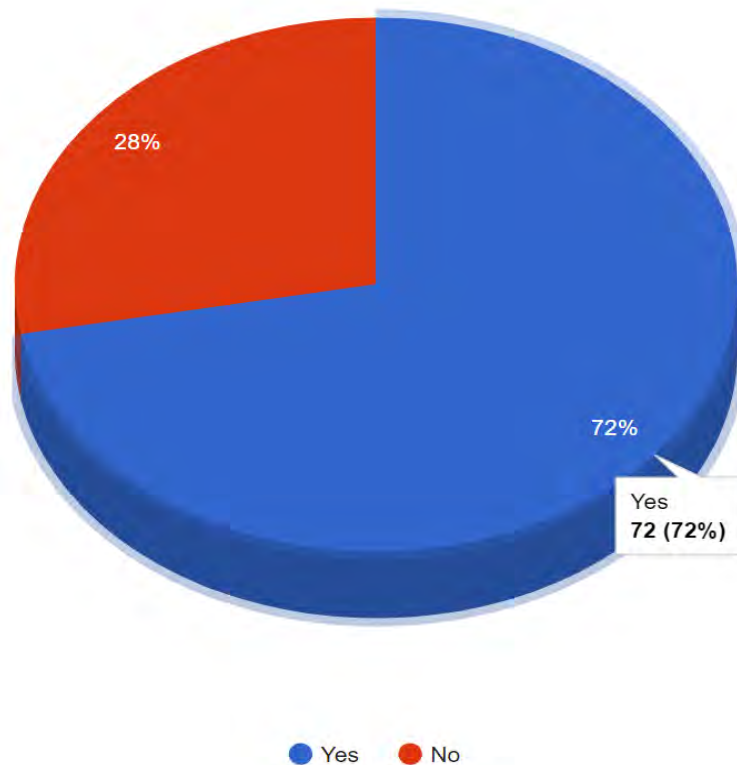
**Figure 29: Crosstab Distribution of Endometriosis Patient Based on Impact of Pain in daily activity with occupation**

### 6.9.3 Distribution of Endometriosis Patient Based on weight gain with symptoms

**Table 33: Frequency Table Distribution of Endometriosis Patient Based on Weight Gain with Symptoms**

|       |       | Weight Gain with Symptoms |         |               | Cumulative Percent |
|-------|-------|---------------------------|---------|---------------|--------------------|
|       |       | Frequency                 | Percent | Valid Percent |                    |
| Valid | Yes   | 72                        | 72.0    | 72.0          | 72.0               |
|       | No    | 28                        | 28.0    | 28.0          | 100.0              |
|       | Total | 100                       | 100.0   | 100.0         |                    |

The frequency table distribution of endometriosis patients depending on weight gain with symptoms start reveals that among 100 participants 72% of women have gained weight and 28% of women do not gain weight.



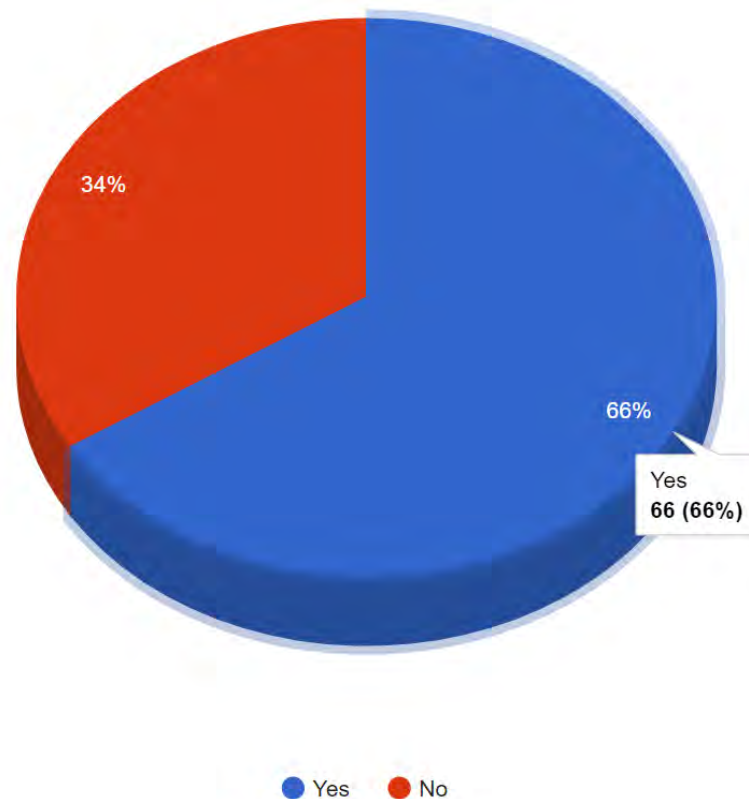
**Figure 30: Distribution of Endometriosis Patient Based on weight gain with symptoms.**

### 6.9.4 Distribution of Endometriosis Patient Based on treatment reduce pain

**Table 34: Frequency Table Distribution of Endometriosis Patient Based on Treatment Reduce Pain**

|       |       | Treatment reduce pain |         |               | Cumulative Percent |
|-------|-------|-----------------------|---------|---------------|--------------------|
|       |       | Frequency             | Percent | Valid Percent |                    |
| Valid | Yes   | 66                    | 66.0    | 66.0          | 66.0               |
|       | No    | 34                    | 34.0    | 34.0          | 100.0              |
|       | Total | 100                   | 100.0   | 100.0         |                    |

The frequency table distribution of endometriosis patients depends on treatment to reduce pain revealing that 66% of women get relief of pain with treatment and 34% of women do not get relief of pain with treatment.



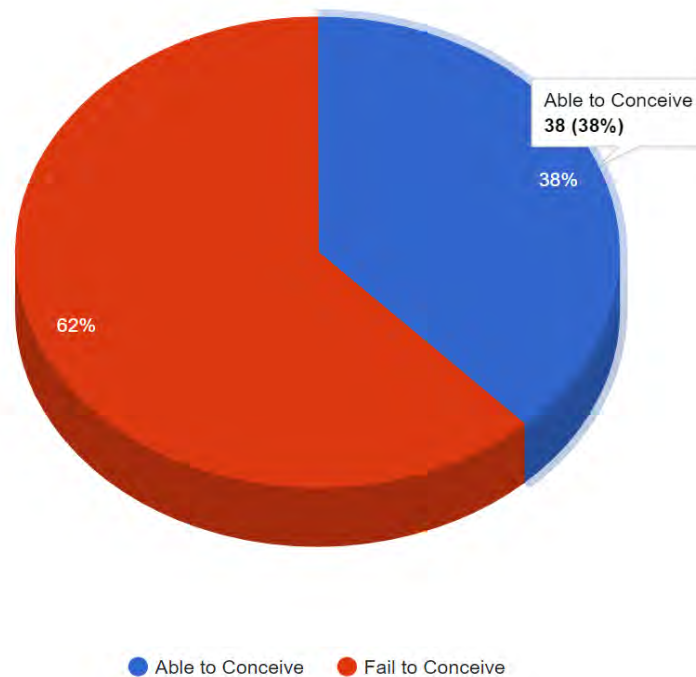
**Figure 31: Distribution of Endometriosis Patient Based on Treatment Reduce Pain**

### 6.9.5 Distribution of Endometriosis Patient Based on conceived by treatment

**Table 35: Frequency Table Distribution of Endometriosis Patient Based on conceived by treatment**

|       |       | Conceived by treatment |         |               | Cumulative Percent |
|-------|-------|------------------------|---------|---------------|--------------------|
|       |       | Frequency              | Percent | Valid Percent |                    |
| Valid | Yes   | 38                     | 38.0    | 38.0          | 38.0               |
|       | No    | 62                     | 62.0    | 62.0          | 100.0              |
|       | Total | 100                    | 100.0   | 100.0         |                    |

The frequency table distribution of endometriosis patients depends on relieve disease revealing that 38% of women get completely relieved from endometriosis and 62% do not get relieved from endometriosis.



**Figure 32: Distribution of Endometriosis Patient Based on conceived by treatment.**

## **Chapter 7: Discussion**

All patients with verified endometriosis took part in this investigation. The total number of participants in this study is 100. From the study, it was found that certain socio-demographic factors could have been an influence on the infertility or diagnosis of Endometriosis. The highest prevalence was seen among the participants who were aged between 15-25 years (56%). Which followed by 30% of patients who are from the 36-35 age group, 12% are from the 36-45 years range, and 2% are within the age range of 46-50 years. Endometriosis is more prevalent among women aged 36 to 45 years (Christ et al., 2021). From the result, it was found that the prevalence of Endometriosis is higher in married women (63%), rather than in unmarried patients (37%). According to the study of (Moradi et al., 2014b) the researchers found that married women were more likely to experience endometriosis. Patients between the ages of 15 and 25 years old had the highest rates of Endometriosis and 63% of all patients were married. Endometriosis is more prevalent among younger, more sexually active women than among older, less sexually active women. In this survey, women with endometriosis were employed at a rate of 29% and housewife 42%. According to A. T. Soliman et al. (2017), 59% of women work full-time and according to Aryani, 2023, housewife is the most dominant occupation (44.4%).

According to the study, 59% of the patients were from Urban settings whereas 30% were from Rural areas which helps conclude that most of the women who are being diagnosed with Endometriosis are from Urban habitation. Also, women in rural areas don't usually visit hospitals which could be one of the reasons for fewer women being diagnosed from Rural areas and it could be that many are suffering from Endometriosis but have no idea about it. Also, from the social status, most were from the lower middle class (53%) whereas the least were from the upper class (13%). Treatment for Endometriosis can be costly and most of the time it's left untreated due to financial problems which could have been avoided otherwise. According to the study of (Shah et al., 2010) a majority of participants in endometriosis

reported a level of education beyond a high school degree, whereas in this study it is found that 45% of patients are graduates.

From this study risk factors that caused the disease in patients to be found are, No Early age at menarche, 55% Normal menstruation cycle, 44% Irregular menstruation type, 38% Longer menstruation flow, 45% Infertility, 41% Over weight BMI, 27% Imbalance thyroid hormone. All risk factors are statistically significant ( $P < 0.05$ ). Patient weight plays an important role in the development of endometriosis. A previous study by (Hediger et al., 2005) reported that women with more advanced stages of endometriosis tend to have a lower BMI, whereas this study found that the prevalence of endometriosis is higher with overweight (41%). Another study found an inverse association, which suggested that women with higher BMI have possibly reduced risk of endometriosis (Liu & Zhang, 2017), So further work will need to focus on BMI associated with endometriosis. In this study, 72% of women gain weight with the disease. A study observed a significant reduction in the incidence of endometriosis with increasing body size for all periods (Vitonis et al., 2010), Which is in stark contrast to this study. Vercellini et al. (1997) found that women with endometriosis have lengthier menstrual Flow. This study found that most of them have longer menstruation flow which is more than seven days (38%). Women who had irregular menstrual periods had a lower risk of developing the condition, according to a study by Candiani et al., 1991. This study reported an inverse result, so irregular menstruation (44%) may be a risk factor for endometriosis. Thyroid-stimulating hormone (TSH) operates as a proliferative and prooxidative hormone on all endometria of endometriosis patients and controls, while T3 and T4 act to selectively promote ectopic endometrial cell proliferation and reactive oxygen species (ROS) production (Peyneau et al., 2019). A study by Petta et al., 2007, showed that the overall frequency of thyroid dysfunction was 12.2%. In this study, 27% of thyroid imbalance women with endometriosis were found. A study by Nnoaham et al. (2012) found that endometriosis risk

increased with early menarche, this study did not find any early menarche patients. A previous study by Matalliotakis et al. (2007b) found shorter menstrual cycle increased the risk of endometriosis which is in contrast to this study. This study found that 55 % of patients with endometriosis had normal menstruation cycles. Tomassetti and D'Hooghe (2018) previous study shows that endometriosis has a strong association with infertility. This study shows that 45% of patients with endometriosis suffer from infertility.

In addition, cross-table analysis was done between age and the risk factors to check the relation between age and the risk factors. We found that most patients have irregular menstruation type, normal menstruation flow, and overweight BMI aged between 15-25.

The most frequent symptoms found in this study were Dysmenorrhea (12.9%), Low back pain (11.8%), Pelvic pain (11.5%), Excessive Bleeding (10.1%), Cramping (10%), Fatigue (9.2%), and Infertility (6.8%).

Transvaginal ultrasonography is very useful for detecting endometriosis cysts. Recently, TVS was proven to be effective in detecting deep infiltrating lesions, notably in the rectovaginal septum. A recent worldwide pilot study discovered that when ultrasonography is conducted by the IDEA consensus, there is a higher detection of deep endometriosis, with an overall sensitivity of 88% and specificity of 79% compared to direct surgical visualization (Chen-Dixon et al., 2022). This study found that 73% of endometriosis patients had Transvaginal ultrasonography (TVS). Endometriosis medications can be classified into two types: low-cost pharmaceuticals like oral contraceptives (OCs) and most progestogens, and high-cost drugs like dienogest and GnRH agonists (Vercellini et al., 2018). Hormone-based therapies for endometriosis are 80%-100% successful in relieving pelvic discomfort throughout a 6-month course of treatment (Winkel & Scialli, 2001). From this study, the most used medications that are found for the disease are, NSAID (Non-steroidal anti-inflammatory drugs) 39%,



Progestin combined with estrogens (23%), nonsteroidal aromatase inhibitor (20%) and Gonadotropin hormone-releasing hormone (18%). All of this medicine proven effective in relieving pain and reducing the extent of endometriotic implants (Fedele & Berlanda, 2004). There are no studies that directly compare the efficacy or side effects of medicinal and surgical treatments. By a study, Nezhat et al., 1986, found that endometriosis surgical treatment increases the conception rate and by Mettler et al., 2014, a 50% cure rate was achieved by exclusive surgical treatment. In this study, 33% of patients have laparoscopy surgery and 1% have laparotomy. 66% of patients do not participate in any surgical treatment due to a lack of knowledge and as well as financial incapacity. A previous study by Busacca et al., 1998b showed that in the conservative surgical treatment of recurring endometriosis, operative laparoscopy was just as effective as laparotomy. The laparoscopic method provided effective fertility recovery and pain alleviation.

Most endometriosis diagnoses are delayed because women do not seek medical attention at the first sign of symptoms. During treatment, this study found that 64% of patients did not consult with a doctor at the onset of their symptoms. According to Surrey et al. (2020), 35.3% of patients experience a significant delay in diagnosis. Oehmke et al. (2009) studied the effect of endometriosis on quality of life in 65% of women. This study showed that 82% of 100 women have an impact of endometriosis in their life and most of them were housewife & least of them were students One of the major impacts is gaining weight. In this study, 72% of women gain weight with the disease. A study observed a significant reduction in the incidence of endometriosis with increasing body size for all periods (Vitonis et al., 2010), Which is in stark contrast to this study. We also discovered that the treatment reduced the incidence of endometriosis discomfort in 66% of patients, and 38% of women were able to conceive after overcoming endometriosis blockage

## **Chapter 8: Limitations**

For this endometriosis study, data were collected from three hospitals: Dhaka BIRDEM Women and Children Hospital, Dhaka Central Hospital, and Kishoreganj General Hospital. Endometriosis patients at these three hospitals may not be representative of endometriosis patients across the country or around the world. The research data are insufficient to depict a global scenario. Patients with endometriosis were less likely to express or disclose their lifestyles, making it difficult to undertake appropriate lifestyle analyses. Furthermore, convenience sampling was adopted, which reduced the variety of patients and raised the possibility of sample bias. The study had a small amount of data, which may have resulted in low statistical power, increased error rates, and less precise data. The study lasted one year, which may not be sufficient for this investigation. Furthermore, there were challenges in data collecting for this study because several hospital officials were reticent to give or share their personal information.

The questionnaire form was prepared in such a way that it incorporated the questions/information these hospitals in Bangladesh could provide. There could have been more info asked there which we could not obtain in the Q survey.

We took only the dry lab dataset. Did not use real samples for this research. Which could have given more insight into the issues and risk factors associated with the endometriosis situation in Dhaka/Bangladesh

## **Chapter 9: Conclusion**

Bangladeshi women face numerous problems and difficulties in many parts of their lives, including access to healthcare, employment opportunities, political participation, and financial management. Ensuring reproductive health is critical for women around the world, but it is especially difficult in low- and middle-income nations like Bangladesh. Sexual and Reproductive Health and Rights (SRHR) for women remains a delicate and socially unacceptable topic in our society. The study was conducted over the course of almost a year with the purpose of evaluating the incidence and various risk factors of Endometriosis among 100 Bangladeshi women. Attempts were made to broaden the patient population by conducting the study at two healthcare institutions in different geographic areas. The findings of this study are insufficient to demonstrate the prevalence of endometriosis among women because the majority of women in this nation do not seek medical attention for reproductive health concerns. They seek medical assistance only when the symptoms last for a long time or pose major complications. Irregular menstrual cycles are one of the causes of endometriosis, however, most women in Bangladesh are unconcerned about irregular menstrual cycles or menstrual pain, believing that it is a normal occurrence. Most women in Bangladesh have menstruation discomfort, but due to a lack of awareness, they do not treat it or consider it an illness. Because women are unaware of the therapy for endometriosis, the condition transmits to the next generation, increasing infertility rates. Endometriosis causes so severe pain that it interferes with people's ability to work and live a normal life. More extensive research is needed on the impact of endometriosis on women's quality of life in various studies, we find that the risk of endometriosis decreases when women increase in weight, but in our country, more studies are needed to find that it increases with weight gain. Every woman has the human right to be fully informed about her health. If we can enhance awareness of women's health in our country, we will be able to lower the prevalence of such disorders. Public and private health agencies can take measures to raise public awareness. In

addition, different management can be adopted by the government. Only by raising women's awareness of their health would it be possible to lessen the impact of endometriosis while also significantly lowering infertility rates in Bangladesh.

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